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Grassland performance and its relationship with profitability on 10 Northern Ireland dairy farms

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OVERALL SUMMARY

- Dairy farming within Northern Ireland is increasingly vulnerable to volatility in world milk price. The long term survival of individual farm businesses will depend on controlling costs of production and achieving high levels of technical efficiency.
- On many farms the decreasing reliance on home produced forages, especially grazed grass, has resulted in more costly production systems being adopted. In addition, expertise in grassland management varies considerably between farms. As grazed grass remains the lowest cost feed available on livestock farms, relationships between grassland performance and profitability are expected.
- Thus this project was established on ten commercial dairy farms to identify relationships between grassland performance, cow performance and farm profitability.
- The ten farms were selected to provide a geographical spread around Northern Ireland, and a wide range of performance levels, including:
  - herd size (74 – 187 cows)
  - milk sold per cow per year (4,910 – 8,700 litres/cow)
  - concentrates fed (760 – 2,550 kg/cow/year)
  - milk production from forage (2,260 – 4,550 litres/cow/year).
- Physical and financial performance within the ten farms was monitored over three years. This involved monthly measurements of grassland performance during the grazing season, while physical and financial records were collected at the end of each year.
- Information collected has resulted in the following key messages:

1. Increasing scale is not necessarily associated with increased profit per cow. Provided costs are controlled, medium sized family run dairy farms within Northern Ireland are, and can, remain profitable and have a viable long term future.
2. Profitable milk production is not driven by maximising milk output per cow. A wide range of production systems can be profitable provided a high level of technical efficiency is achieved.
3. Improving milk composition by using proven high component sires can have a long term positive effect on the value of each litre of milk produced.
4. Timely turnout in spring will help ensure that grass swards are properly grazed during the first grazing cycle and enable pre- and post-grazing herbage mass targets to be achieved.
5. Grazing grass at the optimum growth stage will result in higher intakes of higher quality pasture, higher milk yields, less herbage wastage and higher quality

regrowths. Grazing poor quality pasture can result in a loss of income of up to £1.25 per cow per day.

6. In order to optimise the inclusion of grazed grass in the diet, ensure that farm infrastructure is set up to allow flexible access to grazing areas, and take full advantage of grazing opportunities when they arise.
7. Improve concentrate use efficiency by offering high quality pasture and high quality silage.
8. Target concentrates to cows with the genetic potential to respond and do not overfeed lower yielding and late lactation cows.
9. Each 1,000 litre increase in milk from forage is associated with an increase in profitability of £120/cow. Grassland farms in Northern Ireland should seek to improve milk from forage through improved grassland management, improved silage quality and improved concentrate use efficiency.
10. Benchmarking data highlights that a wide range of production systems can be profitable.
11. Keep focused on key aspects of your farm business at all times.

BACKGROUND

The Northern Ireland dairy industry has changed significantly during the last 20 years. For example, average herd size has increased, with 60% of dairy cows in Northern Ireland now managed in herds of more than 100 cows. In addition, the genetic merit of most dairy herds has increased during this time, with an associated increase in milk yield per cow and concentrate use. However, some of these changes have contributed to an increase in the costs of production, which, given ongoing volatility in milk markets, creates a challenge for long term sustainability.

One example of increasing production costs can be attributed to the decreasing reliance on home produced forages, especially grazed grass, on many farms. As grazed grass remains the lowest cost feed available on farms, it might be expected that relationships would exist between grassland performance and farm profitability. However, most farm monitoring schemes do not collect data on grassland performance, focusing instead on cow performance and financial information. Thus this project was established to provide information on the relationships between grassland performance, cow performance and financial performance. Because of the intensity of measurements undertaken within this project, the work was restricted to 10 dairy farms.

Objective of this experiment
To measure grassland performance on ten Northern Ireland dairy farms and to examine if relationships exist between grassland performance and farm profitability.

DESCRIPTION OF STUDY

Farm selection
Ten farms were selected from within the 300 farms participating in the Greenmount Dairy Benchmarking Programme in 2005. Farms were selected to provide a geographical spread across Northern Ireland, a range of soil types, herd sizes, calving patterns, and physical performance levels. The location of the 10 farms are presented in Figure 1. Physical and financial performance data were collected from the farms during three successive years (April 2006 - March 2009).

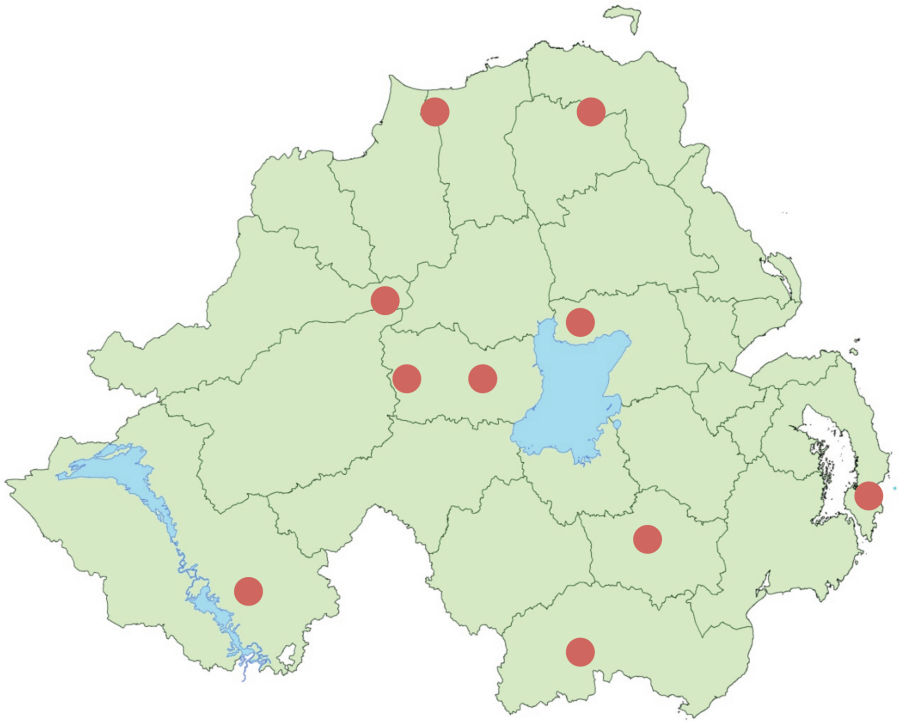

Figure 1: The location of the 10 participating farms

Collection of grassland management information
Information on grassland management was collected during monthly visits (from April to October) by staff from AFBI Hillsborough and CAFRE Greenmount. During each visit grass heights within all paddocks within the grazing area were measured using a rising plate meter. This allowed the quantity of grass that cows were being offered (pre-grazing herbage mass), the quantity of grass they were leaving after grazing (post-grazing herbage mass), the average quantity of grass on the grazing platform (average farm cover), and herbage utilization efficiency to be determined. The grazing stocking rate was also calculated at each visit based on the area available for grazing and the number of cows in the herd at that time.

Collection of financial information
All financial data were obtained through Benchmarking. Data obtained included the total area being farmed, stock numbers, labour input, calving pattern, volume and quality of milk sold, average milk price received, total variable costs and overhead costs. Total variable costs included concentrate, forage, vet and medicine, AI and miscellaneous costs. Overhead costs included common costs (machinery, contractor, depreciation, electric/water/phone, property repairs and miscellaneous costs), paid labour, conacre and interest charges on bank loans. This information was used to calculate a 'common margin' (£/cow, £/ha and ppl) for each farm. The common margin was calculated by subtracting the common costs from the value of the total output (milk, calf and cull cow sales). The costs associated with labour, conacre and finance were not included in the calculation of common margin.

OUTCOMES

Description of the ten farms
The average herd size was 111 cows, with herd size ranging from 74 – 187 cows (Table 1). The wide range of milk yields (4,910 to 8,700 litres/cow/year) reflect the diverse range of systems adopted across the ten farms. Four of the farms had a compact calving pattern (more than 60% of cows calving within 12 weeks), with three of these 'spring calving' while one farm was exclusively autumn calving. The other six farms had a spread calving pattern. Average annual concentrate feed levels ranged from 760 to 2,550 kg/cow, while milk from forage ranged from 2,260 to 4,550 litres/cow/year (mean of 2,960 litres/cow/year).

The ten farms were representative of benchmarked farms in terms of herd size, performance per cow and milk composition. However, the annual concentrate input on these farms was 400 kg/cow lower than the mean of the benchmarked farms, resulting

in milk production from forage being 38% higher than the mean of benchmarked farms. Thus in terms of feed use efficiency, these farms were well ahead of the average Northern Ireland dairy farm, a reflection of the farm selection criteria adopted.

Table 1 Average performance data, and the range of values for the ten farms over the three years of the study

	3 year average across all farms	Range between farms Minimum	Maximum
Herd size (cows)	111	74	187
Milk yield (litres/cow/year)	6890	4910	8700
Milk fat content (%)	4.09	3.55	4.52
Milk protein content (%)	3.29	2.99	3.57
Milk from forage (litres/cow/year)	2960	2260	4550
Concentrates fed (kg/cow/year)	1770	760	2550
Milk price (ppl)	21.0	19.5	22.6

Relationship between herd size and profitability

- Although average herd size continues to increase, most Northern Ireland dairy farms remain 'family run' businesses.
- In common with the full benchmarking dataset (Figure 2), the results of this study provided no evidence of any improvement in common margin due to increasing herd size.
- In general, as cow numbers increase, the availability of land which is accessible for grazing becomes a major constraint. Consequently, management systems with these larger herds tends to become more intensive and milk from forage is reduced. The overall outcome is frequently little or no improvement in profitability per cow.
- Any increase in scale must be associated with maintaining or increasing the efficiency of the production system.
- However, farm profit is a combination of margin per litre and volume of milk sold per farm. Thus while herd size tends not to be closely related to margin per cow, smaller herds are increasingly unlikely to be able to provide a family with an acceptable standard of living.

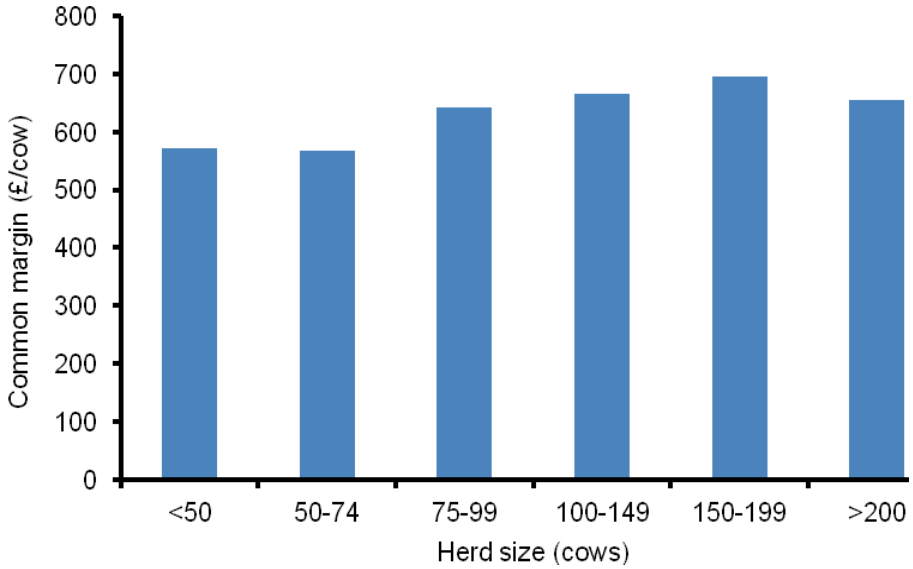

Figure 2 The relationship between profit/cow (£/cow) and herd size within CAFRE Benchmarking

KEY MESSAGE
Increasing scale will not necessarily result in an increased profit per cow. Provided costs are controlled, medium sized family run dairy farms within Northern Ireland are and can remain profitable, and have a viable long term future.

Relationship between milk yield per cow and profitability

- Many farmers use milk production targets to benchmark their businesses. However, no relationship was identified between the total volume of milk sold per year and common margin, or between annual milk yield per cow (Figure 3) and common margin.
- This agrees with the overall trends within CAFRE Benchmarking and is likely due to an increase in concentrate costs and total variable costs with increasing milk yield. Nevertheless, the most profitable 25% of farmers within Benchmarking do tend to have higher milk yields per cow. However, this is not due to these farmers 'chasing' yield, but rather due to their overall higher levels of technical

performance/efficiency.

- Higher milk yield systems can however be more profitable when milk price is high, while lower milk yield systems can be more profitable when milk price is low.

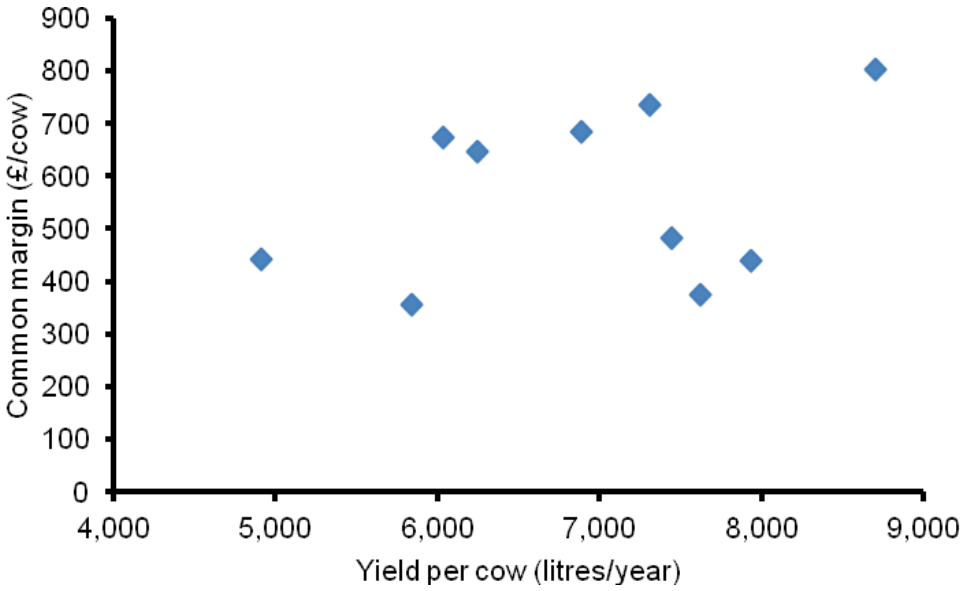

Figure 3 No relationship was identified between average annual milk yield per cow and common margin (£/cow)

KEY MESSAGE

Profitable milk production is not driven by maximising milk output/cow. A wide range of Northern Ireland milk production systems, involving a wide range of milk yield levels, can be profitable provided the system adopted is appropriate for the farm and the type of cow on the farm, and a high level of technical efficiency is achieved.

Relationship between milk price and profitability

- As a result of market factors, average milk price varied considerably over the three years of the study, being highest during Year 2 (24.0 ppl) and lowest during Year 1 (17.1 ppl).
- However, within any one year milk price varied by more than 3 ppl between the farm with the highest and lowest milk price, with this range in milk price largely driven by differences in milk quality (Figure 4). While nutrition may have contributed to these quality differences, cow genotype is likely to have been the predominant factor. Selecting sires with the ability to improve milk composition will have a long term effect on the value of each litre of milk produced.

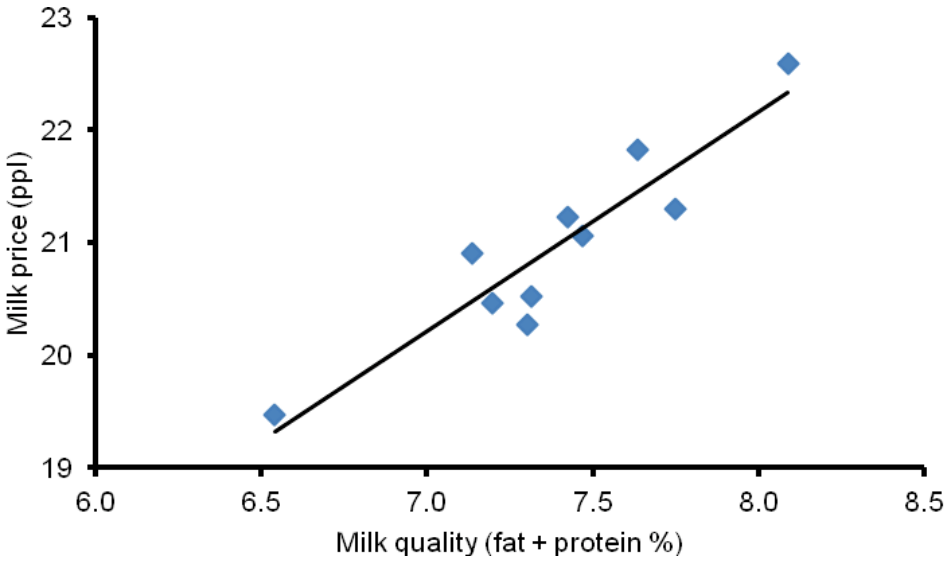

Figure 4 Relationship between milk composition (fat plus protein %) and average milk price on each of the ten farms.

KEY MESSAGE

Improving milk composition by using proven high component sires can have a long term positive effect on the value of each litre of milk produced.

Grassland management on the ten farms

- Despite a climate that is ideally suited to the production of large quantities of grass, efficient utilisation of grass within grazing systems can be challenging.
- Across the ten farms a range of grassland performances was observed (Table 2).

Table 2 Key grassland performance indicators measured across the ten farms during the period from April to September

	3 year average across all farms	Range between farms* Minimum	Maximum
Full time grazing days	150	0	244
Total grazing days (full time + part time)	204	174	285
Sward measurements (kg DM/ha)			
Pre-grazing herbage mass	4,400	3,400	5,100
Post-grazing herbage mass	2,300	1,800	2,500
Average farm cover	3,400	2,500	3,900
Grazing stocking rate (cows/ha)	4.0	3.1	6.0
Grass utilisation (%)	75	70	90
Average quality of grazed grass			
Metabolisable energy (MJ/kg DM)	11.2	10.7	11.6
Crude protein (g/kg DM)	186	143	203
Mean concentrate feed level (kg/cow/day)	3.8	0.7	6.7

* Minimum and maximum values are not from the same farm

Pre- and post-grazing targets

- Grazing grass at the correct stage of growth, and grazing to the correct residual sward height, are two key principles of grassland management. It is generally accepted that a target pre-grazing herbage mass (above ground level) of 3,000 – 3,300 kg DM/ha, and a target post-grazing herbage mass of 1,600 – 1,800 kg DM/ha, will optimise milk output per hectare without an unacceptable compromise in individual animal performance. These targets are demonstrated in the photographs in Figure 5.
- However, in general herbage masses recorded on the farms were in excess of these targets (Table 2), with grass surpluses measured during May and June being particularly excessive (Figure 6).

Figure 5 Example of optimum pre- and post-grazing herbage masses

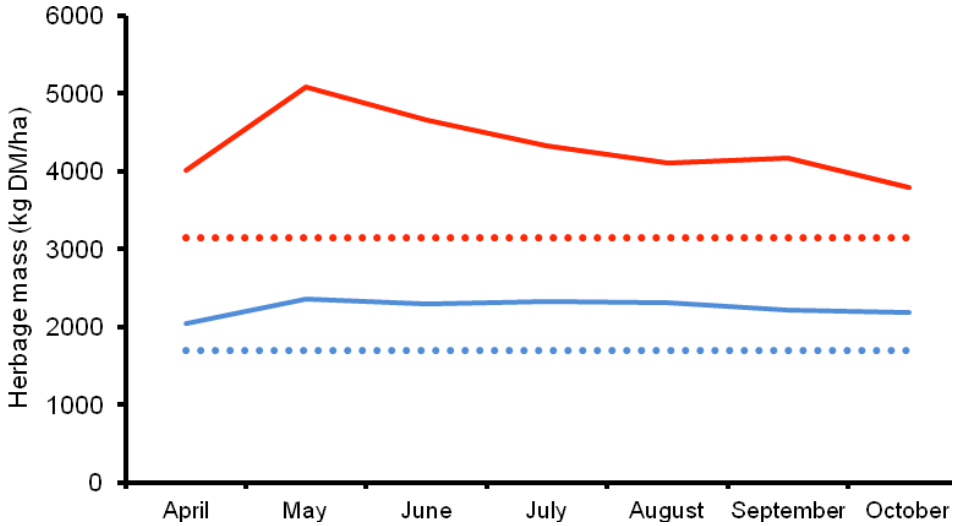

Figure 6 Monthly pre- (solid red line) and post-grazing (solid blue line) herbage mass (mean of the ten farms) over the three years of the study, with 'target' herbage masses shown as dotted lines

- These excessively high early season herbage masses are likely due in part to a delay in turnout date. Delayed turnout combined with the surge in early season growth often leaves cows struggling through heavy covers during May and June. This can be a particular problem if cows are not turned out until there is 'adequate' grass cover across the entire grazing area. In this situation, while grazing covers may be 'ideal' when cows are initially turned out in mid-April, by the time cows get to the end of the first grazing cycle, grass covers may already be too high.
- Thus, a key grassland target (on most farms) should be to have the core grazing area grazed by mid to late April. This will help ensure that a 'grazing wedge' is established for the second grazing cycle, and that all fields are not at the optimal grazing stage at the same time. Failing to finish the first rotation on target will mean that as grass growth hits its annual peak, it will be very difficult to achieve target pre-grazing and post-grazing grass covers. Grazing high covers of poor quality grass in early May will compromise herbage quality into mid and late season.

KEY MESSAGE
Timely turnout in the spring will help ensure that swards are properly grazed during the first grazing cycle and that grass surpluses are less likely to arise during the peak in grass growth through April/May.

Sward quality

- Grazing grass at the optimum growth stage (3,000 – 3,300 kg DM/ha) will lead to higher herbage intakes. In addition, each mouthful of grass eaten will contain more energy. This was demonstrated within this study (Figure 7) with an increase in pre-grazing herbage mass associated with a decline in herbage metabolisable energy content.
- When cows graze swards with high pre-grazing covers, the lower intakes and poorer quality herbage can result in a loss of over 5.0 litres of milk/cow/day.
- In addition, high herbage mass swards will be poorly grazed, resulting in high levels of herbage wastage, slower sward recovery, poor quality regrowths during the next grazing cycle or the expense of having to remove uneaten grass from the grazing platform.
- Herbage utilization figures ranged from 70-90% in this study. This means that on one farm up to 30% of herbage grown was wasted in the field, while on another farm, only 10% of herbage grown was wasted.

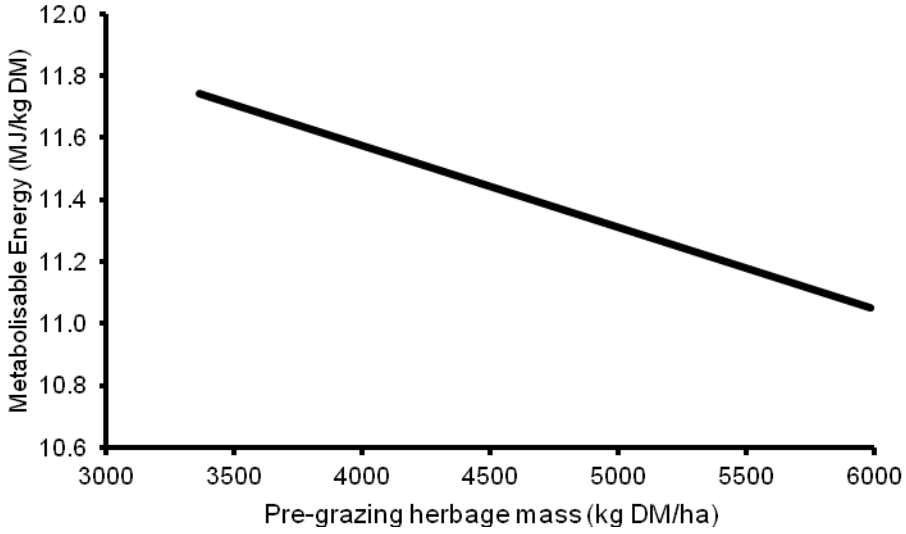

Figure 7 The relationship between pre-grazing herbage mass and average metabolisable energy content of herbage in early season (April, May, June)

KEY MESSAGE
Grazing grass at the optimum growth stage will result in higher intakes of higher quality pasture, higher milk yields, less herbage wastage and higher quality regrowths. Grazing poor quality pasture can result in a loss of income of up to £1.25/cow/day (5 litres milk at 25ppl)

Relationship between grazing days and profitability

- Herds grazed full-time for an average of 150 days, although on one farm there were 244 days of full time grazing, while on another farm cows were housed overnight throughout the grazing season.
- As the number of grazing days increased (full time and part time), common margin also increased (Figure 8). This is likely to reflect an increased reliance on lower cost grazed grass on the farms with the greatest number of grazing days.
- In addition, timely turnout in the spring, together with well managed autumn grazing, is likely to result in higher quality pasture throughout the season, and increased milk from forage.
- Strategies to increase 'grazing days' include the use of extended grazing techniques during difficult grazing conditions. This includes having sufficient cow laneways to allow cows to access the fields via alternating entry/exit points, and ensuring there are adequate water troughs to allow back fences to be used and allow fresh grass to be allocated in square blocks after each milking.

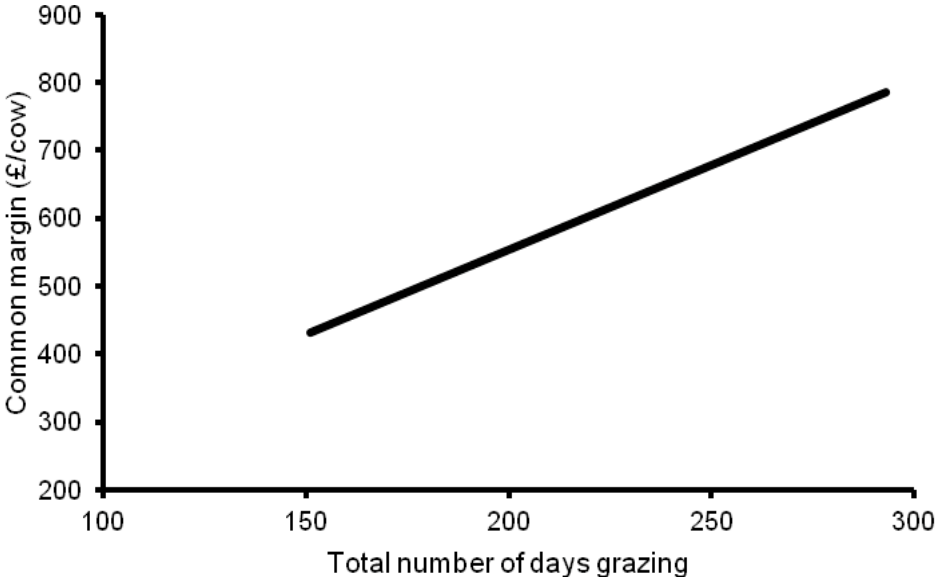

Figure 8 Relationship between the total number of days grazing (full time and part time) and common margin (£/cow) on the ten farms

KEY MESSAGE
In order to optimise the inclusion of grazed grass in the diet ensure that your farm infrastructure is set up to allow flexible access to grazing areas, and take full advantage of grazing opportunities when they arise.

Relationship between grazing stocking rate and profitability

- No relationship was identified between grazing stocking rate and common margin in early season (April, May, June). However, farms with a higher stocking rate in late season (July, August and September) had a lower common margin (Figure 9).
- Higher grazing stocking rates were generally associated with the more intensive milk production systems, which involved higher concentrate inputs and ensiled forages during the summer.

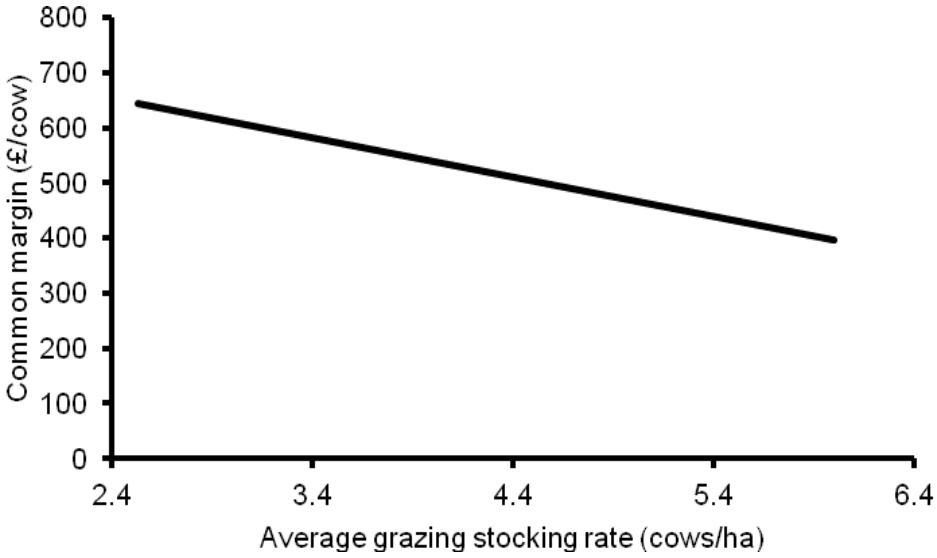

Figure 9 Relationship between average grazing stocking rate in late season (July, August and September) and common margin (£/cow) for the ten farms.

KEY MESSAGE

An increased focus on optimising production from grazed grass has the potential to improve the margins generated from milk production.

Making efficient use of concentrates

- While concentrates represent between 60 – 70% of total variable costs on the average Northern Ireland farm, the efficiency of concentrate use varies widely from farm to farm.
- This is clearly demonstrated in Figure 10 using the full benchmarking data set. For example, if we examine farms where annual concentrate inputs were approximately 2000 kg/cow/year, a huge range of performance levels exist. Some farms are achieving annual milk yields of 5,000 litres/cow at this level of concentrate input (red circle), while others are achieving in excess of 8,000 litres/cow (green circle).
- Factors contributing to the variation in concentrate use efficiency include:
  1. Grazing management
  2. Silage quality
  3. Targeted use of concentrates to cows with the genetic potential to respond

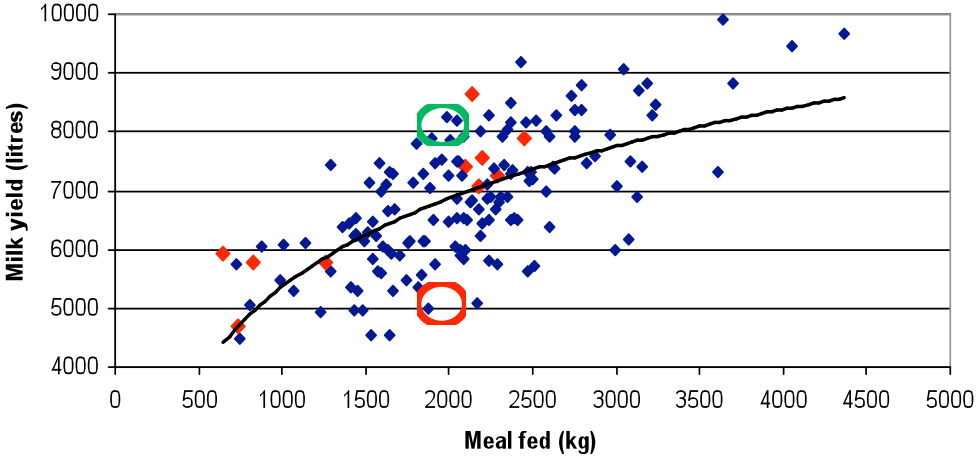

Figure 10 The relationship between milk yield (litres/cow/year) and concentrates fed (kg/cow/year) for all Benchmarked farms (with the 10 study farms highlighted by red dots)

- Despite pre- and post-grazing herbage masses on most of the ten farms being above the 'targets' presented earlier, concentrate use efficiency on these farms was either average or above average. This suggests that there are many Northern Ireland farms where grassland performance is much poorer than on the 10 study farms.
- While this project primarily focused on grazing management, the quality of forage offered during the winter will have a huge impact on concentrate use efficiency. High quality grass silage should be a target on all dairy farms.

KEY MESSAGE

Improve concentrate use efficiency by offering high quality pasture and high quality grass silage. Target concentrates to cows with the genetic potential to respond and do not overfeed lower yielding and late lactation cows.

Relationship between milk from forage and profitability

- A high concentrate use efficiency is normally reflected in a high 'milk from forage' value. Milk from forage provides a simple estimate of the proportion of milk on the farm produced from forage, and is calculated by dividing the average annual concentrate input per cow by 0.45, and subtracting this value from the annual milk output/cow. For example, for a farm producing 6,700 litres/cow/year from 1500 kg concentrate/cow/year, 'milk from forage' is calculated as:

6,700 – (1500 x 0.45) = 3,370 litres milk/cow/year from forage.

- No relationship was identified between milk from forage and profitability on the ten study farms, with this a reflection of the small number of farms on the study. However, when the full benchmarking dataset is examined (Figure 11) a clear relationship between milk from forage and profit/cow is identified.
- For every 1000 litre improvement in milk from forage, common margin increased by £120/cow/year

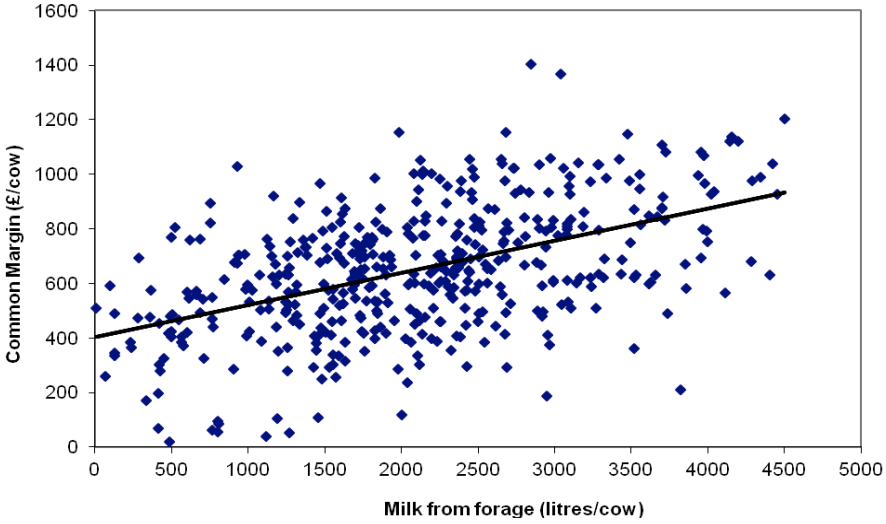

Figure 11 The relationship between milk from forage and common margin per cow from CAFRE Benchmarking)

KEY MESSAGE
Grassland farms in Northern Ireland should seek to improve milk from forage by improving grazing management and silage quality and through targeted use of concentrate feeding.

Relationship between production system and profitability

- The 10 farms examined represented a diverse range of milk production systems. These ranged from low input spring calving systems to high input partial confinement systems.
- The results of this study highlight that it is possible to achieve a similar common margin per cow across a range of production systems. For example, the two farms highlighted in Figure 12 were consistently among those with the highest common margin during the study, while operating two very different production systems. On Farm A an annual milk production of 6,000 litres/cow was achieved from a concentrate input of 1.0 t/cow/year within a spring calving system. In contrast, on Farm B an annual milk production of 8,700 litres/cow/year was achieved from a concentrate input of 2.3 t/cow/year, with cows calving throughout the autumn, winter and spring period.
- However, one similarity between these two farms was their milk production from forage, with both farms achieving in excess of 3,500 litres milk from forage.

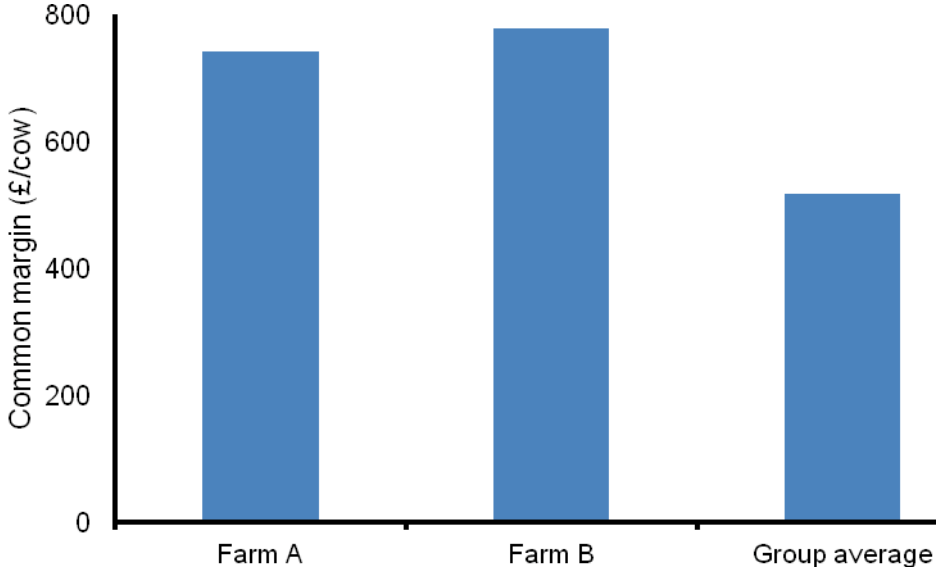

Figure 12 Common margin achieved on two farms (Farm A and B) operating very different milk production systems, compared to the group average.

- This finding is supported by CAFRE benchmarking, the results of which clearly demonstrate that the most profitable 25% of Benchmarked farms encompass a diverse range of production systems (5,800 – 9,700 litres/cow/year).
- Thus system does not appear to be a key driver of profitability. Rather, profitability will be increased by getting as many aspects of the system as possible correct, having cow genetics that suit the system, having an understanding of the key measures that are required within that system, and having the correct information with which to make sound business decisions.
- The importance of having the right cow for the system is highlighted within the ten monitored farms. On Farm A, a mainly crossbred herd comprising Jersey and New Zealand Holstein genetics has been bred to ensure that grazed grass is efficiently utilised within the spring calving system. In contrast, Farm B has bred a cow that can achieve high intakes of forage during the winter months and utilise grazed grass during the summer months, while having the genetic potential to respond to moderate/high concentrate inputs.

KEY MESSAGE

Benchmarking data highlights that a wide range of production systems can be profitable. Profitability tends not to be driven by type of system, but rather by ensuring a high level of technical efficiency and excellent management across all aspects of the farm business.

Keeping focused and remaining profitable

- After making an adjustment for differences in milk price between years, common margins tended to remain relatively constant on most of the ten farms across the three years of the study. However, on a small number of farms common margin declined dramatically during one of the three years.
- There was evidence that if there were significant changes occurring within the farm businesses due to building projects, animal disease issues or personal circumstances, technical performance slipped and this had a detrimental effect on herd profitability
- This served to demonstrate how legitimate 'distractions' can easily cause farms to 'lose focus' on key management decisions, and have a negative effect on profit.
- The successful management of a farm business requires a flexible attitude, a flexible cow, adequate planning, attention to detail and ensuring the performance of the business is being measured, as you 'cannot manage what you do not measure.'

KEY MESSAGE

Keep focused on key aspects of your farm business at all times.

Analysis of common data from Northern Ireland and the Republic of Ireland

- The ten farms on this study were part of a larger project in which an additional 16 dairy farms in the Northeast and Northwest of the Republic of Ireland were monitored by TEAGASC.
- Table 3 compares some of the key herd and grassland performance data from the two sets of farms. In general, the farms in Northern Ireland had larger herd sizes, higher milk yields per cow and produced milk with a higher fat content than the farms in the Republic of Ireland. However, the Northern Ireland cows were fed over 0.5 t more concentrates/cow/year to achieve this higher level of production. As a result, milk produced from forage was over 300 litres/cow/year lower on the Northern Ireland farms.
- Furthermore, the herds in the Republic of Ireland grazed swards with lower herbage masses, and grazed these tighter, than herds in Northern Ireland. This was reflected in a higher grass utilisation efficiency in the Republic of Ireland.
- An analysis of the combined datasets reinforces many of the trends already highlighted within this booklet, namely that milk yield and herd size were not related to common margin, but that increased milk produced from forage had a positive effect on common margin (ppl) (Figure 13).

Table 3 A comparison of key herd and grassland performance indicators on the 10 farms in Northern Ireland and the 16 farms in the Republic of Ireland.

	Northern Ireland farms	Republic of Ireland farms
Herd size (cows)	111	69
Yield per cow (litres/cow/year)	6,890	6,000
Milk fat (%)	4.09	3.81
Milk protein (%)	3.29	3.31
Concentrate fed per cow (kg/year)	1,770	1,220
Milk from forage (litres/cow/year)	2,960	3,300
Sward measurements (kg DM/ha)		
Pre-grazing herbage mass*	4,500	3,000
Post-grazing herbage mass*	2,300	1,700
Grass utilisation (%)	76	84

* measured by rising plate meter in Northern Ireland and by 'eyeball' in the Republic of Ireland

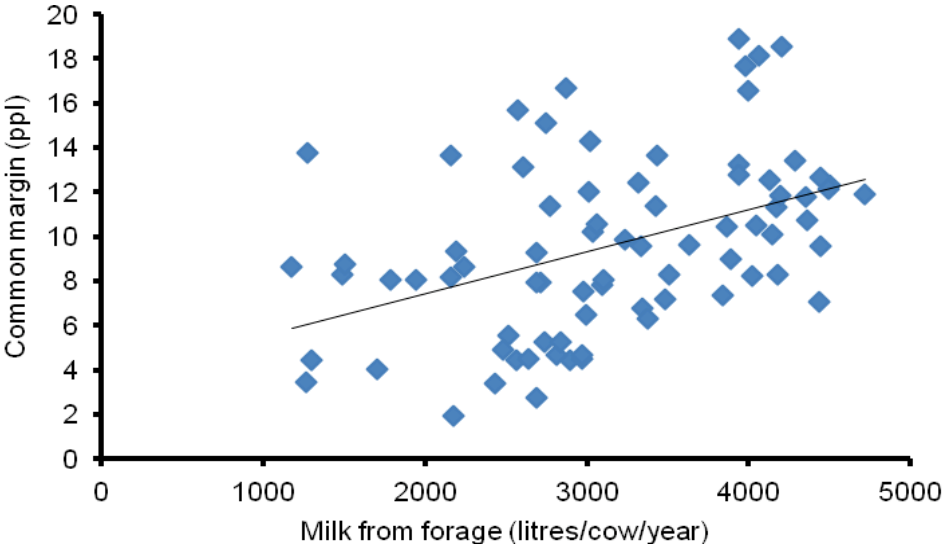

Figure 13 The relationship between milk produced from forage and common margin (ppl) on the twenty six farms monitored within Northern Ireland and the Republic of Ireland.

KEY MESSAGE
When data from Northern Ireland and the Republic of Ireland are combined, once again milk from forage is seen to be a key driver of profitability.

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AGRISEARCH BOOKLETS

1 SHEEP
The Effects of Genetics of Lowland Cross-Bred Ewes and Terminal Sires on Lamb Output and Carcass Quality

2 DAIRY
A Comparison of Four Grassland-Based Systems of Milk Production for Winter Calving High Genetic Merit Dairy Cows

3 DAIRY
Dairy Herd Fertility - Examination of Effects of Increasing Genetic Merit and other Herd Factors on Reproductive Performance

4 SHEEP
Developing Low Cost 'Natural-Care' Systems of Sheep Production

5 BEEF
An Examination of Factors affecting the Cleanliness of Housed Beef Cattle

6 BEEF
The Effects of Housing System on Performance, Behaviour and Welfare of Beef Cattle

7 DAIRY
Developing Improved Heifer Rearing Systems

8 BEEF
The Influence of Suckler Cow Genetics and Terminal Sire on Performance of the Suckler Herd

9 DAIRY/ BEEF
Reducing Organic Nitrogen Outputs from Dairy Cows and Beef Cattle in Nitrate Vulnerable Zones

10 DAIRY
The Effect of the Type of Dietary Supplement on the Performance of the Grazing Dairy Cow

11 DAIRY
Are International Dairy Sire Genetic Evaluations Relevant to Milk Production Systems in Northern Ireland?

12 DAIRY/ BEEF
Holstein Bull Beef

13 DAIRY
Effective Footbathing of Dairy Cows

14 DAIRY
Effects of Feeding Forage Maize and Whole Crop Silages on the Performance of Dairy Cows Offered Two Qualities of Grass silage

15 BEEF
Maximising Beef Output from the Suckler Herd Through the Production of Heavy Bulls

16 DAIRY
The Effect of Reducing the Protein Content of the Diet on the Performance of Dairy Cows

17 DAIRY
Comparisons of Dairy Cow Management Strategies which Differ in Labour Inputs

18 DAIRY
Reducing Phosphorous Levels in Dairy Cow Diets

19 DAIRY
The Effect of Applying Slurry During the Grazing Season on Dairy Cow Performance

20 BEEF
Contribution of Meat (Beef and Lamb) From Grass-Fed

21 BEEF
Maximising Returns from Beef Sourced from the Dairy Herd

22 DAIRY
A Comparison of the Performance of Holstein-Friesian and Norwegian Red cows on Northern Ireland Dairy Farms

23 DAIRY
The Effect of a Number of Novel Supplementation Strategies on Milk Production and Fertility of High Yielding Dairy Cows

24 DAIRY
A Comparison of the Performance of Holstein-Friesian and Jersey Crossbred Cows across a Range of Northern Ireland Production Systems

25 DAIRY (available December 2012)
The Effect of Applying Cattle Slurry as the Sole Source of Nutrients over a Four Year Period on the Yield and Persistency of Seven Perennial Forage Crops

26 DAIRY (available December 2012)
Grassland performance and its relationship with profitability on 10 Northern Ireland dairy farms

For further information or to request a copy of the the full scientific report detailing the experimental tests and statistical analysis contact

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