

Improving Through Feeding

feeding⁺

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- *Understanding the importance of feeding improvement.*
- *Exploring the main avenues for improved feeding.*
- *Appreciating the value of productivity and production gains.*

As by far the largest dairy herd cost, feeding almost certainly offers the greatest potential for improving profitability on the vast majority of UK units.

Compared to breeding, fertility or other key aspects of herd management which have a longer term impact, the financial effects of changes in feeding are generally apparent within a relatively short space of time.

As well as immediate economic effects, feeding adjustments can have a profound effect on labour requirements, machinery and other overhead costs, herd health and fertility and environmental impact – both positive and negative.

For the greatest value, therefore, all changes to herd feeding need to be made with particular care, based upon firm improvement objectives, a thorough understanding of dairy nutrition, a full appreciation of likely consequences and a commitment to continual monitoring.

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Summary

- *Meeting the nutritional needs of cows through their lives as completely and cost-effectively as possible is the primary purpose of dairy feeding.*
- *The key to success with dairy feeding is invariably in the way it is implemented rather than the system itself.*
- *Given the sheer scale of the costs involved, a relatively small change in the efficiency of dairy feeding can have a major effect on herd profitability.*
- *Improving the physical and financial efficiency with which dairy feeds are utilised for milk production is one of the best opportunities most herds have to boost profitability.*
- *In most cases it pays to maximise the use of home-grown forages by well-planned and managed production, conservation and utilisation.*
- *Valuable cost savings can also be made by the careful selection, purchasing, storage and handling of both concentrate and moist feeds.*
- *The correct balancing of feeds in daily diets that give the most efficient rumen fermentation also offers considerable potential for feeding efficiency improvement.*
- *It is important to focus improvements on maximising overall herd productivity rather than just lactation performance.*
- *As the vital transition from one lactation to another, improved dry cow feeding has an important role to play in dairy health and fertility as well as efficient milk production.*
- *The best possible youngstock feeding is also crucial for the greatest overall herd productivity.*

See also

Section 2: Planning Your Nutrition

Section 3: Planning Your Feeding

Section 4: Assessing Your Feed Options

Section 5: Managing Your Forage Feeds

Section 6: Managing Your Non-Forage Feeds

Section 7: Managing Your Feeding

Section 8: Managing Organic Feeding

Section 9: Managing Dry Cow Feeding

Section 10: Managing Youngstock Feeding



Action Plan

To appreciate your potential gains and opportunities for improved feeding.

1 Assess Your Present Feeding System

Examine your current feeding system critically for the extent to which it meets your objectives and makes the most of your resources.

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2 Explore Your Current Feeding Position

Evaluate your current feeding performance against national benchmarks and your potential for placing greater reliance on home-grown forage.

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3 Evaluate Your Feeding Improvement Opportunities

Assess the opportunities you have to reduce feed costs and improve both feed efficiency and overall herd productivity.

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The *grass+* programme provides practical advice on making the most of grass.

The *breeding+* programme provides practical advice on improving through breeding.

The *pd+* programme provides practical advice on improving herd fertility.

The MDC heifer rearing workbook is a CD-based tool allowing costed comparisons to be made between different systems for specific farm circumstances.

The MDC What If? workshop package allows individual herds to explore their opportunities for change in more detail by taking an intense look at their current accounts and testing future options through a sophisticated computer model.



Feeding Essentials

- Meeting the nutritional needs of cows through their lives as completely and cost-effectively as possible is the primary purpose of dairy feeding.

As well as the most economic production of milk to the requirements of the particular supply contract, youngstock rearing and milking and dry cow nutrition must be geared to ensuring the healthiest and most fertile stock for the greatest overall herd productivity (Section 2).

A wide variety of different feeding systems are employed across the UK to deliver the required nutrition.

Each system has its own strengths and limitations (Section 3), its suitability for any unit depending upon:

- The objectives of the owner/manager;
- The type and performance potential of the stock;
- The facilities and resources available; and,
- The requirements of the milk contract.

In addition to nutrition, labour is a crucial consideration in achieving the most cost-effective dairy feeding, given its major contribution to total costs.

Rule of Thumb

For a 200 cow herd averaging 7000 litres/cow a saving of just one hour per day in feeding time can be worth 0.25ppl.

Some feeding systems require much more labour than others, with simplicity being a major advantage in reliability as much as time-saving.

Even with the most labour-intensive feeding arrangements, a good layout of facilities can make all the difference.

While Total Mixed Ration (TMR) feeding continues to grow in popularity and is seldom out of the headlines, it is important to appreciate that many herds are achieving equally good physical and financial results with more traditional and lower capital cost feeding approaches.

- The key to success with dairy feeding is invariably in the way it is implemented rather than the system itself.

Feeding Costs

Purchased feeds are the largest variable cost on most units, even those which rely on large amounts of home-grown feeds.

When forage costs are taken into account, the overall feed bill typically represents at least 50% – and often more – of a dairy unit's variable costs and over 25% of its total costs (Table 1.1).

Add on the labour, machinery and storage costs of home-grown feeds, and the labour and equipment costs involved in physically allocating these and purchased feeds to the cows and feeding can easily amount to half a unit's entire annual cost.

Table 1.1: Milk Production Costs 2006/7

	p/litre
Variable Costs	
Herd replacements	1.47
Concentrate feeds	3.76
Bulk feeds	0.35
Forage costs	1.74
Bedding	0.31
Vet & medicines	0.64
AI & bull hire	0.46
Recording & consultancy	0.21
Consumable & dairy sundries	0.53
Contract work (excluding forage)	0.19
Casual labour	0.13
Milk quota leasing	0.03
Total Variable Costs	9.80
Fixed Costs	
Dairy specific labour	4.35
Forage labour	0.23
Direct machinery & equipment	1.33
Forage machinery	0.43
Dairy specific buildings	0.61
Purchased milk quota (annualised)	0.55
Field rent (net)	1.28
Interest	0.80
Total Fixed Costs	9.60
Overhead Costs	
Other employed labour	0.57
Machinery	0.21
Buildings	0.10
General Overheads	1.05
Total Overhead Costs	1.92
TOTAL COSTS	21.32

Figures may not add up due to rounding.

Source: British Milk: What Price 2007? National Farmers Union and Royal Association of British Dairy Farmers report, May 2007



- Given the sheer scale of the costs involved, a relatively small change in the efficiency of dairy feeding can have a major effect on herd profitability.

- At the same time, the inter-relationships between feeding, labour and machinery – not to mention less immediately tangible things like environmental impact and quality of life – mean that any feeding change may have important consequences for many other aspects of farm performance.

Any increases in forage costs – from additional fertiliser, silage-making or grassland management inputs – will, of course, offset this purchased feed saving.

Even so, more detailed studies have shown that herds producing around 2000 litres more milk per cow from grazed grass can save 1.3 p/litre in purchased feeds, leading to bottom-line profitability improvements of 0.7p/litre (Table 1.3).

Units need to be aware, however, that extra milk from grass or forage is no guarantee of performance improvement, as extra forage production costs can easily outweigh purchased feed savings.

This is more likely if more hired or family labour is required or major changes need to be made to feed storage or feeding systems to accommodate additional forage use.

Under many circumstances, relatively modest levels of milk production from forage or grazing can still be highly profitable if they allow higher stocking rates and total milk output per hectare.

Increasing Reliance on Forage

There is ample evidence to show that significant improvements in financial performance can be achieved through greater reliance on home-grown forage on many farms.

- A target of 7000 litres of milk per forage hectare should be achievable on most farms.

- Growing and utilising large amounts of good quality forage with the least possible wastage is more important than merely achieving high milk from forage figures.

Regardless of production level, dairy costings almost always show worthwhile reductions in concentrate and other purchased feed costs as a result of greater reliance on forage in general and grazed grass in particular (Table 1.2).

The grass+ programme provides practical advice on making the most of grass.

Table 1.2 Feeding and Herd Performance

Herd Performance Level	6000-7000 litres		7000-8000 litres		8000-9000 litres	
	25% highest	25% lowest	25% highest	25% lowest	25% highest	25% lowest
Milk from Grazing						
Yield (litres/cow)	6473	6625	7473	7625	8567	8485
Yield from forage (litres/cow)	3055	2083	3719	2266	3758	2104
Concentrate use (kg/cow)	1657	2147	1795	2400	2154	2536
Concentrate use (kg/litre)	0.26	0.32	0.24	0.31	0.25	0.30
Purchased feed cost (£/cow)	206	293	250	338	309	390
Purchased feed cost (p/litre)	3.18	4.42	3.35	4.43	3.61	4.60

Source: Kingshay Dairy Manager Costings, May 2007



Table 1.3: Performance of Herds at Different Levels of Milk from Grass

	25% Lowest milk from grazing	25% Highest milk from grazing	
Physical results			
Milk yield (litres/cow)	6818	6431	
Milk from grazing (litres/cow)	665	2612	
Milk from forage (litres/cow)	2480	3967	
Purchased feed (kg/cow)	1772	1176	
Financial results			Saving (p/litre)
Purchased feed (p/litre)	3.3	2.0	1.3
Forage, fertiliser (p/litre)	1.1	1.1	
Total variable costs (p/litre)	6.4	5.2	1.2
Total overhead costs (p/litre)	9.8	10.4	- 0.6
Total costs including calves and replacements	17.3	16.6	0.7

Source: Kingshay Profitable Milk Survey 2000

Feeding Improvements

- Improving the physical and financial efficiency with which the many dairy feeds available (Section 4) are utilised for milk production is one of the best opportunities most herds have to boost profitability.

Improved feeding efficiency can also have major benefits in minimising the environmental costs of dairying by increasing the efficiency with which fertiliser, fuel and other inputs are used to produce milk as well as reducing harmful methane and other emissions.

Feeding costs per litre can essentially be reduced by:

- Reducing the cost of the feeds used.
- Increasing the efficiency of feed usage.

Reducing Feed Costs

There are numerous opportunities available for reducing the cost of dairy feeds.

Home-grown forages or concentrates are usually cheaper than purchased feeds, provided reasonable yields can be achieved.

It is, however, important to cost out home-produced feeds carefully, since lower yields or higher production costs can make them more expensive than purchased alternatives, especially on units less well-suited to efficient arable cropping.

- In most cases it pays to maximise the use of home-grown forages by well-planned and managed production, conservation and utilisation (Section 5).

- This is particularly important in organic production systems (Section 8).



Good planning and effective management can significantly reduce the cost of forage feeds.

While economic increases in forage production can be achieved in most cases, reducing wastage in both grazing and conservation invariably offers the greatest opportunities for improvement on most units.

Avoidable waste in clamped grass silage production, for instance, can often account for 10% of the total dry matter, costing up to 0.35 pence per litre.

Cutting out this wastage will also reduce the amount of fertiliser and diesel used in milk production while cutting down on the carbon dioxide produced in aerobic silage spoilage.

Valuable cost savings can further be made by the careful selection, purchasing, storage and handling of both concentrate and moist feeds (Section 6).

Good planning should allow purchased feeds to be bought in the right quantity at the right time at the best prices.

Forward contracts provide a useful way of locking into attractive feed prices for delivery and payment up to 18 months ahead, but require good market intelligence to avoid costly mistakes.

Bulk buying with other farms can also give savings on many products but it is vital to agree tight specifications for manufactured products and carry out independent quality control checks.

While cost per unit of energy or protein is clearly critical in feed buying, continuity of supply, reliability of deliveries and attractiveness of credit arrangements can also be important considerations.

Effective storage and handling will play a major role in reducing unnecessary wastage of purchased feeds too.

Improving Feed Efficiency

Increasing milk output per unit of feed is a major improvement opportunity for every dairy unit, regardless of herd type or size.

Milk Yield

Milk yield has a direct effect on efficiency of energy utilisation per litre of milk.

Rule of Thumb

At an average yield of 6000 litres maintenance accounts for 30% of a cow's total energy use but at 8000 litres this drops to 25% – an extra 5% of the energy being used for milk production.

Higher yields mean less cows are needed to produce each million litres of milk, reducing labour and building costs as well as the amount of feed energy required in their production.

Producing the milk from fewer cows also means less methane produced by rumen fermentation as well as far less slurry, giving the potential for major environmental benefits.

Breeding

Breeding differences must be taken into account in ensuring the most efficient feeding, with some breeds considered better suited to some production systems than others.

Most importantly perhaps, long-term studies within the Holstein-Friesian breed have shown cows consistently bred from bulls with the highest genetic merit for weight of fat and protein to be markedly more efficient at converting feed energy into milk.

The *breeding+* programme provides practical advice on improving through breeding.

Energy Density

Irrespective of yield level or genetic merit, the amount of milk produced per unit of feed consumed can be improved by increasing the energy density of the diet.

A diet with an energy density of 12.0 MJ ME/kg DM, for instance, can produce 2.25 litres of milk whereas a diet at 10.5 MJ ME/kg DM only produces 2.0 litres of milk.

These differences can easily result from different levels of grassland management expertise, underlining its critical importance in dairy feeding.

The *grass+* programme provides practical advice on making the most of grass.



Balanced Feeding

The correct balancing of feeds in daily diets to give the most efficient rumen fermentation is another area offering major potential for feeding efficiency improvement (Section 7).

As well as energy, a poor balance of proteins in the diet can lead to poor rumen fermentation, poor feed utilisation and less efficient overall feed utilisation.

Protein imbalances can also lead to increased excretion of surplus protein as nitrogen.

Apart from being financially wasteful, this increases the potential for nitrate pollution of water courses and the release of the nitrous oxide to the atmosphere.

Improving Overall Productivity

While the balance between the cost of current feed inputs and the value of immediate milk outputs is the primary consideration in improved feeding, it is important to focus improvements on maximising overall herd productivity rather than just lactation performance.

Nutrition is a critical factor in determining cow health and fertility, although the effects of positive or negative changes may not become evident until very much later in the lactation or well into the next.

Equally, the impact of poor health and fertility is often only apparent over the far longer term, in a lower average herd life and increased enforced culling and replacement costs.

With the average cost of replacing a cow calculated to be around £765 (Table 1.4) and some 60% of current culling being for health and fertility rather than management or performance, feeding for these factors as well as production clearly makes sense.

Table 1.4: Average Cow Replacement Costs

Animal	Replacement heifer cost	£850
	Cull cow value	£325
	Animal replacement cost	£525
Yield	Mature cow yield lost	7,500 litres
	Replacement heifer yield gained	6,500 litres
	Loss of 1,000 litres @ 20ppl	£200
Calf	Calf value from mature cow	£100
	Calf value from heifer	£60
	Loss in calf value	£40
Total Replacement Cost		£765

Estimated September 2007 costs – home reared heifers.

Given the particular nutritional stress most cows are under in early lactation, it is particularly important to feed for fertility as much as production at this stage.

The *pd+* programme provides practical advice on improving herd fertility.

As the vital transition from one lactation to another, improved dry cow feeding has an important role to play in dairy health and fertility as well as efficient milk production (Section 9).

Good dry cow nutrition and management has been shown to minimise calving problems and early lactation metabolic disorders, maximise subsequent lactation performance and udder health, and optimise fertility and overall cow productivity.

The best possible youngstock feeding is also crucial for the greatest overall herd productivity (Section 10).

As well as cutting the net cost of rearing, calving heifers at two years of age rather than the traditional three significantly reduces the number of replacement animals that have to be carried, giving valuable time and cost savings.

The MDC heifer rearing workbook is a CD-based tool allowing costed comparisons to be made between different systems for specific farm circumstances.

