

Are you making money from milk or milk from money?

– lessons learned from 3 years of research in Northland.

John Roche, Principal Scientist Animal Science, DairyNZ

Main points

- Marginal milk is the additional milk produced when supplements and/or crops are used to increase MS production per cow and/or per ha;
- The profitability of supplementary feeds depends on the cost of this marginal milk:
 - If the cost of marginal milk is less than the milk price, it's profitable;
 - If the cost of marginal milk is more than the milk price, it's unprofitable;
- Cost of marginal milk depends on:
 - the milk production response to supplement;
 - the price of the supplement; and,
 - any non-feed costs associated with the greater use of supplements (e.g., labour, fuel);
- The average milk production response to PKE at NARF was very high:
 - 126 g MS/kg PKE DM (this ranged from 107 to 147 g MS/kg PKE DM);
 - In comparison, the average response in DairyBase is ~80 g MS/kg supplement DM;
- Because of the high milk response to PKE, the cost of marginal milk at NARF was low:
 - \$5.30 per kg MS (this ranged from \$4.18 to \$6.38);
- A recent analysis of DairyBase reported the marginal cost of milk from increased use of supplementary feeds was \$7.50 to \$7.66 (Ma et al., 2018).

Summary

Over the three years of the experiment, the farm experienced:

- one very low milk price (<\$4/kg MS) and two good milk prices (>\$6/kg MS);
- one very prolonged wet winter and spring, and an early dry, but relatively short summer.

Although the experiment was established to investigate the use of cropping to reduce the reliance on purchased feeds and, especially, palm kernel (PKE), the design also allowed us to investigate the profitability of increasing stocking rate and using PKE to overcome the resultant feed deficits.

In brief, over 3 years:

- The Pasture-only farmlet, at 2.6 cows/ha produced, on average, over 900 kg MS/ha and 350 kg MS/cow;
- The Cropping farmlet, at 2.9 cows/ha, produced, on average, 1,000 kg MS/ha and 343 kg MS/cow;
- The PKE farmlet, at 2.9 cows/ha and with 500 kg DM PKE/cow, produced almost 1,100 kg MS/ha and over 375 kg MS/cow;
- The average response to PKE was 126 g MS/kg DM, with a range from 107 to 147 g MS/kg PKE DM.

The profitability of the different strategies for managing a higher stocking rate (i.e., Cropping or PKE) was dependent on the milk price and the cost of producing the extra MS. The amount of extra milk produced and the associated cost of the extra milk are presented in Table 1.

Table 1. The increase in milksolids production/ha from Cropping or importing PKE relative to the Pasture-only farmlet and the associated cost of the marginal milk.

		Cropping	PKE
2015-16	MS	174	159
	Cost	\$6.85	\$5.34
2016-17	MS	88	153
	Cost	\$13.08	\$6.38
2017-18	MS	-7	241
	Cost	-	\$4.18

In brief:

- The Cropping strategy failed to achieve the same milk production as the PKE farmlet in all but the first year. This was because of
 - poorer than anticipated crop yields;
 - difficulty in managing re-sown pastures during winter and spring, and;
 - reduced pasture growth during summer in new ryegrass pastures relative to kikuyu-dominant pastures.
- The PKE farmlet consistently produced more MS than the Pasture-only farmlet; this was particularly noticeable in the 2017-18 year, when the Pasture-only treatment was forced onto once-a-day milking for most of the spring and a greater proportion of their diet was pasture silage; this reduced their total milk production by ~8% relative to the PKE farmlet. In comparison, the PKE farmlet maintained milk production through the spring and capitalised on excellent autumn pasture growth conditions.

Because of these bio-physical differences between the farmlets, the Pasture-only farmlet was most profitable in Year 1, the PKE farmlet was most profitable in Year 3, and there was no difference in profitability in Year 2.

The Cropping farmlet failed to reach the same level of profitability as the other two farmlets in any year, because the cost of the marginal milk was greater than the milk price.

Take home messages

In all three seasons, the moderately stocked Pasture-only farmlet was profitable and could be managed without importing supplements from off-farm. However, the farm would probably have benefited from a small amount of supplementary feed during the spring of 2017-18.

Supplementary feed offered a tactical advantage to the higher stocked herd during an exceptionally wet winter and spring; however, these results need to be view in context:

- Through good management, we limited the use of supplements to 1,450 kg DM PKE/ha (i.e., 500 kg DM PKE/cow) and produced 1,100 kg MS/ha on the PKE farmlet;
- In comparison, over the preceding 3 years, the farm used almost 4 t DM/ha of supplement to produce 1,154 kg MS/ha. Therefore, we achieved a very good response to supplement used;
- The 10-year average response to supplements and crops in DairyBase is 80g MS/kg DM.

The effects of response to supplement on the cost of marginal milk using the NARF data are presented in Figure1. On average, the MS response to supplement must be greater than 100g MS/kg PKE DM for the extra milk produced to cost less than \$6/kg MS and provide a return for the additional investment of infrastructure and time.

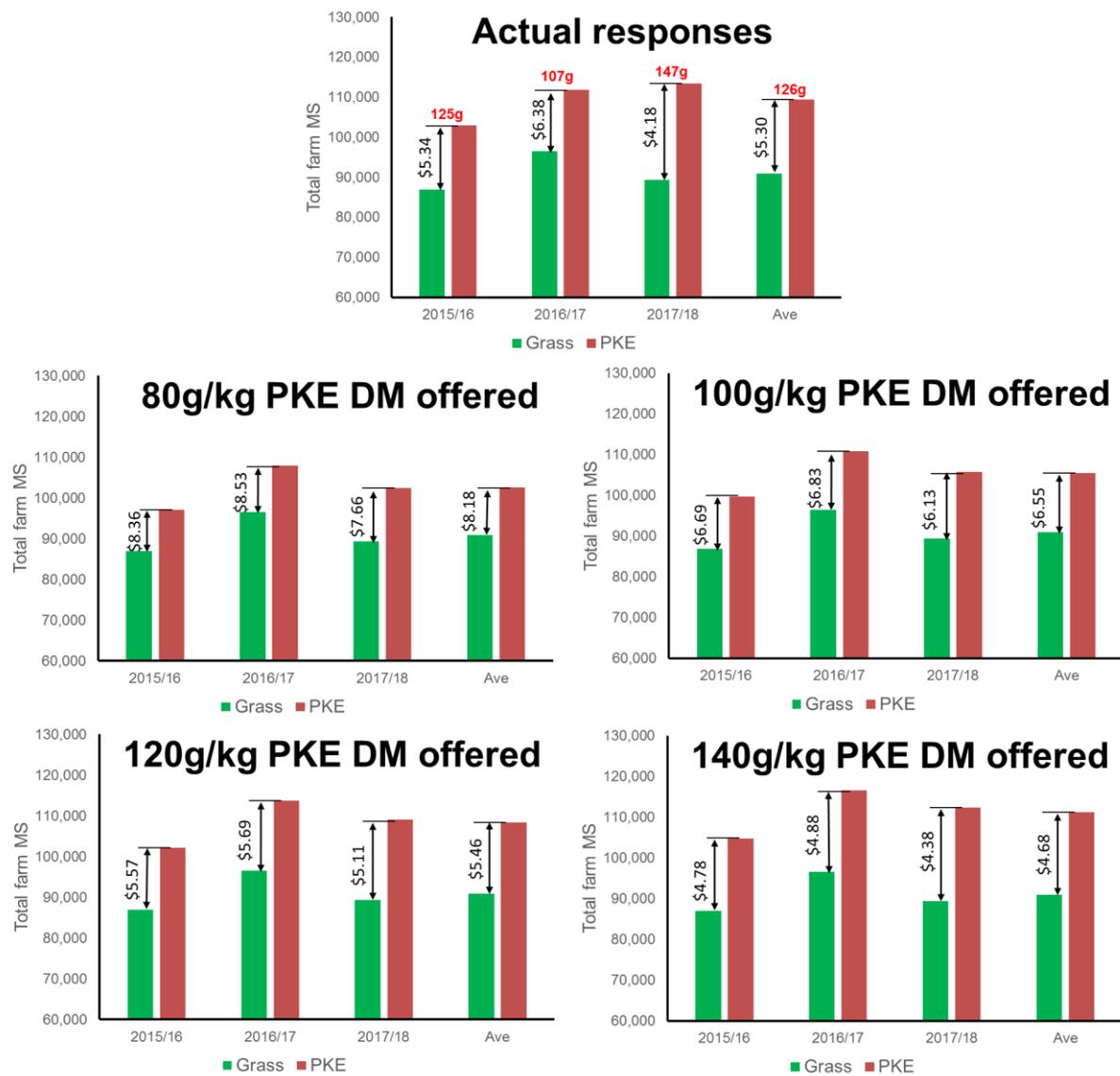


Figure 1. The cost of producing marginal (i.e. more) milk using PKE to increase stocking rate is very dependent on the response to the additional feed. Nationally, the 10-year average response to supplement is 80g MS/kg supplement DM.

Reference cited:

Ma, W., A. Renwick, and K. Bicknell. 2018. Higher Intensity, Higher Profit? Empirical Evidence from Dairy Farming in New Zealand. *J. Agric. Econ.* 69:Version of Record online: 9 FEB 2018. doi:DOI: 10.1111/1477-9552.12261.