

Otago Dairy Farm

Focus on consistent improvement for long-term success



Otago

Farm Systems Change – 2016 Dairy Farm Case Study

Ministry for Primary Industries
Manatū Ahu Matua





Otago Dairy Farm
At a glance

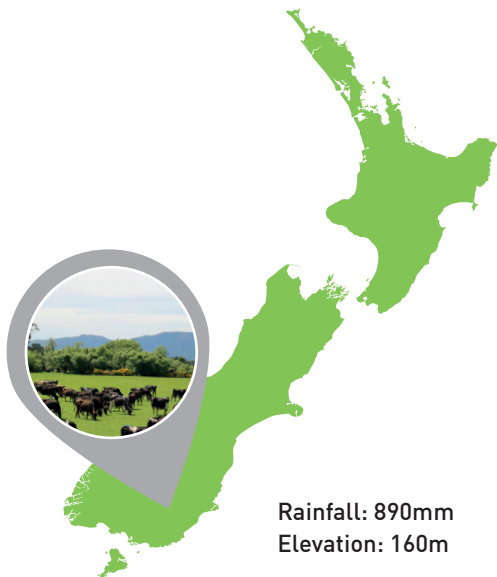
Otago Dairy Farm

Beginning this stage of their dairy farming journey in 2003, this husband and wife team entered into an equity partnership in 2005. They are 50/50 sharemilkers for the equity partnership. Together they have a solid foundation of experience and knowledge in dairy farming and animal husbandry on which they continue to build their farming business.

They recognise the importance of developing their team as a key driver to improving farm performance. A key requirement is that each team member understands the whys and wherefores of what he or she is doing and how that contributes to the overall performance of the farm.

Season Ended	Total kgMS	FWE/kgMS
2012	261,935	\$4.57
2013	263,469	\$4.26
2014	286,901	\$4.34
2015	272,957	\$4.94
2016	264,951	No data

At a glance – 2014/15 Season



Farm Details

Milking Platform	184.0 ha
Dairy support	142.5 ha
Total	326.5 ha
Effective Milking Platform	173.0 ha
Est. kgDM grown (per effective ha/year)	14,800
Cows (per effective ha)	3.2

Livestock Details



Breed Type	Friesian
Peak cows milked	551
Production per cow (kgMS)	495
Live weight per cow (estimated actual kg)	550

Other Details

People working on farm	4
Peak Production (kgMS/Cow/Day for top month)	2.3
Start of Calving	6 Aug
Calved in 6 weeks	81%
Average Pasture Cover (kgDM/ha at start of calving)	2,057
Production (kgMS/effective ha)	1,578

Farming focus

These farmers focus on farming as efficiently as they can to bring improvements across the whole of their business. They are working towards a long-term goal of sustainability in all areas including environmental, financial, human and capital. The business is constantly scrutinised to identify weaknesses and then those areas are focused on to remove or minimise the limiting factors to performance.



CONSTANTLY IMPROVING FARM PERFORMANCE

These farmers have concentrated on effectively improving the farm performance while keeping focused on ensuring the farm remains profitable. To achieve these objectives they have sought advice on how to improve cow performance and attended training courses to increase their own knowledge.

[Read more on Page 5](#)



INVESTING FOR THE LONG-TERM

These farmers invest for the long-term in farm infrastructure which supports the simplicity of their farming business and seek to achieve their goals for both their livestock and their farm team.

[Read more on Page 11](#)



Otago Dairy Farm
A closer look

Constantly improving farm performance

Access to finance is the lifeline of this farming business. Therefore, keeping the bank manager happy is a number one priority. To deliver the correct financial results requires getting the farm performance right, which is achieved by viewing the farm as a “whole picture” not separate pieces.

A contributor to their success has been surrounding themselves with the right team of people including bank managers, equity partners, accountants, lawyers and farm advisors.

The husband has benefitted from learning his dairy farm skills from a range of employers during his early years in the industry. These farmers have a strong employment philosophy founded on the development of the members of their team and helping them progress in the dairy industry. They recognise the importance of developing their team as a key driver to improving farm performance. A key requirement is that each team member understands the whys and wherefores of what he or she is doing and how that contributes to the overall performance of the farm.

Based on the understanding that cows are the foundation to which all other aspects of the farm connect, they seek quality advice and co-ordinate the knowledge to effectively learn more themselves. They have worked closely with their farm advisors since 2008 and credit the advice

and training received with many of the improvements in efficiency and production that have been achieved on the farm.

Together with approximately 60 other farmers, they are part of the Southern Otago Buyers Group. These farmers benefit from the supplier arrangements negotiated by the Group to purchase goods and services.

These farms produce 89 percent of the feed, which comes from either the milking platform or the crops and silage on the dairy support land. This gives greater control of their feed costs and also the quality of feed.

Palm kernel expeller (PKE) is the main purchased feed for the following reasons:

- Availability of supply all year-round.
- Consistent quality.
- Simple to use.
- Minimal investment in infrastructure.
- Get it, produce milk and pay for it.
- Overall economically effective.

With around 37 percent of feed or 2.4tDM/cow available from off the milking platform, the opportunity to reduce wastage associated with feeding out was analysed. This resulted in the decision in 2012 to build a covered feed pad. In the past four years, the design and construction of

the covered feed pad has been undertaken and it is now nearing completion. The benefits primarily are reducing feed wastage (compared to feeding out on pasture), and efficiencies from a plant and labour perspective (less time and distance). Also, it is anticipated the feed pad will assist to reduce pasture damage by enabling the cows to be taken off the pasture during wet periods.

The covered feed pad provides management options in the future for dried-off cows pre-calving. This includes the opportunity to improve cow condition by reducing the energy demand from the cows as the feed is presented to them on the feed pad rather than requiring them to forage for it.

In conjunction with the development of the feed pad, the effluent ponds were also extended. The increased capacity of the effluent ponds delivers the opportunity to capture and manage effluent more effectively. This includes the ability to transport effluent to the dairy support land to fertilise crops and silage paddocks.

The ability to better feed the cows during the winter is expected to contribute to improved overall cow health and deliver improved farm performance.

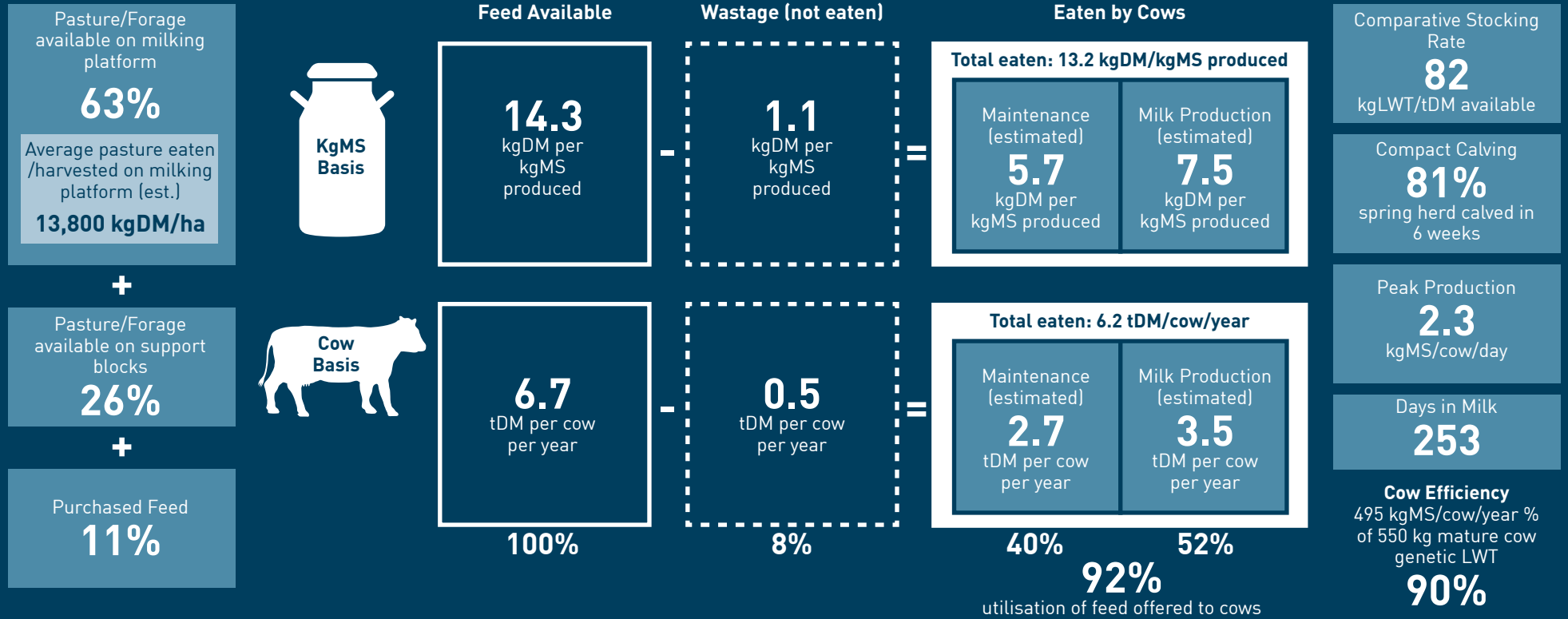


Feed to milk efficiency 2014/15 season

FEED SUPPLY

FEED UTILISATION

COW EFFICIENCY



What does this show?

Feed Supply

It is estimated that 13,800kgDM/ha is eaten or harvested on the milking platform from an estimated 14,800kgDM/ha grown. Of the total feed supply for the herd, 63 percent is available from pasture and forage from the milking platform, 26 percent is grown on dairy support land with the balance of 11 percent being purchased feed.

Feed Utilisation

Of the total feed available of 14.3kgDM available/kgMS the cow feed conversion was 13.2kgDM eaten for each kgMS produced. The wastage being the difference at 1.1kgDM/kgMS produced. On a per cow basis for the 2014/15 year,

6.7tDM/cow of feed was supplied with 6.2tDM/cow eaten and 0.5tDM/cow or 8 percent of wastage.

Cow Efficiency

Overall utilisation of 92 percent is split into an estimated 52 percent efficiency in terms of converting the megajoules of metabolisable energy (MJME) in all feed available into the MJME sold in milk solids, and an estimated 40 percent used for maintenance of the cow.

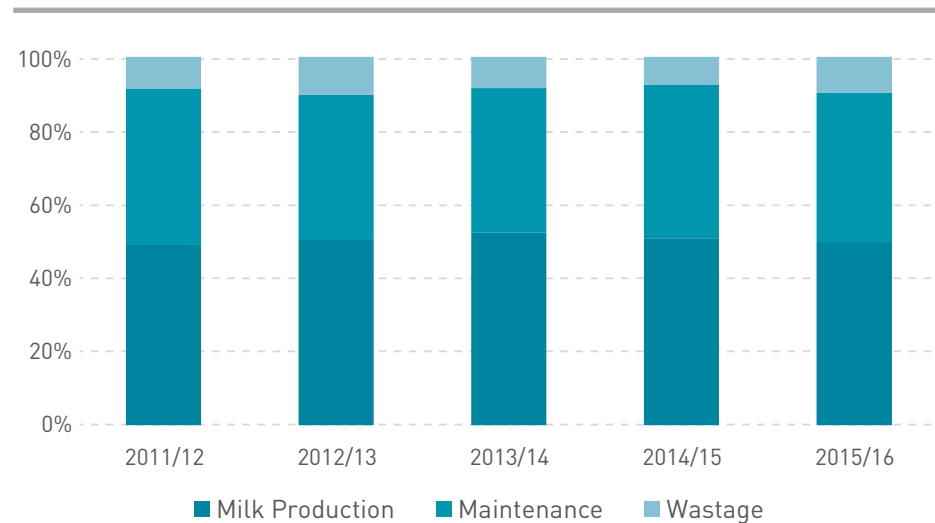
The comparative stocking rate for this herd is relatively high at 82kg mature cow genetic live weight per tDM available. This level provides for a high level of utilisation.

The compact calving with 81 percent of the herd calved in six weeks and cows peaking at 2.3kgMS/cow results in a highly efficient cow producing 495kgMS or 90 percent of mature cow genetic live weight. This result has been achieved within a relatively short lactation period of 253 days in milk.

The feed to milk performance over time on the following page demonstrates the relative consistency of performance over the five seasons.

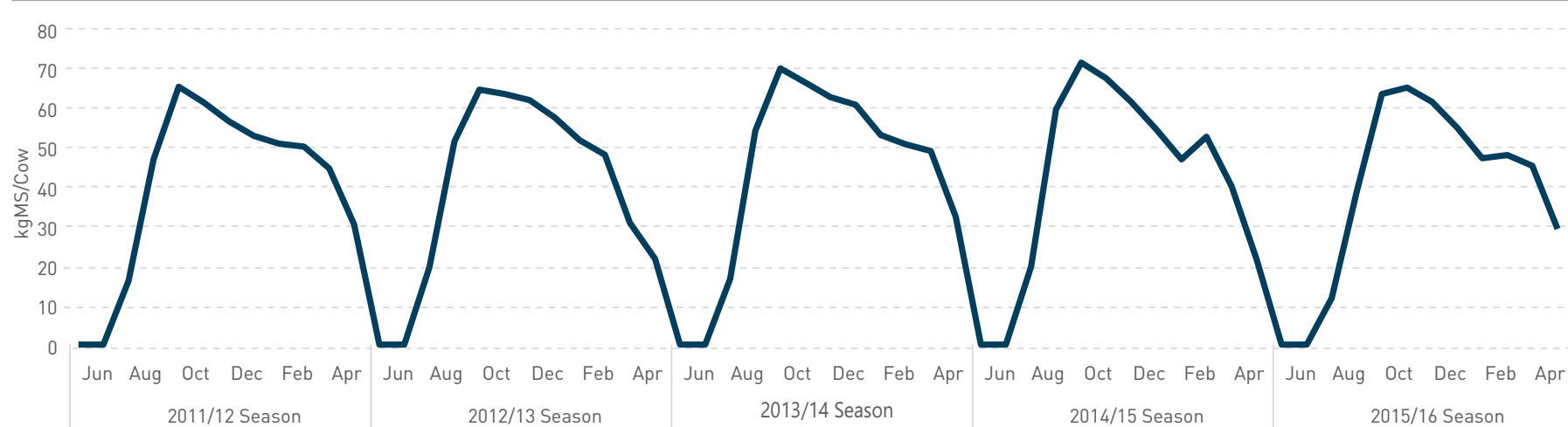
Feed to milk efficiency performance over time

Feed to Milk Efficiency

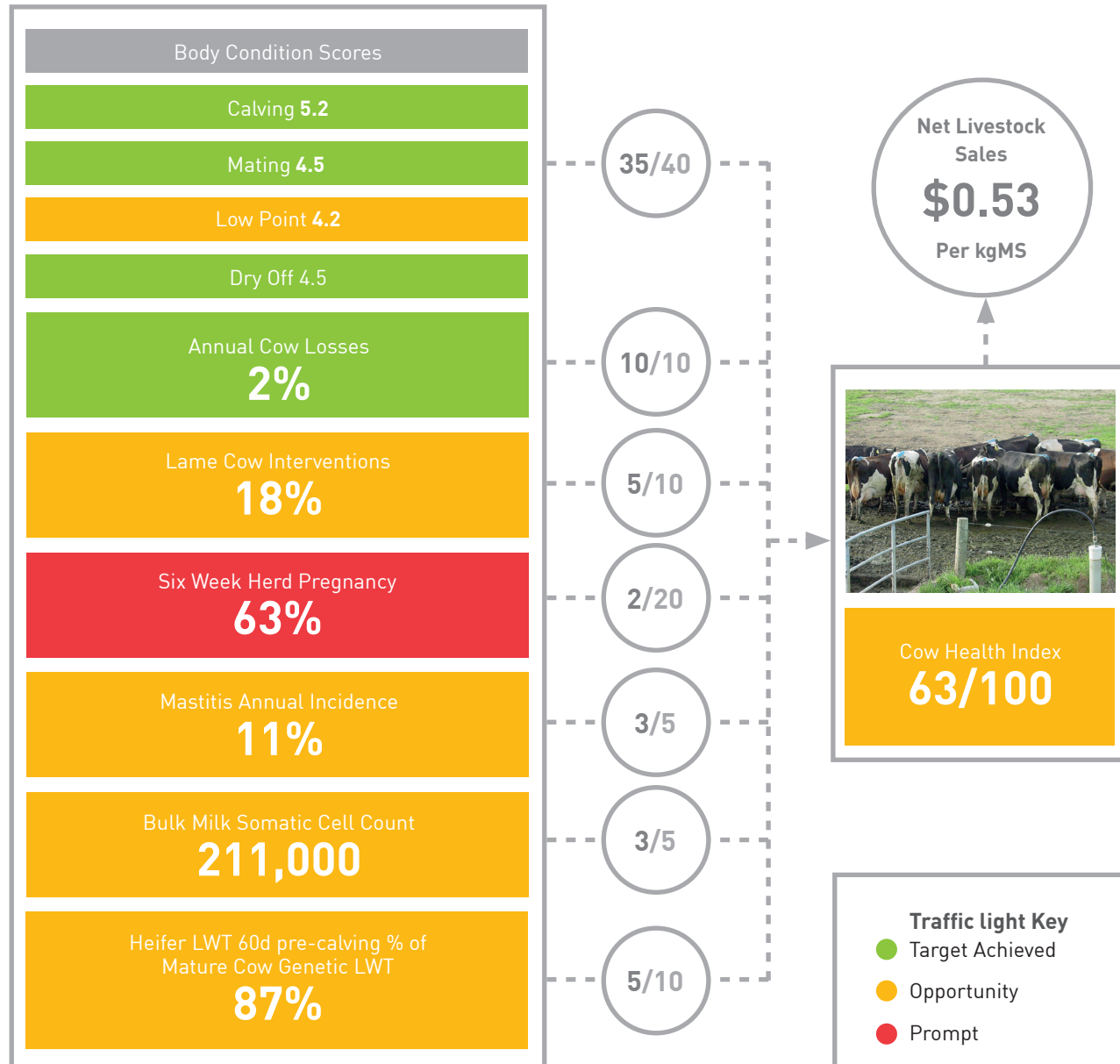


	Season Ended				
	2012	2013	2014	2015	2016
Comparative Stocking Rate kgLWT/tDM available	84	82	79	82	84
Farm Feed Conversion kgDM/kgMS produced	14.8	14.5	13.9	14.3	14.6
Cow Feed Conversion kgDM/kgMS produced	13.5	13.0	12.7	13.2	13.2
Feed Wasted kgDM/kgMS produced	1.3	1.5	1.2	1.1	1.4
Feed Grown % of feed available	91%	93%	93%	89%	88%
Feed Purchased % of feed available	9%	7%	7%	11%	12%

Per Cow Milk Solids Production



Animal health 2014/15 season



What does this show?

The Cow Health Index is a weighted score out of 100 comprising body condition score, cow losses, lame cow interventions, herd pregnancy rate, mastitis, somatic cell count and heifer live weight.

The measures are coded using the traffic light system. Green indicates areas where targets have already been achieved, orange where there is opportunity to improve, and red where performance has been less than desired.

Herd Survivability Metrics

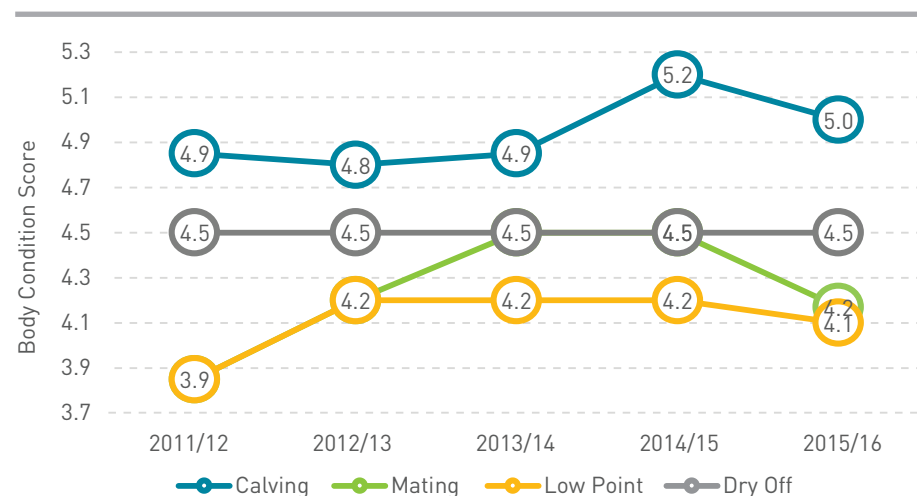
3 year-olds Retention Rate	87%
Replacement Rate at calving	21%
Heifer Mating LWT % Mature Cow LWT	60%
Herd Empty Rate	16%

The retention of heifers as three-year-olds is 87 percent. This is reflective of the heifers being well grown, reaching 330kg live weight at mating and 480kg live weight 60 days prior to calving. In total, 21 percent of replacements go into the herd each year.

The six week herd pregnancy rate at 63 percent reflects a cold wet spring which was hard on the cows and therefore impacted upon mating. As the heifer calving is very compact with around 8 days from calving to mid-point the result is that 81 percent of the herd is still calved within six weeks.

Animal health performance over time

Animal Health



	Season Ended				
	2012	2013	2014	2015	2016
Cow Health Index (Max 100)	43	58	63	63	71
Annual Cow Losses	1%	1%	3%	2%	1%
Lame Cow Interventions	16%	10%	17%	18%	7%
Six Week Herd Pregnancy	60%	64%	70%	63%	68%
Mastitis	19%	15%	8%	11%	12%
BMSCC (000s)	236	180	182	211	232
Heifer LWT 60d pre-calving % of Mature Cow Genetic LWT	82%	85%	86%	87%	87%

What does this show?

The body condition score (BCS) at dry off is consistent across all seasons and has lifted at calving in the past two seasons. The 2015/2016 season started with a very cold winter which made it hard to hold BCS between calving and mating.

These farmers have a strong focus on animal health so they have the cows scanned and then they group the cows based on scan results so they can be run in separate mobs enabling feed to be targeted to the cows needs.

The cow losses are very low which reflects this focus on animal health especially during the spring.

The mastitis and the bulk milk somatic cell count are

relatively high. The primary contributor to these are the wet conditions particularly in the spring. Although they use dry cow and teat seal on both cows and heifers the risk of mastitis remains. However, with a focus on animal health the cows are treated promptly.

The six week herd pregnancy rate has ranged between 60 percent to 70 percent over the last five years.

The empty rate has progressively risen from 7.3 percent in 2011/2012 to 20 percent in 2015/2016. The rise in the empty rate corresponds with the decrease in the mating period from 15-weeks to 8-weeks to achieve a more compact calving. It is expected that the empty rate will

reduce as the cows adjust to a shorter mating period.

Environmental performance

This dairy farm is located in West Otago in the Pomahaka Catchment within the Otago Regional Council (ORC) boundaries. The flat contoured farm is required under ORC Plan 6A to meet thresholds for nutrient budget and water quality and management practices to satisfy permitted activity status.

The 142.5 hectare of dairy support land located six km away is used for young stock and winter grazing. In addition to feed grown on the milking platform and dairy support land, purchased feed includes PKE, molasses and baleage.

A large lined effluent pond was constructed in 2007 to expand effluent storage capacity during wet periods. This allows effluent to be spread when soil conditions are at their optimum, maximising the uptake of nutrients across the land. Prior to this upgrade, limited effluent storage was possible. The effluent area has been extended over time from the original 36 hectares, now the whole farm can be accessed with the use of a slurry tanker which delivers a spread of nutrients across the farm and exceeds the ORC requirements.

Managing wet conditions on the property can be challenging, so considerable thought and investment has been applied to ways of caring for both the land and the livestock. During

the spring, to mitigate pugging of pasture a loafing pad is used by springing cows. In 2006, a self feed silage pad was installed at one of the dairy support blocks and it is used from May to September for dry cows.

Over the past four years, an investment of approximately \$1,000,000 has been progressively made in a covered feed pad and a green wash system. The covered feed pad has capacity for 600 cows. This significant investment is intended to deliver greater sustainability for the farming operation. The covered feed pad assists to mitigate pasture damage especially during the wet weather and to improve feed utilisation by reducing feed wastage. The green wash system is designed to reduce both water wastage and effluent volumes. A cost-benefit assessment is in progress to assess the installation of rubber matting on the feed pad area to increase cow comfort and enable an extended feeding time.



Investing for the long-term

With the motto of “keep capital input as low as we can to achieve our goals”, these farmers stay focused on a sustainable farming business.

They want to feed their cows well and in delivering on that minimise the feed wastage. While the aim is to be increasingly more efficient they seek to balance increasing milk production against the costs of production.

Over the past four years the design and development of the covered feed pad has been focused on meeting their specific needs to best deliver cow comfort and operational simplicity. The covered feed pad has been built with capacity for 600 cows (slightly more than their existing herd). This feed pad addresses two aspects of feed wastage, the first being the delivery of the feed in a way that reduces

wastage between feeding and consumption and second being the ability to take the cows off paddock for feeding at times when it is wet and thereby protecting future feed by mitigating the risk to the pasture from pugging and compaction.

The design of the covered feed pad includes a water reticulation system which captures rain water from the roof for transfer to storage tanks to use in the flood wash system. The effective use of rain water reduces the reliance on pump water. The feed troughs in the covered feed pad are designed for ease of feeding for the cows. The feed remains within reach of the cows and eliminates the need to either manually or robotically push feed back into the feed area as is usually the case with other covered feed pads.

The covered feed pad adjoins the milking shed so the cows flow easily through from feeding to milking at their own pace.

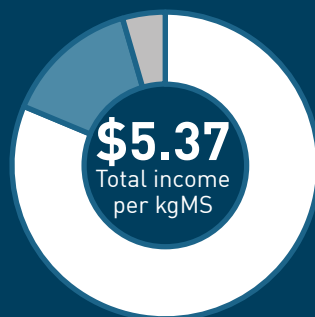
In addition, the investment in the covered feed pad assists in creating a better work environment for the on-farm team by improving efficiency. By using the covered feed pad there is less time involved in travelling around the farm to feed out which saves both on-farm team time and wear and tear on farm equipment.

The ultimate goal for these farmers is to increase their investment in the equity partnership to 100 percent. To achieve this goal their farming business must continue to deliver profits and cashflow which requires continual improvement in productivity.



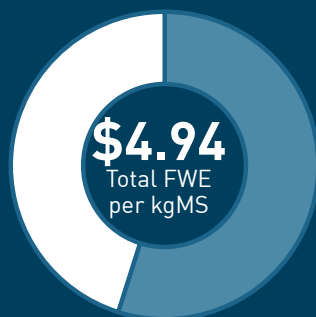
Financial performance 2014/15 season

Income per kgMS



- Milk Income per kgMS
- Livestock Trading per kgMS
- Other Income per kgMS

FWE per kgMS



- Feed Expenses per kgMS
- Other FWE per kgMS

Profit and Loss

	\$000s	Per Cow	Per KgMS
Milk Income	1,185	\$2,151	\$4.34
Livestock Trading & Other Income	280	\$508	\$1.03
Total Income	1,465	\$2,659	\$5.37
Feed Costs	460	\$836	\$1.69
Other FWE	888	\$1,612	\$3.25
Total FWE	1,348	\$2,448	\$4.94
EBITDA	117	\$211	\$0.43

Breakeven Milk Price (per kgMS)

Feed Costs

\$1.69

+

Other FWE

\$3.25

=

Total FWE

\$4.94

-

Livestock Trading and Other Income

\$1.03

=

Breakeven Milk Price
Before debt servicing and depreciation

\$3.91

What does this show

Livestock Trading and Other Income contributes 19 percent of Total income for the 2014/2015 season. Historically livestock has been sold strategically through the season to achieve a premium price, although changes in the mating plan have altered the livestock sales pattern.

The Other Farm Working Expenses have increased from \$3.19kgMS in 2011/2012 to \$3.25kgMS in 2014/2015 and the Feed expenses have increased from \$1.93kgMS to \$2.05kgMS. Overall total Farm Working Expenses have fluctuated through the range from \$5.12kgMS in 2011/2012 to \$5.30kgMS in 2014/2015. The total Farm Working Expenses increased by \$106,097 from 2012/2013 to 2013/2014 however production increased by 23,432kgMS and as a result the per kgMS cost is almost identical. This highlights the effect of measuring expenses on kgMS basis.

The breakeven milk price before debt servicing and depreciation is \$3.91kgMS for the 2014/2015 season. There is relative consistency across the four seasons starting with \$3.59kgMS in 2011/2012, dropping to \$3.39kgMS in 2012/2013 and then up again to \$3.82kgMS in 2013/2014.

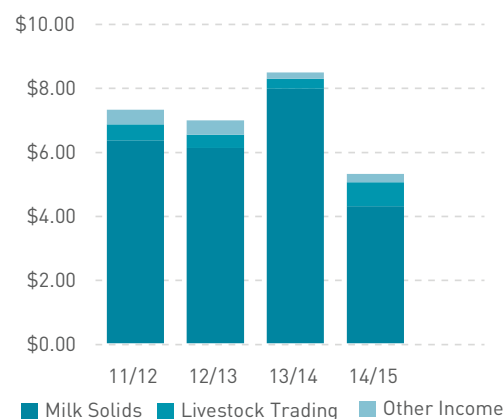
This consistency of performance ensures that these farmers deliver to their banker's expectations. By delivering consistency they achieve credibility and are therefore able to access opportunities for finance to invest in their farming business.

Financial performance over time

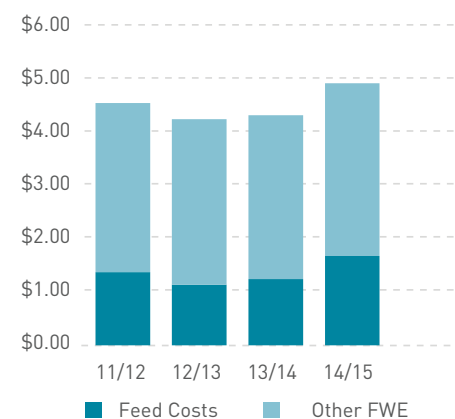
Financial Efficiency	Season Ended			
	2012	2013	2014	2015
Feed cost per kgMS	\$1.38	\$1.15	\$1.25	\$1.69
Other FWE per kgMS	\$3.19	\$3.12	\$3.09	\$3.25
Breakeven Milk Price	\$3.59	\$3.39	\$3.82	\$3.91
Return On Assets %	5%	5%	9%	0%
Capital employed per kgMS	\$51	\$51	\$45	\$46
Milk Price	\$6.43	\$6.20	\$8.08	\$4.34

Profit and Loss to EBITDA (per kgMS)	Season Ended			
	2012	2013	2014	2015
Milk income	\$6.43	\$6.20	\$8.08	\$4.34
Dividends	\$0.38	\$0.40	\$0.15	\$0.17
Livestock trading	\$0.51	\$0.42	\$0.32	\$0.76
Other operating income	\$0.09	\$0.05	\$0.05	\$0.10
Total income	\$7.41	\$7.07	\$8.60	\$5.37
Feed costs	\$1.38	\$1.15	\$1.25	\$1.69
Other FWE	\$3.19	\$3.12	\$3.09	\$3.25
Total FWE	\$4.57	\$4.27	\$4.34	\$4.94
EBITDA	\$2.84	\$2.80	\$4.26	\$0.43

Income per kgMS



Expenses per kgMS





Definitions

Definitions

General

kgDM	Kilograms of Dry Matter at 11MJ ME
kgMS	Kilograms of Milk Solids
MJ ME	Mega Joules of Metabolic Energy

Animal Health

Actual LWT (Live weight)	Actual live weight of mature cows (5 – 7 years) with Body Condition Score of 4.5 at 100 days in milk
Annual Cow Losses	All cows which died (died, euthanised, pet food) during the season divided by cows calved
BW (Breeding Worth)	The index used to rank cows and bulls based on how efficiently they convert feed into profit. This index measures the expected ability of the cow or bull to breed replacements that are efficient converters of feed into profit. BW ranks male and female animals for their genetic ability for breeding replacements. For example a BW68 cow is expected to breed daughters that are \$34 more profitable than daughters of a BW0 cow.
BMSCC (Bulk Milk Somatic Cell Count)	Arithmetic average of Bulk Milk Somatic Cell Count for the season
BCS (Body Condition Score)	An assessment of a cow's body condition score (BCS) on a scale of 1-10 to give a visual estimate of her body fat/protein reserves
Cow Health Index	Weighted score out of 100 comprising BCS (40), Heifer LWT (10), Reproductive outcomes (20), Lameness (10) , Cow losses (10), Mastitis (5) and Bulk Milk Somatic Cell Count (5)
Genetic Mature Cow LWT (Live weight)	Live weight Breeding Value from Livestock Improvement Corporation (LIC) (modified by ancestry) for a fully grown mature cow (5 – 7 years) at BCS 4.5 at 100 days in milk
Lame Cow Interventions	The recorded incidence of new lame cow treatments per cows that have calved in the season (new being the same leg after 30 days or a new leg)
Mastitis	The recorded incidence of new cases per the number of cows, including heifers, calved for the season (new being the same quarter after 14 days or a new quarter)
PW (Production Worth)	An index used to measure the ability of the cow to convert feed into profit over her lifetime.
Recorded Ancestry	This is an "identified paternity" measure. The higher the level the more accurate the BW and PW information. It indicates the level of recording of an animal's dam and sire and includes all female relatives related through ancestry (ie sisters, nieces, etc) and is used when she is a calf. The evaluation of untested animals is based solely on ancestry records.
Reliability	A number on a scale of 0 to 99 which measures how much information has contributed to the trait evaluation for the animals, and how confident we can be that a Breeding Value is a good indication of the animal's true merit. The more herd testing data available the higher the score.
Replacement Rate	The number of heifers to calve divided by the total herd to calve for the season, expressed as a percentage

Feed Efficiency

Comparative Stocking Rate	Total kilograms of mature cow genetic live weight of cows calved divided by tonnes of dry matter available
Cow Feed Efficiency – Eaten	Standardised (11 MJ ME/kgDM) kilograms of dry matter eaten per kilogram of milk solids produced
Farm feed Efficiency – Available	Standardised (11MJ ME/kgDM) or kilograms of dry matter per kilogram of milk solids produced
PKE	Palm Kernel Expeller
DDG	Dried Distillers' Grain

Environmental

Green House Gas Emissions	Green house gases on a whole farm basis expressed as CO ² equivalents
Nitrogen Conversion Efficiency	A ratio of product divided by Nitrogen input (Nitrogen input includes fertiliser, supplement and Nitrogen fixation), expressed as a percentage
N loss (Nitrogen loss)	An estimate of the Nitrogen that enters the soil beneath the root zone, expressed as kg N/ha/year
P loss (Phosphorus loss)	An estimate of the Phosphorus lost to water as surface and subsurface run off, expressed as kg P/ha/year

Financial

Net Livestock Sales	Net Income from Livestock sales (sales less purchases)
Breakeven Milk Price	The breakeven milk price is the payout needed per kgMS to cover the direct costs of production
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation and is the cash surplus available from the farming business
Feed Costs	All feed purchases, irrigation, nitrogen, grazing, silage/hay contracting, cropping costs, regrassing, pest and weed control, leases, related wages
FWE (Farm Working Expenses)	Direct farm working costs including owner operator remuneration before interest, taxation, depreciation, amortisation
Livestock Trading	The income from livestock trading including both Net Livestock Income and accounting adjustments for changes to both the number of cows and the value of cows on hand at year end.
Milk Price	Total milk income divided by total kgMS



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