

Farm Business Survey

2011/2012

Dairy Farming in England



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Paul Wilson

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2011/12**

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Foreword to the First Series

This report is one of a series being produced based on the results of the Farm Business Survey (FBS) for England. The annual Farm Business Survey is the most comprehensive and independent survey of farm incomes and provides a definitive data source on the economic and physical performance of farm businesses in England. It is conducted by a Consortium comprising the Universities of Cambridge, Newcastle upon Tyne, Nottingham and Reading, and Askham Bryan, Duchy and Imperial Colleges. The Consortium is lead by the University of Nottingham and its members work in partnership, using uniform and standard practices in reporting on their findings to ensure consistent data quality, accuracy and validity. The Survey is financed by Defra and the Consortium values greatly the input of their staff.

These detailed reports for various farm types and enterprises are in addition to the comprehensive Farm Business Survey Reports for Government Office Regions published at www.farmbusinesssurvey.co.uk. The Consortium is seeking by these additional reports to ensure that timely and relevant information is available to farmers, consultants, advisers and other organisations and individuals interested in farming and land management. The analysis and publication of these reports uses data from farm businesses across England, with an individual member of the Consortium undertaking the research analysis. In line with the ethos of the Consortium, these reports present results in such a way as to ensure a significant element of continuity and consistency from one report to the other, whilst also ensuring that each report captures the contemporary issues of relevance to the sector of agriculture in England to which it relates.

We believe these new reports will make a valuable and useful contribution to the farming industry and we commend them to you.

Prof. Martin Seabrook

(Chief Executive of the Consortium)

Foreword to the Seventh Series

After months of negotiations Europe's leaders and finance ministers have finally agreed a finance package for the EU for the period up to 2020. To many people and businesses this may be of minor interest to their daily lives, but to those engaged in agriculture and horticulture such news carries more weight. Crucially, there are many farm businesses which rely heavily on the Single Farm Payment (SFP). Of course, not all sectors are equally reliant upon the SFP, in particular those in the pig, poultry and horticultural sectors for which the SFP is often a minor or non-existent revenue source. However, as Europe's leaders have now agreed the budget deal, the focus now turns to looking for clarity over the future of the Common Agricultural Policy (CAP). As noted in the foreword to the Sixth series of these reports, the only realistic direction of the value of the SFP is downwards; focusing upon the market, reducing business inefficiencies and dealing with risk and volatility are key areas for business development and growth.

Having witnessed one of the wettest summers on record during 2012, many businesses have observed first-hand the extreme production and price volatility that can result from operating within the natural environment. While the 2011 cropping and production year, upon which the results presented in this series are based, represented a more benign agricultural and horticultural environment, the variation in business and enterprise performance remains a strong feature of the analyses we present. Set against an environment of increased volatility, farmers and growers need to be aware of the strengths and weaknesses of their business and of their comparative position within their particular sector; having the data to undertake this analysis is therefore a key business requirement.

Rural Business Research's (RBR) series of enterprise and farm type reports based upon independent analysis from the Defra-funded Farm Business Survey (FBS) for England is now in its seventh series. It has, over a short space of time, become increasingly recognised as a key independent information source for businesses, business advisors and government to turn to for their data needs. In business standing still often equates to moving backwards as those around you grow and develop. In the competitive sectors in which agriculture and horticulture operates, knowledge and information remain key business tools for success.

As our series of reports has grown in popularity, I thank all the farmers and growers who take part in the FBS research programme which allows us to produce these valued information sources. I trust that the independent data produced within these reports continues to offer value to all the reports' readers.

Dr Paul Wilson

Chief Executive Officer, Rural Business Research
Spring 2013

www.ruralbusinessresearch.co.uk

Acknowledgements

Rural Business Research thanks sincerely all the farmers who have voluntarily provided records and information on which the annual Farm Business Survey, and this report, is based.

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Summary

The Dairying Sector

- During 2011/12, dairy farming in England witnessed an increase in milk prices with a yearly average price of 28.06 pence per litre (ppl) compared to 25.14 ppl in 2010/11. Record high butter prices in the spring of 2011 and cost-tracker pricing arrangements contributed to the rise in milk prices
- Key inputs costs, namely feeds, fertilisers, energy and veterinary costs all increased on the levels of 2010
- Annual milk production increased during 2011/12 when production rose by 124 million litres, up 0.9% on the previous year. Production at this level was last achieved in 2006/07
- Average milk yield increased by 3.3% (7617 litres per cow; (lpc)); the fourth year in succession that yields have increased. The national herd reduced in size by approximately 33,000 cows between 2010/11 and 2011/12
- Between December 2011 and December 2012, 67 (net) milk producers left the industry (0.6%)

Farm level results

- Farm Business Survey data from 2011/12 shows that the average Farm Business Income (FBI) from dairying was £608/ha, which at the average farm size equates to an FBI of approximately £86,750, representing an increase of 31% from 2010/11
- Average FBI on lowland dairy farms was £604/ha (up from £448/ha in 2010/11). For LFA dairy farms, average FBI was £632/ha compared to £663/ha in 2010/11
- Management and Investment Income (MII) in dairy farming increased by £135/ha to £292/ha in 2011/12. This equates to an average MII of £41,663 per farm
- For the smaller dairy farms, i.e. less than 60 hectares, the significant reliance on family labour resulted in a lower MII than was achieved for the two larger size groups presented, with the smaller size group achieving a MII of -£260/ha
- Regionally, lowland dairy farms in the North and West showed a greater degree of specialisation, recording significantly higher levels of output and variable costs than those in the East. FBI in the North, West and East was £701/ha, £694/ha and £400/ha, respectively
- Profitability analysis reveals that FBI for the upper quartile of lowland dairy farms was £1,267/ha compared to £122/ha for the lower quartile. The upper quartile group has the smallest farm size at 119.34ha, compared to 141.96ha for the lower quartile
- LFA dairy farms within the largest size group presented (greater than 120 hectares) operate significantly less intensive input-output systems; achieving the lowest total farm output (£2,643/ha) whilst incurring the lowest variable (£1,157/ha) and fixed costs (£1,042/ha). The heavy reliance on family labour resulted in the smallest size group (less than 60 hectares) recording the lowest MII at £60/ha. The respective FBIs for the less than 60 hectares, the 60 to 120 hectares and the greater than 120 hectares size groups are £34,414, £53,549 and £111,218
- Regional analysis shows that LFA dairy farms in the West achieved a higher total farm output than those in the North and in doing so, incurred lower variable costs. Average farm-level FBI returns for the North and West were £66,560 and £82,947 respectively

- Analysis by LFA quartile groupings (by FBI) reveals that the upper quartile achieved a milk output that was 125% greater than that achieved by the lower quartile. At the average farm sizes for these groups, the lower and upper quartiles achieved FBI returns of approximately £16,260 and £134,000 respectively

Dairy Enterprise Results

- Enterprise-level analysis reveals that for lowland dairy herds, despite a slight fall in average yield, an increase in milk price of 2.80 ppl resulted in an increased output from milk of £190/cow. For LFA herds, average milk price increased by 3.10 ppl, which coupled with an 8% increase in yield resulted in an increased output from milk of £360/cow. Respective gross margins for lowland and LFA herds were £1,071/cow and £969/cow
- For lowland herds, as herd size increases, so do the average yield/cow, milk output/cow, total variable costs/cow and total gross margin/cow. Gross margins per cow for the less than 80 cows, the 80 to 130 cows and the greater than 130 cows groups were £873, £1,054 and £1,093 respectively. These margins per cow equate to gross margins per litre for the less than 80 cows, the 80 to 130 cows and the greater than 130 cows groups of 13.77ppl, 13.98ppl and 13.94ppl respectively
- Regional analysis of lowland herds shows that although dairy farms in the West are not so intensive in their production, they achieve the highest milk price, resulting in the highest gross margin of £1,134/cow, compared to £984/cow (East) and £1,030/cow (North)
- Lowland dairy farms in the upper quartile (by gross margin performance) produced on average 2,588lpc more than those in the lower quartile. Average milk prices for the upper quartile exceeded those of the lower quartile by 1.5ppl which represents a narrowing of the difference from the 2010/11 level of 1.8ppl
- Concentrate to milk conversion rates of 7.0ppl and 9.1ppl were recorded for the gross margin upper and lower quartile farms respectively (6.3 ppl and 8.5 ppl in 2010/11), whilst gross margin per litre results were 16.5 ppl (upper quartile) and 10.3 ppl (lower quartile) compared to 15.3ppl and 8.5ppl in 2010/11
- LFA enterprise regional analysis reveals that the North averaged 785 lpc more than the West, generating £2,062/cow of milk output (£1,848/cow; West). However, the West's lower variable costs of £707/cow compared to the North's £1,040/cow, resulted in the West achieving the highest gross margin per cow at £1,085/cow, compared to £858/cow in the North
- Gross margin performance quartile analysis of LFA dairy farms reveals that the better performers have larger herds and achieve substantially higher yields (+1800 litres per cow) and receive higher milk prices (+1.3ppl); leading to a wide disparity between the two groups in gross margin per cow achieved of more than £700/cow

Conclusion

- The findings in this report reaffirm the conclusions drawn in previous reports in this series, that in general, the larger herds are more profitable and operate relatively high input-output systems. The report also highlights the marked differences in economic returns and technical efficiency between the top and bottom performers that have been observed in previous year's analyses
- Profitable producers will seek opportunities to expand their business as they exploit their good technical efficiencies and profit margins, whilst producers from within the lowest performing groups will continue to leave the industry based on income levels that are not sustainable

Chapter 1: The Dairying Sector

1.1: Introduction

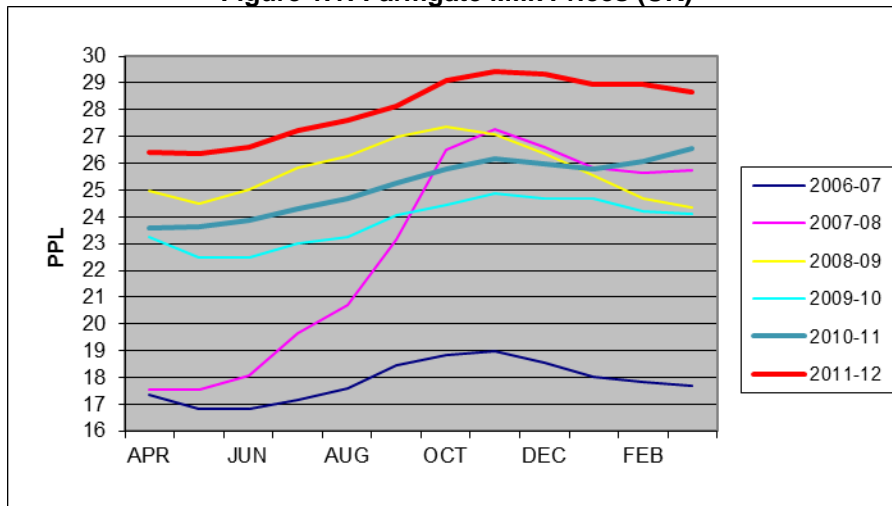
The 2011/12 milk year saw a continuation of the increase in the price of farmgate milk that began in 2010/11. Key input costs also increased but the increase in outputs more than compensated for this, resulting in elevated income and margin returns. Despite the upturn in dairying incomes and some optimistic pointers for the future, e.g. high commodity prices and the widening imbalance between the global supply and the increasing demand for dairy produce, the national herd size and the number of producers continued to decline. However, despite there being fewer producers and fewer cows, the UK production of milk in 2011/12 increased as a result of a continuation of the increase in average milk yield per cow. Drawing upon information from a range of published sources together with analysis of data from the Farm Business Survey 2011/12, *Dairy Farming in England* provides a contemporary analysis of the performance of dairy farms, and dairy production, in England for the 2011/12 financial year. The purpose of this introductory section of the report is to set out the market environment and key factors affecting the sector during this financial year. Specifically, this section of the report gives an overview of the UK dairying sector, focusing on:

- farmgate milk prices
- input prices
- annual milk production
- UK dairy herd and average milk yield
- producer numbers

1.2: Farmgate Milk Prices

Figure 1.1 shows the average ex-farmgate milk price (including seasonality; net of delivery charges) for the 2011/12 milk year. The average price during 2011/12 was 28.06 pence per litre (ppl) compared to 25.14 ppl in 2010/11, 23.79 ppl in 2009/10 and 25.75 ppl in 2008/09. The range of prices offered by milk buyers was, once again, very wide, with dedicated suppliers featuring at the top end of the payments scale. Prices in 2011/12 benefitted from high commodity prices with butter prices at a record high in the spring of 2011 and cost-tracker pricing arrangements have boosted milk prices where they have been in operation. Whilst the milk price did benefit from higher commodity prices, producers lamented what they felt was the continued disconnect between commodity prices and farmgate prices, i.e. the milk price did not sufficiently track and reflect any increases in the price of butter, cheese and skimmed milk powder.

Figure 1.1: Farmgate Milk Prices (UK)

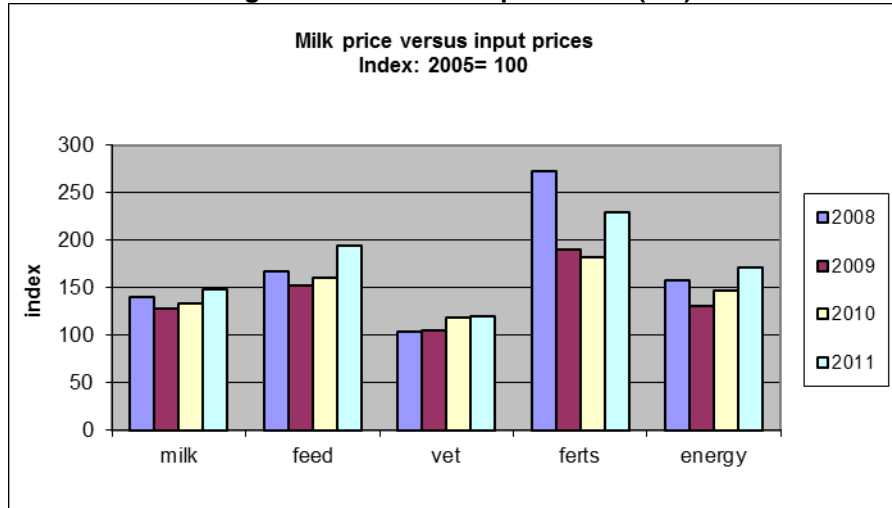


Source: Defra (2013a), Milk Price Surveys

1.3: Input Prices

Figure 1.2 shows the trends in farmgate milk prices and the prices of some key dairying inputs from 2008 to 2011, using the year 2005 as the base year (index = 100). It can be seen that in 2011 the prices of feeds, veterinary services and medicines, fertilisers and energy all increased on 2010 levels. As outlined above (figure 1.1) the price of milk also increased, due in part to the significant number of 'cost-plus' milk price contracts that producers have entered into and which serve as insurance against input price increases and help preserve margins.

Figure 1.2: Milk and Input Prices (UK)

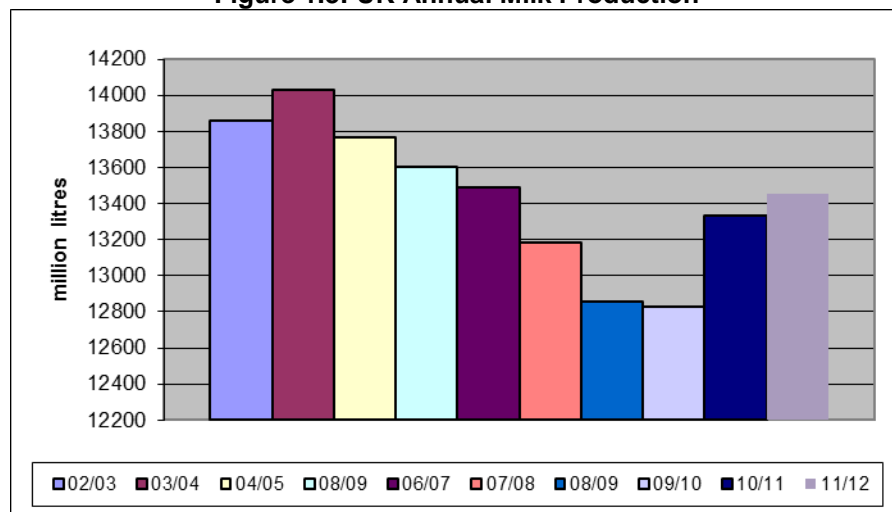


Source: Defra (2013b); Agriculture in the UK 2011

1.4: Annual Milk Production

Figure 1.3 shows annual milk production in the UK (defined as wholesale deliveries) for the years 2002/03 to 2011/12. The 2011/12 year built on the increase in production that began in 2010/11 when a six year trend in declining production was reversed. Annual production increased to 13,456 million litres, and increase of 124 million litres (0.93%) and was influenced by favourable grass growing conditions in the spring of 2011 and higher milk prices that served as encouragement to increase production. As will be shown later in this report, this increase in production was set against the backdrop of declining cow numbers but also and significantly, an increase in average yields per cow.

Figure 1.3: UK Annual Milk Production

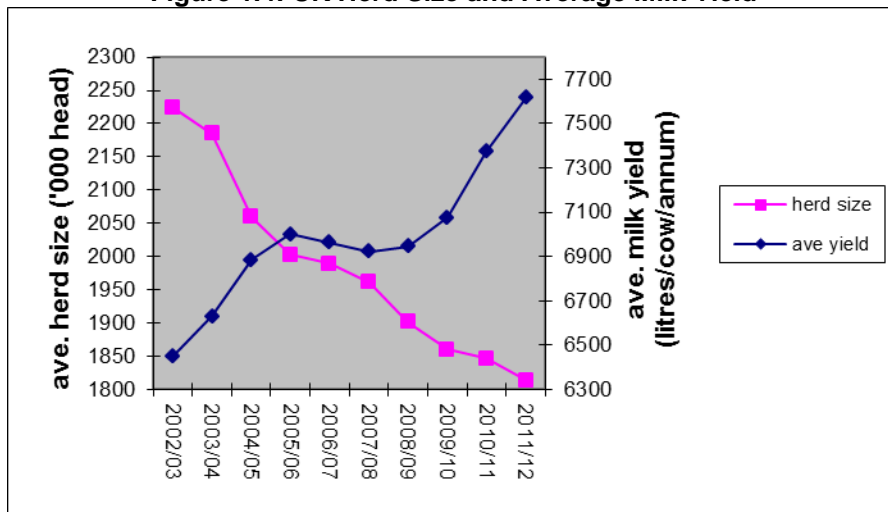


Source: MDC Datum (2013a)

1.5: UK Dairy Herd and Average Milk Yield

Figure 1.4 shows that 2011/12 was the fourth consecutive year when average milk yield had increased. A 242 litres per cow (3.3%) increase on the 2010/11 average yield saw yields of 7617 litres per cow recorded, on average, in 2011/12. Factors that contributed towards this increase in yield include the aforementioned favourable grass growing conditions in spring 2011 but perhaps more significantly was the continued decline in producer and national herd numbers, in that it is reasonable to assume that a large percentage of the cows that have left the national herd would have been lower than average yielding cows and thus, those remaining will be largely the better performing cows with a subsequent positive effect on national average yields. Figure 1.4 illustrates that in 2011/12 the national herd size continued to decline with 33,000 fewer cows, leaving the herd size at 1,814,000 cows (down 1.8%). Despite the improved financial performance of dairying in 2011/12, producers continued to exit the industry. As will be illustrated later in this report, there is a wide range between the high and low performers in terms of income. Although those producers leaving the industry are not exclusively from the low performing bracket, it is mostly these farmers who are persuaded to cease milk production on the back of poor incomes and therefore little money to make necessary investments, plus the prevailing high prices for cull and breeding cows that add further impetus to their decision to leave. It is important to note that as producers go out of business, not all of their cows are re-cycled back into the national herd, with about one-fifth being culled due to poor productivity, age and health related factors. Consequently, it could be said that as producers exit the industry the health of the national herd improves, resulting in higher average yields per cow, as highlighted above.

Figure 1.4: UK Herd Size and Average Milk Yield

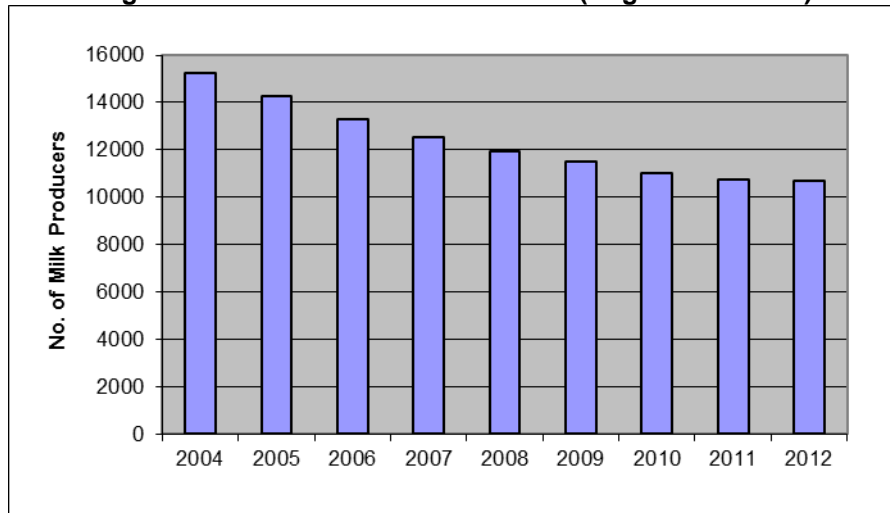


Source: MDC Datum (2013b)

1.6: Producer Numbers (England & Wales)

Figure 1.5 shows the continuing trend of the fall in the number of milk producers in England and Wales, when, between December 2011 and December 2012, 67 (0.6%) milk producers withdrew from the industry. This level of decrease is further evidence that the exodus from dairying is levelling out when set against the figures from recent years, when between 2004 and 2011 the corresponding percentage decreases were 6.7%, 6.4%, 6.9%, 5.4%, 5.1%, 3.5%, 4.0% and 2.6% respectively. Between 2004 and 2012, 4533 producers ceased milk production, representing a fall of 29.8%.

Figure 1.5: Number of Milk Producers (England & Wales)



Source: MDC Datum (2013c)

1.7: Structure of Report

The above sections have described the market environment in which the dairy sector has been operating during the 2011/12 financial year, whilst making reference to the economic and market conditions over recent years. The remaining chapters of this report are as follows: Chapter 2 details the data source and data analysis undertaken; Chapter 3 provides the results of the data analysis; Chapter 4 discusses the results of the analysis in context of previous research and identifies the main performance drivers in Dairy Farming in England.

Chapter 2: Data and Methodology

2.1: Data

The data used in this report are derived from the Farm Business Survey returns for England for those farms classed as Dairy Farms¹ and relate to the outputs, inputs and returns to each farm, together with total farm area and farm size data. The data for 2010/11 are directly comparable with data for 2011/12, but are not comparable with the data for 2009/10 and 2010/11 reported in McHoul *et al.* (2011) due to a methodological change in the classification of farm types. For a sub-set of these results data is available at the enterprise level to produce output, variable input and Gross Margin (GM) data (total dairy output minus variable costs) together with cow numbers and physical yield (litres per cow). Table 2.1 below details the number of observations for the per hectare farm results, in each category by farm type (Lowland and Less Favoured Area (LFA)), by EU super region (North, East, West; see figure 2.1), by farm size categories, by lower and upper performance quartiles. Table 2.2 details the number of observations for the enterprise level results, in each category by farm type (Lowland and LFA), by EU super region (North, East, West), by herd size categories, by lower and upper performance quartiles for Lowland and LFA farms.

Table 2.1: Observations by Category: Farm-Level Data 2011/12

Category		Lowland	LFA
Number of farms		259	61
EU Super Region	North	64	36
	East	64	Ins. Data
	West	131	17
Farm Size	<60 hectares	34	16
	60-120 hectares	90	23
	>120 hectares	135	22
Performance Quartile	Lower quartile	65	15
(by FBI)	Upper quartile	65	15

FBI = Farm Business Income: Ins. data = Insufficient data available (<10 observations)

¹ Holdings on which dairy cows account for more than two thirds of the total Standard Output for the farm. A holding is classified as a Less Favoured Area (LFA) holding if 50 percent or more of its total area is in the LFA and a lowland holding if less than 50 per cent of its total area is in the LFA. See:

http://www.defra.gov.uk/statistics/files/defra-stats-foodfarm-farmmanage-fbs-UK_Farm_Classification.pdf

Table 2.2: Observations by Category: Enterprise-Level Data 2011/12

Category		Lowland	LFA
Number of farms		239	58
EU Super Region	North	60	36
	East	58	Ins. Data
	West	121	16
Farm Size	<80 cows	45	21
	80-130 cows	77	25
	>130 cows	117	12
Performance Quartile	Lower quartile	60	15
(by Gross Margin)	Upper quartile	60	15

Ins. data = Insufficient data available (<10 observations).

2.2: Methodology

The farm and enterprise level data were weighted using the Farm Business Survey weights and the subsequent results presented on a per hectare (farm level analysis) or per cow (gross margin analysis) basis. Descriptive results with the mean (average) for each category are reported as detailed in Chapter 3.

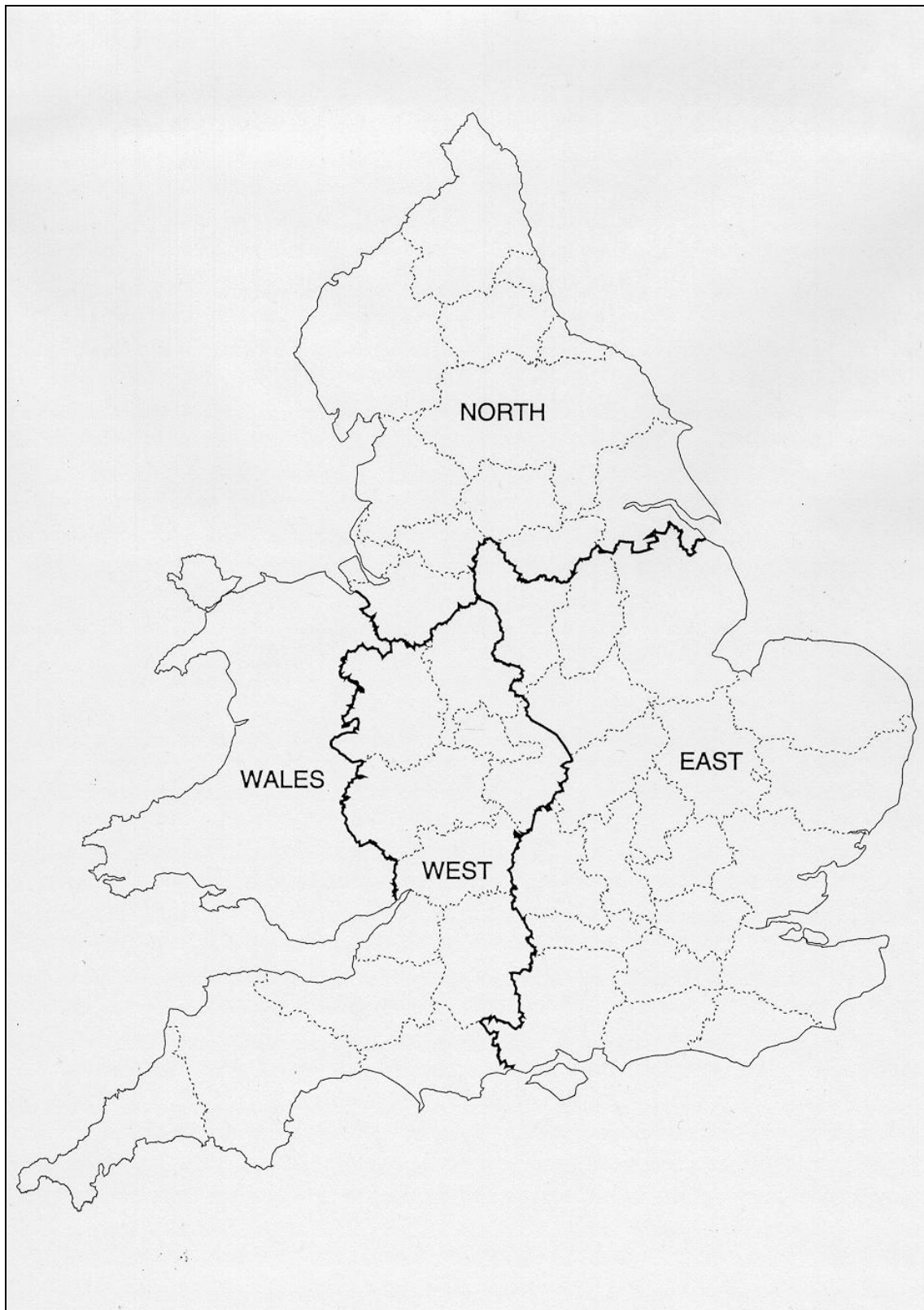


Figure 2.1: The EU Super Regions of England and Wales

Chapter 3: Results

3.1: All farms

The results of the outputs, inputs, and margins from dairy farms in England on a per hectare (ha) basis for 2010/11 and 2011/12 are presented in Table 3.1. The table shows the results for all farms, together with results for lowland and less favoured area (LFA) farms detailed separately. The results for all farms show that for 2011/12, Farm Business Income (FBI) was £608 per hectare, which at the average farm size provides an average FBI of £86,749; an increase of 31% on the 2010/11 figure. The previous years' results had shown an increase of 4.6% between 2009/10 and 2010/11. It is interesting to note however, that the FBI decreased by 20% between 2008/09 and 2009/10; increased by 28% between 2007/08 and 2008/09 and substantially increased by 47% between 2006/07 and 2007/08 (McHoul *et al.*, 2011).

The value of farmer and spouse labour fell slightly from £200/ha in 2010/11 to £198/ha in 2011/12, and thus made a small contribution to the substantial increase in Management and Investment Income (MII) of 86% from £157/ha in 2010/11 to £292/ha in 2011/12. MII is the economic return after accounting for the value of labour and owned land. This increased MII is higher than the 2008/09 peak of £281/ha and significantly higher than the 2009/10 MII of £126/ha (Robertson and Wilson, 2010). In 2011/12, average MII on dairy farms in England rose to £41,663 compared to the 2010/11 result of £21,795. MII for all dairy farms in 2011/12 rose above the recent peak of 2008/09, when the average MII was just over £33,500, compared to the trough of £16,346 in 2009/10 (Robertson and Wilson, 2011).

On analysis of farm output, the data shows an 11% increase in total farm output; increasing from £2,895/ha to £3,209/ha. Milk output also rose by 10% to £2,248 compared to £2,043/ha in 2010/11. Calf output increased by 13%; from £90/ha in 2010/11 to £102/ha in 2011/12.

Total variable costs increased by 8% from £1,237/ha in 2010/11 to £1,333/ha in 2011/12 compared to an increase of 4% from £1,190/ha in 2009/10 to £1,237/ha in 2010/11. This compares to the period 2008/09 to 2009/10 when it was noted that variable costs increased by less than 1% to £1,190/ha in 2009/10 compared to £1,126/ha in 2008/09 (McHoul *et al.*, 2011). Most variable cost categories show an increase on the previous year, notably home-grown concentrates (7%), purchase concentrates (10%), coarse fodder (24%) and other livestock costs (2%). Notably, fertiliser costs increased by 14% to £119/ha; following the fall of 15% from £123/ha in 2009/10 to £104/ha in 2010/11 (McHoul *et al.*, 2011).

Fixed costs increased by 7% to £1,386/ha compared to £1,301/ha in 2010/11. Without exception, all the fixed cost categories show increases on the previous year; labour (6%), contract (5%), machinery depreciation (4%), other machinery (16%), miscellaneous (10%) and rent and rental equivalent (1%).

Table 3.1: Outputs, Inputs and Margins for All Farms, Lowland and LFA

	All Farms		All Lowland		All LFA	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	322	320	261	259	61	61
Area (Ha)	138.82	142.68	145.42	148.86	107.49	113.22
	£/ha		£/ha		£/ha	
Output						
Milk	2043	2248	2031	2267	2125	2128
Calf	90	102	86	98	113	124
Lease Quota (net)	0	0	0	0	0	0
Other Dairy	15	1	15	2	16	0
Herd Replacement	-210	-238	-204	-236	-250	-248
Total Dairy Output	1938	2113	1928	2131	2004	2003
Other Livestock	408	522	397	516	482	562
Other	549	573	579	611	353	334
Total Farm Output	2895	3209	2904	3258	2839	2900
Variable Costs						
Home-grown	60	64	61	68	55	39
Concentrates						
Purchased	624	689	617	684	669	720
Concentrates						
Coarse Fodder	42	52	41	51	48	55
Other Livestock						
Concentrates	10	9	12	10	0	0
Vet and Medicine	95	94	95	94	96	92
Other Livestock Costs	219	224	221	226	207	215
Seed	30	32	33	36	10	10
Fertiliser	104	119	104	119	105	117
Crop Protection	33	31	36	35	10	9
Other Crop Costs	20	20	21	21	13	17
Total Variable Costs	1237	1333	1241	1342	1214	1274
Fixed Costs						
Labour	326	344	333	354	281	283
Contract	139	146	144	156	103	89
Machinery						
Depreciation	167	173	169	174	156	164
Other Machinery	170	197	173	200	156	175
Miscellaneous	240	265	242	269	227	244
Rent and Rental						
Equivalent	259	261	265	270	222	202
Total Fixed Costs	1301	1386	1326	1423	1144	1158
Net Farm Income	357	489	338	493	481	468
Farmer / Spouse						
Labour	200	198	190	190	269	245
Management & Investment Income	157	292	148	303	212	222
Farm Business Income (FBI)	477	608	448	604	663	632

3.2: Comparison of Lowland and Less Favoured Area (LFA) farms

Table 3.1 also shows the performance of lowland and LFA dairy farms. The average farm area of lowland farms increased by 3.44ha to 148.86ha., whilst for LFA farms the average farm area increased by just over 5.73ha to 113.22ha. In 2010/11, lowland dairy farms achieved, on average, a total farm output of £65/ha greater than the LFA group. In 2011/12 this figure increased substantially to £358/ha. The total farm output increased by 12% on lowland farms; however total farm output increased by just 2% on the LFA farms. Although the lowland group achieved a higher output by £358/ha, it also incurred greater variable and fixed costs.

The total variable costs and total fixed costs were respectively £68/ha and £265/ha greater than for the LFA group. The substantial differences in the cost structures of the two groups noted in previous years has increased, with lowland farms operating at 5% and 23% higher cost level for variable and fixed costs respectively than LFA farms. In 2010/11, lowland farms were operating at 2% and 14% higher cost level for variable and fixed costs respectively than LFA farms. In previous years, prior to the 2010/11 publication, the cost structure differences between the lowland and LFAs groups were more marked; this largely flows from the change to the farm type classification which has resulted in those LFA farms with a relatively smaller percentage of output derived from dairying, being classified as another farm type, rather than within dairying.

Despite the additional output achieved by the lowland group, the average FBI was £604/ha in comparison to £632/ha for the LFA group. It should be noted that these figures represent an increase in FBI return for lowland farms of £156/ha (+35%), whilst the FBI for LFA farms has decreased by £31/ha (-5%). At the average farm size, these results equate to an average FBI of £89,911 for lowland farms and £71,555 for LFA farms. Taking into account values for farmer and spouse labour and owned land, the respective MII for lowland and LFA farms are approximately £45,105 and £25,135.

3.3: Lowland: Influence of Farm Size

Table 3.2 shows the results of the three lowland size groups. The specialist nature of smaller farms, as noted in the previous five editions of this report, is not as evident in 2011/12. In 2010/11, the less than 60 hectares group recorded the highest total farm output per hectare (£3,406/ha), milk output (£2,572/ha), variable costs (£1,564/ha) and fixed costs (£1,444/ha). However, in 2011/12, it is the 60-120 hectares group that recorded the highest total farm output per hectare (£3,704/ha), milk output (£2,895/ha) and fixed costs (£1528/ha). However, in contrast, variable costs were slightly lower at £1,559/ha for the 60-120 hectare group compared to the less than 60 hectare group variable costs (£1603/ha) but higher than the more than 120 hectare group variable costs (£1,271/ha).

The less than 60 hectares group achieved a MII of minus £260/ha, compared to the 60 to 120 hectares and greater than 120 hectares groups which achieved a MII of £286/ha and £1,339/ha respectively. The MII figure for the less than 60ha group has increased slightly and thus arrested the overall downward trend. In 2010/11, the MII was minus £282/ha, in 2009/10 it was minus £227/ha, whilst in 2008/09 the MII was minus £21/ha and in 2007/08 the MII was minus £115/ha (McHoul *et al.*, 2012).

On analysis of the three groups by FBI performance, the results show that in contrast to previous years the less than 60 hectares group records the lowest FBI (£542/ha) in comparison to the 60 to 120 hectares group (£762/ha) and the greater than 120 hectares group (£565/ha). The key factor is the great reliance on farmer and spouse labour shown on farms in the less than 60 hectares group, whereby the farmer and spouse labour is valued at £709/ha. This figure contrasts sharply with the two other groups which show respective contributions of £331/ha and £124/ha for the 60 to 120 hectares and greater than 120 hectares groups. The range of the total FBI across the three size groups is interesting, with the less than 60 hectares group achieving an average FBI per farm of £24,206 compared to that of the 60 to 120 hectares group and the greater than 120 hectares group which achieved £66,462 and £123,289 respectively.

3.4: Lowland: Influence of Region

Table 3.3 presents outputs, inputs and margins for lowland dairy farms across the three EU super regions. The greater degree of specialisation in dairying in the North and West, as noted in previous editions of this report (Robertson and Wilson, 2009, 2010; McHoul *et al.*, 2011 and 2012) is again illustrated by the amount of total output that is derived from milk output. For the North and West regions, milk output comprises 76% and 72% of total output, respectively, whereas for the East, 60% of total output comes from milk.

Of particular note is the range in total variable costs across the three regions, with the North recording the highest variable costs (£1,652/ha) and the East recording the lowest (£1,104/ha). Analysis of the individual variable costs from the North and West highlights substantial differences in expenditure for purchased concentrates, coarse fodder, veterinary and medicine, other livestock costs and fertiliser, with the North incurring +£373/ha, +£16/ha, +£48/ha, +£98/ha and +£34/ha for these costs respectively, compared to the East.

Contrary to variable costs, all three regions show similar levels of fixed costs. The highest FBI, on a per ha basis, is found in the North (£701/ha), followed by the West (£694/ha) and the East (£400/ha), which marks a change in rank of the West and North compared to the repeated order of West, North and East recorded in 2007/08, 2008/09 and 2010/11.

On comparing these levels of FBI with 2010/11, the FBI has increased by 36% in the North, 32% in the West and 29% in the East. From 2009/10 to 2010/11, the FBI increased by 26% in the North, however fell by 7% and 11% in the West and East respectively. The results from 2008/09 to 2009/10 highlight the increases in FBI of 18% in the North and 5% in the East, but a decrease in the West (7%). This contrasted sharply with the increase in FBI from 2007/08 to 2008/09 of 25% in the West, 35% in the North and 22% in the East (Wilson and Robertson, 2010 and McHoul *et al.*, 2012).

3.5: Lowland: Comparison by Profitability Quartiles

It is notable from Table 3.4 that the upper quartile has the lowest average farm size (119.34ha) compared to that of the lower quartile (141.96ha). The upper quartile achieved a substantially greater farm output (£4,473/ha) than the lower quartile (£2,737/ha). The upper quartile also shows higher levels of total variable costs (£1,770/ha) and total fixed costs (£1,669/ha) compared to the lower quartile's respective costs of £1,245/ha and £1,422/ha, resulting in an average FBI of £1,267/ha, in contrast to the lower quartile's £122/ha.

At the average farm sizes detailed in Table 3.4, these FBI data equate to an average farm-level FBI of £151,204 for the upper quartile and £17,319 for the lower quartile. Compared to 2010/11, these levels of income represent an increase in average FBI, for the average upper quartile farm of £23,376 and £20,903 for an average lower quartile farm.

Furthermore, there are notable differences between the two quartile groups regarding the increases in output and various costs. For the upper quartile group, milk output increased by 26% between 2010/11 and 2011/12, whilst for the lower quartile group, milk output increased by 9%. Purchased concentrate costs for the upper quartile increased by 30% (+£220/ha), whilst for the lower quartile concentrate costs increased by <2% (+£9/ha). In addition, for the lower quartile, coarse fodder, other livestock costs and fertiliser increased by 29%, 8% and 25% respectively. In contrast, coarse fodder, other livestock costs and fertiliser costs increased by 49%, 17% and 34% respectively. Vet and medicine costs decreased 7% for the lower quartile and increased by 17% for the upper quartile compared to the 2010/11 results.

The MII for the lower quartile group increased to minus £128/ha compared to minus £254/ha for 2010/11. The MII for the upper quartile group increased to £791/ha compared to £592/ha for 2010/11. In 2011/12, the difference in FBI between the two groups increased slightly, from £1,063/ha in 2010/11 to £1,145/ha. It is interesting to note that the FBI differences from

previous reports was £1,032 recorded in 2009/10, £1,169/ha noted in 2008/09 and £1030/ha in 2007/08 (Wilson and Robertson, 2010).

Table 3.2: Outputs, Inputs and Margins: Lowland by Farm Size

LOWLAND	< 60 ha		60 – 120 ha		> 120 ha	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	35	34	98	90	128	135
Area (Ha)	44.02	44.66	86.26	87.22	218.35	218.21
	£/ha		£/ha		£/ha	
Output						
Milk	2572	2645	2555	2895	1842	2080
Calf	153	157	114	144	74	83
Lease Quota (net)	0	0	0	0	0	0
Other Dairy	24	1	23	0	12	2
Herd Replacement	-271	-286	-275	-319	-179	-212
Total Dairy Output	2478	2517	2418	2721	1750	1953
Other Livestock	571	663	463	597	367	487
Other	357	330	405	386	644	687
Total Farm Output	3406	3510	3285	3704	2761	3127
Variable Costs						
Home-grown Concentrates	46	51	48	47	66	74
Purchased Concentrates	806	838	766	854	561	630
Coarse Fodder	72	80	59	78	34	43
Other Livestock Concentrates	18	18	1	1	15	12
Vet and Medicine	118	103	109	106	89	90
Other Livestock Costs	303	296	260	287	204	206
Seed	19	21	30	27	35	39
Fertiliser	147	162	111	123	99	116
Crop Protection	9	10	19	17	43	41
Other Crop Costs	25	25	25	21	19	21
Total Variable Costs	1564	1603	1427	1559	1166	1271
Fixed Costs						
Labour	212	186	307	341	348	367
Contract	149	142	157	170	140	152
Machinery Depreciation	197	231	209	206	155	163
Other Machinery	212	237	169	190	172	201
Miscellaneous	362	371	287	327	222	248
Rent and Rental Equivalent	313	290	299	294	252	263
Total Fixed Costs	1444	1458	1430	1528	1288	1393
Net Farm Income	398	449	428	617	307	462
Farmer / Spouse Labour	680	709	335	331	119	124
Management & Investment Income	-282	-260	93	286	188	339
Farm Business Income (FBI)	525	542	566	762	409	565

Table 3.3: Outputs, Inputs and Margins: Lowland by EU Super Region

LOWLAND	North		East		West	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	63	64	69	64	129	131
Area (Ha)	122.98	127.12	192.90	196.33	132.27	137.81
	£/ha		£/ha		£/ha	
Output						
Milk	2552	2828	1538	1641	2146	2415
Calf	101	111	66	74	94	108
Lease Quota (net)	0	0	0	0	0	0
Other Dairy	21	0	9	2	16	2
Herd Replacement	-302	-307	-130	-168	-210	-247
Total Dairy Output	2372	2633	1484	1550	2046	2278
Other Livestock	537	616	300	394	399	550
Other	448	467	761	814	504	544
Total Farm Output	3357	3716	2545	2758	2949	3372
Variable Costs						
Home-grown Concentrates	89	80	56	56	51	70
Purchased Concentrates	822	894	490	521	608	690
Coarse Fodder	68	70	35	54	32	41
Other Livestock Concentrates	0	0	9	6	21	18
Vet and Medicine	133	121	74	73	91	94
Other Livestock Costs	275	273	181	175	223	237
Seed	24	26	37	41	35	37
Fertiliser	124	145	91	111	103	112
Crop Protection	24	25	49	44	33	33
Other Crop Costs	19	18	25	24	18	21
Total Variable Costs	1578	1652	1048	1104	1214	1352
Fixed Costs						
Labour	337	349	330	339	334	367
Contract	145	161	136	145	150	160
Machinery Depreciation	179	184	153	150	176	186
Other Machinery	172	206	180	199	167	198
Miscellaneous	251	275	220	255	255	274
Rent and Rental Equivalent	262	263	239	241	287	294
Total Fixed Costs	1346	1439	1259	1329	1368	1479
Net Farm Income	433	626	238	325	366	542
Farmer / Spouse Labour	212	204	141	146	217	213
Management & Investment Income	221	421	97	179	150	328
Farm Business Income (FBI)	516	701	309	400	524	694

Table 3.4: Outputs, Inputs and Margins: Lowland by Profitability Quartiles

LOWLAND	Lower quartile		Upper quartile	
	10/11	11/12	10/11	11/12
Number of farms	65	65	65	65
Area (Ha)	149.34	141.96	123.03	119.34
	£/ha		£/ha	
Output				
Milk	1612	1753	2779	3488
Calf	70	69	117	147
Lease Quota (net)	0	0	0	0
Other Dairy	11	0	18	6
Herd Replacement	-191	-209	-254	-326
Total Dairy Output	1502	1613	2660	3316
Other Livestock	351	421	520	685
Other	581	703	508	472
Total Farm Output	2433	2737	3689	4473
Variable Costs				
Home-grown Concentrates	53	54	69	66
Purchased Concentrates	611	620	731	951
Coarse Fodder	41	53	55	82
Other Livestock Concentrates	1	8	24	26
Vet and Medicine	91	85	108	126
Other Livestock Costs	200	215	247	289
Seed	34	39	32	34
Fertiliser	91	114	110	147
Crop Protection	33	34	30	27
Other Crop Costs	18	23	21	23
Total Variable Costs	1173	1245	1427	1770
Fixed Costs				
Labour	319	351	380	429
Contract	142	148	142	176
Machinery Depreciation	178	173	174	211
Other Machinery	184	213	190	211
Miscellaneous	251	288	262	306
Rent and Rental Equivalent	244	249	293	337
Total Fixed Costs	1318	1422	1441	1669
Net Farm Income	-58	70	822	1034
Farmer / Spouse Labour	196	199	230	242
Management & Investment Income	-254	-128	592	791
Farm Business Income (FBI)	-24	122	1039	1267

3.6: LFA: Influence of Farm Size

Table 3.1 above provided the results for all less favoured area (LFA) dairy farms. Table 3.5 presents the results of LFA dairy farms according to the three size groupings. Examining the input-output systems of the three size groupings, confirms that similarly to the findings for lowland farms, the greater than 120 hectares size group operates at a substantially lower intensity of production level than the two other smaller size groups. The greater than 120 hectares group achieved the lowest total farm output (£2,643/ha), compared to the less than 60 hectares and between 60 to 120 hectares groups which achieved total outputs of £3,245/ha and £3,278/ha respectively.

The percentage of total output derived from milk sales fell back slightly in comparison to the previous year; for the less than 60 hectares group (74% *cf.* 73% in 2010/11), the 60 to 120 hectares group (75% *cf.* 77% in 2010/11) and the greater than 120 hectares group (72% *cf.* 73% in 2010/11).

Total variable costs increased from 2010/11 to 2011/12, by 10%, 2% and 11% for the less than 60ha, 60-120ha and greater than 120ha groups respectively. Purchased concentrates and fertiliser costs increased by 7% and 13% respectively for the less than 60 hectare group, by 3% and 22% respectively for the 60-120ha group and by 17% and 7% for the greater than 120ha group respectively. From 2009/10 to 2010/11, the variable costs increased by 17% and 10% for the less than 60ha and 60-120ha groups respectively, whilst the variable costs reduced by less than 1% for the greater than 120ha group. This contrasts with the slight increases of 3%, 4% and 2% for the less than 60ha, 60-120ha and greater than 120ha groups respectively recorded between 2008/09 and 2009/10 (McHoul *et al.*, 2011).

Fixed costs increased by 4% (+£47/ha) for the less than 60ha group, 3% (+£35/ha) for the 60-120ha group and 3% (+£35) for the greater than 120ha group.

Regarding MII returns, the lower input-output system (greater than 120 hectares group) achieved the highest MII of £290/ha, compared to the higher input-output systems of less than 60 hectares group MII of £60/ha and the 60 to 120 hectares group which attained an MII of £140/ha.

With reference to the average farm sizes noted in Table 3.5, average FBI returns are £34,414, £53,549 and £111,218 for the less than 60 hectares, 60 to 120 hectares and greater than 120 hectares groups respectively. This is an increase on the 2010/11 year's FBI returns of £23,811, £72,548 and £102,123 for the less than 60 hectares, 60 to 120 hectares and greater than 120 hectares groups respectively.

3.7: LFA: Influence of Region

Table 3.6 presents the LFA dairy farm results by EU super region. Insufficient observations exist for the East region to present results.

In 2010/11, both regions recorded substantial increases of total farm outputs of 17% in the North and 8% in the West (McHoul *et al.*, 2012). In contrast, in 2011/12, total farm output has reduced by 2% for the North and increased by 3% for the West, which is in part due to the 4% reduction in milk output in the North compared to a static level of milk output in the West. Thus, total farm output remains higher in the West at £3,043/ha compared to £2,627/ha in the North.

The average MII for LFA farms in the North decreased by £6/ha to £151/ha, whilst in the West, the MII increased by £35/ha to £389/ha. At FBI level, the average returns are £548/ha and £924/ha for the North and West respectively, resulting in average farm-level FBI returns of £66,560 for the North and £82,947 for the West.

Table 3.5: Outputs, Inputs and Margins: LFA by Farm Size

LFA	< 60 ha		60 – 120 ha		> 120 ha	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	16	16	27	23	18	22
Area (Ha)	43.77	44.81	92.30	90.15	173.09	175.70
	£/ha		£/ha		£/ha	
Output						
Milk	2045	2366	2578	2473	1797	1904
Calf	166	190	131	142	89	104
Lease Quota (net)	0	0	0	0	0	0
Other Dairy	17	0	16	0	17	0
Herd Replacement	-311	-253	-283	-267	-215	-237
Total Dairy Output	1916	2303	2441	2347	1688	1772
Other Livestock	350	440	516	562	479	579
Other	535	502	391	369	293	292
Total Farm Output	2801	3245	3348	3278	2460	2643
Variable Costs						
Home-grown Concentrates	13	18	64	49	55	37
Purchased Concentrates	701	752	810	834	557	654
Coarse Fodder	73	61	42	45	49	60
Other Livestock Concentrates	0	0	0	0	0	0
Vet and Medicine	79	79	109	105	89	87
Other Livestock Costs	251	307	258	255	161	179
Seed	4	7	13	10	10	10
Fertiliser	112	126	108	132	101	108
Crop Protection	3	3	12	10	10	9
Other Crop Costs	10	17	17	25	11	13
Total Variable Costs	1246	1370	1433	1463	1042	1157
Fixed Costs						
Labour	205	192	298	301	281	287
Contract	106	105	124	111	86	74
Machinery Depreciation	187	209	179	189	133	144
Other Machinery	187	204	183	206	131	154
Miscellaneous	294	304	287	325	169	190
Rent and Rental Equivalent	208	218	244	216	208	193
Total Fixed Costs	1186	1233	1314	1349	1008	1042
Net Farm Income	368	642	602	467	410	443
Farmer / Spouse Labour	592	582	330	327	166	153
Management & Investment Income	-224	60	272	140	244	290
Farm Business Income (FBI)	544	768	786	594	590	633

Table 3.6: Outputs, Inputs and Margins: LFA by EU Super Region

LFA	North		East		West	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	36	36	<i>Insufficient data</i>		17	17
Area (Ha)	111.57	121.46			95.88	89.77
	£/ha		£/ha		£/ha	
Output						
Milk	1936	1862			2309	2311
Calf	107	105			125	143
Lease Quota (net)	0	0			0	0
Other Dairy	16	0			15	0
Herd Replacement	-240	-253			-260	-210
Total Dairy Output	1819	1714			2189	2244
Other Livestock	483	592			442	434
Other	381	321			333	364
Total Farm Output	2683	2627			2964	3043
Variable Costs						
Home-grown Concentrates	66	45			48	39
Purchased Concentrates	672	682			563	581
Coarse Fodder	42	48			38	44
Other Livestock Concentrates	0	0			0	0
Vet and Medicine	97	92			80	74
Other Livestock Costs	204	193			188	197
Seed	9	9			14	12
Fertiliser	109	123			114	104
Crop Protection	9	8			10	9
Other Crop Costs	14	18			9	10
Total Variable Costs	1222	1219			1064	1070
Fixed Costs						
Labour	253	257			310	279
Contract	93	78			124	101
Machinery	163	155			152	174
Depreciation						
Other Machinery	158	171			146	143
Miscellaneous	204	208			245	294
Rent and Rental Equivalent	173	164			287	271
Total Fixed Costs	1043	1033			1263	1262
Net Farm Income	418	375			637	710
Farmer / Spouse Labour	261	224			284	321
Management & Investment Income	157	151			353	389
Farm Business Income (FBI)	581	548			913	924

3.8: LFA: Comparison by Profitability Quartiles

Table 3.7 presents the analysis of LFA farms by profitability quartiles. In 2011/12, the average farm size in the upper quartile decreased to 96.89ha compared to 120.24ha in 2010/11, whilst for the lower quartile, the average farm size increased to 127.02ha compared to 108.58ha in 2010/11. The upper quartile achieved a substantially higher total farm output (£4,630/ha) than the lower quartile (£2,191/ha), representing a substantial difference in the increase in output between the two quartile groups from 2010/11 to 2011/12. The lower quartile's total farm output increased by 8% (+£163/ha) compared to an increase of 27% (+£983/ha) for the upper quartile. As in 2010/11, output from milk differs substantially between the two groups, with the lower quartile recording £1,610/ha from milk returns, compared to the upper quartile which returned £3,623/ha. It is interesting to note that the output from milk for the lower quartile increased by 12% (+£176/ha) compared to a 29% increase in output from milk for the upper quartile (+£803/ha).

Total variable costs increased for both quartile groups with the lower quartile's increasing by 17% to £1,089/ha and the upper quartile's increasing by 28% to £1,818/ha. Concentrate, coarse fodder, vet and medicine, other livestock costs and fertiliser costs increased by 17% (+£82/ha), 60% (+£21/ha), 14% (+£10/ha), 33% (+£50/ha) and 44% (+£35/ha) respectively for the lower quartile and by 27% (+£274/ha), 2% (+£1/ha), 30% (+£30/ha), 27% (+£66/ha) and 27% (+£32/ha) respectively for the upper quartile. The similar patterns observed for both quartiles demonstrate the industry level changes that have occurred across the profitability groups. Noted by McHoul *et al.*, 2012, the difference between the lower and upper quartile total variable costs increased from £432/ha in 2009/10 to £490/ha in 2010/11 compared to £729/ha in 2011/12. Furthermore, the difference between the lower and upper quartile total fixed costs reduced from £351/ha in 2009/10 to £317/ha in 2010/11, however has increased to £644/ha in 2011/12.

Examining MII, the lower quartile shows that the average MII in 2011/12 is minus £132/ha compared to minus £150/ha in 2010/11, whilst for the upper quartile MII returns were £878/ha compared to £668/ha in 2010/11. In terms of FBI, the lower quartile achieved an FBI return of £128/ha, representing an increase of £28/ha on 2010/11, whilst the upper quartile achieved an FBI return of £1,383/ha; an increase of £208/ha on 2010/11 returns. At the average farm sizes for these groups, the lower and upper quartiles achieved FBI returns of £16,259 and £133,999 respectively.

3.9: Further Analysis: Lowland and LFA by Region and Farm Size

The above sections have provided analysis for lowland and LFA dairy farms by region, size groupings and profitability quartiles. It is possible to present the data for lowland farms through further analysis that examines the data by farm size groupings for each EU super region. The results of this analysis are presented in Tables A1 to A3 and A5 to A7 in the appendix, albeit that where the number of farms by any one group is less than 10, these data have been withheld to preserve the statistical robustness of the data. It was only possible to provide meaningful results for some LFA groups in the North on this basis of analysis due to sample size restrictions which are presented in Tables A4 and A8 in the appendix.

Table 3.7: Outputs, Inputs and Margins: LFA by Profitability Quartiles

LFA	Lower quartile		Upper quartile	
	10/11	11/12	10/11	11/12
Number of farms	15	15	15	15
Area (Ha)	108.58	127.02	120.24	96.89
	£/ha		£/ha	
Output				
Milk	1434	1610	2820	3623
Calf	67	94	163	224
Lease Quota (net)	0	0	0	0
Other Dairy	18	0	18	0
Herd Replacement	-195	-231	-337	-311
Total Dairy Output	1324	1473	2663	3536
Other Livestock	327	453	572	673
Other	377	265	412	420
Total Farm Output	2028	2191	3647	4630
Variable Costs				
Home-grown Concentrates	61	20	95	82
Purchased Concentrates	496	578	744	1018
Coarse Fodder	35	56	67	68
Other Livestock Concentrates	0	0	0	0
Vet and Medicine	72	82	108	138
Other Livestock Costs	153	203	242	308
Seed	12	9	12	12
Fertiliser	80	115	118	150
Crop Protection	10	7	17	16
Other Crop Costs	12	20	18	26
Total Variable Costs	932	1089	1422	1818
Fixed Costs				
Labour	191	219	348	433
Contract	91	83	109	117
Machinery Depreciation	159	147	161	227
Other Machinery	140	156	168	237
Miscellaneous	252	224	245	348
Rent and Rental Equivalent	161	178	281	290
Total Fixed Costs	995	1008	1312	1652
Net Farm Income	101	95	913	1159
Farmer / Spouse Labour	251	226	246	281
Management & Investment Income	-150	-132	668	878
Farm Business Income (FBI)	100	128	1175	1383

3.10: Dairy Enterprise Results: Gross Margin for All, Lowland, and LFA Farms

In the above sections, outputs, inputs and returns were presented for dairy farms on a per hectare basis, with results that included data from the dairy enterprise, plus other enterprises on the farm to produce overall farm results. In this and the following sections, results are presented that relate solely to the dairy enterprise and are reported to Gross Margin (GM) returns (total dairy output minus total variable costs).

Table 3.8 provides the dairy enterprise results for all farms and for lowland and LFA farms as separate data. Examining the “all farms” results shows that the average number of cows increased by 3%, whilst average yield per cow decreased by 1% between 2010/11 and 2011/12. Despite the yield reduction, the value of milk output increased by £196 per cow due to an increase in average milk price of 2.8 pence per litre (ppl) to 28.2ppl. It is interesting to note that the average milk price received in 2008/09 was 26.8ppl, in 2009/10 was 24.4ppl and in 2010/11 was 25.4ppl (McHoul *et al.*, 2012). Herd replacement increased from £202/cow to £228/cow. Variable costs increased by 9% (£80/cow) to a total of £974/cow.

The increase in total output (+9%) and increase in variable costs (+9%) resulted in an overall rise in the GM of £88/cow (+9%). For 2011/12, the average GM has risen to 13.82 ppl from 12.52 ppl in 2010/11. In previous years the average GMs reported were 11.74 ppl in 2009/10, 13.96 ppl in 2008/09 and 11.97 ppl in 2007/08 (McHoul *et al.*, 2012). Based on the average number of cows in 2011/12, the average GM for all farms is £157,387, representing an increase on 2010/11 of 13% when the average GM was £139,827.

Studying the differences between lowland and LFA dairy farms, reveals a familiar pattern, as highlighted in previous reports (Robertson and Wilson, 2007; 2008; 2009; 2010 and McHoul *et al.*, 2011 and 2012), of lowland herds achieving a higher yield, from a larger average herd size and selling milk at higher prices than their LFA counterparts. Both groups achieved higher milk prices in 2011/12, with increases on 2010/11 prices of 2.8ppl for lowland herds and 3.1ppl for LFA herds. However, whilst the average milk yield decreased by 1.5% to 7,680 litres on the lowland farms in 2011/12, the average milk yield notably increased by 8% to 7,441litres in 2011/12 on the LFA farms. Total variable costs in lowland production increased by £69/cow whilst in LFA production the costs increased by £73/cow; respective increases in GMs were £93/cow and £150/cow. At the average herd sizes, in 2011/12, the total GM on lowland farms was £166,969 compared to £144,940 in 2010/11 and for LFA farms was £112,016 compared to £102,539 in 2010/11.

Table 3.8: Gross Margin Results for All Farms, Lowland and LFA

	All Farms		All Lowland		All LFA	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	298	297	243	239	55	58
Average number cows	144.3	148.9	148.2	155.9	125.2	115.6
Average yield (litres)	7740	7648	7794	7680	6892	7441
Milk price (ppl)	25.4	28.2	25.5	28.3	24.5	27.6
	£/cow		£/cow		£/cow	
Output						
Milk	1963	2159	1986	2176	1690	2050
Calf	87	98	85	94	104	121
Lease Quota (net)	0	0	0	0	0	0
Other Dairy	15	1	15	2	14	0
Herd Replacement	-202	-228	-201	-225	-202	-241
Total Dairy Output	1862	2031	1885	2047	1607	1929
Variable Costs						
Concentrates	546	607	551	606	494	614
Coarse Fodder	27	35	27	35	30	38
Vet and Medicine	77	75	79	76	59	71
Other Livestock Costs	161	169	165	171	139	153
Forage Costs	83	88	85	88	66	85
Total Variable Costs	894	974	907	976	788	961
Total Gross Margin	969	1057	978	1071	819	969

3.11: Dairy Enterprise Results: Influence of Herd Size on Lowland Herds

Table 3.9 shows gross margin results by three size categories for lowland farms. It is interesting to note that for almost all the key performance indicators, the same pattern occurs across all the three size groups. That is, as the herd size increases, the average yield per cow, milk output per cow, total dairy output per cow, total variable costs per cow and total gross margin per cow all increase. Average yields per cow for the less than 80 cows group, the 80 to 130 cows group and the greater than 130 cows group are 6,340 lpc; 7,537 lpc and 7,843 lpc respectively, with the greater than 130 cows group outperforming the less than 80 cows group by 1,503 lpc, which equates to a 24% difference between these two groups and is an increase on the 20% gap which occurred in 2010/11. The milk price received by the less than 80 cows group of 27.4ppl is notably lower than the 27.7ppl received by the 80-130 cows group and the 28.6ppl received by the greater than 130 cows group.

An examination of average total variable costs per cow shows that the less than 80 cows group, the 80 to 130 cows group and the greater than 130 cows group recorded £798/cow, £928/cow and £1,006/cow respectively, resulting in respective total gross margins of £873/cow, £1,054/cow and £1,093/cow. As in 2010/11, the results show that the less than 80 cows group achieved the lowest GM per litre at 13.77ppl (12.62ppl in 2010/11), however the 80-130 cows group at 13.98ppl (12.72ppl in 2010/11) achieved a slightly higher GM than the greater than 130 cows group which achieved a GM of 13.94ppl (12.99ppl in 2010/11).

Table 3.9: Gross Margin Results: Lowland by Herd Size

LOWLAND	< 80 cows		80 – 130 cows		> 130 cows	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	51	45	81	77	111	117
Average number cows	57.7	55.8	106.3	106.2	213.7	220.3
Average yield (litres)	6316	6340	7246	7537	7601	7843
Milk price (ppl)	24.7	27.4	25.4	27.7	26.1	28.6
	£/cow		£/cow		£/cow	
Output						
Milk	1561	1740	1839	2086	1985	2241
Calf	89	114	87	107	84	89
Lease Quota (net)	0	0	0	0	-1	0
Other Dairy	24	0	13	1	15	2
Herd Replacement	-153	-185	-189	-211	-203	-233
Total Dairy Output	1521	1671	1750	1982	1880	2099
Variable Costs						
Concentrates	420	476	486	549	553	634
Coarse Fodder	24	36	29	36	27	34
Vet and Medicine	59	62	69	72	74	78
Other Livestock Costs	154	152	158	172	162	172
Forage Costs	68	71	86	100	78	87
Total Variable Costs	724	798	827	928	893	1006
Total Gross Margin	797	873	922	1054	987	1093

3.12: Dairy Enterprise Results: Influence of Region on Lowland Herds

The average results by EU super region for lowland herds are presented in Table 3.10. The pattern of average milk yields in 2011/12 differs compared to the previous year, whereby in 2010/11 the East region was the top physical performer (8,095 lpc) followed by the North region (7,811 lpc) and West region (7,642 lpc). However, in 2011/12, the North was the top physical performer (7,746 lpc), followed by the West (7,694 lpc) and the East dropped from top to the lowest (7,562 lpc).

The milk price variation also changed with regards to the highest and lowest amount received. The West region again recorded the highest average milk price (28.7 ppl), followed by the North region (28.1 ppl) with the lowest amount being received in the East region (27.8 ppl). In 2010/11 the North region received the lowest amount at 25.0 ppl compared to the West which received the highest amount at 25.9 ppl.

Total variable costs increased across all three regions. Gross margins for North, East and West in 2011/12 were £1,030/cow, £984/cow and £1,134/cow respectively, equating to increases over the previous year of +£146/cow in the North and +£99/cow in the West, however the East underwent a reduction of minus £4/cow. It is interesting to note that the milk price in the North increased by 3.1 ppl, in the East by 2.4 ppl and 2.8 ppl in the East from 2010/11 to 2011/12.

Table 3.10: Gross Margin Results: Lowland by EU Super Region

LOWLAND	North		East		West	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	61	60	60	58	122	117
Average number cows	162.7	167.8	138.7	148.9	144.4	152.7
Average yield (litres)	7811	7746	8095	7562	7642	7694
Milk price (ppl)	25.0	28.1	25.4	27.8	25.9	28.7
	£/cow		£/cow		£/cow	
Output						
Milk	1950	2178	2055	2101	1976	2210
Calf	78	86	90	94	87	99
Lease Quota (net)	0	0	0	0	0	0
Other Dairy	16	0	13	4	15	2
Herd Replacement	-230	-235	-171	-209	-195	-227
Total Dairy Output	1814	2029	1987	1989	1883	2083
Variable Costs						
Concentrates	570	617	595	619	518	594
Coarse Fodder	35	42	32	44	19	26
Vet and Medicine	86	79	84	80	72	72
Other Livestock Costs	157	170	197	179	154	168
Forage Costs	81	92	90	84	86	88
Total Variable Costs	930	999	999	1006	849	950
Total Gross Margin	884	1030	988	984	1035	1134

3.13: Dairy Enterprise Results: Lowland Herds by Performance Groups

Table 3.11 presents results measured by gross margin performance for lowland farms. The results are shown for the upper and lower quartiles as measured by gross margin performance. A comparison of the two quartile groups reveals significant differences with respect to two key physical performance indicators; that is, the differences between the average herd sizes and average yields. The average herd size of the upper quartile is 171 cows compared to the lower quartile's average herd size of 132 cows. Average milk yield for the upper quartile is 8,658 lpc, whilst for the lower quartile it is 6,070 lpc; a difference of 2,588 lpc between the two groups. The difference in milk price between the two quartiles in 2007/08 was 2.7 ppl, 1.7 ppl in 2008/09, 3.7 ppl in 2009/10 and 1.8 ppl in 2010/11 (McHoul *et al.*, 2012). In 2011/12 the difference narrowed to its lowest at 1.5 ppl (upper quartile 29.1 ppl; lower quartile 27.6 ppl).

The quartiles recorded increased herd replacement costs per cow of +£13/cow and +£38/cow for the lower and upper quartiles respectively, compared to 2010/11. However, the familiar pattern emerged whereby the upper quartile incurred lower replacement costs than the lower quartile. Total variable costs for both groups increased; the lower quartile costs rose by 1% (+£9/cow) whilst the upper quartile costs increased by 12% (+£103).

It is interesting to report the difference in the rates of conversion of concentrates to milk between the two quartile groups and also note the change from 2010/11 to 2011/12. In 2010/11 the conversion rate of concentrates to milk was 8.5 ppl for the lower quartile and 6.3 ppl for the upper quartile. In 2011/12, the conversion rate increased to 9.1 ppl for the lower quartile and 7.0 ppl for the upper quartile.

Gross margin results considered per litre, for the lower quartile equal 10.3 ppl compared to 8.5 ppl in 2010/11 and for the upper quartile equal 16.5 ppl compared to 15.3 ppl in 2010/11. This analysis of upper and lower quartile groups reaffirms previous year's findings which

show that the larger herds with their high-input, high-output systems achieve the higher GM, with the main factor being the higher milk price achieved through a combination of producing a high quality product and / or seeking out the best marketing opportunities.

Table 3.11: Gross Margin Results: Lowland by Performance Quartiles

LOWLAND	Lower quartile		Upper quartile	
	10/11	11/12	10/11	11/12
Number of farms	61	60	61	60
Average number cows	113.9	131.5	160.4	171.3
Average yield (litres)	6457	6070	8514	8658
Milk price (ppl)	24.5	27.6	26.3	29.1
	£/cow		£/cow	
Output				
Milk	1583	1677	2238	2518
Calf	66	79	98	103
Lease Quota (net)	0	0	-1	0
Other Dairy	13	0	18	0
Herd Replacement	-229	-242	-174	-212
Total Dairy Output	1433	1514	2178	2410
Variable Costs				
Concentrates	549	550	539	607
Coarse Fodder	24	35	27	34
Vet and Medicine	69	68	76	82
Other Livestock Costs	159	164	163	168
Forage Costs	82	76	73	89
Total Variable Costs	883	892	878	981
Total Gross Margin	550	622	1301	1429

3.14: Dairy Enterprise Results: Influence of Herd Size on LFA Herds

Table 3.12 shows the results of the gross margin analysis of LFA farms by herd size. Examining the herd sizes of the less than 80 cows group, the 80 to 130 cows group and greater than 130 cows group shows that between 2010/11 to 2011/12, the average number of cows decreased by 2% to 57.8 cows, decreased by 0.5% to 109.8 cows and increased by <1% to 226.1 cows for the three groups respectively. The average yield for the less than 80 cows group has increased by 252lpc, for the 80 to 130 cows group has decreased by 92lpc and has decreased by 81lpc for the greater than 130 cows group. As in 2010/11, all herd sizes received higher milk prices than in the previous year, equating to a 3.1ppl increase for the less than 80 cows group, a 2.9ppl increase for the 80-130 cows group and 3ppl for the greater than 130 cows group in 2011/12. As noted by McHoul *et al.* (2011), LFA dairy farms underachieve when compared to their lowland counterparts with all size groups recording milk prices approximately 1ppl lower than lowland dairy herds. For 2011/12, the LFA dairy farms repeat the same pattern for all size groups; however the difference has narrowed by receiving 0.6ppl less than the lowland dairy farms in the less than 80 cows group, just 0.1ppl less than the lowland dairy farms in the 80-130 dairy cows group and 0.8ppl less than the lowland greater than 130 cows group. The variable costs increased by £97/cow for the less than 80 cows group, by £125/cow for the 80-130 cows group and by £119/cow for the greater than 130 cows group.

The increase in GM between the two years is 24% (+£180/cow) for the less than 80 cows group, 5% (+£40/cow) for the 80-130 cows group and 7% (+£74/cow) for the greater than 130 cows group. In previous years, it has been noted by McHoul *et al.* (2012) that the GM remains lower than the GM for the comparable herd size groupings for lowland production as

noted in Table 3.9. However, in 2011/12, the GM for the LFA less than 80 cows group was higher at £936/cow compared to £873/cow for the lowland group; although the GMs remained lower for the LFA herds of 80 to 130 cows and greater than 130 cows groups.

Table 3.12: Gross Margin Results: LFA by Herd Size

LFA	< 80 cows		80 – 130 cows		> 130 cows	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	22	21	22	25	11	12
Average number cows	58.8	57.8	110.3	109.8	225.3	226.1
Average yield (litres)	6459	6711	7887	7795	7368	7287
Milk price (ppl)	23.7	26.8	24.7	27.6	24.8	27.8
	£/cow		£/cow		£/cow	
Output						
Milk	1531	1800	1950	2148	1824	2028
Calf	111	132	98	115	101	123
Lease Quota (net)	0	-187	0	-278	0	0
Other Dairy	12	0	18	0	12	0
Herd Replacement	-187	0	-245	0	-196	-217
Total Dairy Output	1467	1745	1821	1985	1741	1934
Variable Costs						
Concentrates	441	504	621	717	456	525
Coarse Fodder	25	23	27	41	32	40
Vet and Medicine	50	57	80	78	61	67
Other Livestock Costs	132	151	159	159	125	146
Forage Costs	63	73	80	96	62	76
Total Variable Costs	712	809	967	1092	735	854
Total Gross Margin	756	936	854	894	1006	1080

3.15: Dairy Enterprise Results: Influence of Region on LFA Herds

Analysis of gross margin data for LFA farms by EU super region is presented in Table 3.13. Sample size restrictions result in data for the East LFA region not being analysed. In 2010/11, it was recorded that both the North and West regions had witnessed an increase in the average herd size of 3.4 cows and 11.4 cows and average yield increases of 706 litres and 257 litres for the North and West regions respectively were also noted (McHoul *et al.*, 2012). However, in 2011/12, both the North and West regions underwent a reduction in the average herd size of 3.3 cows and 19.0 cows for the North and West regions respectively and an average yield reduction of 176 litres for the North and a small increase of 68 litres for the West were also recorded. There is a notable difference in average yield between the two regions with the North recording 785 lpc (+11.7%) more than the West, narrowing the gap recorded in 2010/11 (1029 lpc) yet higher than 2009/10 (580 lpc) and 2008/09 (629 lpc) (McHoul *et al.*, 2011). Milk output has increased by £184/cow and £213/cow for the North and West respectively.

Variable costs have increased by £113/cow for the North region and by £96/cow for the West region. This is mainly due to the increase in cost of concentrates of £68/cow in the North and £71/cow in the West. GMs have increased in both regions, with the North experiencing an increase of £8/cow compared to the West region witnessing an increase of £145/cow. As reported in previous years, despite the North region's superior milk yield and output, its higher variable costs compared to the West has resulted in the North achieving a lower GM than the West (North, £858/cow; West, £1,085/cow).

Table 3.13: Gross Margin Results: LFA by EU Super Region

LFA	North		East		West	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	32	36	<i>Ins. data</i>	<i>Ins. data</i>	17	16
Average number cows	113.0	109.7			135.4	116.4
Average yield (litres)	7696	7520			6667	6735
Milk price (ppl)	24.4	27.4			24.5	27.4
	£/cow		£/cow		£/cow	
Output						
Milk	1878	2062			1635	1848
Calf	114	116			89	114
Lease Quota (net)	0	0			0	0
Other Dairy	16	0			11	0
Herd Replacement	-231	-281			-184	-170
Total Dairy Output	1777	1898			1550	1792
Variable Costs						
Concentrates	598	666			369	440
Coarse Fodder	29	42			20	29
Vet and Medicine	75	80			48	50
Other Livestock Costs	152	158			104	118
Forage Costs	74	94			69	70
Total Variable Costs	927	1040			611	707
Total Gross Margin	850	858			940	1085

3.16: Dairy Enterprise Results: LFA Herds by Performance Groups

The analysis by performance quartiles for lowland herds, measured by gross margins and outlined in Section 3.11, highlighted larger herd size, higher average yield for the upper quartile whilst the lower quartile witnessed a drop in yield and higher milk price for both quartiles as the main performance drivers. Studying Table 3.14 which shows the lower and upper quartile results for 2010/11 and 2011/12, reveals that the pattern noted for lowland herds is repeated for LFA herds with the exception that the herd size in the upper quartile for LFA farms dropped by 10.2 cows. The average herd size and average milk yield for the upper quartile in 2011/12 are 45.3 cows and 1,816 lpc greater than for the lower quartile. The difference in average milk price between the upper quartile and the lower quartile is 1.3 ppl. When combined with the average yield, milk outputs of £2,353/cow and £1,756/cow for the upper and lower quartiles respectively are produced. As noted in previous reports (Robertson and Wilson, 2007, 2008, 2009, 2010 and *McHoul et al.*, 2012) herd replacement costs are lower for the upper performance group. The upper quartile incurred total variable costs that are £42/cow greater than the lower quartile. The upper quartile's high-output, high-input system produced a GM of £1,305/cow, compared to the lower quartile's characteristic low-output, low-input system which produced a GM of £581/cow.

Table 3.14: Gross Margin Results: LFA by Performance Groups

LFA	Lower quartile		Upper quartile	
	10/11	11/12	10/11	11/12
	14	15	14	15
Number of farms				
Average number cows	81.9	110.4	165.9	155.7
Average yield (litres)	6808	6546	8344	8362
Milk price (ppl)	24.0	26.8	25.0	28.1
	£/cow		£/cow	
Output				
Milk	1637	1756	2090	2353
Calf	103	103	114	143
Lease Quota (net)	0	0	0	0
Other Dairy	23	0	14	0
Herd Replacement	-356	-315	-182	-186
Total Dairy Output	1406	1545	2036	2310
Variable Costs				
Concentrates	558	615	558	652
Coarse Fodder	29	52	35	26
Vet and Medicine	79	66	72	82
Other Livestock Costs	173	147	146	168
Forage Costs	78	84	64	78
Total Variable Costs	917	964	875	1006
Total Gross Margin	489	581	1161	1305

3.17: Further Analysis: Dairy Enterprise Results for Lowland by Region and Herd Size

Further analyses of the enterprise GM results (for lowland production) are presented in the appendix in Tables A5 to A8. Where the number of data observations permit (10 or above), the results are provided by EU super region by herd size. Unfortunately it was not possible to provide meaningful results for LFA production for the East and West region and herd size.

Chapter 4: Discussion and Conclusion

4.1: Introduction

Chapter 3 has provided enterprise and gross margin results for dairy farming in England, detailing returns for both 2010/11 and 2011/12. In doing so, the previous chapter has focused upon particular results by region, farm size or herd size and performance quartile. Chapter 4 draws together the main findings identified in the above chapter and set these in the context of previous research.

4.2: Lowland Dairying

Lowland dairy farming in England in 2011/12 achieved an average Farm Business Income (FBI) of £604/ha, compared with £448/ha in 2010/11. In between these two years, Management and Investment Income (MII) increased by £155 with returns to MII in 2011/12 of £303/ha in comparison to an MII of £148/ha in the previous year. The number of farms in the less than 60ha group and 60 to 120ha group has declined slightly, however, it has increased in the greater than 120ha group, whilst the average area for farms in the greater than 120ha group has remained static after an increase in the previous year. Previous reports (Robertson and Wilson, 2009 and 2010 and McHoul *et al.*, 2011 and 2012) have suggested that structural change within the dairying industry is on-going and the evidence within this report reinforces this finding. Those farms that remain in dairying tend, by and large, to have increasingly larger herds, a statement that is reinforced by Gross Margin analysis (Table 3.9) which shows an increase in herd size for herds with more than 130 cows.

The less than 60 hectares group is characterised by its comparatively high degree of specialisation which does not, however, translate into higher levels of income, in terms of MII, when compared to the other larger size groups. However, interestingly this smaller group attained lower milk output, farm output and fixed costs compared to the 60 to 120ha group which contrasts to previous years' results. However, these indicators were higher than for the greater than 120ha group. For the smaller farm group (less than 60 hectares), the greater reliance on farmer and spouse labour, results in an MII that is negative, although slightly lower in magnitude than for 2010/11. The larger size groups produced positive MII returns, which are £193/ha greater for the 60 to 120ha group and £151/ha greater for the greater than 120ha group than in 2010/11. FBI returns also showed that the smaller farms achieved, on a per hectare basis, levels of income that were lower than both the larger groups. However, in the previous year, the FBI for the less than 60ha group had in fact been higher than the greater than 120 hectares group, but lower than the 60 to 120 hectares group.

Analysis of lowland production EU super regions shows that on average, the North and West regions have dairying systems that are more specialised than those found in the East. The data shows that farms in the East recorded the lowest level of milk output and the lowest expenditure on variable costs per hectare. In previous years, it has been noted that despite the North having achieved the highest milk output, the West, as a consequence of its lower variable costs, achieved the highest FBI. However, in 2011/12, the North actually achieved the highest FBI at £710/ha compared to the West achieving an FBI of £694/ha.

Analysis by profitability quartiles shows the wide variation in average performance of all the key performance indicators, between the upper and lower quartiles. Milk output for farms in the upper quartile is 99% higher than on farms in the lower quartile. However, total variable costs for the upper quartile are £525/ha greater than those of the lower quartile. The upper quartile's high output-input systems produced an average FBI return that was £1,145/ha greater than the FBI on the lower quartile farms. Although there is some variation between the two quartile's respective levels of variable and fixed costs, it is the large difference between the levels of milk output achieved that is the key driver behind the wide variation in quartile performance.

Gross margin results for the lowland farms show a noticeable increase of £93/cow, resulting in a GM of £1,071/cow in 2011/12 compared to £978/cow in 2010/11. The decrease in average milk yield between the two years of 114 litres per cow has been offset by the increase in milk price of 2.8ppl to 28.3ppl in 2011/12 which has produced this notable increase in GM returns. The increase in variable costs of £69/cow to £976/cow in 2011/12 and reduction in yield minimised the impact of the increase in milk price on the GM.

The results by lowland herd size shows increases in GM/cow across all three size groups, with the lowest increase in the less than 80 cows of +£76/cow, followed by the greater than 130 cow group of +£106/cow and lastly the 80-130 cows group of +£132/cow. From 2009/2010 to 2010/11, the greater than 130 cows group experienced a decrease in average yield, whilst the 80-130 cows group and less than 80 cows group witnessed an increase in average yield (McHoul *et al.*, 2012). However, in 2011/12 the 80 to 130 cows group and greater than 130 cows group achieved increases in yield of 291lpc and 242lpc respectively whilst the less than 80 cows group achieved an increase of just 24lpc. The figures suggest a correlation between average herd size and average milk yield across the three size groups.

Regional analysis reveals that in contrast to previous years the East achieved the lowest average yield (historically has achieved the highest), with the North achieving the highest yield (historically has ranked second). Variable costs increased across the North and West by 11.9% and 10.6% respectively, however remained almost static in the East. GM returns in the North and West increased by £146/cow and £99/cow respectively, however dropped by £4/cow in the East.

Previous reports have suggested a strong link between herd size and milk yield and the results in this report seem to confirm this. The upper quartile group averages 171.3 cows per herd, producing an average yield of 8,658 lpc, whilst the lower quartile averages 131.5 cows per herd and 6,070 lpc. Average milk price achieved for upper quartile herds was 29.1 ppl, compared to 27.6 ppl for the lower quartile. The high input-output systems that characterise the upper quartile produced a Total Gross Margin (TGM) that was £807/cow greater than that of the lower quartile.

4.3: Less Favoured Area Dairying

The above analysis of lowland dairy farming highlights the fact that MII increased by £155/ha from 2010/11 to 2011/12. Although LFA dairy farms also achieved an increase in their MII returns, their less intensive production systems produced a smaller increase of £10/ha. It is noteworthy to study the differences between the two groups in respect to the MII and FBI returns; however the difference in average size structure of lowland and LFA farms should be also be considered.

Analysis by farm size shows that the largest size group (greater than 120 hectares) farm at a lower intensity than the other two smaller size groups, recording a total farm output of £2,643/ha, compared to £3,245/ha and £3,278/ha for the less than 60 hectares group and 60 to 120 hectares group, respectively. All three size groups recorded an increase in variable and fixed costs. The resultant MII returns for LFA farms show that the highest average MII is achieved by the greater than 120 hectares group, followed by the 60-120 hectares group and the lowest MII is reported for the less than 60 hectares group. Interestingly, the increase in MII was notably greater for the less than 60ha group at +£284/ha, followed by the greater than 120ha group at +£46/ha. It is of interest to note the reduction in MII of minus £132/ha for the 60 to 120 hectares group. This is a result of the reduction in milk output of minus £105/ha combined with the increase in variable and fixed costs. In 2011/12, the FBI returns illustrate that for the less than 60 to 120ha group the lowest FBI at £594/ha is reported and the greater than 120 hectares group records an FBI at £633/ha and the 60-120 hectare group reports the highest FBI at £786/ha. In contrast, in 2010/11, the less than 60ha group actually produced the lowest FBI.

The effect of regional influence on LFA dairy farming can be summarised by declaring that the West region, with its higher input-output systems when compared to the North, resulted in

achieving a higher MII of £389/ha for the West and £151/ha for the North. In 2010/11 the West achieved an MII of £353/ha compared to £157/ha in the North. The highest FBI of £924/ha was recorded in the West compared to a FBI of £548/ha in the North.

In the previous year (2010/11), analysis of performance by profitability quartiles shows a contrasting pattern compared to the lowland farms whereby the upper quartile consists of the largest farms. However, in 2011/12, the LFA mirrors the lowland in respect to the upper quartile farms having a smaller average area than the lower quartile. Furthermore, the upper quartile achieved a markedly higher total farm output than the lower quartile. MII returns increased by £18/ha from -£150/ha to -£132/ha for the lower quartile, whereas for the upper quartile the actual MII increased by £210/ha from £668/ha to £878/ha. The lower quartile group remained in negative figures as has been recorded in previous reports (Wilson and Robertson 2007, 2008, 2009, 2010; McHoul *et al.* 2011 and 2012). At the average farm sizes for these groups, the lower and upper quartiles achieved FBI returns of £16,259 and £133,999 respectively.

An analysis of GM results for LFA farms shows that in 2011/12, milk yields increased by 8% in comparison to 2010/11 from 6,892 lpc to 7,441 lpc, which contrasted with the previous year's increase of 0.2% and +3% from 2008/09 to 2009/10 (McHoul *et al.* 2012). Milk prices increased in 2011/12, by an average of 3.1ppl compared to 2010/11. Due to a combination of the increased milk price and yield, milk output increased by £360/cow or 21% for LFA farms. The total gross margin per cow for LFA farms in 2011/12 was £969/cow (£819/cow; 2010/11) which at the average herd size translates to £112,016 (£102,539; 2010/11). This figure increased due to a combination of increase in milk price, yield and calf output, which offset the increase in variable costs; notably the rise in cost of concentrates.

The results by LFA herd size reveal that the less than 80 cows group, 80 to 130 cows group and greater than 130 cows group achieved increases in their milk prices of 3.1ppl, 2.9ppl and 3ppl respectively. In 2010/11, milk prices on LFA farms were 1ppl, 0.7ppl and 1.3ppl lower for the less than 80 cows group, 80 to 130 cows group and greater than 130 cows group than those received on lowland farms. However, in 2011/12 this difference reduced to 0.6ppl, 0.1ppl and 0.8ppl for the 80 cows group, 80 to 130 cows group and greater than 130 cows group respectively. The less than 80 cows group incurred concentrate costs of 7.5ppl of milk produced, compared to 9.2ppl for the 80 to 130 cows group and 7.2ppl for the greater than 130 cows group. All size groups achieved increases in total gross margins of £180/cow, £40/cow and £74/cow for the less than 80 cows, 80 to 130 cows and greater than 130 cows groups respectively.

Examining the regional analysis of LFA farms reveals that both the North and West witnessed reductions in average herd size of 2.92% and 14.03% respectively. This contrasts to the increase noted for the previous year (McHoul *et al.*, 2012). The North experienced a reduction in average yield of minus 176 lpc, whereas the West recorded a slight increase of 68 lpc. In 2010/11, it was recorded that in the West the increases in yield were less than those in the North, whilst herd size increases were greater in the West than in the North. Herd size increased by 3% in the North compared to 8% in the West and yield increased by 706 lpc in the North compared to 257 lpc in the West. In the previous year, average yields were approximately 15% higher in the North than in the West, however this figure has reduced to 11.6% in 2011/12. Both regions attained increases in milk output (£121/cow, North; £145/cow, West). Both areas witnessed increases in concentrate costs of £68/cow in the North compared to £71/cow in the West. The North region's comparatively high input-output system resulted in a lower GM than achieved in the West (North, £858/cow; West, £1,085/cow).

Examining GM performance by performance quartiles for 2010/11 and 2011/12 reveals that the upper quartile contains the largest herd sizes that, in turn, produce the highest yields. The upper quartile also achieved the highest milk price. Compared to the lower quartile, the upper quartile incurred lower replacement costs and higher total variable costs. Total gross margins for the lower and upper quartiles in 2011/12 were £581/cow and £1,305/cow, respectively. This pattern, whereby the most successful producers at GM level operate high input-output systems has been in evidence across both LFA and lowland production systems

and has been reported in all the previous editions of this report. Technical efficiencies, coupled with better quality milk, sold to more favourable contracts are the clear markers for distinguishing between farms in the upper and lower quartiles.

4.4: Comparison with Previous Research

This report, now the seventh in the *Dairy Farming in England* series, consists of two central themes; i) the increased financial performance of dairy farming in 2011/12 that followed on from the improved economic performance in 2010/11; in contrast to the decrease in economic performance in 2009/10 (McHoul *et al.*, 2012) and ii) the continuation of the wide disparity in performance within the dairy sector. With milk yields increasing on LFA farms and remaining relatively stable on lowland farms; reducing by just 1.5%, the increase in economic returns highlighted in *Dairy Farming in England 2011/12* are mainly due to the combination of increase in the average price of milk on all farms and yield increase on LFA farms, which resulted in an overall 10% increase in the value of milk output per cow across the full sample.

Despite some notable increases in milk prices and yields, by comparison dairy farmers have witnessed only modest increases in their margins. Wilson and Robertson, 2008/09 reported that concentrate costs were a major factor which increased by 30% per cow and had consequently limited profit margins for the 2008/09 year. Although not of the same magnitude, increases in concentrate costs of 10% (lowland) and 24% (LFA) have significantly eroded output gains accrued via improved milk prices and yields which for lowland farms was +10% and for LFA farms was +21%. A similar situation was reported by Wilson and Robertson in 2007/08, when milk output (all farms) increased by 23% per cow, only to be eroded by an increase of 25% per cow for concentrates costs.

In terms of average Farm Business Income (FBI), the average dairy farm achieved £86,749 in 2011/12 compared to £66,217 in 2010/11, £59,156 in 2009/10, and notably achieving a higher FBI compared to the peak achieved in 2008/09 of £70,548. On the basis of Management and Investment (MII), 2011/12 experienced an increase in the returns available to cover managerial input and provide a return on tenant's capital. For the years 2005/06, 2006/07, 2007/08, 2008/09, 2009/10, 2010/11 and 2011/12, the respective MII returns were £46/ha, -£2/ha, £186/ha, £281/ha, £126/ha, £157/ha and £292/ha. The MII for measure of economic performance for 2011/12, has thus now reached levels above the historic peaks achieved in 2007/08 and 2008/09.

4.5: Conclusion

This report has described the market conditions dairy farmers experienced during 2011/12 (Chapter 1) and the recent changes in the structure of the dairying industry. It has also analysed and reported at the farm-level and gross margin level, the economic performance of dairy farming (Chapter 3). Chapter 1 described a year when milk prices increased, total milk production rose for the second year running and average yields continued their year-on-year improvement. However, to counter these positive factors, it was also noted that input prices had increased by significant proportions and that the number of producers and the national herd size had both declined. Chapter 3 illustrated a year in which income and margin returns had increased but also highlighted the continuing widening of economic performance between the most and least profitable farmers. Our conclusion is a familiar one whereby we note that the dairy sector is still undergoing considerable structural change and the disparity in performance between the high and low performers will cause structural change to continue with the least profitable producers opting to leave the industry, whilst the more profitable producers expand their businesses to fill the gap created by those that leave.

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Glossary

Output: Other Livestock is comprised of sales of non-dairy livestock and livestock products adjusted for valuation changes plus the value of produce used on the farm and consumed in the farmhouse or by the workers, less livestock purchases. Miscellaneous livestock receipts are also included.

Output: Other is the sales of crops adjusted for valuation changes, plus the value of produce used on the farm (other than forage crops and straw) and produce consumed in the farmhouse or by the workers. Income from land let and buildings let, hirework, non-allocated grants e.g. for environmental schemes, profit on resale of purchased agricultural produce and other miscellaneous farm income including the change in valuation of cultivations is also included.

Other livestock costs include livestock haulage, marketing charges, AI charges, straw and woodshavings for bedding and dairy sundries.

Other crop costs include silage bags, twine, all marketing costs including crop haulage, purchase of standing crops, soil analysis and potato sacks.

Labour is comprised of the gross cost of regular paid employees including an allowance for perquisites together with unpaid family labour (other than the farmer and spouse) manual labour.

Machinery depreciation is calculated using the current cost accounting method whereby each item of equipment is revalued by an index prior to the depreciation calculation.

Rent and Rental Equivalent consist of gross rent, imputed rent on the net cost of the tenant's own improvements, drainage rates and for owner-occupied land a rental value based on what a tenant would be paying for similar land with an equal length of occupancy.

Miscellaneous costs include water charges, vehicle tax, insurance, professional fees, bank commission, telephone charges, subscriptions, office expenses and pest control, general repairs.

Net Farm Income (NFI) is total output less total inputs as defined above. It represents the reward to the farmer and spouse for their own manual labour, management and a return on tenant's capital.

Farmer's and spouse's manual labour is the estimated value of their manual labour.

Management and Investment Income (MII) is Net Farm Income less the allowance made for the farmer's and spouse's manual labour. It represents the reward for management and a return on tenant's capital. MII therefore represents the return to management after all costs have been deducted, including the imputed cost of all unpaid manual labour and a notional rent on owner occupied land and buildings.

Farm Business Income (FBI) represents the return to all unpaid labour (farmers, spouses and others with an entrepreneurial interest in the farm business) and to all their capital invested in the farm business including land and farm buildings. It is defined as Total Farm Output (TFO) minus cost (C): where TFO is defined as the sum of output from: crop enterprises, adjustment for disposal of previous crops, livestock enterprises, separable non-agricultural diversification, single farm payment, agri-environmental payments, other grants and subsidies, miscellaneous receipts; C is defined as variable costs plus fixed costs. *[For 2006/07 the definition of FBI included the profit / loss on sale of assets as part of the total farm output]*

Total Gross Margin, presented for the dairy enterprise results, is total dairy output minus total variable costs.

Appendix 1: Results by Region and Farm Size

Table A.1: Outputs, Inputs and Margins: Lowland (North) by Farm Size

LOWLAND (North)	< 60 ha		60 – 120 ha		> 120 ha	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	<i>Ins data</i>	10	30	25	24	29
Area (Ha)		49.81	86.27	85.88	185.3	182.06
	£/ha		£/ha		£/ha	
Output						
Milk		2125	2955	3612	2390	2580
Calf		124	135	179	83	84
Lease Quota (net)		0	0	0	0	0
Other Dairy		0	26	0	18	0
Herd Replacement		-221	-369	-424	-275	-268
Total Dairy Output		2028	2747	3367	2217	2396
Other Livestock		513	563	694	525	594
Other		413	449	372	446	508
Total Farm Output		2955	3758	4433	3188	3498
Variable Costs						
Home-grown		60	76	62	98	88
Concentrates						
Purchased		661	933	1102	781	831
Concentrates		16	93	116	56	56
Coarse Fodder		3	0	0	0	0
Other Livestock		98	131	135	137	118
Concentrates		221	324	356	256	245
Vet and Medicine		7	25	25	25	27
Other Livestock Costs		160	134	148	118	143
Seed		6	24	22	26	28
Fertiliser		32	19	20	18	16
Crop Protection						
Other Crop Costs		1264	1759	1986	1515	1552
Total Variable Costs						
Fixed Costs						
Labour		162	304	352	369	363
Contract		139	145	169	146	160
Machinery		200	223	200	157	176
Depreciation		230	180	213	171	202
Other Machinery		359	299	333	218	247
Miscellaneous		215	311	323	241	243
Rent and Rental						
Equivalent		1305	1463	1589	1301	1391
Total Fixed Costs						
Net Farm Income		386	537	857	372	555
Farmer / Spouse		530	330	342	128	127
Labour						
Management & Investment Income		-144	206	515	244	427
Farm Business Income (FBI)		492	641	952	442	621

Table A.2: Outputs, Inputs and Margins: Lowland (East) by Farm Size

LOWLAND (East)	< 60 ha		60 – 120 ha		> 120 ha	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	<i>Ins data</i>	<i>Ins data</i>	18	14	47	46
Area (Ha)			81.20	84.23	249.39	255.07
	£/ha		£/ha		£/ha	
Output						
Milk			2058	1900	1442	1593
Calf			101	137	58	66
Lease Quota (net)			0	0	0	0
Other Dairy			12	0	9	3
Herd Replacement			-193	-233	-118	-157
Total Dairy Output			1977	1805	1391	1505
Other Livestock			321	371	288	393
Other			429	598	808	846
Total Farm Output			2726	2774	2486	2744
Variable Costs						
Home-grown			24	17	61	60
Concentrates						
Purchased			664	590	455	503
Concentrates						
Coarse Fodder			28	50	33	54
Other Livestock			0	1	10	6
Concentrates						
Vet and Medicine			94	69	70	74
Other Livestock Costs			216	267	171	162
Seed			29	20	38	43
Fertiliser			92	100	89	111
Crop Protection			17	13	53	48
Other Crop Costs			48	15	22	25
Total Variable Costs			1212	1142	1004	1085
Fixed Costs						
Labour			258	279	340	348
Contract			139	131	132	146
Machinery						
Depreciation			200	162	146	148
Other Machinery			157	168	181	203
Miscellaneous			272	321	210	245
Rent and Rental						
Equivalent			233	206	237	243
Total Fixed Costs			1260	1267	1247	1333
Net Farm Income			254	364	235	326
Farmer / Spouse						
Labour			334	335	106	110
Management & Investment Income			-80	29	130	216
Farm Business Income (FBI)			348	459	307	405

Table A.3: Outputs, Inputs and Margins: Lowland (West) by Farm Size

LOWLAND (West)	< 60 ha		60 – 120 ha		> 120 ha	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	22	20	50	51	57	60
Area (Ha)	42.18	44.01	88.18	88.47	209.95	212.27
	£/ha		£/ha		£/ha	
Output						
Milk	2678	2915	2457	2774	1984	2256
Calf	150	176	104	126	86	97
Lease Quota (net)	0	0	0	0	-1	0
Other Dairy	21	2	26	1	12	2
Herd Replacement	-282	-297	-239	-282	-194	-231
Total Dairy Output	2568	2795	2348	2618	1888	2123
Other Livestock	525	761	445	605	371	515
Other	295	268	366	335	574	636
Total Farm Output	3388	3825	3158	3559	2833	3275
Variable Costs						
Home-grown Concentrates	45	51	37	47	57	79
Purchased Concentrates	803	879	688	790	561	642
Coarse Fodder	47	112	48	65	25	27
Other Livestock Concentrates	25	25	1	1	28	24
Vet and Medicine	116	112	100	100	85	91
Other Livestock Costs	309	316	232	254	212	225
Seed	20	25	34	30	36	40
Fertiliser	149	169	101	115	100	107
Crop Protection	10	10	16	15	42	41
Other Crop Costs	26	24	20	23	17	19
Total Variable Costs	1551	1724	1277	1438	1162	1294
Fixed Costs						
Labour	229	196	327	353	345	385
Contract	115	133	172	182	145	154
Machinery Depreciation	207	259	203	220	163	169
Other Machinery	228	254	165	183	162	199
Miscellaneous	353	374	284	325	235	250
Rent and Rental Equivalent	340	320	315	301	272	290
Total Fixed Costs	1472	1536	1466	1565	1323	1446
Net Farm Income	365	565	416	555	348	535
Farmer / Spouse Labour	725	757	339	325	127	134
Management & Investment Income	-361	-192	77	231	221	401
Farm Business Income (FBI)	553	725	590	741	496	676

Table A.4: Outputs, Inputs and Margins: LFA (North) by Farm Size

LFA (North)	< 60 ha		60 – 120 ha		> 120 ha	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	<i>Ins data</i>	<i>Ins data</i>	<i>Ins data</i>	14	13	14
Area (Ha)				94.65	169.33	177.30
	£/ha		£/ha		£/ha	
Output						
Milk				2545	1483	1507
Calf				125	84	87
Lease Quota (net)				0	0	0
Other Dairy				0	16	0
Herd Replacement				-337	-165	-209
Total Dairy Output				2333	1418	1385
Other Livestock				627	446	592
Other				443	279	236
Total Farm Output				3404	2144	2213
Variable Costs						
Home-grown Concentrates				74	53	35
Purchased Concentrates				866	546	585
Coarse Fodder				39	46	55
Other Livestock Concentrates				0	0	0
Vet and Medicine				120	79	79
Other Livestock Costs				285	143	140
Seed				11	9	8
Fertiliser				152	101	108
Crop Protection				12	7	6
Other Crop Costs				33	9	12
Total Variable Costs				1593	992	1029
Fixed Costs						
Labour				320	229	241
Contract				122	68	54
Machinery Depreciation				168	138	140
Other Machinery				237	120	135
Miscellaneous				318	125	146
Rent and Rental Equivalent				181	157	154
Total Fixed Costs				1347	837	870
Net Farm Income				464	314	314
Farmer / Spouse Labour				293	179	159
Management & Investment Income				170	135	155
Farm Business Income (FBI)				619	482	503

Table A.5: Gross Margin Results: Lowland (North) by Herd Size

LOWLAND (North)	< 80 cows		80 – 130 cows		> 130 cows	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	14	Ins data	14	15	33	36
Average number cows	64.8		110.0	108.8	211.6	208.2
Average yield (litres)	6171		7634	7264	8005	7910
Milk price (ppl)	24.0		24.6	27.7	25.1	28.3
	£/cow		£/cow		£/cow	
Output						
Milk	1481		1879	2009	2010	2235
Calf	91		71	103	77	82
Lease Quota (net)	0		0	0	0	0
Other Dairy	19		18	0	15	0
Herd Replacement	-186		-210	-266	-238	-235
Total Dairy Output	1404		1758	1846	1865	2083
Variable Costs						
Concentrates	388		548	557	591	637
Coarse Fodder	31		46	31	34	45
Vet and Medicine	59		77	70	91	81
Other Livestock Costs	130		169	195	158	167
Forage Costs	71		90	109	81	89
Total Variable Costs	679		929	962	955	1019
Total Gross Margin	725		828	884	910	1064

Table A.6: Gross Margin Results: Lowland (East) by Herd Size

LOWLAND (East)	< 80 cows		80 – 130 cows		> 130 cows	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	Ins data	Ins data	26	24	25	28
Average number cows			105.0	101.9	204.7	218.1
Average yield (litres)			7689	7394	8477	7784
Milk price (ppl)			25.0	27.2	25.8	28.0
	£/cow		£/cow		£/cow	
Output						
Milk			1920	2009	2183	2176
Calf			103	132	84	78
Lease Quota (net)			0	0	0	0
Other Dairy			12	0	14	5
Herd Replacement			-189	-178	-165	-221
Total Dairy Output			1846	1963	2116	2037
Variable Costs						
Concentrates			548	585	638	644
Coarse Fodder			31	40	34	46
Vet and Medicine			78	68	90	84
Other Livestock Costs			179	183	210	178
Forage Costs			100	100	85	81
Total Variable Costs			937	977	1057	1033
Total Gross Margin			909	986	1059	1004

Table A.7: Gross Margin Results: Lowland (West) by Herd Size

LOWLAND (West)	< 80 cows		80 – 130 cows		> 130 cows	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	28	30	41	38	53	53
Average number cows	52.8	55.6	105.9	107.5	219.5	230.7
Average yield (litres)	6710	6563	7569	7718	7780	7824
Milk price (ppl)	24.9	27.5	25.2	27.9	26.2	29.1
	£/cow		£/cow		£/cow	
Output						
Milk	1673	1804	1909	2155	2038	2275
Calf	87	111	80	95	90	98
Lease Quota (net)	0	0	0	0	-1	0
Other Dairy	37	-1	13	2	13	2
Herd Replacement	-156	-192	-194	-207	-200	-237
Total Dairy Output	1642	1727	1808	2046	1940	2138
Variable Costs						
Concentrates	448	492	474	526	543	627
Coarse Fodder	22	45	25	35	17	21
Vet and Medicine	61	57	72	74	73	74
Other Livestock Costs	161	151	144	158	157	173
Forage Costs	72	70	91	96	86	88
Total Variable Costs	763	815	805	890	875	984
Total Gross Margin	878	912	1003	1156	1065	1154

Table A.8: Gross Margin Results: LFA (North) by Herd Size

LFA (North)	< 80 cows		80 – 130 cows		> 130 cows	
	10/11	11/12	10/11	11/12	10/11	11/12
Number of farms	13	14	14	16	<i>Ins data</i>	<i>Ins data</i>
Average number cows	59.5	58.3	112.6	112.2		
Average yield (litres)	7128	7117	7941	7822		
Milk price (ppl)	23.5	26.7	24.5	27.4		
	£/cow		£/cow		£/cow	
Output						
Milk	1678	1903	1945	2145		
Calf	114	125	91	106		
Lease Quota (net)	0	0	0	0		
Other Dairy	14	0	18	0		
Herd Replacement	-219	-236	-273	-338		
Total Dairy Output	1587	1793	1782	1914		
Variable Costs						
Concentrates	514	551	651	766		
Coarse Fodder	25	20	23	42		
Vet and Medicine	63	67	90	86		
Other Livestock Costs	141	158	165	156		
Forage Costs	81	89	83	101		
Total Variable Costs	824	884	1012	1151		
Total Gross Margin	763	908	769	762		

Appendix 2: Reports in Series

Reports in this series:

Crop Production in England

Dairying Farming in England

Hill Farming in England

Horticulture Production in England (Horticultural Business Data)

Lowland Grazing Livestock Production in England

Pig Production in England

Poultry Production in England

Details available at www.ruralbusinessresearch.co.uk

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