

Gascoigne Farm Limited

Robust management decisions for long-term sustainability



Waikato | Marc & Maria Gascoigne

Farm Systems Change – 2016 Dairy Farm Case Study

Ministry for Primary Industries
Manatū Ahu Matua





Gascoigne Farm Limited

At a glance

Gascoigne Farm Limited

“We strive to do our best but recognise there is always more that we can improve on ”

Marc and Maria Gascoigne started on Gascoigne Farm Limited in 1995 in a 50/50 equity partnership with Marc’s parents. Over time they progressively bought out their equity partner and expanded. The farm now comprises a 150 hectare effective milking platform and a 38 hectare dairy support block. It is located 10 minutes south of Cambridge in the Waikato. They have a 445 cow spring calving Friesian herd, which produced 224,692 kgMS in the 2014/15 season.

Season Ended	Total kgMS	FWE/kgMS
2012	201,658	\$3.63
2013	197,845	\$3.91
2014	214,651	\$4.28
2015	224,692	\$3.81
2016	211,634	\$3.37

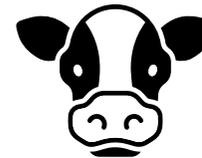
At a glance – 2014/15 Season



Farm Details

Milking Platform	161 ha
Dairy support	38 ha
Total	199 ha
Effective Milking Platform	150 ha
Est. kgDM grown (per effective ha/year)	16,000
Cows (per effective ha)	3.0

Livestock Details



Breed Type	Friesian
Peak cows milked	445
Production per cow (kgMS)	505
Live weight per cow (estimated actual kg)	500

Other Details

People working on farm	3
Peak Production (kgMS/Cow/Day for top month)	2.2
Start of Calving	10 Jul
Calved in 6 weeks	82%
Average Pasture Cover (kgDM/ha at start of calving)	2,593
Production (kgMS/effective ha)	1,498

Farming focus

Marc and Maria Gascoigne both studied at Lincoln University where they met before heading away on their OE. After returning to New Zealand and working in finance they decided to start farming. They began as sharemilkers on Maria's family farm near Putaruru, they then moved to the Gascoigne family dry stock farm, which they converted to dairy in partnership with Marc's parents in 1995.



SUSTAINABLE MANAGEMENT OF RESOURCES

Marc and Maria have focused on long-term stewardship and land sustainability. They have developed their farm with a focus on the sustainable use of their farming business resources.

[Read more on Page 5](#)



TRANSITION THROUGH THE GENERATIONS

Marc and Maria generated sufficient equity in their cows to leverage themselves into a 50/50 equity partnership. Following a defined plan with clear objectives, they progressively bought out their equity partner to achieve 100 percent ownership of Gascoigne Farm Limited.

[Read more on Page 11](#)



Gascoigne Farm Limited

A closer look

Sustainable management of resources

Marc and Maria have worked to achieve operational efficiencies and improve the performance of their farming business through sustainable management of their resources.

Marc and Maria focus on some simple principles to ensure they protect the resources of their farming business.

Understanding the best use of the land

They have a challenging farm with only 19.9 hectares of flat land, which transitions relatively rapidly to rolling and easy hill land. Marc and Maria are committed to looking after their land and this includes understanding the best use. For example, they graze the young stock on the steeper land and keep the dairy cows on the flatter contours to minimise the damage to the landscape.

Fully feeding cows – pasture management and purchased feed

Marc has a strong focus on ensuring his cows are well fed through a process with minimal feed wastage and careful management of the rate at which production declines post peak. Marc's approach includes improved pasture management and the strategic use of purchased feed. His measures of success include: cows' behaviour, body condition score and milk production.

An in-shed feeding system reduces stress

After a wet spring where Marc and Maria were unable to effectively feed their cows, the stressed couple sought guidance from their farm advisor on alternative feeding options. The pros and cons of a feed pad and in-shed feeding system were considered, with the decision ultimately to select an in-shed feeding system. While feeding dry cows on a feed pad is easier than through the shed, the infrastructure cost of the feed pad is significantly higher and commits land use to a specific purpose. The in-shed feeding system is contained within existing infrastructure and is less labour intensive. Marc and Maria now find it easier to feed the cows, especially during a wet spring, with stress reduction for both the farm team and the cows. As Marc says, "happier cows, happier farmers."

Increased days in milk

Milk production is driven by days-in-milk. Marc and Maria try to maximise the days-in-milk by calving early, drying off later and winter milking the late calving cows and empty cows.

In the 2014/15 year, the percentage of the herd calving at 6 weeks increased from 76 percent to 82 percent with cows which were calving at BCS 4.5 now calving at BCS 5.0. The cows body condition score at dry off has increased from BCS 4.2 to BCS 4.7. Correspondingly, the days in milk increased from 274 in the 2011/2012 season to 304 in the 2014/15 season.

The right people

Marc and Maria believe it is very important to have the right people working on the farm. They care about having a satisfied and stable team who work well together and can efficiently get the job done. As with any business, if the team isn't working well it can cause a lot of stress and be detrimental to overall farm performance. Marc and Maria measure their success with their employees in terms of low staff turnover, the general mood and culture of the team.



Feed to milk efficiency 2014/15 season

FEED SUPPLY

FEED UTILISATION

COW EFFICIENCY



What does this show?

Feed Supply

An average of 13,700kgDM/ha is harvested from the milking platform of an estimated 16,000kgDM/ha grown.

The feed requirements of the herd are met 76 percent from pasture and forage available from the milking platform, 3 percent from dairy support land and 21 percent from purchased feed. The purchased feed comprises meal, PKE and molasses.

Feed Utilisation

Total feed available per kgMS produced has remained relatively consistent at around 14.2kgDM. However, cow feed

conversion has improved from 12.9DM/kgMS to 12.5kgDM/kgMS over the last five years. On a per cow basis, each cow is supplied 6.9tDM, and eat 6.1tDM, leaving 0.8t/cow (or 11 percent) of wastage. The high feed utilisation of 89 percent is a reflection of the in-shed feeding and effective pasture management.

Cow Efficiency

The percentage of metabolisable energy converted from feed to milk has been consistently about 53 percent.

The comparative stocking rate has progressively reduced from 85 in 2011/2012 to 80 in 2014/2015 as the purchased

feed has increased from 16 percent to 21 percent of total feed. As the cows consume more feed their body condition improves and milk production lifts.

For the 2014/2015 season, the average per cow production was 505kgMS/cow giving a cow efficiency of 92 percent based on the mature cow genetic live weight of 550kg. This comparison is to the estimated potential of the cow based on breeding rather than the estimated actual live weight of the cow of 500kg.

Feed to milk efficiency performance over time

Feed to Milk Efficiency

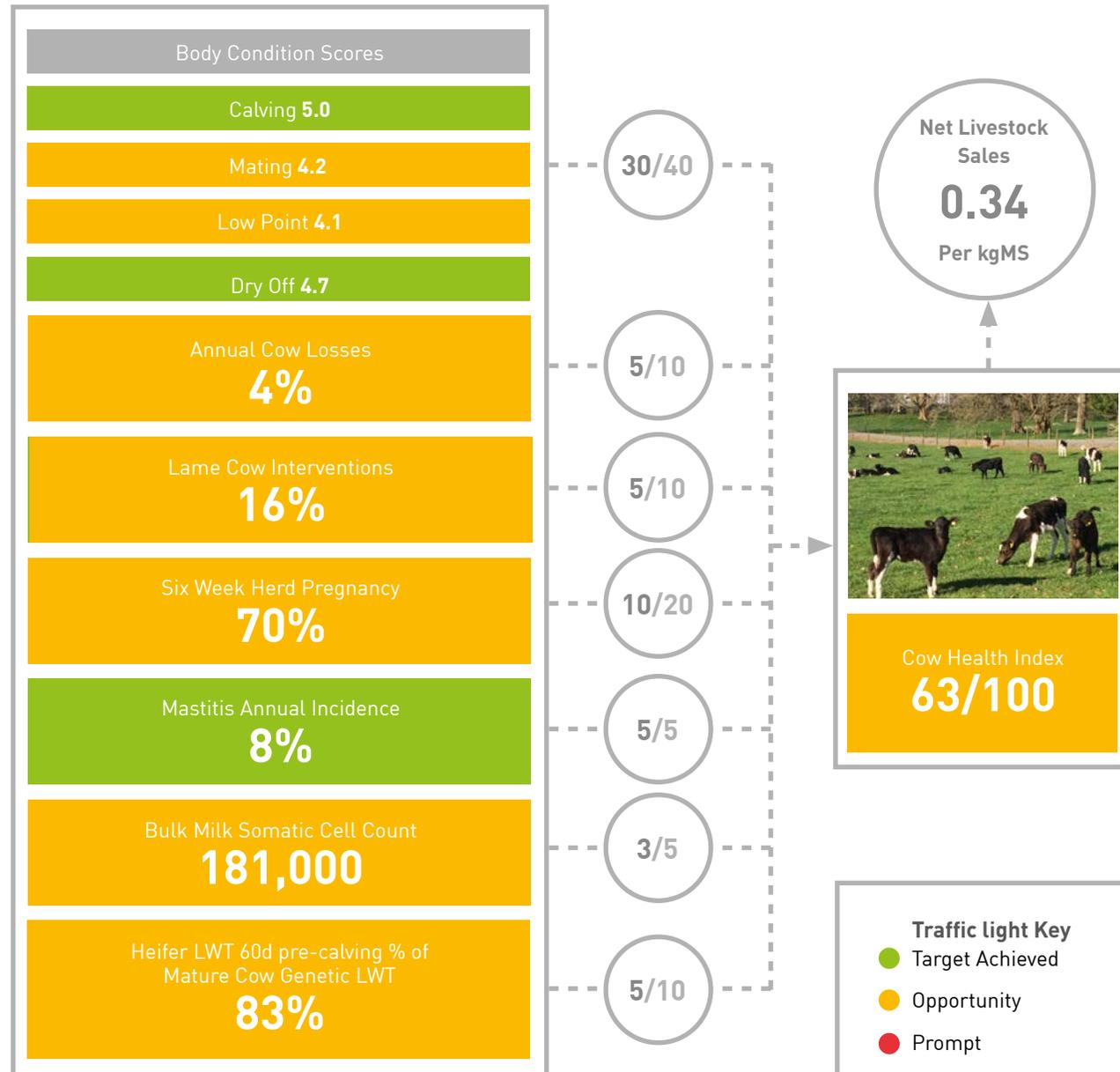


	Season Ended				
	2012	2013	2014	2015	2016
Comparative Stocking Rate kgLWT/tDM available	85	83	75	80	79
Farm Feed Conversion kgDM/kgMS produced	14.4	15.0	15.3	14.0	14.3
Cow Feed Conversion kgDM/kgMS produced	12.9	12.7	12.6	12.5	12.2
Feed Wasted kgDM/kgMS produced	1.5	2.3	2.7	1.5	2.1
Feed Grown % of feed available	84%	79%	75%	79%	81%
Feed Purchased % of feed available	16%	21%	25%	21%	19%

Average Pasture Cover



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	92%
Replacement Rate at calving	16%
Heifer Mating LWT % Mature Cow LWT	No data
Herd Empty Rate	12%

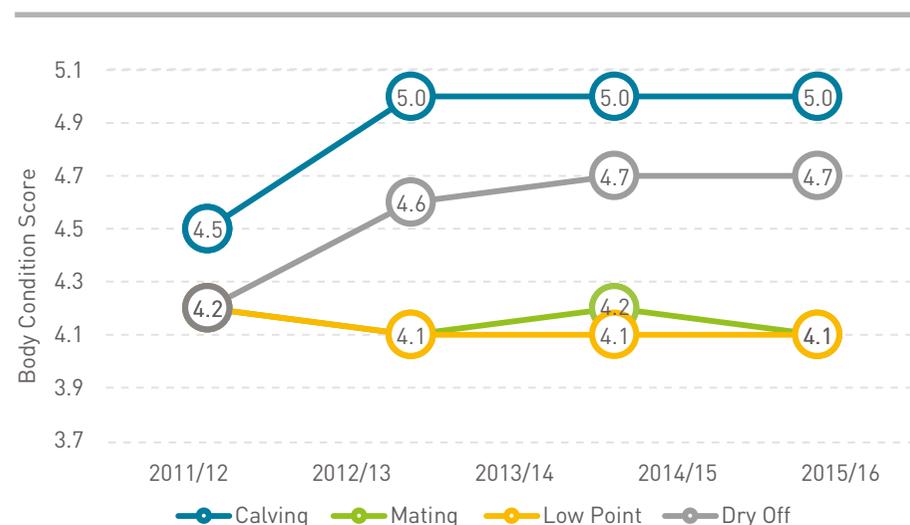
The three-year old retention rate is high at 92 percent, reflecting well-grown heifers going into the herd in good body condition.

Marc and Maria keep 16 percent of replacements, which are well grown at 83 percent of mature cow genetic live weight at 60 days from calving.

The herd empty rate has increased from 5.8 percent in 2012 to 18.3 percent in 2016. Marc and Maria were not happy with this high empty rate which was attributed to the short mating period. The 2015 mating period was nine weeks and six days with a calving period of eight weeks and five days. Further staff training in this area has been a focus for the 2016/2017 season.

Animal health performance over time

Animal Health



	Season Ended				
	2012	2013	2014	2015	2016
Cow Health Index (Max 100)	43	63	78	63	63
Annual Cow Losses	2%	1%	1%	4%	1%
Lame Cow Interventions	11%	11%	12%	16%	11%
Six Week Herd Pregnancy	74%	73%	70%	70%	62%
Mastitis	5%	5%	7%	8%	10%
BMSCC (000s)	209	181	159	181	173
Heifer LWT 60d pre-calving					
% of Mature Cow Genetic	83%	83%	83%	83%	85%
LWT					

What does this show?

Marc and Maria aim for fully fed cows all year round, however at times achieving this objective is challenging. They measure their success by observing cow behaviour, assessing body condition score and in the production achieved.

The focus on feeding their cows well has resulted in an improvement in cow condition at calving and mating. However, Marc and Maria continue to work on cow condition at low point and dry off.

The cows losses have generally been very good at less than 2 percent, except for the 2014/2015 year when cow losses were 4 percent. The main contributor to the 4 percent loss was an episode of nitrate poisoning. The new pasture had been

grazed previously and Marc had undertaken the preventive tests for nitrate, believing the pasture to be fit for his cows. The nitrate testing strips were faulty, generating unreliable results and the consequences were fatal.

The incidence of lame cows increased in 2014/2015 to 16 percent with the wet season being the main contributing factor. Typically lame cow intervention has been around 11 percent.

While average bulk milk somatic cell count (BMSCC) has remained relatively consistent over time, the level of mastitis treatment has increased from 5.3 percent in 2012 to 10.3 percent in 2016.

The heifer live weight 60-days pre-calving is consistently in the mid-80 percent range demonstrating the effort that Marc and Maria put into the growing out their young stock to prepare them for joining the herd.

Marc and Maria prefer to give all their heifers another chance even if they don't perform in the first year. The empty high breeding worth heifers can be milked through as part of the winter milk herd. Now that Marc and Maria winter milk they have increased their livestock management options.

Environmental performance

Background information

Consistent with their focus area, Marc and Maria are well aware of the environmental impact of their farming practices on their farm and wider environment.

Their farm is located in Waipa River Catchment. The Waikato Regional Council's notification of the "Wai Ora: Healthy Rivers Plan for Change" in September 2016, focuses attention on Farm Environment Plans, land use change, a nitrogen reference point and stock exclusion.

The property has a range of contour. The milking platform has a small amount of flat land with the remainder rolling to easy hill country. The dairy support land includes steeper paddocks at the far end of the farm.

The replacement heifers are grazed on the block identified as "Young Stock" in the OVERSEER® file until they are 18 months old, and then grazed off until they return to the farm to calve. In addition, up to 100 of the later calving cows are wintered off farm for up to eight weeks from drying off to calving.

Soils are silt loams predominately derived from volcanic parent material, flats are developed peat soils.

With a rainfall of 1,125mm per annum, the property can be wet in the winter and dry in the summer.

Land Use Planning

The steeper parts of the farm are used for grazing the young stock as they are lighter and less likely to damage the pasture.

The riparian areas of the farm (a total of 10.1 hectares) are fenced off to exclude the livestock. The gully area was planted 18 years ago and has evolved into a habitat with birdlife and glow worms.

Managing for wet conditions

The winters are usually wet, so Marc and Maria have sought out ways to reduce the amount of feeding out on

the pasture. These include grazing off the late calving cows and using a stand-off pad.

During winter in wetter conditions, the cows which haven't calved are taken off pasture onto a stand-off pad for up to twelve hours a day to reduce pugging damage. The basic stand-off pad, set up in 2008, is based around a small fenced off area of compacted sawdust located alongside the main race. Although this form of stand-off pad is common in this district, the potential for nitrogen leaching may be mitigated with development to capture the effluent.

Managing for dry conditions

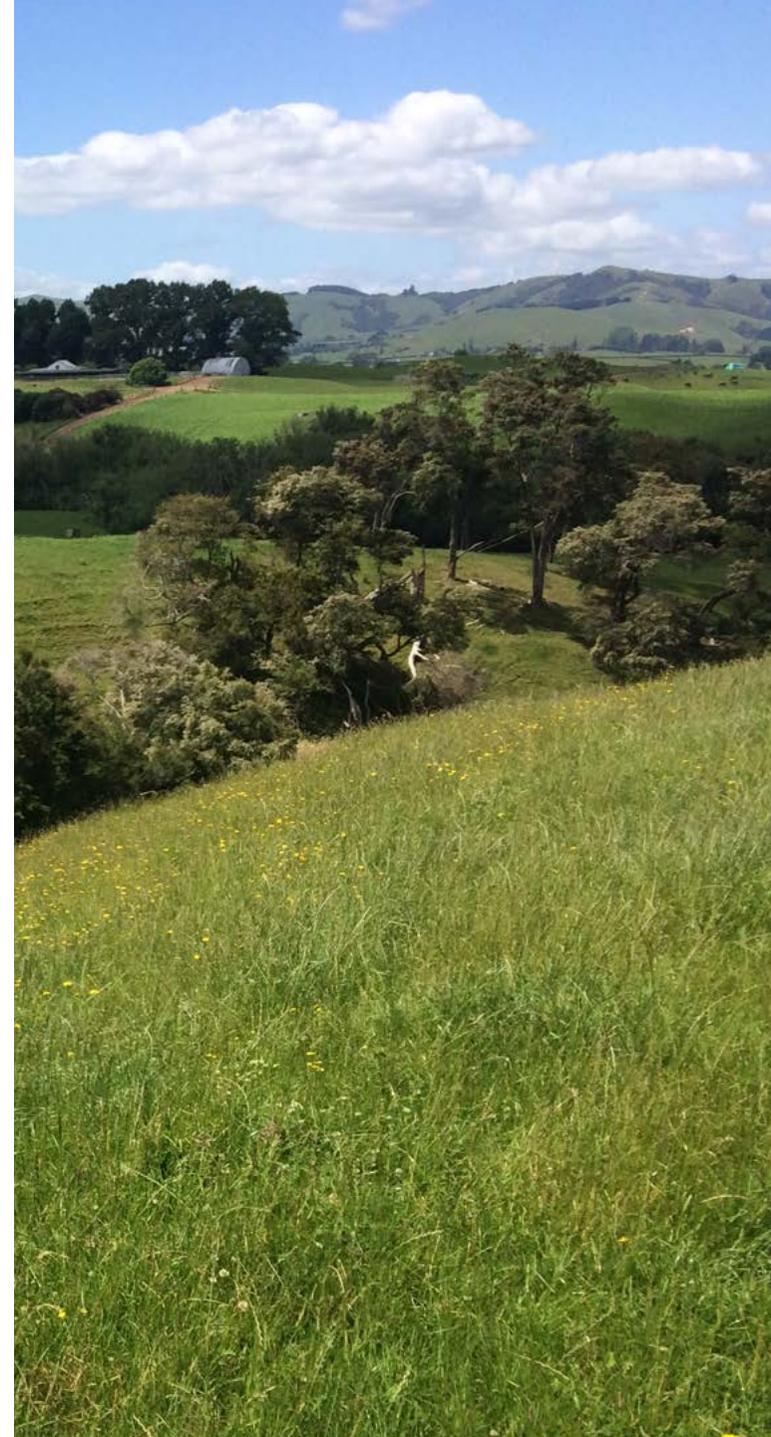
Marc and Maria rotate crops year to year from turnips to chicory. These crops are grazed from December to February and returned to pasture. This approach gives more certainty to the summer/autumn feed budget. As long as conditions are good in the establishment phase, Marc and Maria can budget on a guaranteed good quality feed in late summer, early autumn, of around 15tDM/ha.

Maximising the use of nutrients

Aiming for additional environmental benefits, Marc and Maria use their effluent holding pond for storage during wet conditions. The nitrogen is applied strategically using the principle of little and often through out the year. This allows nitrogen to be used by the plants with less opportunity for leaching. The later into the autumn that nitrogen fertiliser is applied, the more nitrogen loss OVERSEER® attributes to it. The modelled losses of nitrogen in OVERSEER® when applied in March rather than April are noticeably less.

The future

Marc and Maria are working with Waikato Regional Council to plant natives in a wetland area on the farm to further protect the ecosystem.



Transition through the generations

Marc grew up on a dry stock farm. He headed away to Lincoln to study after leaving school and when he finished his Bachelor of Agricultural Science, travelled overseas with Maria.

On returning to New Zealand he initially worked for Rural Bank and then, while working for an accountant, realised that he would rather be farming. As Maria's family were dairy farmers, the farming journey began with a sharemilking position at Maria's family farm in Putaruru.

In 1995 Gascoigne Farms Limited was formed through a 50/50 equity partnership between Marc and Maria and Marc's parents. The 90 hectare dry stock farm was converted to dairy and the partnership leased a further 60 hectares from Marc's parents. Marc and Maria were the 50/50 sharemilkers for the equity partnership. Over time Marc and Maria progressively bought out Marc's parents, initially the 90 hectares, and then purchasing the 60 hectares. A neighbouring block of 47 hectares was also purchased in 2008.

Throughout the step by step process to 100 percent ownership, Marc and Maria planned and managed their farming business so they were cashflow positive and able to grow progressively.

They couldn't afford to purchase the shareholding to own the farm all at one time. An independent valuation was undertaken for each sale and purchase transaction between Marc and Maria, and Marc's parents. The independent valuation ensured there was fairness and equity for Marc's parents and his siblings.

The process that Marc and Maria undertook to ultimately own the farm assisted them in understanding the importance of good business structures. They created a business structure that allows them to operate the farming business and invest off-farm. This gives them the flexibility to choose how they may assist their children in the future. Again with the overarching discipline of fairness and equity for themselves and their children.



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	989	\$2,223	\$4.40
Livestock Trading & Other Income	162	\$363	\$0.72
Total Income	1,151	\$2,586	\$5.12
Feed Costs	426	\$958	\$1.90
Other FWE	429	\$964	\$1.91
Total FWE	855	\$1,922	\$3.81
EBITDA	296	\$664	\$1.31

Breakeven Milk Price (per kgMS)

Feed Costs

\$1.90

+

Other FWE

\$1.91

=

Total FWE

\$3.81

-

Livestock Trading and Other Income

\$0.72

=

Breakeven Milk Price
Before debt servicing and depreciation

\$3.09

What does this show

During the 2014/15 year, the total income of Gascoigne Farm Limited was \$5.12/kgMS with the total farm working expenses at \$3.81/kgMS. This translates to an operating surplus (EBITDA) of \$1.31/kgMS.

Feed expenses have increased 49 percent on a per cow basis and 38 percent on a per milksolid basis from 2011/12 to 2014/15. This is partly related to more feed purchased, and also due to the change from PKE to meal, which is a more expensive feed.

Although other farm working expenses have decreased 10 percent from \$2.15/kgMS to \$1.93/kgMS (due to an extra 23,000kgMS diluting expenses), the total farm working expenses have

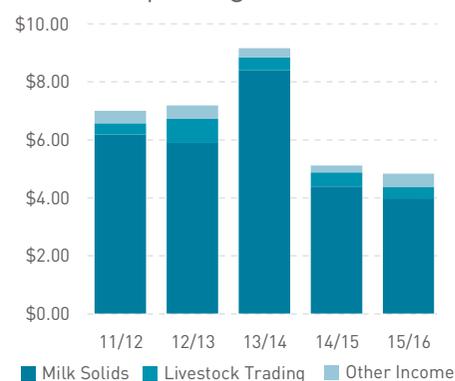
increased 9 percent from \$3.48/kgMS to \$3.81/kgMS over the same period, due to the additional feed purchases.

Consequently the breakeven milk price (before debt servicing and depreciation) has increased from \$2.67/kgMS in 2011/12 to \$3.09/kgMS in 2014/15. While the total expenses at \$3.81/kgMS and net breakeven at \$3.09/kgMS allow for a cash surplus for debt servicing, regular review of feed costs ensures that input and output are monitored.

Financial performance over time

Financial Efficiency	Season Ended				
	2012	2013	2014	2015	2016
Feed cost per kgMS	\$1.37	\$1.67	\$2.29	\$1.90	\$1.50
Other FWE per kgMS	\$2.26	\$2.24	\$1.99	\$1.91	\$1.87
Breakeven Milk Price	\$2.81	\$2.62	\$3.51	\$3.09	\$2.53
Return On Assets %	8%	8%	14%	3%	3%
Capital employed per kgMS	\$38	\$38	\$35	\$32	\$35
Milk Price	\$6.20	\$5.91	\$8.42	\$4.40	\$3.99

Income per kgMS



Expenses per kgMS



Profit and Loss to EBITDA (per kgMS)	Season Ended				
	2012	2013	2014	2015	2016
Milk income	\$6.20	\$5.91	\$8.42	\$4.40	\$3.99
Dividends	\$0.36	\$0.39	\$0.21	\$0.15	\$0.33
Livestock trading	\$0.38	\$0.83	\$0.46	\$0.48	\$0.40
Other operating income	\$0.07	\$0.08	\$0.10	\$0.09	\$0.12
Total income	\$7.02	\$7.21	\$9.20	\$5.12	\$4.84
Feed costs	\$1.37	\$1.67	\$2.29	\$1.90	\$1.50
Other FWE	\$2.26	\$2.24	\$1.99	\$1.91	\$1.87
Total FWE	\$3.63	\$3.92	\$4.28	\$3.81	\$3.38
EBITDA	\$3.39	\$3.29	\$4.91	\$1.32	\$1.46





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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