Managing your herd for profit

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Introduction

Managing dairy herds for profit is underpinned by three fundamentals:

- Making the most of your cheapest feedstuff – in an Irish context this is maximising the role of grazed grass in the diet of the cow;
- Using genetics to breed cows that are 'fit for purpose' i.e. that firstly are fertile and secondly produce sufficient milk;
- Financial planning and monitoring – farmers who budget and monitor their income and spending make more money.

In this paper I will focus on the following areas:

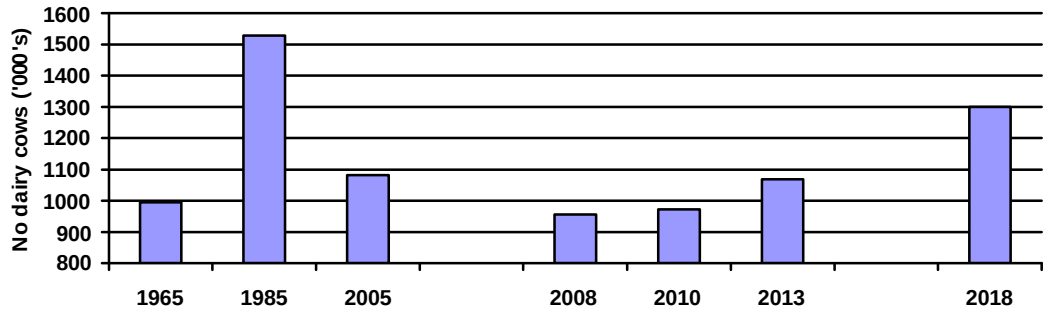
- An overview of the Irish dairy industry;
- The adoption of profitable technologies;
- Three elements of profitable dairying.

The Irish Dairy Industry

My own background is that I work for Teagasc, a "semi-state organisation" which provides integrated research, advisory and training services for the agriculture and food industry in Ireland. One third of its budget supports Teagasc's advisory service, which has both a farm business and a national social policy remit. The organisation employs approximately 80 Business and Technology dairy advisers and five dairy specialists who directly support almost two thirds of Ireland's 18,000 dairy farmers.

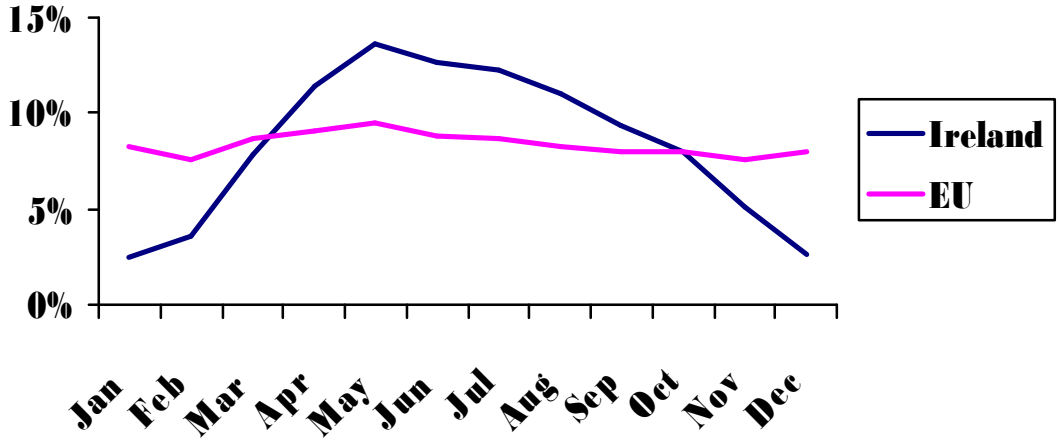
The data in Figure 1 shows the trends in the number of dairy cows in Ireland over the past 50 years. Between 1965 and the introduction of milk quotas there was a 50% increase in the number of dairy cows in Ireland. Between then and 2005, the size of the national herd was again in decline. Since then there has been a small but significant increase in the size of the national herd with a further increase expected by 2018 to 1.3 million dairy cows.

Figure 1. National dairy herd size in Ireland from 1965 to 2013 and 2018 forecast.



Ireland has a seasonal milk supply pattern compared to the EU average as shown in Figure 2. The peak month for Irish milk production is May, which accounts for 14 to 15% of total annual milk supply. The trough months are December and January which account for 2 to 3% each of total annual milk supply

Figure 2. Milk supply profiles for Ireland and the EU average.

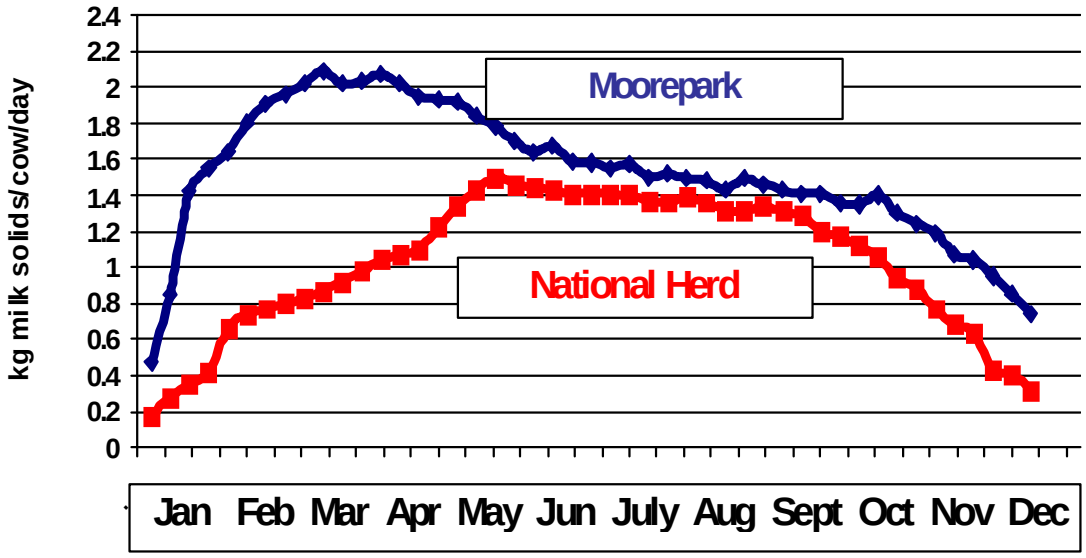


The aim is to strike a balance between optimum sustainable market returns and production cost efficiency. Irish milk producers will maximise our natural competitive advantage by compactly calving the maximum number of cows to grass in the spring. Cash costs for grass, silage and concentrate feedstuffs are currently estimated at 2p/kg dry matter (DM), 9.5p/kg DM and 25.6p/kg DM respectively.

There still remains however a requirement for the production of a certain volume of milk all year round to meet the requirements for certain products e.g. liquid milk, Bailey's Cream Liqueur. Compact spring calving will result in highly seasonal milk supply patterns and higher milk processing costs because of poor processing capacity utilisation. The seasonal nature of Irish milk production is exaggerated by

the fertility status of the national dairy herd. The milk supply profile for the national dairy herd is compared to the highly fertile herd at the Teagasc research institute at Moorepark in Figure 3.

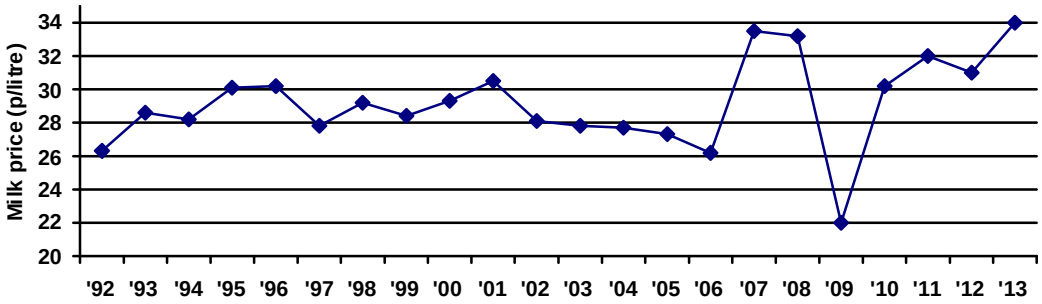
Figure 3. Milk supply profiles for dairy herd at Moorepark dairy research centre and the national dairy herd.



The research herd at Moorepark yielded 490 kg of milk solids compared with the national average of 340 kg milk solids per cow. Three quarters of the 150 kg difference in milk production occurred in the first half of the year and was due to a much earlier median calving date – 15th February compared to the median of March 18th for the national herd. While start of calving was similar at Moorepark and the national herd, calving was also substantially more compact. While 90% of the Moorepark herd calved in 6 weeks, nationally only 67% calved in 10 weeks resulting in a long 'tail end' to the calving season of the national herd.

Figure 4 shows the average milk price for the years 1992 to 2011 from CSO data. The most noticeable features of the graph are (a) the relatively stable milk price for the period 1993 to 2005 and (b) the variation in milk prices since then. The reason for such recent variation is due to the effective removal of market stability measures since 2006 – a process known as 'decoupling'. Such measures included intervention, export refunds, tariff protection and internal disposal supports. All of these have either been eliminated or much reduced.

Figure 4. Milk price received by Irish dairy farmers between 1992 and 2013 *(forecast)*.



The high milk prices received in 2007 and in 2008 resulted in a reduction in world demand for milk-derived products as food processors substituted such products with vegetable and cereal derived alternatives. The 'burn off' in demand resulted in a slump in milk price in 2009. Irish dairy farmers have endeavoured to adopt low cost milk production systems to protect themselves from such price volatility. Despite this there remains considerable variation in production costs and profitability nationally as detailed in Table 1. The data shows a 2.8 p/litre and a 4.2 p/litre difference in gross output and costs of production respectively between the top and bottom thirds of Irish dairy farmers. The net result is a difference of €35,600 difference in net profit per 100 dairy cows. Such variation in output, cost and profitability are a feature of dairy industries world wide.

Table 1. Variation in the costs and profitability of Irish dairy farmers in 2010 ranked by net profit per litre[1].

	Top 1/3	**Middle 1/3**	**Bottom 1/3**
Gross output (p/litre)	27.9	26.3	25.1
Variable costs (p/litre)	8.5	10.0	12.4
Fixed costs (p/litre)	10.4	9.1	10.7
Net profit (p/litre)	**9.0**	**7.2**	**2.0**
Net profit (p/litre)	**9.0**	**7.2**	**2.0**
Net profit (£/100 cows)	**45,000**	**36,000**	**9,400**

[1] Teagasc National Farm Survey (2010), Teagasc, Ireland.

Adoption of Profitable Technologies

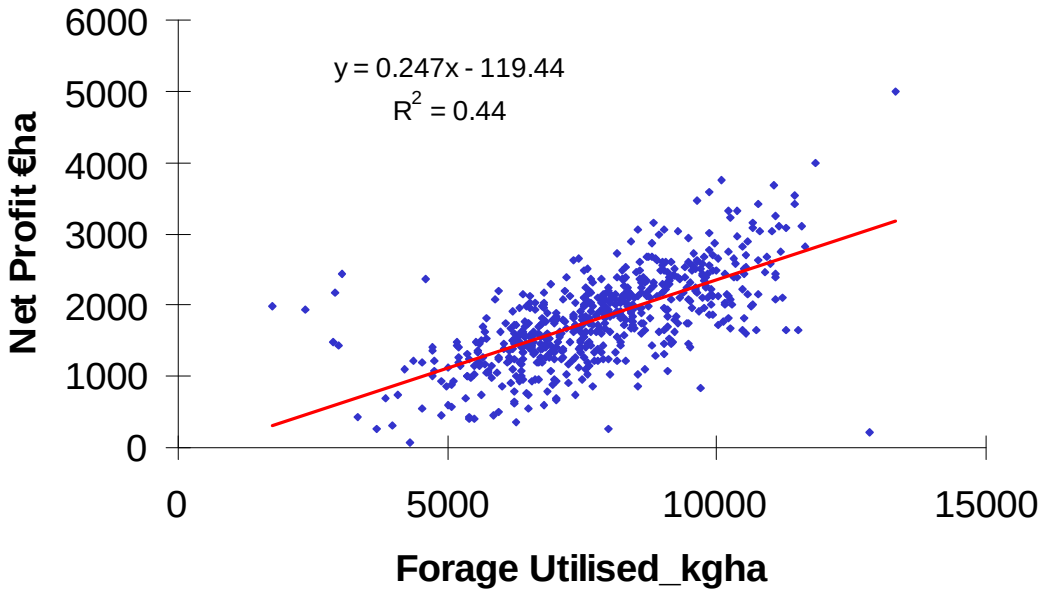
Dairy farmers continually adopt new technologies generally for production or profit reasons. In this section of the paper, I will concentrate on the adoption of technologies for profit improvement. While there are many, I will focus on three major areas where the adoption of technologies will improve profit on dairy farms. These are:

1. Grassland;
2. Genetics;
3. Financial.

Grassland

When large scale analysis of the data from Ireland and indeed most pastoral dairy systems is analysed on a *profit per hectare* basis, dairy farms that are the most profitable tend to be those farms utilising the most grass as shown in Figure 5.

Figure 5. Association between grass utilised per hectare (kg DM/ha) and net profit (€/ha).



Each dot on the graph represents the grass utilised per ha in kilogrammes and the net profit per hectare for the individual farm. Basically what the graph is saying is that as more grass is used profit increases. In the example shown in Figure 5 each additional tonne of grass dry matter consumed per hectare was associated with an increase of €247 per hectare (£211) in net profit. The increase varies from year to year with fluctuations in the relative values of grass and concentrate but all studies show a positive linear association. In other words, profit increases as more grass is used.

Using more grass doesn't come for free. An appropriate roadway network, water and paddock system is required to ensure that the length of the grazing season is maximised. Researchers at Moorepark have estimated that each additional day at grass is associated with an increase of approximately £2.50 in profit per cow. My own analysis of farm data has supported this with half of the additional increase in profit coming from an increase in milk yield and improvements in milk composition and the other half coming from a reduction of 5.5 kg per cow in concentrate feeding levels for every extra day that the cows spend at grass.

Progressive dairy farmers use the following tools to manage grass effectively across the grazing season:

1. The spring rotation planner to graze their farm in the spring – basically grazing 1/3 of the grazing platform in February ; 1/3 by March 17th and the remaining 1/3 by the end of March/early April.
2. The summer wedge which graphs the grass cover on all paddocks on the farm to allow farmers to assess their grass supply. This needs to be done weekly during the main grazing season.
3. The autumn rotation planner to graze their farm in the autumn – basically grazing approximately 60% of the grazing platform area between the start and the end of October and the balance by the end of the grazing season.

Teagasc recommends a grazing season length of 280 days on dry free-draining farms. Typical targets that we have for such farms include:

- Turnout to grass of mid-February with full-time turn out to grass taking place approximately 10 days later;
- Housing by night in early November with full-time housing towards the end of the month.

The target stocking rate on dry free-draining farms is at least one cow per acre (2.47 cows per hectare); less than 500 kg meal fed per cow per lactation; a milk solids yield of 450 kg per cow; grass utilisation of approximately 11 tonnes dry matter per hectare per annum – approximately 75% - 80% of the cows diet is composed of grazed grass with the balance composed of ensiled grass and concentrate feed.

Genetics

Practically all dairy cows in Ireland were originally of the Shorthorn breed. With the introduction of the British Friesian breed from the UK in the 1940's, most farmers started to cross breed their dairy herds. Continual breeding with British Friesian resulted in black and whites predominating in dairy herds through the '70's and '80's. Fertility levels were excellent throughout this period while milk yields were typically

2,700- 3,200 litres (600-700 gallons) per lactation. The introduction of the Holstein Friesian breed in the mid-'80's gave the milk yield potential of the national dairy herd a welcome boost. The breeding index at the time (the RBI), focused solely on improvements in milk yield. Ultimately research at Moorepark showed that the 'high merit' Holstein Friesian dairy cow was capable of delivering substantial volumes of milk in seasonal calving herds (up to 8,000 litres on 500 kg meals) but was not capable of maintaining a 365-day calving interval – a critical attribute particularly in seasonal calving herds. The RBI had underestimated the antagonistic genetic relationship between milk production and fertility resulting in a less fertile national herd (Evans et al., 2002; Berry et al., 2003). Indeed research showed that 'medium merit' RBI dairy cattle were more profitable than 'high' RBI stock when their higher fertility performance was accounted for (Veerkamp et al., 2000). When modelled, farm profit was most sensitive to changes in milk price followed by replacement rate (Evans et al., 2006). Further on-farm analysis confirmed these trends as outlined in Table 2.

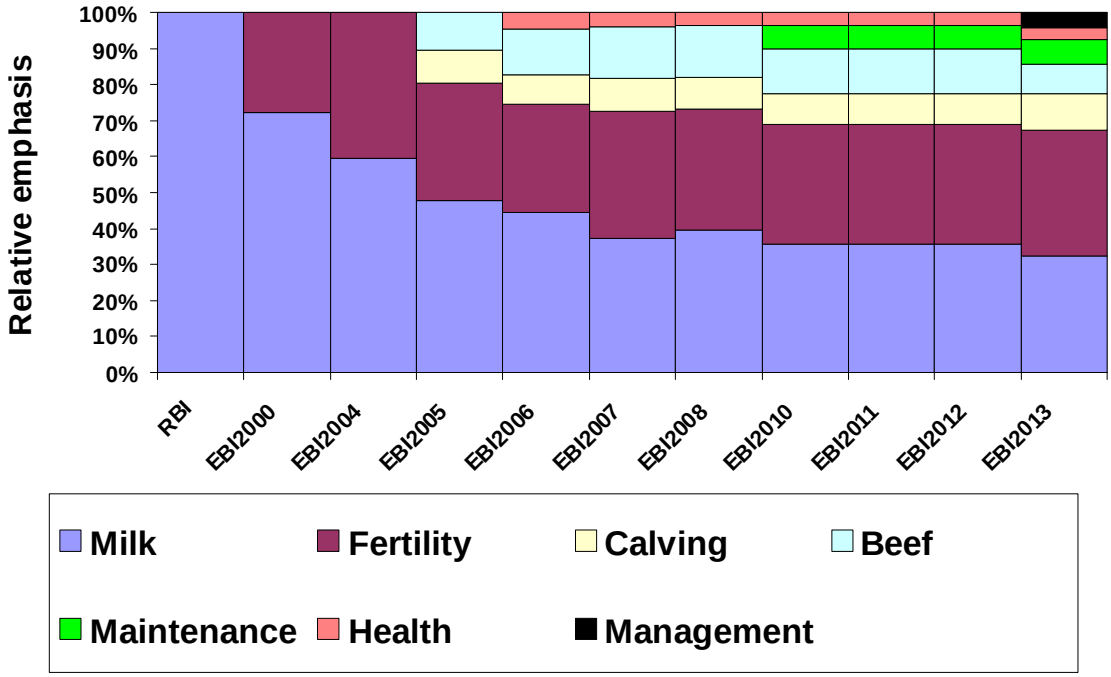
Table 2. Trends in milk production and replacement rate on farm net profit for 14 spring calving dairy herds.

	Milk		Replacement		
Year	Yield (kg)	Sales (£,000's)	Rate (%)	Cost (£,000's)	Profit (£,000's)
1990	5,033	108	16	18	25
1993	5037	116	21	24	26
1997	5629	124	25	29	27
2000	5609	126	26	30	28
2003	5638	128	27	32	28
Change	**605**	**21**	**16**	**14**	**3**

This analysis by Evans et al. (2006) showed that increases in milk production on a matched sample of farms was resulting in an increase in farm milk sales. However economically farmers were little better off because replacement rate increased due to the poorer fertility levels observed.

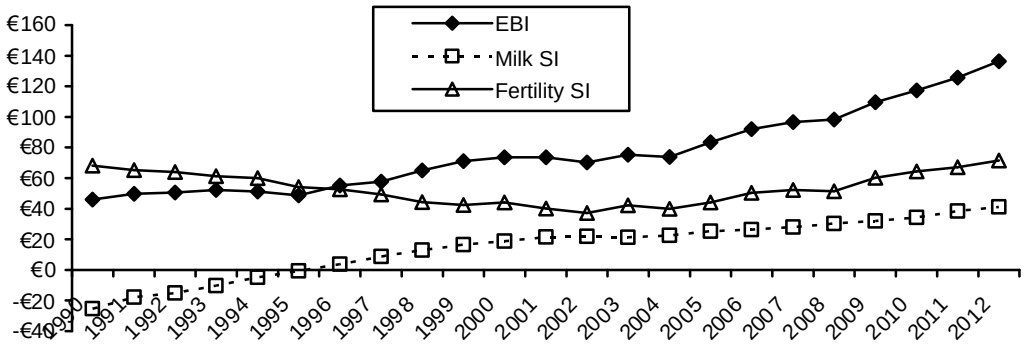
The use of AI was falling in tandem with the decline in fertility of the national dairy herd, most dairy replacements were sired by stock bulls and genetic merit of the replacement heifers entering the national dairy herd had stagnated (Wickham et al. 2012). Starting in the late 1990's Teagasc and the newly formed Irish Cattle Breeding Federation (ICBF) developed strong collaborative linkages in education, research and advice. A new more balanced index called the Economic Breeding Index (EBI) was developed which incorporates a range of traits in addition to milk production and fertility. The EBI has evolved since it's introduction in 2000 as outlined in Figure 6.

Figure 6. Development of the EBI between 2000 and 2010.



Since EBI's introduction, the genetic merit of the dairy replacement calves born in Ireland has increased, particularly in the last couple of years as outlined in Figure 7.

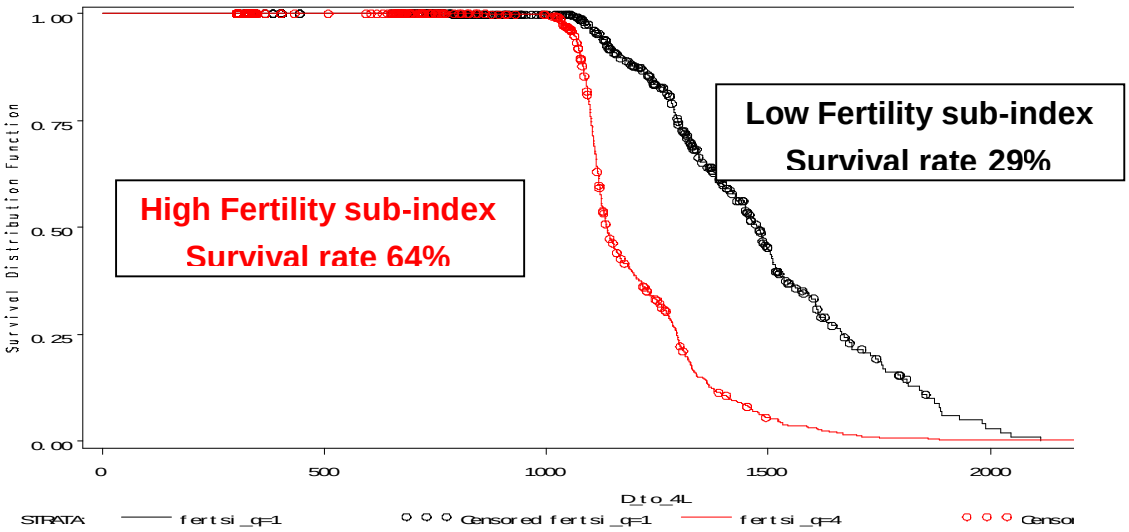
Figure 7. Average EBI, milk sub-index (SI) and fertility SI of dairy replacement heifers born in Ireland between 1990 and 2012.



The rapid rise observed in the last couple of years reflects the trend to using more genomic sires (which are higher EBI). This rise in EBI of the heifers born is being driven primarily by higher genetic merit for milk production and fertility as shown in Figure 7. This can be observed in first lactation animals as an increase in milk yield and a reduction in their calving interval. Further improvement in fertility levels is expected over the next number of years as the fertility sub-index has risen substantially since – that of the 2012 born heifers is €71.

Such emphasis on genetic merit for fertility should not be seen as the domain of the seasonal calving herd. The data in Figure 8 shows the reproductive performance of over 3,700 cows from 22 autumn calving herds in Ireland. The data shows that fertility sub-index is positively associated with survival rate to fourth calving, milk produced in the first three lactations and negatively associated with calving interval of cows surviving to fourth lactation.

Figure 8. Survival curves to fourth lactation of high fertility sub-index and low fertility sub-index dairy cows from winter calving herds.

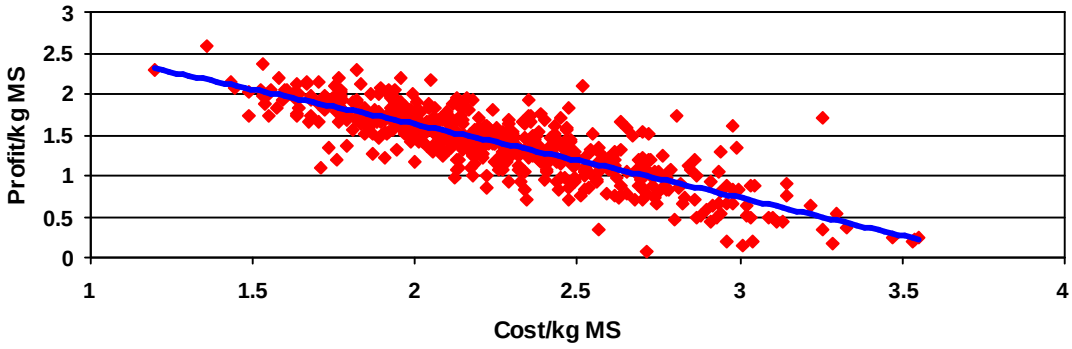


Only 29% of the low fertility sub-index cows calved for a fourth time compared to the high fertility sub-index cows while those that survived took 270 days longer to calve for the fourth time compared with their high fertility herd mates.

Financial

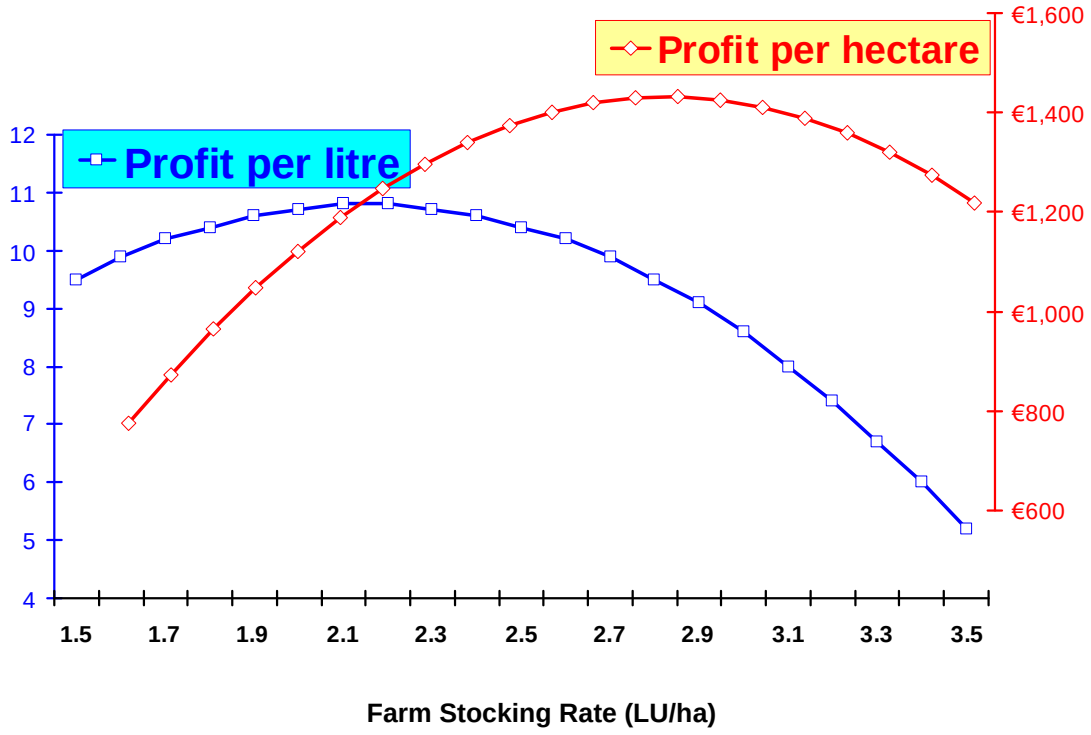
Finance is the third area where technology adoption will improve dairy profitability. Put simply farmers who plan and monitor their finances closely are more profitable. In Figure 9 the data shows that farms with the lowest cost of production tend to be more profitable per litre.

Figure 9. Association between milk production costs and net profit (€/kg milk solids) for dairy farms.



This message is relevant where milk quotas continue to constrain milk production. However the message is slightly different in a non-quota environment. When the same data set is analysed on a per hectare basis, net profit per hectare is maximised at a higher cost level than for net profit per litre as presented in Figure 10.

Figure 10. Trends in net profit per litre and per hectare at different stocking rates and costs of production.



The data in Figure 10 indicates that profit per litre is optimised at a stocking rate of approximately 2.0 – 2.2 livestock units per hectare which is of relevance to quota constrained farms because above this level, costs tend to increase and net profit per

litre diminishes. However where milk quota is not a limiting constraint, profit per hectare tends to increase to approximately 2.8 – 3.2 livestock units per hectare because a declining net margin per litre is more than compensated for by increasing volume sales and thus a higher net margin per hectare is obtained. The most important message in all of this is that farmers who know what their costs of production are will make better management and more profitable decisions as the data in Table 3 shows.

Table 3. The costs and profitability of Irish dairy farmers nationally, on the farms of Profit Monitor users and on the farms of the 10% of Profit Monitor users ranked by net profit per litre in 2010.

	National average	**Profit Monitor Average**	**Top 10% Profit Monitor**
Gross output (p/litre)	26.3	26.5	28.1
Variable costs (p/litre)	10.0	9.0	7.3
Fixed costs (p/litre)	9.1	7.8	5.4
Net profit (p/litre)	**7.2**	**9.7**	**15.5**
Net profit (£/100 cows)	**36,000**	**51,000**	**84,000**

Profit Monitor is a system of analysing the financial performance of farmers in Ireland. Approximately 2,000 dairy farmer clients use the system on an annual basis to benchmark their performance. Analysis of the data consistently shows that farmers who complete Profit Monitor are more profitable than the national average – in 2010, they made an additional £15,000 per 100 dairy cows compared with the national average. The top 10% of users made £48,000 more per 100 cows. This suggests that farmers who analyse their financial performance tend to be more profitable than farmers who are less cost aware. While it is unlikely that the Profit Monitor system is available to non-Irish dairy farmers, there are many other financial analysis packages available for use around the world allowing you to benchmark your data against the best dairy farmers in your country.

Summary

Three key messages to take from this paper are as follows

1. Identify the cheapest feedstuffs available to you and use them to the maximum – in Ireland it's grazed grass and the most profitable farmers are those exploiting it to the maximum.
2. Breed the most genetically fit for purpose herd of cows that you can – our experience is that a breeding index balanced for the most economically important traits is the most profitable breeding index to adopt.
3. Develop a focus on financial planning and monitoring – doing so will help to ensure that your dairy production system becomes more profitable.

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