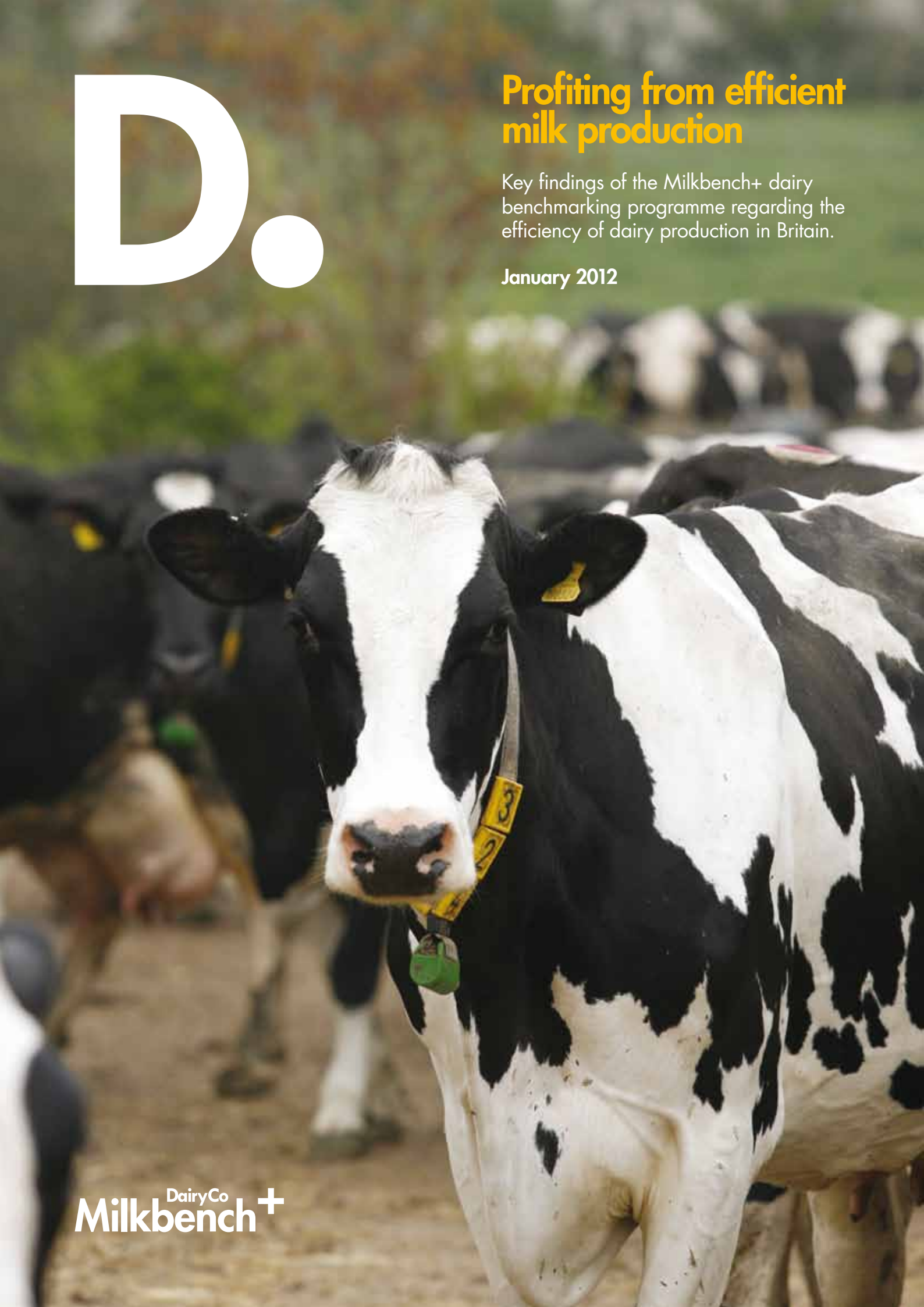

D.

Profiting from efficient milk production

Key findings of the Milkbench+ dairy benchmarking programme regarding the efficiency of dairy production in Britain.

January 2012

DairyCo Milkbench+

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Executive summary

D. DairyCo's Milkbench+ benchmarking service offers participating British dairy farmers the opportunity to become more financially efficient by giving them a clearer picture of just how to make their businesses work hardest for their benefit. It also provides DairyCo with uniquely detailed and accurate information about how the production end of the dairy sector really works; what are the key drivers of profit and, just as importantly, what are the potential pitfalls?

This report shows the findings of the first full analysis that we have carried out on Milkbench+ data. The report raises many issues, including just how difficult it can be to make a profit from milk production. However, there are also strong indications that many dairy farmers have the opportunity to take positive steps in managing production costs that could significantly increase financial returns.

In this, the first of an annual series of Milkbench+ reports, we have made three key findings and drawn three high-level conclusions:

Key findings:

- The key determinant of profit is total cost of production, not milk price
- The right balance between input use and milk output (herd size and average yield) is essential. In particular the need for low yielding herds to maximise utilisation of grass through a simple system and for small herds to contain fixed costs
- Average yield per cow is not the main driver of profit. Higher yields are not the answer if they are produced at the expense of feed efficiency; every extra litre needs to be profitable.

Conclusions

- Milk can be produced efficiently from any of the major systems that are currently practised in Britain. Moreover, efficient milk production is possible at almost any scale of production
- Different factors drive profit for each system. The impact these factors have on returns varies considerably
- The need to fit the system that you use to your own circumstances has never been more important.

Data analysis has identified three key enterprise types:

- **Cows at grass**. Predominantly grass-based and operating at lower yield levels
- **Composite**. Maximum use of family labour and a mixed approach to feeding and housing
- **High-output cows**. Generally housed with intensive use of major inputs.

Statistical techniques allowed us to identify the most important ways in which dairy enterprises differ. These are:

- The feeding strategy adopted; whether feeding is based principally on grass, on a total mixed ration or a more traditional combination of the two
- Intensity of input use; large-scale but low input, intensively housed or smaller scale operators
- Type of output; low-yielding with high constituents or large liquid producers.

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The findings from this report could have challenging implications. Nevertheless, there are opportunities for producers to focus their attention on the most viable options for taking their business forwards. The findings can also help DairyCo, and other organisations whose remit is to support dairy farmers, to target their farm improvement support programmes more effectively.

About Milkbench+

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Milkbench+ is an internet-based benchmarking service that allows British dairy farmers to compare how their enterprise is performing against other dairy farms. The service is able to provide users with easy-to-understand summaries of input use, costs and income down to the net margin level. With this information, individual users of the service are able to identify opportunities to improve production efficiency and reduce costs for a better profit from dairying. Readers of this report who may be interested in using the Milkbench+ service on their own farms are encouraged to get in touch with the Milkbench+ team for further information. Contact details are on the back cover.

In addition to providing this service to individual levy payers, the Milkbench+ dataset as a whole offers us a great opportunity to learn more about the most important factors that determine whether different types of dairy enterprise can be profitable or not. This report presents some of the highlights of our first analysis at this level.

The Milkbench+ data cover both physical and financial aspects of dairy enterprises at a high level of detail. The Milkbench+ assessment is based very much on production efficiency at the enterprise level; it is not based on accounting principles, nor is it a costings service. Thanks to the robust methodology using standardised variables and imputed values where necessary, we can look at the whole range of enterprise types and compare them on an equal footing.

Finally, we also take the greatest care to ensure that the information collected is accurate, secure and that confidentiality is maintained. As a result, we are confident that the insights that Milkbench+ is starting to give us are meaningful and relevant. We hope that you will also find them stimulating and useful.

The Milkbench+ database

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The Milkbench+ database holds all the data that has been collected as a part of the Milkbench+ service to British dairy farmers. To produce this report we analysed a subset of the database containing farm accounts with year ends between December 2010 and June 2011. The resulting dataset consists of 330 farms (for a more detailed description of this dataset see Appendix A). The data is of very high quality, collected on-farm by our team of dedicated data collectors and only after it has been independently validated is it finally included in the Milkbench+ database. In order to compare the wide variety of different systems, some figures are imputed and all other enterprises, including youngstock, are separated out. The imputed figures include rent on land (we treat everyone as tenants), cost of family labour and finance cost of capital employed.

The structure of Milkbench+ is organised into eight clusters:

1. Key farm output data	
2. Feed and forage	**Variable costs**
3. Herd health and replacement costs	
4. Labour	**Fixed costs**
5. Power and machinery	
6. Depreciation	
7. Property and finance	
8. Overheads	

Description of the main, dairy specific variables that you will see in this report:

- **Herd size** – this is the average number of dairy cows in the milking herd during the year
- **Yield** – calculated from the total amount of milk produced in the year, divided by either the herd size to obtain the average yield per cow per year or by total area allocated to the dairy herd to obtain the average yield per hectare per year
- **Revenue** – consists of value of milk produced, value of calves at 20 days, net value of quota leases (in or out) and other dairy income (slurry to arable land etc)
- **Gross output** – is calculated as revenue minus herd replacement cost
- **Cows calved in the year** – percentage of cows calved in the year, calculated by the number of cows calved divided by the herd size
- **Herd replacement rate** – is based on number of cows that have left the herd throughout the year, presented as a percentage share of the herd size

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- **Herd replacement cost** – is equal to the number of cows that have left the herd throughout the year multiplied by the average value of incoming cows and heifers, plus value of incoming dairy stock bulls, minus the total value of all outgoing cows, heifers and dairy stock bulls
- **Non-forage feeds** – consist of purchased compound feed, cereals, protein feeds and by-products plus home-grown cereals, protein feeds and by-products
- **Forage** – grass silage, hay, non-grass forage and straw (both purchased and home-grown)
- **Feed and forage cost** – equates to actual cost of all purchased feed and forage plus market value of all home-grown non-forage feed and variable cost of home-grown forage
- **Labour efficiency** – is calculated as the total number of hours worked by all staff (dairy enterprise only, management time excluded) divided by the herd size
- **Labour cost** – actual cost of paid labour plus imputed cost for family labour (for manual tasks only, management time excluded as net margin is a reward for management time)
- **Power and machinery cost** – consists of repairs and spares, machinery hire, contracting, fuel, electricity
- **Machinery depreciation** – imputed depreciation on dairy specific and forage machinery and equipment
- **Machinery and equipment cost** – power and machinery cost plus machinery depreciation
- **Dairy machinery and equipment cost** – excluding forage specific power and machinery costs
- **Imputed field rent** – imputed rent on the hectares of land used for the dairy herd (grassland and forage areas)
- **Cost of production** – consists of all variable costs, fixed costs and herd replacement cost
- **Net margin** – equals gross output minus variable costs and minus fixed costs.

All of the above variables are related to dairy enterprise only.

Making a profit from milk

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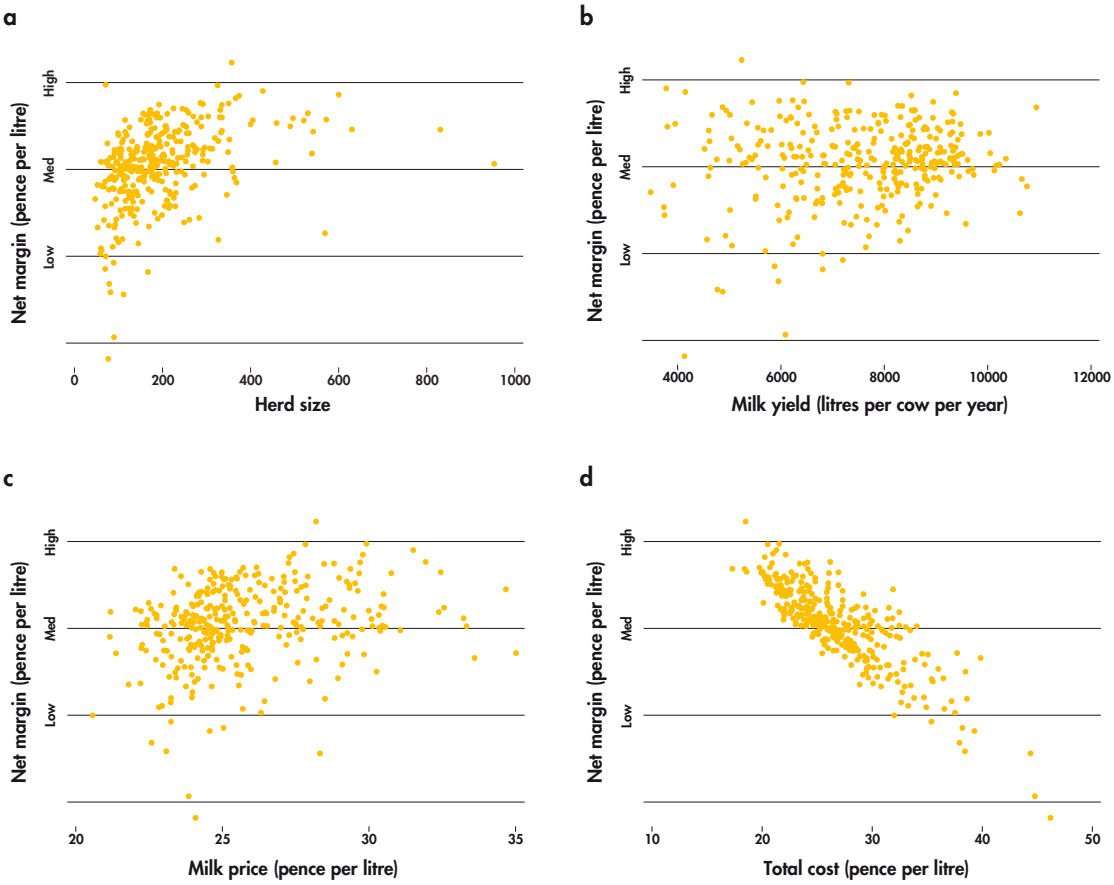
What type of enterprise do we need to produce milk profitably? This is a question that is regularly asked by stakeholders across the whole dairy supply chain in Britain.

Fig. 1



The headline figures from Milkbench+, shown in the set of graphs above, actually provide a very clear answer; it is possible to produce milk efficiently at almost any scale and at any level of outputs; two factors which actually, in their varied combinations, cover most of the systems that we see in GB.

Well-managed, small herds can produce milk, on a per litre basis, at similar levels of efficiency to herds that are at least three times larger (however, the viability of very small herds to provide sufficient income for owners is a different matter). Similarly, provided that the system is right, outputs of less than 5,000 litres per cow per year can be profitable when operated effectively.

The relationship between milk price and margin is actually not that strong. Cost of production, on the other hand, is very clearly related to margin. This represents a real opportunity for dairy producers, as at least some of the costs of production that they face are within their control. Milk price is an aspect of milk production that is largely outside the control of producers, although it can be influenced to a degree by milk quality, level of milk components and degree of seasonality. However, there are clear opportunities for producers operating in the right circumstances to make a good profit from milk, whatever their milk price.

These findings are interesting and, to some extent at least, should be encouraging for producers. However, while they tell us that it is possible to produce milk efficiently, they give little indication of what the most efficient producers are doing to achieve their results and to what extent these practices can be replicated by others in order to improve their profitability. For this reason, we have developed a more systematic characterisation of dairy enterprises that allows us to dig more deeply.

D. Characterising British dairy farms

The Milkbench+ data provide us with a high level of detail about the physical and financial performance of dairy enterprises. The opportunity that this has given us to examine real differences among farm types has helped us to be uniquely well equipped and objective in our analysis. It is important that we challenge and examine potentially damaging assumptions based on less objective views about efficiencies of one system type over another. For example, can extensive production systems work as businesses? Are large farms more efficient than small farms? Is consolidation the only path that the industry can take? While we are finding that some of these views are grounded, we are also amassing evidence that others are definitely not.

The first step towards this has been an analysis that has identified the most significant types of dairy enterprises in Great Britain on the basis of what Milkbench+ is telling us about the ways in which they operate. We based this analysis on statistical techniques that allowed us to identify the most important ways in which dairy enterprises differ and then to "cluster" similar farms together for a more detailed analysis of the drivers of profit for different farm types (for a more detailed description of methodology please see Appendix B).

Our analysis has revealed three major areas in which British dairy farms are likely to differ:

- The feeding strategy adopted; whether feeding is based principally on grass, on a total mixed ration or a more traditional mixture of the two
- Intensity of input use; large-scale but low input, intensively housed or smaller scale operators
- Type of output; low-yielding with high constituents or large liquid producers.

Exploring these differences in more depth has led us to identify three key enterprise types:

- **Cows at grass.** Predominantly grass-based and operating at lower yield levels
- **Composite**. Maximum use of family labour and a mixed approach to feeding and housing
- **High-output cows**. Generally housed with intensive use of major inputs.

Some of the key differences amongst these three farm types are highlighted in the table.

	Cows at grass	Composite	High-output cows
Number of farms	77	123	130
Average herd size (cows)	217	143	234
Feed efficiency* (kg dry matter per litre)	0.63	0.72	0.76
Total feed** (kg dry matter per cow per year)	1,091	2,162	2,808
Time at grass (weeks per year)	33	27	25
Reliance on high-yielding breeds (per cent)	4	65	90
Contribution of family labour (per cent)	50	64	39
Yield (litres per cow per year)	5,602	7,628	8,593
Revenue index (pence per litre) (Cows at grass = 100)	100	91	91
Total cost index (£ per cow per year) (Cows at grass = 100)	100	136	145
Total cost index (pence per litre) (Cows at grass = 100)	100	100	94
Net margin index (pence per litre) (Cows at grass = 100)	100	-46***	52

* Total feed and forage excluding grazed grass fed per litre of milk produced.
** Total feed excluding forage and grazed grass fed per cow per year.
*** Composite systems are on average making a loss of a magnitude of 46% of the Cow at grass net margin.

Profit drivers on different types of dairy systems

D. Most readers of this report should find it reasonably easy to align themselves with one of the three enterprise types that we have identified. This section examines in more detail what Milkbench+ is telling us about the key profit drivers for each type of system. To do this, we have compared the highest performing 10 farms with the lowest performing farms (on basis of net margin ppl) of each type and identified the factors that appear to contribute the most to the improved financial performance of the best 10 farms.

Cows at grass

The main differences in financial performance between the top and bottom 10 farms (based on net margin) are:

	The difference between top and bottom 10 farms (ppl)
Labour cost	-5.2
Dairy machinery and equipment cost	-2.2
Imputed field rent	-1.7
Feed and forage variable cost	-1.3
Net margin	18.32

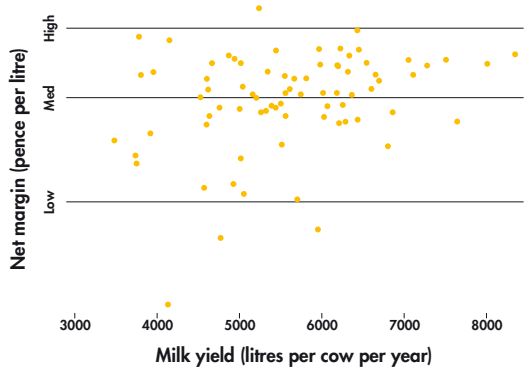
The above four main drivers of profitability for **Cows at grass** system explain 57 per cent of difference in net margin between the top and bottom 10 farms. This system has the greatest variance of net margin between the top and bottom 10 farms.

The table below shows the key performance indicators which describe how the top 10 farms are achieving improved financial performance.

Key performance indicators	Average for top 10 farms based on net margin ppl for Cows at grass
Labour efficiency (hours/cow)	18
Labour cost (ppl)	3.1
Power and machinery running cost (ppl)	2.9
Machinery and equipment depreciation (ppl)	0.8
Stocking rate (LU/ha)	2.4
Imputed field rent (ppl)	1.7
Feed and forage excl. grazed grass (kg DM/l)	0.46
Feed and forage variable cost (ppl)	5.8
Milk yield (£/ha)	13,359

The graphs below explore relationships between the key variables.

Fig. 2

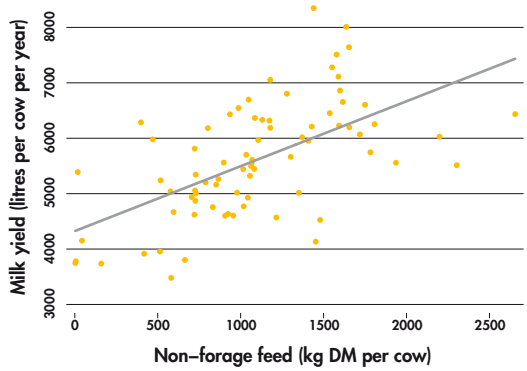


The graph above shows that although similar profit can be made from yields of just under 4,000 to above 8,000 litres per cow, farms making the biggest loss exhibit yields below 6,000 litres per cow. This is due to the costs (especially labour, machinery and equipment, feed and forage) being out of balance with milk output. These relationships are explored further later.

The bottom 10 farms are using 45 per cent more feed and forage to produce their litres; 0.83kg DM/litre compared to 0.46kg DM/litre average for the top 10 farms. On a per cow basis, this amounts to the bottom 10 farms using an extra 1,216kg of forage dry matter and 5kg of non-forage dry matter over the course of the year for no gain in output!

Increasing feed rate is a valid strategy if the extra revenue generated from increased yield per cow covers the associated extra cost.

Fig. 3



Unfortunately, this is not always the case. For the top 10 farms the average response in yield to an increase in feed rate is 1.9 litres for 1kg DM non-forage feed, while the bottom 10 farms could achieve only 0.9 litres for 1kg DM. We can probably attribute this poor response on the bottom 10 farms to genetics, health status, grass utilisation etc.

With dairy compound feeds costing around £300/tonne dry matter, or 30p per kg and 0.9 litres of milk fetching perhaps 23p, it is not surprising that these differentials have a marked effect on margins. However, the increase in feed rate does not only result in increased feed bill, but has a marked affect on other costs too.

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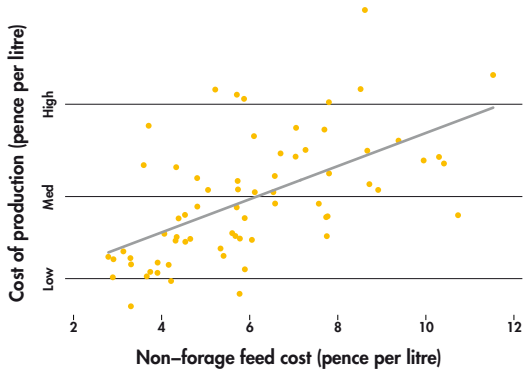
Fig. 4

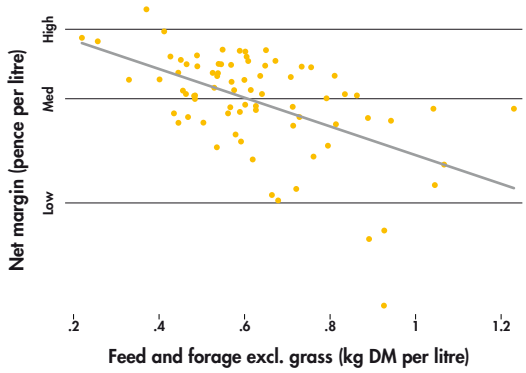


If the non-forage feed cost increases by 1ppl then we see an increase in total production costs of 1.62ppl (for non-forage feed costs above 2.5ppl), which means an extra 62 per cent increase in total cost of production on top of an increase in feed cost. Further analysis indicates that this is due to the rise in associated costs of feeding at a higher level, mainly: labour, livestock husbandry and to some extent machinery costs. The effect of the extra non-forage feed displacing grazed grass and/or forage is an important factor here too.

It is worth pointing out that the ways in which the amount of feed fed impacts on other costs can differ greatly among farms. For this reason, good managers will have a clear understanding of these individual relationships on their own farms. They are also likely to monitor and evaluate, in some detail, the ways in which these evolve as production conditions (input and output prices etc) change.

Clearly, levels and efficiency of grass utilisation make a critical contribution to the profitably of this system. Put simply, more efficient use of grass has a sparing effect on the costs arising from the purchase and feeding process of other feeds.

Fig. 5



Amount of feed and forage fed per litre of milk produced, along with milk yield expressed on a per hectare basis has a direct relationship with the net margin. The very low feed rate per litre of non-grass feed by the top performing farms can therefore be used as a proxy for assuming a very high level of grass utilisation amongst these farms. Together with milk yield per hectare they are useful indicators of grassland utilisation. As expected, higher yields per hectare are associated with higher profits.

For more information on feeding and grass management please see DairyCo's Feeding+ and Grass+ manuals.

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Fig. 6

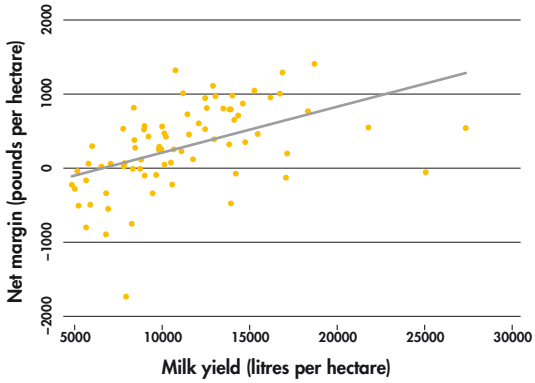
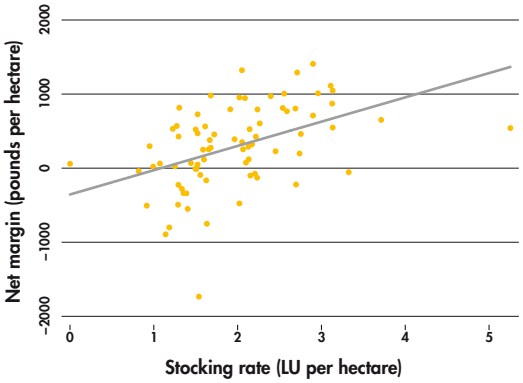


Fig. 7



On average, an increase in yield of 1,000 litres/hectare should deliver an increase in margin of around £62/hectare. Appropriate stocking rates aimed at efficient utilisation of grass are a key to maximising profit per hectare in the **Cows at grass** system.

Both labour and machinery and equipment costs are significant drivers of profit in the **Cows at grass** system. Our data indicate that reducing either of these costs by 1ppl can be expected to result in an increase in net margin of around 2.1ppl and 2.7ppl respectively. This is again due to associated increases in other costs as the data indicate that increasing labour or machinery costs by 1ppl will increase total costs by 2.1ppl and 3.1ppl respectively!

Fig. 8

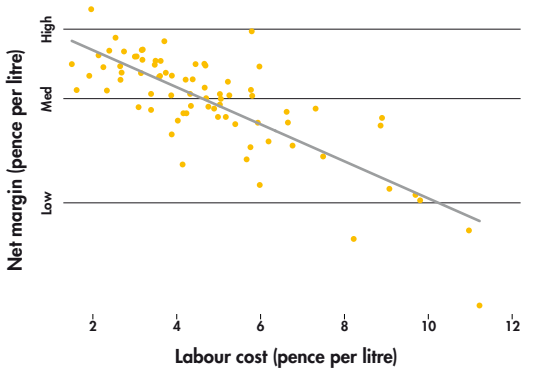


Fig. 9

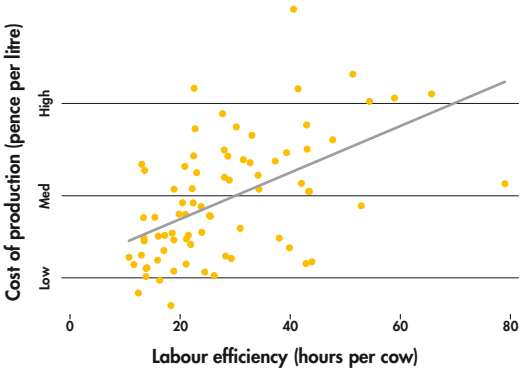


Fig. 10

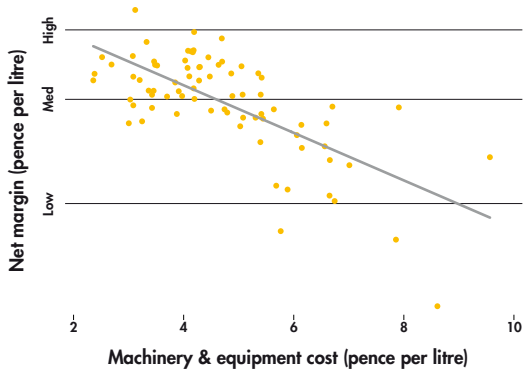
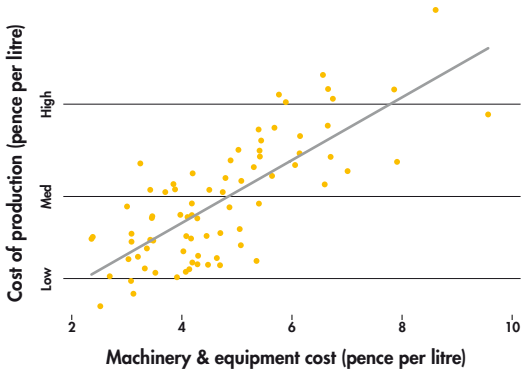


Fig. 11



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Labour and machinery depreciation costs are often considered to be at least partially substituted for each other so that farms with high use of machinery inputs tend to have less reliance on labour and, overall, are able to realise efficiency improvements and cost savings.

Fig. 12

Unfortunately, our data appear to suggest that very few farms profit from this trade-off while the majority experience an increase in both labour and machinery depreciation costs.

Composite

D.

The main differences in financial performance between the top and bottom 10 farms (based on net margin) are:

	The difference between top and bottom 10 farms (ppl)
Labour cost	-4.0
Dairy machinery and equipment cost	-2.6
Herd replacement cost	-1.5
Feed and forage variable cost	-1.0
Net margin	16.6

The above four main drivers of profitability for **Composite** systems explain 55 per cent of difference in net margin between the top and bottom 10 farms.

The table below shows the key performance indicators which describe how the top 10 farms are achieving improved financial performance.

Key performance indicators	Average for top 10 farms based on net margin ppl
Labour efficiency (hours/cow)	25
Labour cost (ppl)	2.7
Power and machinery running costs (ppl)	2.3
Machinery and equipment depreciation (ppl)	0.8
Herd replacement cost (ppl)	2.8
Cows calved in the year (%)	75
Feed and forage (excl. grazed grass) fed per litre (kg DM/l)	0.6
Feed and forage variable cost (ppl)	8.0

Not surprisingly feed efficiency is an issue on these farms but not as pronounced as on the **Cows at grass** farms.

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Fig. 13

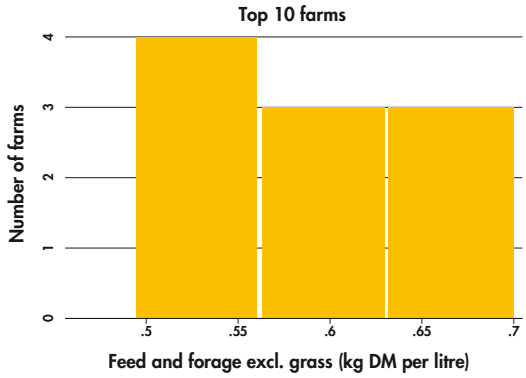
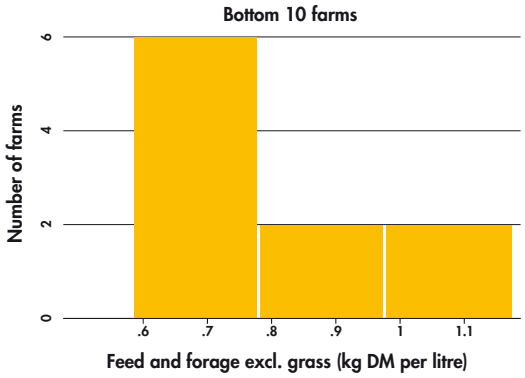


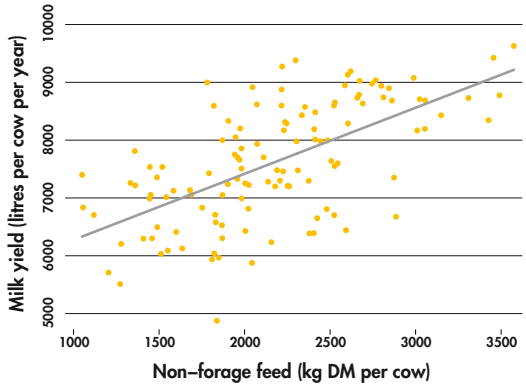
Fig. 14



The difference between the average feed and forage fed per litre of milk produced (feed efficiency) between the bottom and the top 10 **Composite** systems is 0.2 kg DM. This difference in feed efficiency (attributable mainly to health status, poor grass utilisation and feed wastage) results in a 1ppl difference in feed and forage costs. On a per cow basis, the top 10 farms achieve 1,433 litres more milk per year from 60kg less non-forage feeds and 578kg less forage compared to the bottom 10 farms.

The data show that these farms are not extreme grazers. However, figures like these would suggest that best operators of this type of system are still making very effective use of the grass that is available to them, through high levels of pasture harvested, quality forage and effective, all-round ration planning.

Fig. 15



The graph above suggests that on average **Composite** systems achieve about one litre of milk from every extra kilo of dry matter non-forage feed. With prices of feed increasing faster than the price of milk, this relationship could have a marked effect on profit. Under current market conditions, it is necessary to monitor the response of yield to feed rate on individual farms in order to aim to operate at the most profitable level according to the ratio of milk and feed price.

It is also important to bear in mind the relationship between feed and total cost.

Fig. 16

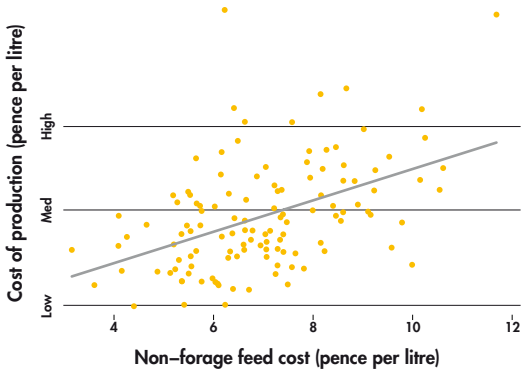
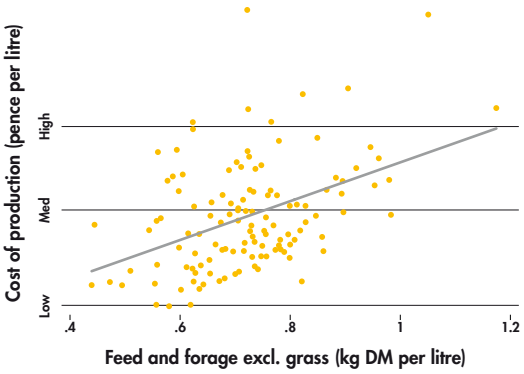


Fig. 17



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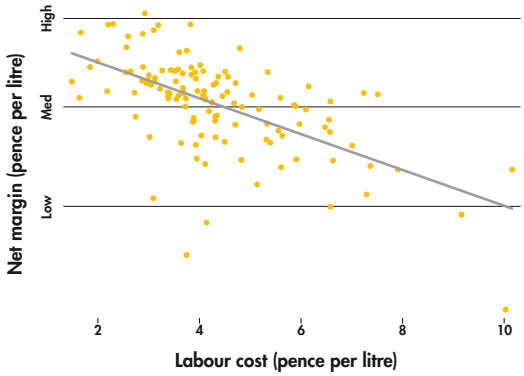
In the **Composite** system on average, for every 1ppl increase in non-forage cost the total production cost increases by 1.32ppl, which is an extra 32 per cent above the increase in feed cost.

The feed use rather than the unit cost of feed is the cause here; as we feed more the total cost increases by more than just the cost of the extra feed due to poorer grass utilisation and increases in associated costs.

For more information on feeding and grass management please see DairyCo's Feeding+ and Grass+ manuals.

In terms of labour use, there is a large difference in labour efficiency and cost between the top and bottom 10 farms.

Fig. 18



The bottom 10 farms spent on average 33 hours per cow per year more than the top 10 farms, even though the average yield achieved on the former is lower. As a result the bottom 10 farms spent, on average, 4ppl more on labour than the top 10.

Paid labour makes up 25 and 45 per cent of the total labour on the bottom and top 10 farms respectively. Hence the labour cost contains a significant proportion of imputed family labour cost. As it is a major profit driver, this contributes positively to the resilience of **Composite** systems because this, imputed cost, is not an actual cost in the farm accounts.

However, at the same time, the large amount of time spent on the technical tasks can lead to lack of time left for management which could result in increased inefficiencies throughout the system.

The two graphs below show that in our sample of dairy enterprises, there is no positive relationship between labour and fertility, health and breeding costs.

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Fig. 19

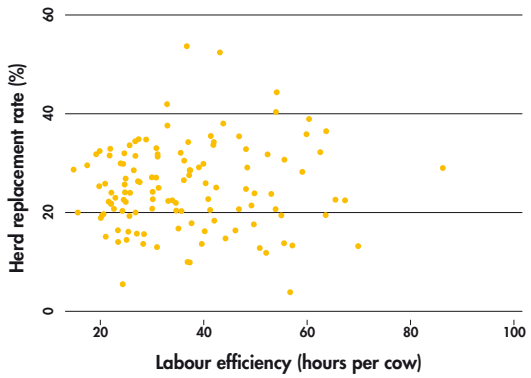
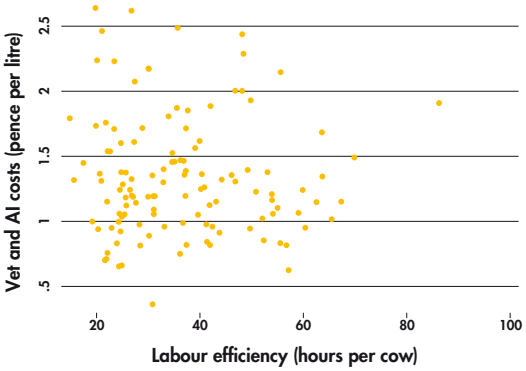


Fig. 20



Herd replacement cost is also a significant determinant of cost and profit in this system with a 1ppl decrease in herd replacement costs being associated with a 1.4ppl increase in margin.

Fig. 21

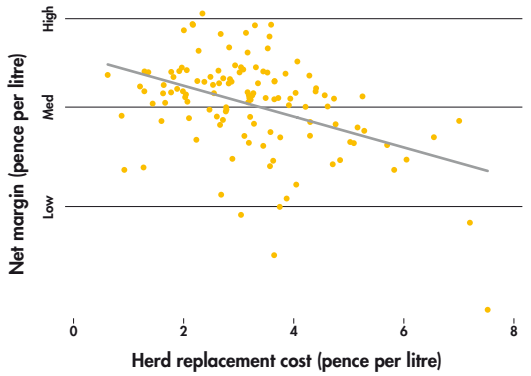
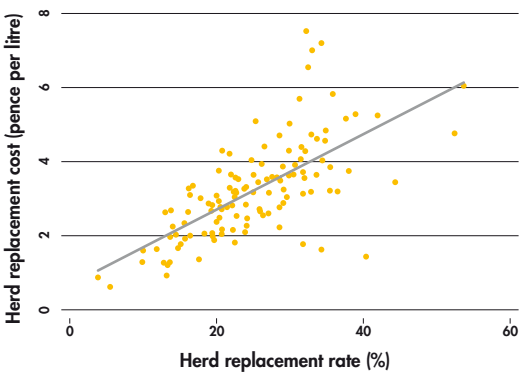


Fig. 22



Unsurprisingly, herd replacement rate is a relatively strong determinant of herd replacement cost, explaining 20 per cent of the variation in herd replacement cost. However, yield per cow, value of culls and value of incoming heifers are also important drivers of herd replacement cost.

The data itself does not explain the differences in herd replacement rates but there are likely to be a wide variety of reasons, from bTB to culling due to infertility and lameness.

The top 10 farms are spending on average 2.6ppl less on dairy machinery and equipment costs.

Fig. 23

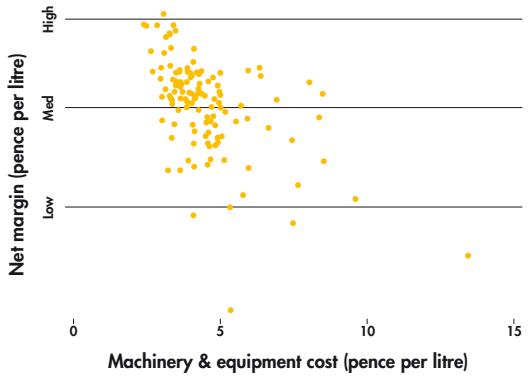
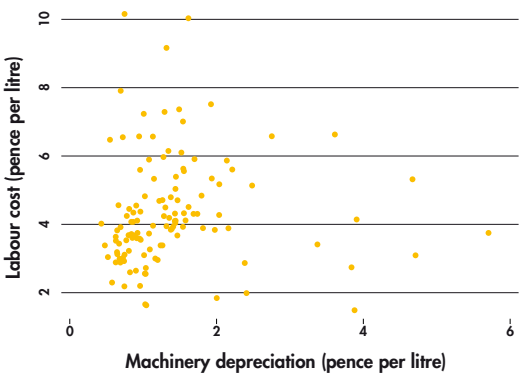


Fig. 24



The left graph above demonstrates the importance of maintaining appropriate machinery and equipment costs in balance with the level of output. The two graphs together also demonstrate the fact that the desired decrease in labour cost, as a result of investment in machinery and equipment, does not fully offset the

decrease in net margin. Nevertheless, investment that is improving the efficiency of the system and is well balanced with the size of the output (ie herd size and yield) is essential to sustain the profitability of this system into the future.

Using Milkbench+ on your own farm is a starting point for analysing your farm's performance. DairyCo also provides considerable support to take this further with various + programmes and Planning for Profit workshops. For details please visit: www.dairyco.org.uk

D.

High-output cows

The main differences in financial performance between the top and bottom 10 farms (based on net margin) are:

	The difference between top and bottom 10 farms (ppl)
Feed and forage variable cost	-2.8
Power and machinery running costs	-1.8
Labour cost	-1.7
Depreciation on dairy buildings	-1.1
Net margin	14.1

The above four main drivers of profitability for **High-output cows** systems explain 53 per cent of the difference in net margin between the top and bottom 10 farms.

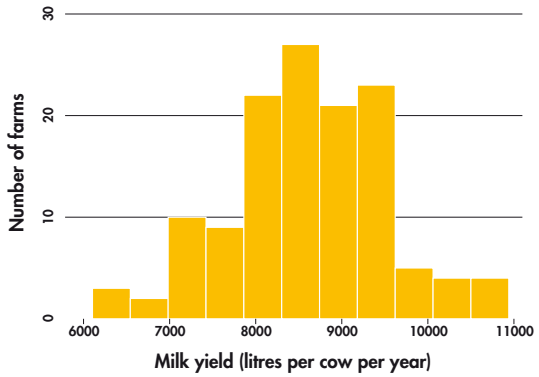
The table below shows the key performance indicators which describe how the top 10 farms are achieving improved financial performance.

Key performance indicators	Top 10 farms based on net margin ppl
Feed and forage kg DM/l (excl. grazed grass)	0.6
Feed cost (non-forage feed and purchased forage) (ppl)	6.6
Power and machinery running costs (ppl)	2.2
Machinery and equipment depreciation (ppl)	0.8
Labour efficiency (hours/cow)	25
Labour cost (ppl)	2.8
Depreciation on dairy buildings	0.5

D.

Unsurprisingly, yield is much more important in this type of system.

Fig. 25



There are clear differences in the yields achieved by the top and bottom 10 farms with the former achieving a minimum of 8,000 litres per cow per year. Interestingly, yields of 8,000 – 9,000 litres per year are the most commonly observed in this high performing group and there are a number of farms with yields approaching 10,000 litres per cow per year that still find themselves among the bottom 10. This suggests that this system is not about pursuing yield at any cost, an idea further supported by the relatively weak relationships that we see between yields, costs and profitability.

Fig. 26

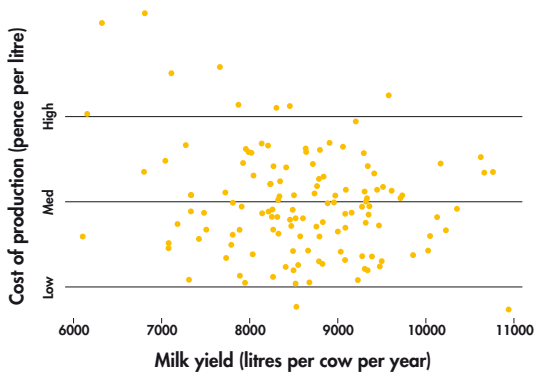
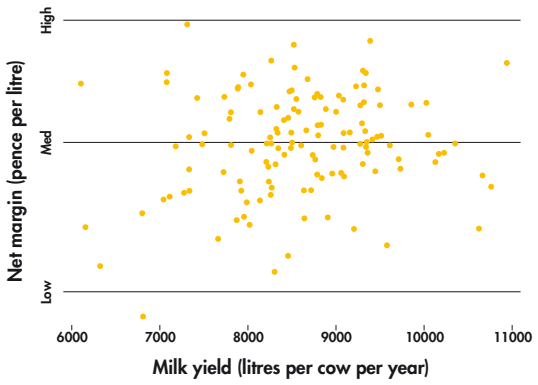


Fig. 27



Higher yields are not the answer if they are produced at the expense of feed efficiency.

Fig. 28

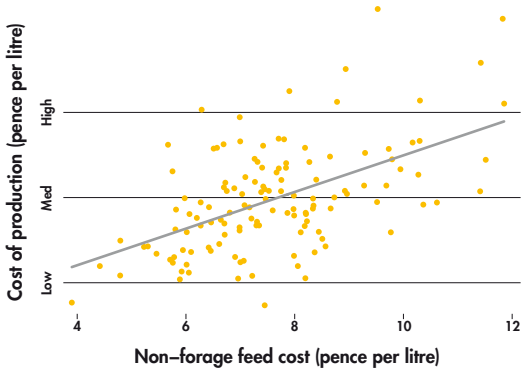
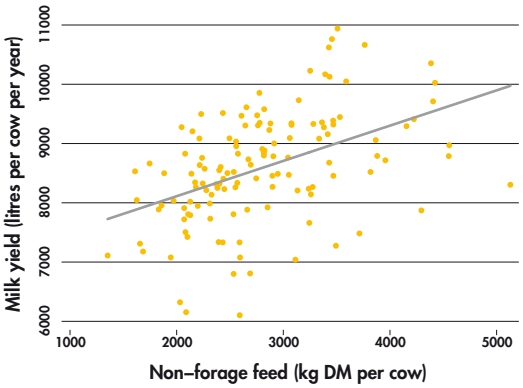


Fig. 29



D.

As for the two previous systems, the increase in feed cost per litre results in more than equivalent increases in total cost of production. The graph above left suggests that the total cost of production increases by 1.30ppl if non-forage feed cost increases by 1ppl due to increases in associated costs. The feed use rather than the unit cost of feed is the cause here. As we feed more the total cost increases by more than just the cost of the extra feed. This is why "margin over feeds" is a very misleading measure of dairy production economics.

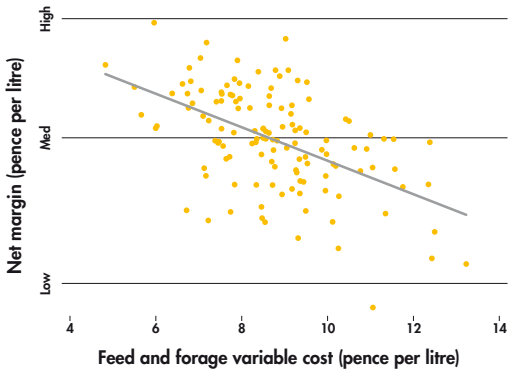
The magnitude of yield response relative to feed rate must be monitored. This will show whether the extra feed costs are covered by the income from extra litres.

The data for the **High-output cows** system indicates that on average an extra 1kg DM of non-forage feed will result in an extra 0.60 litres of milk produced per cow. However, this is a very complex relationship due to the interaction between components of the ration, genetics, health, cow environment and proportion of grazed grass in the diet.

Therefore, good managers will have a clear understanding of these interactions on their own farms. They are also likely to monitor and evaluate, in some detail, the ways in which these evolve as production conditions (input and output prices etc.) change.

It is no surprise then that feed conversion efficiency presented as kg DM of feed and forage (excluding grazed grass) per litre of milk produced is an important driver of profitability in the **High-output cows** system.

Fig. 30

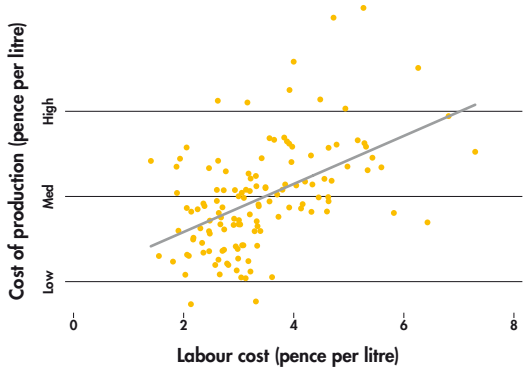


The bottom 10 farms yield on average 550 litres less than the top farms, but feed 378kg DM/cow/year more non-forage feed, and 566kg DM/cow/year more forage, indicating poorer feed efficiency in the bottom farms. On average the top farms feed 0.18kg DM of feed and forage less to produce one litre of

milk and so spent 2.8ppl less on feed and forage variable costs.

Labour costs are a significant determinant of overall costs for **High-output cows** systems.

Fig. 31



As in the **Composite** system, the data disproves that higher labour usage necessarily means improved cow fertility and health.

Fig. 32

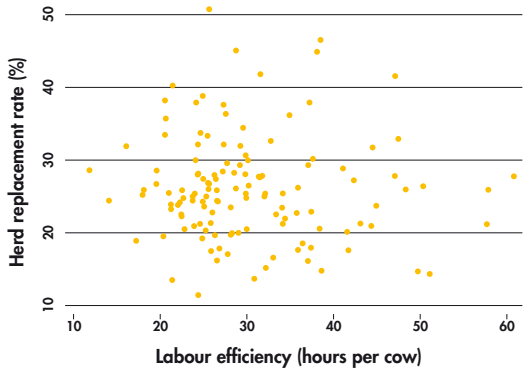
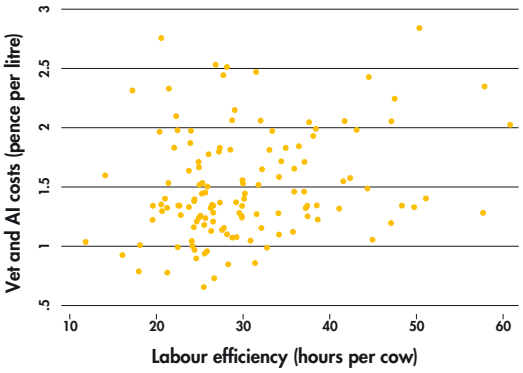
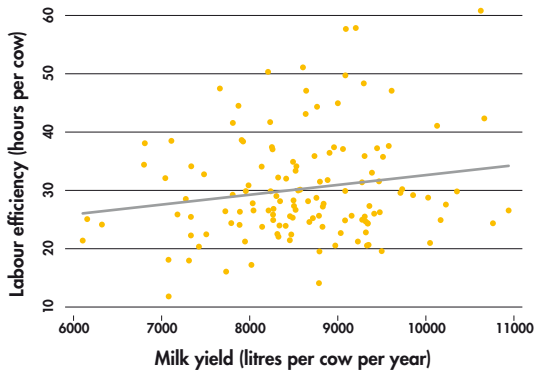


Fig. 33



It is also interesting to note that there are a very few differences in labour use associated with yield.

Fig. 34



Though the top 10 farms have, on average, a higher yield, they spent 11 hours less labour time per cow!

Machinery and equipment use is a significant contributor to total costs on **High-output cow** farms.

Fig. 35

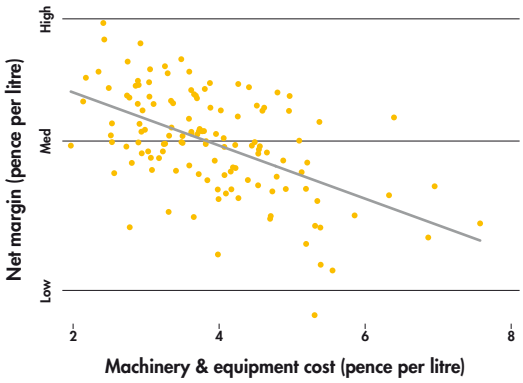
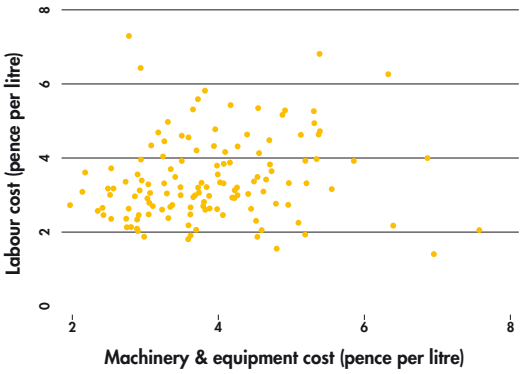


Fig. 36



D.

As machinery and equipment related costs increase, total cost increases by twice as much, indicating associated increases in other costs, for example, labour cost. Again we see the imperfect extent of the substitution of labour for machinery use, although this is perhaps not as pronounced as on the **Cows at grass** farms.

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Differences in profit drivers among dairy system types

D.

We would caution against readers trying to use our figures to justify the selection of one type of system over another. All of these systems have the potential to deliver a profit if they are well-managed. Furthermore, not every system will suit the circumstances in which an individual is farming. Nonetheless, people are likely to be interested in what Milkbench+ is telling us about the potential of each of the systems to deliver profit where they are well-suited to do so. This is the territory in which our top 10 farms are operating so, for this analysis, we have compared the breakdown of costs and revenue for the top 10 farms of each of the three farm types.

Cows at grass

The key driver for this system is the high average yield per hectare achieved through high grass utilisation and very low costs. This system is achieving the highest net margin in pence per litre out of the three systems compared (28.1 per cent of revenue) achieved through high gross output and low costs. However, on average its cows are achieving lower milk yields compared with the other systems.

Composite

The key driver for this system is the right balance between input use and milk output (herd size and average yield) achieved through better division between manual tasks and management. On average the top 10 farms in this system are achieving the lowest net margin only 21.2 per cent of their revenue. The revenue is low and labour, depreciation, property and finance costs are high in comparison to **High-output cows** system.

High-output cows

This system has on average the worst feed efficiency. However, thanks to the high yield, they have the lowest fixed costs. This makes feed conversion efficiency the key driver for this system. The top 10 farms with **High-output cows** achieve on average a net margin of 25.7% of their revenue, which is 1.3ppl lower than the top average of the **Cows at grass** system and 1.1ppl higher than the top average for the **Composite** system. However, their top average yield is 2,972 litres per cow higher than the **Cows at grass** and 467 litres per cow higher than the **Composite** system top average.

Comparison of dairy system types

D.

The level of revenue (income of a dairy enterprise) is obviously very important for the profitability of any system and is affected by milk price, value of calves, and value of any other dairy income. Milk price is largely out of producers' control; however, it can be influenced to a degree by milk quality, level of milk components and degree of seasonality. Clearly, choosing a contract to match your system or matching your system to a contract is very important (please visit the 'DairyCo Interactive Milk Price Calculator' at www.dairyco.org.uk).

Average for top 10 farms based on net margin ppl	Cows at grass	Composite	High-output cows
Revenue index (ppl) (Cows at grass = 100)	100	95	93
Milk price (ppl)	28.3	26.8	26.3
Milk butter fat (per cent)	4.34	4.05	4.02
Milk protein (per cent)	3.46	3.32	3.26
Calf value (ppl)	2.1	1.7	1.7

Our data shows that the top 10 farms in the **Cows at grass** system have achieved the highest revenue through high value of calves and milk price. The high milk price could be attributed to a higher level of milk constituents, depending on the contract. The top 10 farms in the **High-output cows** system have achieved the lowest revenue with the lowest milk price. The top 10 farms in both **Composite** and the **High-output cows** systems have the same calf value, which is 0.4ppl lower than **Cows at grass**.

For more information on milk prices and contracts please visit DairyCo's Datum website at: www.dairyco.org.uk.

The following graphs compare the potential of different systems to retain income, by showing the progressive impacts of costs on margin and the residual sum ie net margin; represented as percentage share in revenue. The differences in management levels have been standardised by comparing the averages for the top 10 farms from each system only. For comparison by cluster please see Appendix C.

Fig. 37

D.

Cows at grass

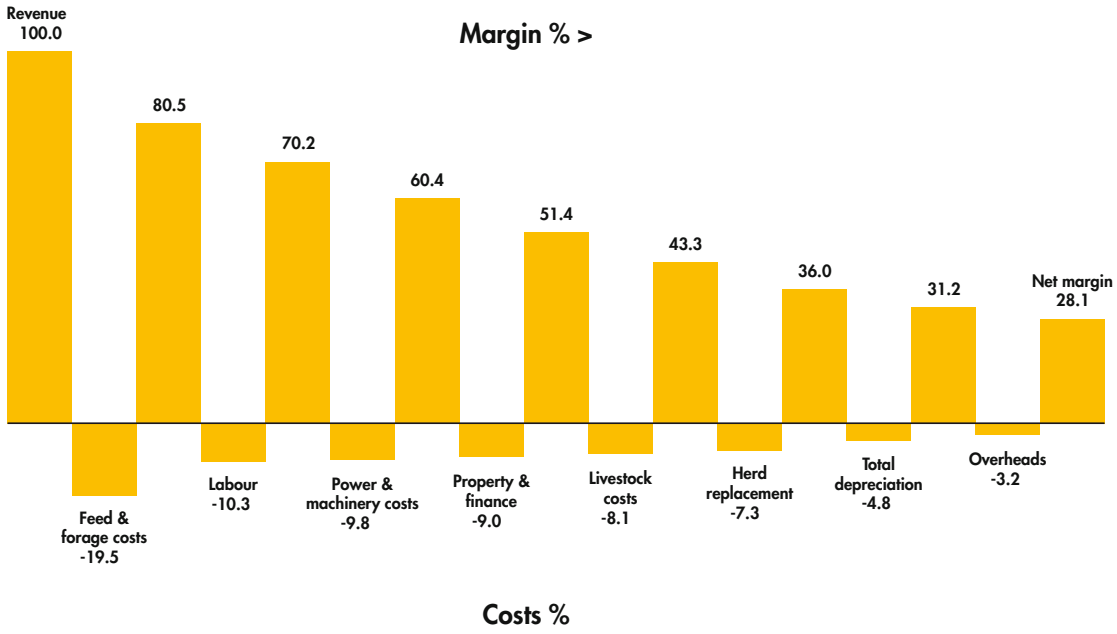


Fig. 38

Composite farms

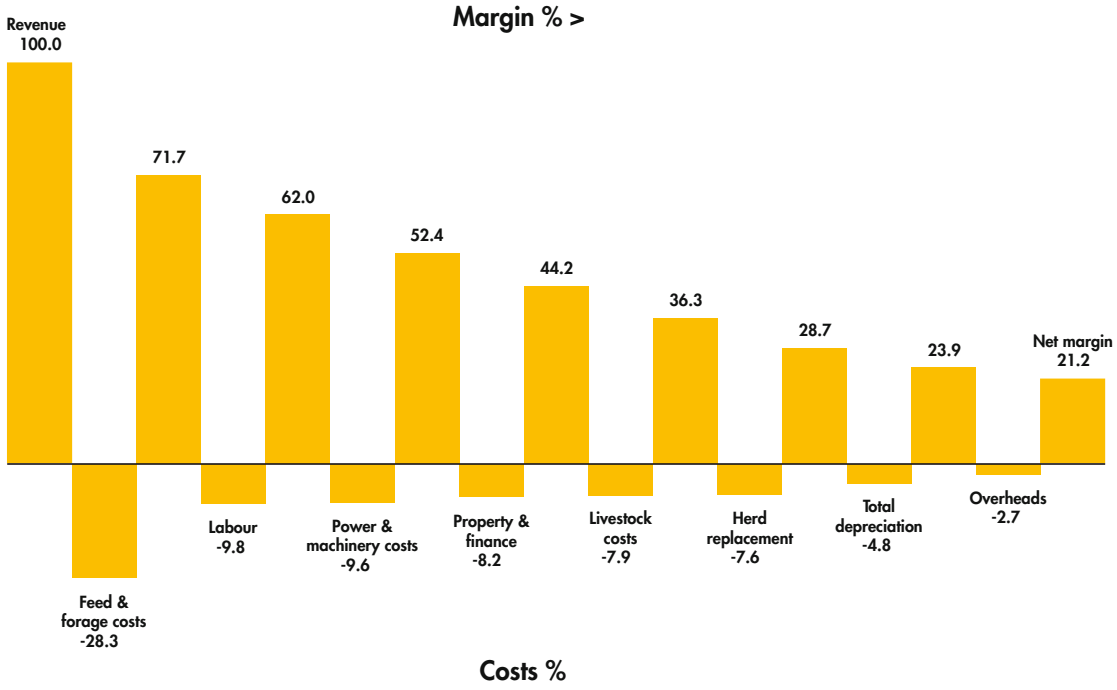
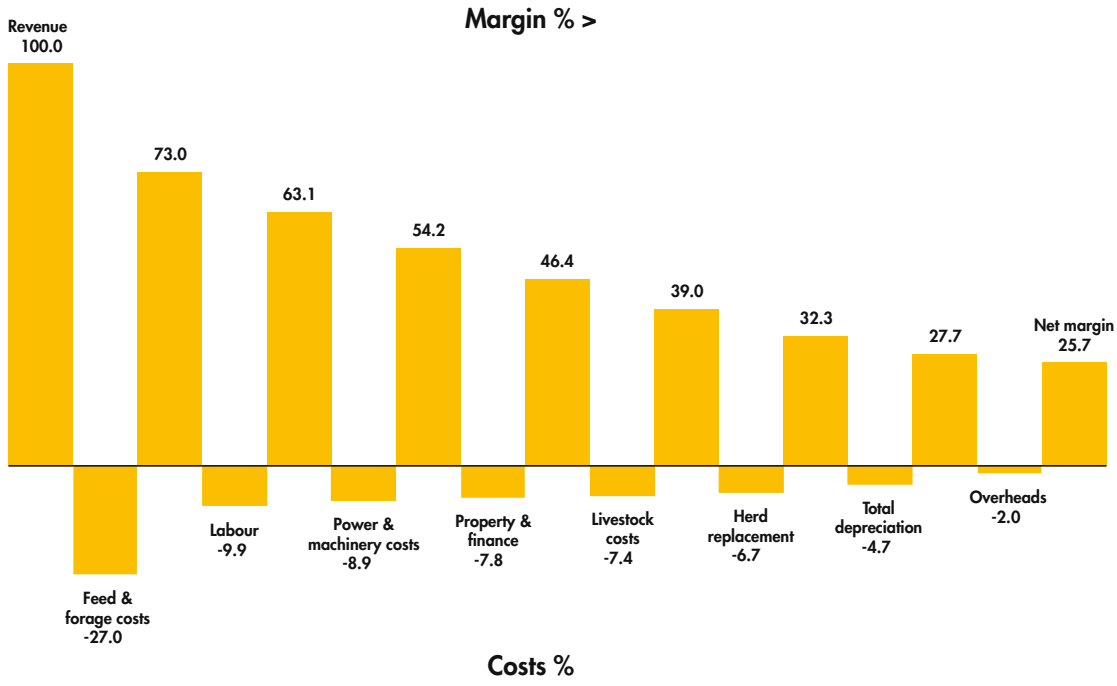


Fig. 39

High-output cows



D.

What next?

D. This is the first of an annual series of Milkbench+ reports. Next year we intend to build on our systems analysis, with more detail provided on the characteristics of the different systems (calving patterns, milk contracts, level of grass utilisation etc.) and provide robust year-on-year analysis. We would like to divert some of our attention to the youngstock enterprise and aim to provide information on production efficiency of youngstock enterprise to Milkbench+ participants.

Support for the way ahead

D.

DairyCo offers a wide variety of services and tools to British dairy farmers. Milkbench+ will help you to assess the production efficiency of your enterprise in relation to your peers. Planning for Profit workshops, which build on the Milkbench+ service, enable you to test difference scenarios for your business and help you to choose those that best match your objectives. The series of various + programmes provide valuable technical information on specific areas of milk production and can be downloaded from the Farming Information Centre or Library section of the DairyCo website (www.dairyco.org.uk).

Alternatively, you can contact your local DairyCo extension officer who is your first point of contact on technical dairying topics.

Datum is our independent, impartial, market intelligence service. Its aim is to provide transparency and information on dairy markets to assist farmers and those involved in the industry with making informed business decisions.

The Datum Dairy Market Update is our fortnightly newsletter which includes the latest dairy business news from the UK and overseas and what impact it is having on your milk price. It's a 'must have' publication for more than 8,000 people in the industry.

The Datum Monthly Report is another essential tool with prices and trends on areas including wholesale markets, input costs and retail sales.

The DairyCo website (www.dairyco.org.uk) is a hub of constantly updated information, including daily milk deliveries, producer numbers, consumer data and much more. If you want something in your pocket to refer to, make sure you ask for a copy of Dairy Statistics. An insiders guide.

Appendix A

D.

Description of the Milkbench+ dataset (year ends between December 2010 and June 2011):

Regional breakdown:

Region	Number of farms in Milkbench+ dataset
East	10
East Midlands	14
North East	1
North West	68
Scotland	38
South East	13
South West	68
Wales	55
West Midlands	42
Yorkshire and the Humber	21

Fig. 40

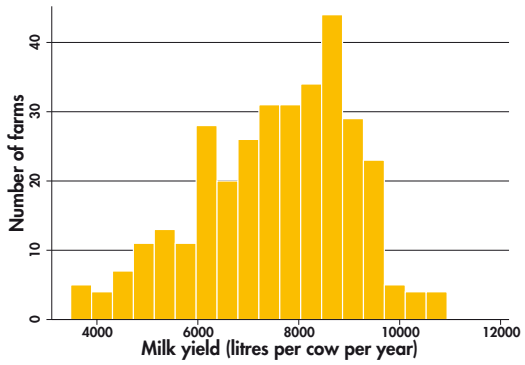
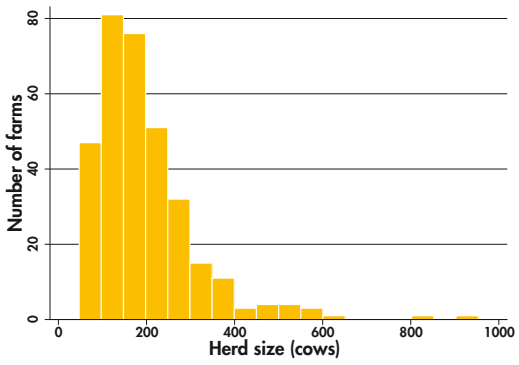


Fig. 41



Appendix B

D.

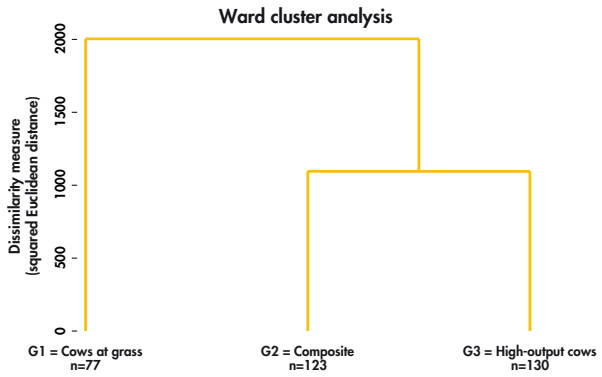
Farm characterisation methodology:

1. Selection of groups of variables important to observed heterogeneity in the sample (eg descriptive statistics) and also meaningful for interpretation and further analysis.

2. Principal component analysis on correlation matrixes of the individual groups of variables. Aims to identify new vectors (components) which incorporate most of the variation.

3. Farms are scored alongside the identified (relevant) components, resulting in new variables (individual farm's values of the new components) and these are then used in Ward's cluster analysis. The resulting clusters are then described using the original variables and their groups.

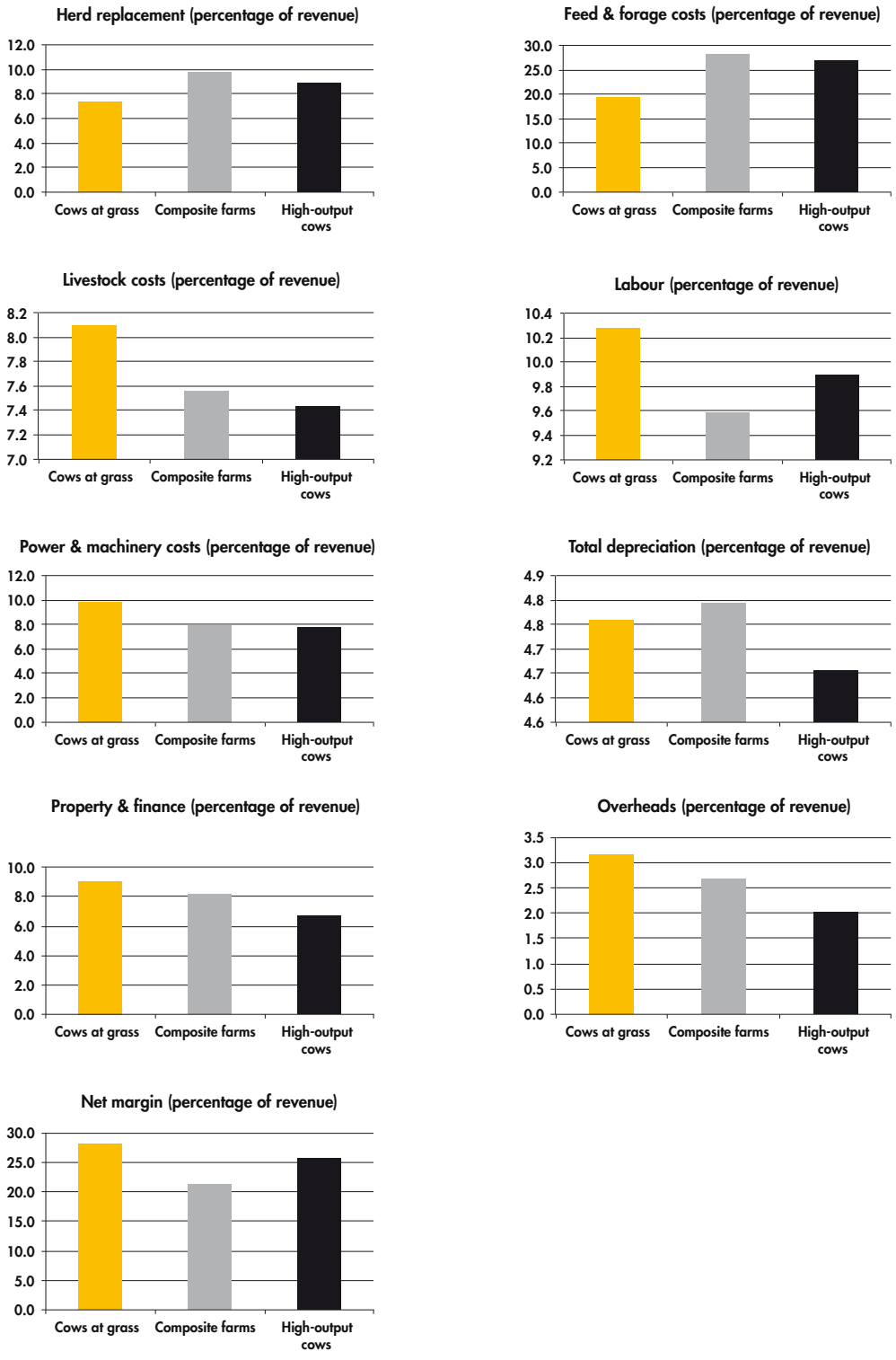
Fig. 42



Appendix C

D. The following graphs compare the share of individual costs in revenue for the different systems and the potential of these systems to retain income. The differences in management levels have been standardised by comparing the averages for the top 10 farms from each system only.

Fig. 43



Acknowledgements

We are very grateful to all those who created and supported Milkbench+ along the way and to all the participating farmers.

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