



## **Farm Business Survey 2005/2006**

### **Dairy Farming in England**



**Farm Business Survey  
2005/06**

**Dairy Farming in England**

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## **Foreword**

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](http://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)

## **Acknowledgements**

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

The basic information on which this report is based was collected on behalf of, and largely financed by, the Department for Environment, Food and Rural Affairs and is Crown Copyright.

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## Summary

- Dairy farming in England is in a state of change at the start of the 21<sup>st</sup> Century with falling producer numbers accompanying a trend towards larger average herd sizes
- The average farmgate price of milk during 2005/06 fluctuated between 17.12 and 19.77 pence per litre; input price rises, particularly in fertiliser and energy have increased the financial pressure on dairy farmers
- Annual milk production in 2005/06 was at its lowest level since 2001/02; the increased average milk yield per cow not being sufficient to outweigh the fall in cow numbers
- The fall in producer numbers is creating a potential polarisation in the sector with an increased percentage of producers with both less than 50 cows and greater than 200 cows; over the last three years, the average herd size in England has been approximately 100 cows
- Milk consumption has fallen by 23% since 1985 and the trend towards semi-skimmed milk, in preference to full-fat milk continues; butter consumption has fallen by approximately 50% over the same period, whilst cheese and cream consumption remains relatively constant, and yoghurt consumption has grown by 139%
- Bovine tuberculosis, and the causes and control of this disease, remain current threats to dairy farmers
- Using data from the Farm Business Survey 2005/06, on average dairy farms in England achieved a Management and Investment Income (MII) of £46/ha, equal to 2.4% of total farm output; within this group, lowland dairy farms were able to produce a MII of £60/ha, but dairy farms in the Less Favoured Areas (LFA) failed to make a positive MII return
- On lowland farms, smaller farms tend to be more specialised in dairy production, however on average do not make a positive MII return; on average lowland dairy farms in the East and West regions are more profitable (measured by MMI/ha) than lowland dairy farms in the North, however analysis by profitability groups indicates that the most profitable have larger herds, achieve greater output per hectare and have more intensive production systems than the less profitable
- On LFA farms, larger farms tend to have more extensive production systems and achieve substantially lower output than smaller farms; however on average, these more extensive production systems produce positive MII returns contrasting with smaller LFA dairy farms
- Regionally, the more intensive, smaller LFA farms in the West are, on average, more profitable than farms in the North; profitability analysis suggests that the most profitable are larger and more intensive in their production
- Enterprise-level data for dairy production shows that average yields in England in 2005/06 were 6738 litres/cow (l/cow), with lowland herds achieving an average of 6797 l/cow and LFA herds an average of 6416 l/cow; the average Gross Margin (GM) for all herds was £748/cow
- Gross Margin analysis for lowland herds indicates that concentrate use, milk yield, dairy output and GM per cow increase with herd size; herds in the North region are, on average, smaller than those in the East and West and following the trend in herd size achieve a lower average yield and GM
- Performance analysis (measured by GM) shows that the upper quartile have larger herds, achieve greater yields and use more concentrates to achieve a GM £560/cow greater than the GM for the lower quartile; it is interesting to note that the upper quartile incurred lower replacement costs
- For LFA dairy enterprises, the influence of herd size on GM performance is less marked than for lowland herds; whilst larger herds do achieve greater average yields the difference in GM produced is not substantial on the evidence of the available data

- Regionally, yields and total output from LFA dairy enterprises in the North and West do not differ substantially, whilst the small sample size for the East does not permit regional analysis
- Examining performance groups as the top and bottom 33% of producers by GM per cow for LFA herds shows that the upper third achieve higher yields from more intensive production systems and tend to operate larger herds; in common with their lowland counterparts the top third incurred lower replacement costs
- Previous research into the economics of dairy production have noted that the more profitable producers tend to operate larger herds under a high-input – high-output system; the current report reinforces these finding that economies of scale appear to be present in dairy production and the changing structure of the dairy industry also reinforces this conclusion
- Change in the dairy industry will be an on-going process as producers seek to remain profitable in the face of increased production costs (both agricultural and industrial related); recent price contract announcements from a major UK retailer have been welcomed by the industry, but at the current time the extent of the impact of such developments on the industry remains unclear.

## Chapter 1: The Dairying Sector

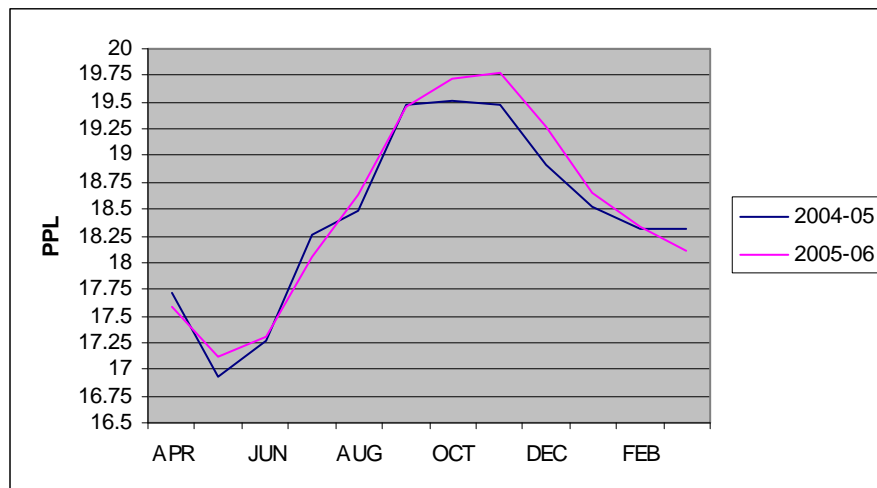
### 1.1: Introduction

Dairy farming in England is recognised as being in a state of change in the early years of the 21<sup>st</sup> Century. Relatively low milk prices have forced many dairy farmers to examine their business structures closely; whilst some dairy farmers have left the industry, others have expanded to seek economies of size and scale to help ensure profitable production. Drawing upon information from a range of published sources together with analysis of data from the Farm Business Survey 2005/06, *Dairy Farming in England*, provides a contemporary analysis of the performance of dairy farms, and dairy production, in England for the 2005/06 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, distribution of herds, and average herd size
- dairy consumption and household expenditure
- bovine tuberculosis

### 1.2: Farmgate Milk Prices

Figure 1.1 shows the average producer ex-farmgate milk price (including seasonality; net of delivery charges). The average milk producer price for the period April 2005 to March 2006 fluctuated between 17.12 pence per litre (ppl) and 19.77ppl and closely followed the price trend of the preceding 12 month period. The peaks and troughs associated with the seasonality of production are clearly shown by the price lows in May (maximum production) and price highs in November (minimum production). The uneven supply of milk throughout the year is a major problem to milk processors and producers can expect tougher pricing arrangements as the processors attempt to level out supply.



Source: Defra (2007a), Milk Price Surveys

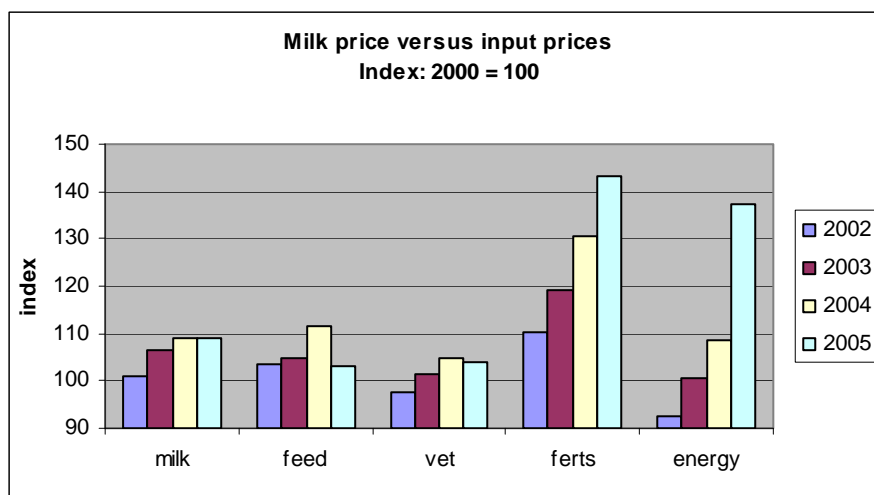
**Figure 1.1: Farmgate Milk Prices (UK)**

The average farmgate price presented disguises a wide range of prices that were paid by individual processors. Increasingly, in an attempt to secure dedicated supplies of milk the

dairying sector saw some significant price premiums being offered by supermarkets to processors and the cascading of these premiums down to producers. However, dairy farmers continued to face frequent changes in the price of raw milk, furthering their call for longer term pricing structures that facilitate improved cash flow and business planning. Whilst competition within the dairying sector for milk supplies continued to be strong, unfortunately for the producer, this did not generally enhance the price of raw milk. Milk processors generally continued to face strong price bargaining with the main supermarkets and a retail price war among supermarkets impacted on the price they were prepared to pay the processors (Farmers weekly; *various* (1)). Furthermore, these factors impacted on the processors' ability to compete with one another and thus reduced their ability to offer improved prices to producers. Other factors likely to have restricted price rises to producers were weakening commodity markets (butter, cheese, cream) and high oil prices leading to higher transport costs of both processor and retailer.

### 1.3: Input Prices

Figure 1.2 shows the trend in the farmgate price of milk and the prices of some key dairying inputs from 2002 to 2005, using the year 2000 as the base year (index = 100). In 2005, milk price was 9% higher than 2000 levels. Feed prices were 3% higher than in 2000, but down on 2004 levels due to lower cereal prices. In 2005, the price of veterinary services was 4% higher than 2000. However, the inputs with the most significant price increases were fertilisers and energy costs. 2005 saw a continuation of the increasing price of fertilisers, culminating in a price that was 43% higher than in 2000. Similarly, energy costs continued to rise, increasing by 37% from 2000 to 2005. Undoubtedly, rising energy costs will continue to impact on the milk sector (and all other agricultural sectors) as many costs of production are linked to energy costs. Potentially, processors may seek to pass on their rising energy bills to the producers, resulting in a two-way squeeze on profitability.

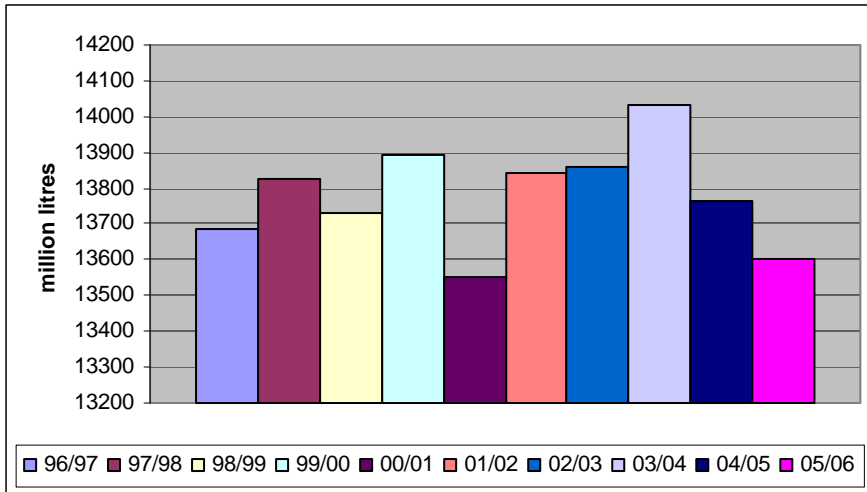


Source: Defra (2007b); Agriculture in the UK 2006

Figure 1.2: Milk and Input Prices (UK)

### 1.4: Annual Milk Production

Figure 1.3 shows annual milk production in the UK (defined as wholesale deliveries) for the years 1996/97 to 2005/06. In 2005/06, milk production fell to its lowest level since 2000/01. Contributing factors to this low point in production levels were a reduction in total cow numbers, a fall in milk prices and unfavourable weather conditions that led to poor quality silage production and a shortened grazing period.



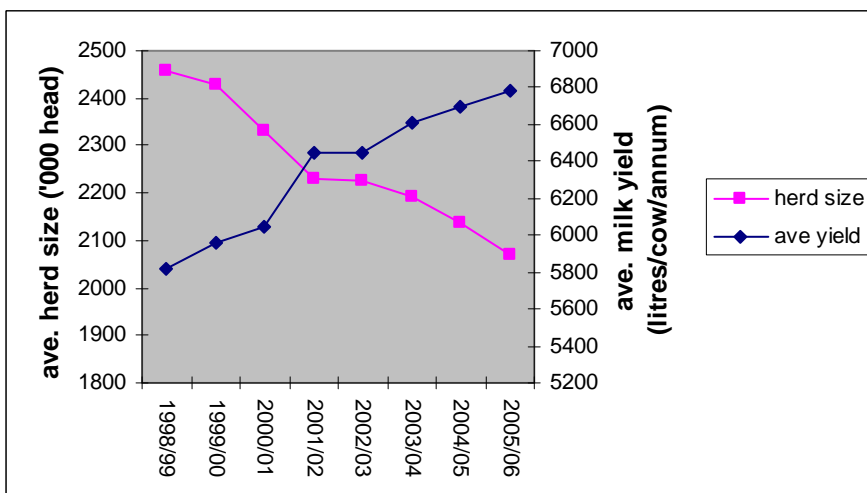
Source: MDC Datum (2007a)

**Figure 1.3: Annual Milk Production (UK)**

In 2005/06, total milk production undershot end-of-year wholesale milk quota by approximately 266 million litres (Defra, 2006). This represented a widening of the gap between production and quota (149 million litres, 2004/05) and was the largest gap since 2000/01 (264 million litres).

### 1.5: UK Dairy Herd and Average Milk Yield

Figure 1.4 illustrates the continuing decline of the UK total average herd size and the continuing increase of the average milk yield per cow. In 2005/06 the total average national herd size had fallen to 2.07 million, which represents a decrease of 3.04% compared with 2004/05. Meanwhile, in 2005/06, average yield increased by 1.38% (6694 litres to 6787 litres per cow). The increase in average yield was insufficient to replace the milk production lost through the decline in cow numbers and this is a significant contributory factor to the recent falls in national milk production.

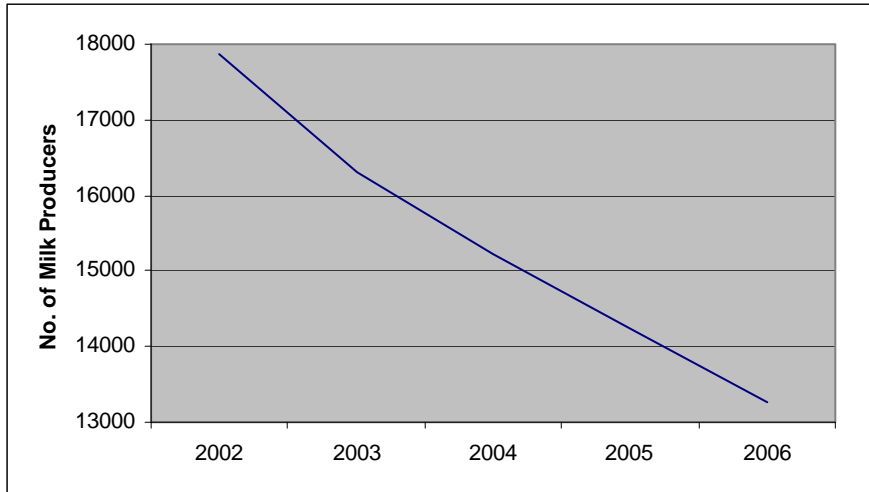


Source: MDC Datum (2007b)

**Figure 1.4: UK Herd Size and Average Milk Yield**

### 1.6: Producer Numbers, Distribution of Herds by Herd Sizes and Average Herd Size

In 2006, the recent steady decline in the number of milk producers continued. Figure 1.5 shows that in England and Wales, the number of producers fell from 14249 (Dec 05) to 13270 (Dec 06), representing a fall of 6.9%. Since December 2002, the number of producers has fallen by 25.7% (17859 to 13270).



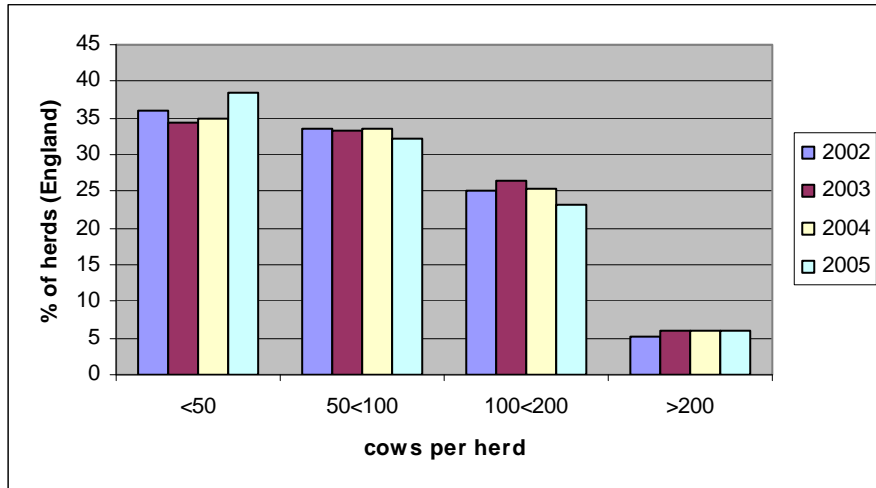
Source: MDC Datum (2007c)

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

Figure 1.6 shows the distribution of herds (in England) by herd size. It can be seen that in 2005 the highest percentage (38.5%) of herds had less than 50 cows and only 6.1% of herds had more than 200 cows. A majority of herds (70.7%) had cow numbers of less than 100. Whilst this situation is a continuation of that from recent years, it is interesting to note that in 2005 a divergence in the incidences of herd sizes may have been beginning to occur. That is, in 2005 the percentage of herds with less than 50 cows increased to its highest level (38.5%) since 2002 and the percentage of herds with between 50 and 100 cows decreased to its lowest level (32.2%) since 2002. Also in 2005, the percentage of herds with greater than 200 cows increased to its highest level (6.1%) since 2002 and the percentage of herds with between 100 and 200 cows decreased to its lowest level (23.2%) since 2002. Although it is too early to say categorically, this pattern may be the beginning of a polarization of average herd sizes as farmers with small herds scale down towards retirement, or as a cost reducing measure, and the larger herds scale up as farmers seek economies of scale and levels of production commensurate with high levels of investment.

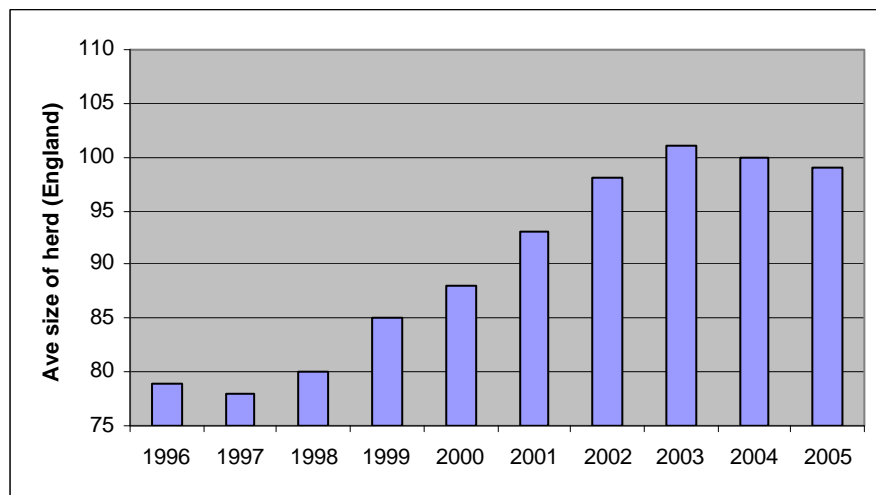
Figure 1.7 shows that the average size of herd in England continued to fall in 2005, from its high point in 2003 (101 to 99 cows). This decline in average herd size is small and in reality may just represent a levelling off of the steep increase witnessed since 1996. Such a levelling off of the average herd size is further evidence that as the incidence of the larger herds increases, this is offset by an increase in the incidence of smaller herds (see Figure 1.6)

It will be interesting to study similar data from 2006 when the Single Payment Scheme (SPS) will have become established and farmers will perhaps have begun re-structuring their businesses, enterprise mix and sizes in the light of this new support payment mechanism.



Source: MDC Datum (2007d)

**Figure 1.6: Distribution of Herds by Herd Size (England)**



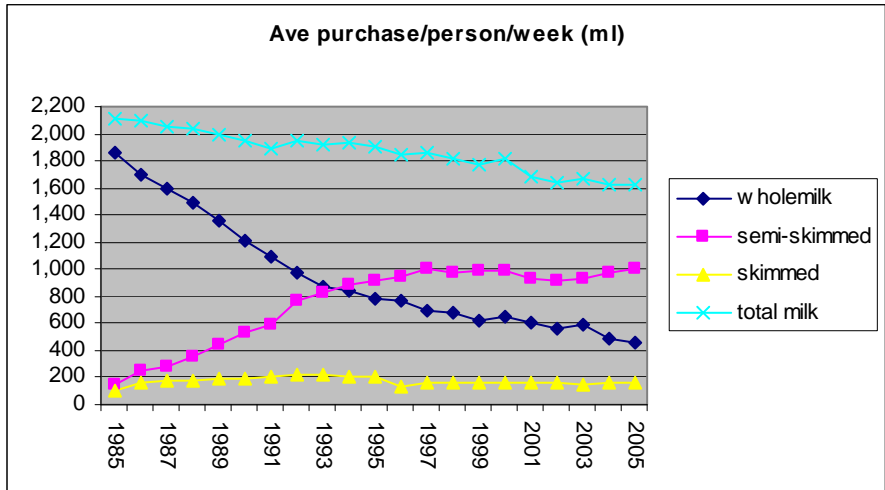
Source: MDC Datum (2007e)

**Figure 1.7: Average Herd Size (England)**

**1.7: Dairy Consumption and Household Expenditure**

Figure 1.8 shows that the total consumption of UK liquid milk increased in 2005 by 0.6% to a level of 1627 mls per person per week (ml/p/wk). However, a comparison with 1985 reveals that over the last 20 years consumption has fallen by 22.9%.

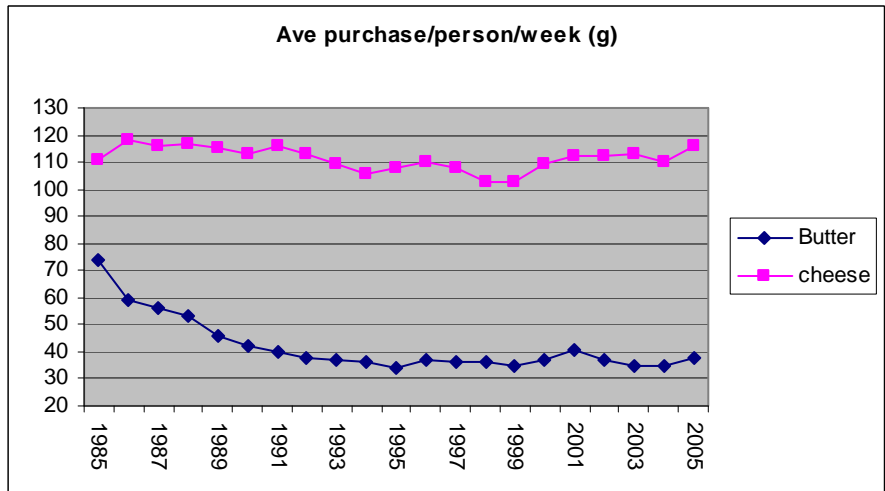
A breakdown of consumption levels in 2005 by fat content shows a continuation of recent trends, with whole-milk consumption decreasing (460 ml/p/wk; -5.0%); semi-skimmed milk consumption increasing (1008 ml/p/wk; +3.4%) and skimmed milk consumption remaining static (159 ml/p/wk). These figures show that whilst the total consumption of milk increased slightly in 2005, consumers continued to purchase increasing amounts of semi-skimmed milk at the expense of whole-milk; a possible reflection of an increasing consumer awareness of diet and saturated fats intake.



Source: MDC Datum (2007f) from Defra; Family Food Survey

**Figure 1.8: Milk Consumption (UK)**

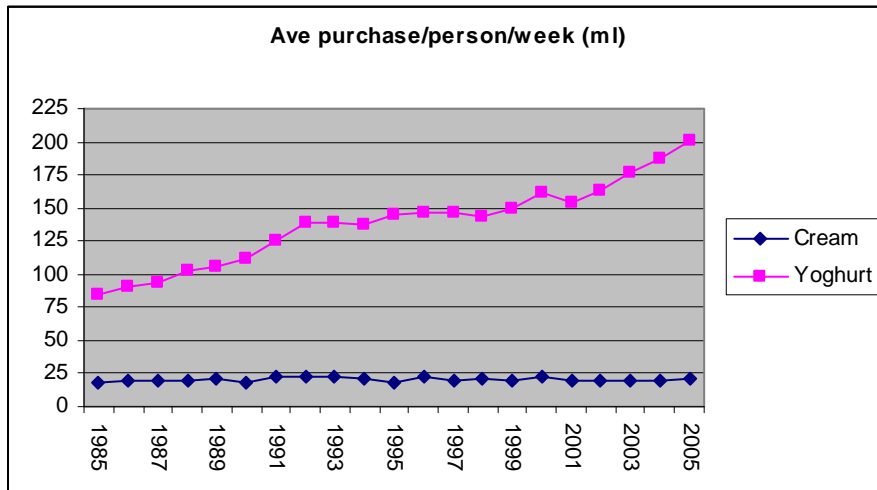
Figure 1.9 shows that in 2005, the consumption of butter and cheese increased to 38 g per person per week (g/p/wk) (+8.6%) and 116 g/p/w (+5.5%), respectively. The past 20 year trend is that although butter consumption has now stabilised at around 35 to 40 g/p/wk, this is down by approximately 50% since 1985 and cheese consumption has continued to oscillate between 103 and 118 g/p/wk.



Source: MDC Datum (2007f) from Defra; Family Food Survey

**Figure 1.9: Butter and Cheese Consumption (UK)**

Figure 1.10 shows that whilst consumption of cream has continued at constant levels (approximately 20 g/p/wk), consumption of yoghurt has continued to increase sharply. In 2005, yoghurt consumption increased by 7.5% (201 ml/p/wk) compared to 2004 (187 ml/p/wk) and since 1985 has increased by 139%, from 84 ml/p/wk. Yoghurt is currently regarded by the consumer as a healthy component of breakfast, lunch and dinner which undoubtedly accounts for its increased popularity.



Source: MDC Datum (2007f) from Defra; Family Food Survey

**Figure 1.10: Cream and Yoghurt Consumption (UK)**

### 1.8: Bovine Tuberculosis

In 2005/06 bovine TB continued to be a major issue for dairy producers. In 2006 there was a provisional 4.4% reduction in the number of new bTB incidents in Great Britain compared to 2005 (Defra 2007c). It is not clear how many of these were dairy cattle. The number of cases is concentrated in the Western region, particularly in Devon and Hereford and Worcester. In March 2006, Defra introduced compulsory pre-movement testing for all cattle in England (over 15 months of age) coming from herds subjected to either twelve or twenty four month testing requirements (Farmers Weekly, *various* (2)).

### 1.9: Structure of Report

The above sections provide the background to some of the main market environment and key factors affecting the dairy industry during 2005/06. This report proceeds to detail the data source and analysis undertaken (Chapter 2), prior to presentation of the results to dairy farming and to dairy enterprises (Chapter 3), whilst Chapter 4 provides a discussion of the main points deriving from the analysis and offers concluding comments.

## 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 2005/06 for those farms classed as Dairy Farms<sup>1</sup> and relate to the outputs, inputs and returns to each farm, together with total farm area and farm size data. 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.

**Table 2.1: Observations by Category: Farm-Level Data**

Category		Lowland	LFA
Farm Type		229	61
EU Super Region	North	62	34
	East	59	Ins. data
	West	108	17
Farm Size	<60 hectares	55	19
	60-120 hectares	100	18
	>120 hectares	74	24
Performance Quartile (by MII)	Lower quartile	57	15
	Upper quartile	57	15

MI = Management and Investment Income: Ins. data = Insufficient data available (<15 observations)

<sup>1</sup> Holdings on which dairy cows account for more than two thirds of the total Standard Gross Margin 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://statistics.defra.gov.uk/esg/asd/fbs/reference/farm\\_classification.pdf](http://statistics.defra.gov.uk/esg/asd/fbs/reference/farm_classification.pdf)

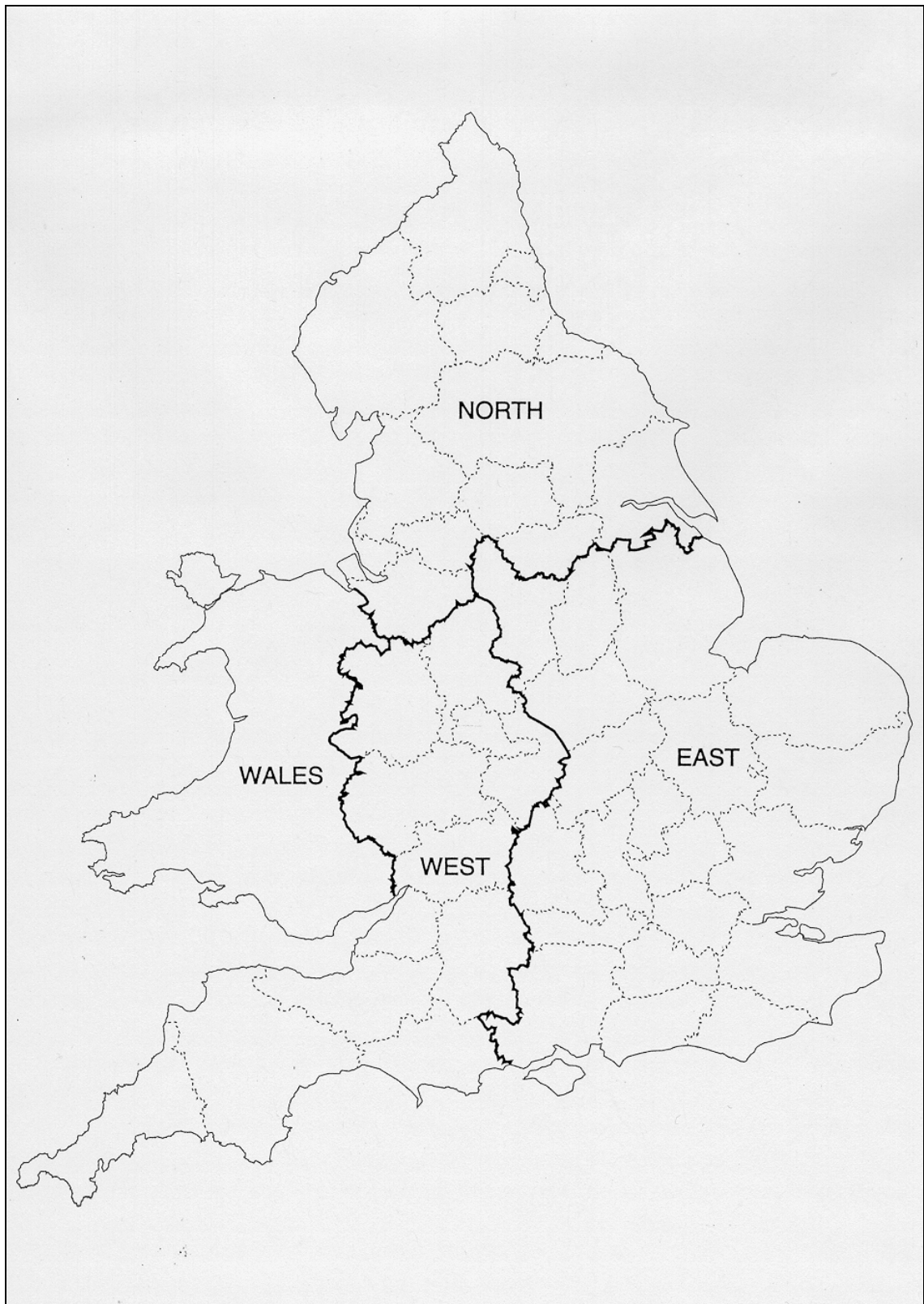
**Table 2.2: Observations by Category: Enterprise-Level Data**

Category		Lowland	LFA
Farm Type		204	54
EU Super Region	North	60	33
	East	44	Ins. data
	West	100	15
Farm Size	<80 cows	67	30
	80-130 cows	75	15
	>130 cows	62	Ins. data
Performance Quartile	Lower quartile / third*	51	18
(by Gross Margin)	Upper quartile / third*	51	18

Ins. data = Insufficient data available (<15 observations). \* for LFA insufficient data exists to analyse lower and upper quartiles, hence lower and upper third groups have been analysed.

## 2.2: Methodology

The data were transformed to produce per hectare (on the basis of total farm area) and per cow data, for the farm-level and enterprise level data respectively. Individual weights were provided by Defra and the transformed data weighted using these weights in order to produce weighted results. Descriptive results of the data were then produced, with the mean (average) result for each category being reported as detailed in Chapter 3.



**Figure 2.1: The EU Super Regions of England and Wales**

## Chapter 3: Results

### 3.1: All farms

Table 3.1 presents the results of the outputs, inputs, and margins from dairy farms in England on a per hectare (ha) basis. The table details the results for all farms, together with results for lowland and less favoured area (LFA) farms being considered separately. Examining all farms, the Net Farm Income (NFI) is £301/ha, which after accounting for the manual labour of the farmer and spouse, leaves a Management and Investment Income (MII) of £46/ha, representing 2.4% of total output. As a revenue source, milk sales, at £1325/ha, represent 68% of total farm output (after accounting for replacement costs); “other” output of £423/ha makes a substantial 22% contribution. Examining variable costs, the combination of home-grown and purchased concentrates accounts for £348/ha, exactly 50% of total variable costs and 18% of total output. In relation to fixed costs, labour (excluding farmer and spouse labour) represents the largest single fixed cost item; taking this together with farmer and spouse labour produces a total labour cost of £485/ha, which represents 25% of overall total farm output.

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

Comparing the results from lowland and LFA farms, Table 3.1 shows that the average area farmed between these two groups is not substantially different. However, examining the output and input results, the difference in intensity of production between these two groups becomes apparent. For lowland farms, total farm output at £2076/ha is 50% greater than the output from LFA farms of £1386/ha, with output from milk on lowland farms being 55% greater than milk output on LFA farms. Correspondingly, total concentrate costs on LFA farms are substantially lower (by £85/ha) than on lowland farms. Overall, total variable costs on LFA farms are £238/ha lower than total variable costs on lowland farms. Additionally, the fixed cost structures between these two groups differ substantially, with fixed costs of £664/ha on LFA farms being two-thirds of the fixed costs on lowland farms. Total costs on lowland farms equals £1754/ha in comparison to £1171/ha for LFA farms. The more intensive lowland farms generate a NFI of £323/ha in comparison to £215/ha for the LFA farms, which correspondingly produces a MII of £60/ha (equal to 2.9% of total output) on lowland farms, whilst, on average, LFA farms record a negative MII.

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

	All Farms	All Lowland	All LFA
Number of farms	290	229	61
Area (Ha)	90.05	89.05	94.17
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	1325	1429	917
Calf	52	55	41
Lease Quota (net)	0	0	1
Other Dairy	0	0	0
Herd Replacement	-95	-103	-66
<b>Total Dairy Output</b>	<b>1282</b>	<b>1381</b>	<b>894</b>
Other Livestock	230	235	212
Other	423	460	280
<b>Total Farm Output</b>	<b>1936</b>	<b>2076</b>	<b>1386</b>
<b>Variable Costs</b>			
Home-grown Concentrates	33	35	24
Purchased Concentrates	315	330	259
Coarse Fodder	31	34	17
Other Livestock Concentrates	9	11	4
Vet and Medicine	55	60	38
Other Livestock Costs	132	140	98
Seed	35	43	3
Fertiliser	61	63	51
Crop Protection	15	17	6
Other Crop Costs	12	13	8
<b>Total Variable Costs</b>	<b>696</b>	<b>745</b>	<b>507</b>
<b>Fixed Costs</b>			
Labour	230	249	156
Contract	86	94	54
Machinery Depreciation	107	115	78
Other Machinery	113	120	84
Miscellaneous	185	199	130
Rent and Rental Equivalent	219	233	161
<b>Total Fixed Costs</b>	<b>939</b>	<b>1009</b>	<b>664</b>
<b>Net Farm Income</b>	<b>301</b>	<b>323</b>	<b>215</b>
Farmer / Spouse Labour	255	263	224
<b>Management &amp; Investment Income</b>	<b>46</b>	<b>60</b>	<b>-9</b>

### **3.3: Lowland: Influence of Farm Size**

Table 3.2 presents data for three lowland farm size groups. Examining the output from the size groups, the less than 60 hectare group records the highest milk output per hectare, followed by the mid-sized, 60 to 120 hectare group, with the larger farm size group (>120 ha) recording the lowest per hectare milk output of £1350. In relation to other, non-dairy, output, the 60 to 120 hectare size group records the greatest other output, and also has the largest total farm output. The smaller farm size group, with its relatively high milk output per hectare, also has the highest concentrate cost per hectare, with home-grown and purchased concentrates totalling £414/ha. This size group also has the lowest per hectare costs for seed and crop protection, indicating that the farms in this size group have a slightly higher degree of specialisation in dairy production in comparison to the other two size groups. Net farm income varies from £237/ha for the greater than 120 hectare group, to £420/ha for the 60 to 120 hectare size group. However, after accounting for the value of the manual labour input of the farmer and spouse, the MII across these size groups indicates that on average, farms in the less than 60 hectare farm size group are achieving returns of minus £226/ha, whilst the other two size groups are achieving positive MII of over £120/ha, approximately 6% of total farm output.

### **3.4: Lowland: Influence of Region**

Analysis of the outputs, inputs and margins for lowland dairy farms across the three EU super regions are presented in Table 3.3. Average farm size in the East region is greatest at 116 hectares, and this regional group also record the greatest “other” output per hectare; consequently milk output, as a percentage of total output for this region, is the lowest of the three regions. The East region also records the lowest total concentrate cost per hectare. The West region records the highest milk output per hectare at £1530, and also has the highest overall output of the three groups. However, total variable costs per hectare are substantially greater for West region. Net farm income ranges from £269/ha (North) to £364/ha (West); after accounting for the value of farmer and spouse labour, MII reaches only £6/ha for the North region, whilst the East achieves an average MII of £98/ha.

### **3.5: Lowland: Comparison by Profitability Quartiles**

Table 3.4 details the results by the lower and upper quartiles of lowland dairy farms as measured by MII/ha. Farms in the upper quartile are substantially larger, at an average of 123 hectares, in comparison to 58 hectares for the lower quartile group. The upper quartile group records substantially greater milk output (by over £700/ha more than the lower quartile) and also achieves higher other output, leading to the total farm output for the upper quartile being more than £1000/ha greater than the lower quartile. This intensity of output is also evident by the higher concentrate costs (by £89/ha), higher seed costs (by £99/ha) and higher coarse fodder costs (by £29/ha) of the upper quartile in comparison to the lower quartile. Whilst the upper quartile record higher paid labour costs, the NFI for this group is £699/ha in comparison to that of the lower quartile group of £62/ha. After accounting for the value of farmer and spouse labour, MII for the upper and lower groups are £540/ha and -£384/ha respectively.

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

<b>LOWLAND</b>	< 60 ha	60 – 120 ha	> 120 ha
Number of farms	55	100	74
Area (Ha)	41.10	84.21	192.16
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	1539	1468	1350
Calf	72	57	45
Lease Quota (net)	-4	-1	2
Other Dairy	1	0	0
Herd Replacement	-96	-102	-106
<b>Total Dairy Output</b>	<b>1513</b>	<b>1423</b>	<b>1291</b>
Other Livestock	249	257	211
Other	389	552	413
<b>Total Farm Output</b>	<b>2151</b>	<b>2232</b>	<b>1915</b>
<b>Variable Costs</b>			
Home-grown Concentrates	20	35	41
Purchased Concentrates	394	326	306
Coarse Fodder	36	37	31
Other Livestock Concentrates	7	16	8
Vet and Medicine	70	59	55
Other Livestock Costs	150	151	127
Seed	12	81	23
Fertiliser	74	61	61
Crop Protection	7	13	24
Other Crop Costs	14	14	11
<b>Total Variable Costs</b>	<b>783</b>	<b>794</b>	<b>688</b>
<b>Fixed Costs</b>			
Labour	179	245	281
Contract	97	98	89
Machinery Depreciation	141	114	105
Other Machinery	137	114	118
Miscellaneous	235	212	173
Rent and Rental Equivalent	244	236	225
<b>Total Fixed Costs</b>	<b>1034</b>	<b>1018</b>	<b>990</b>
<b>Net Farm Income</b>	<b>334</b>	<b>420</b>	<b>237</b>
Farmer / Spouse Labour	559	293	114
<b>Management &amp; Investment Income</b>	<b>-226</b>	<b>127</b>	<b>123</b>

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

<b>LOWLAND</b>	North	East	West
Number of farms	62	59	108
Area (Ha)	73.75	116.13	86.82
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	1355	1343	1530
Calf	59	39	62
Lease Quota (net)	-2	0	1
Other Dairy	0	0	1
Herd Replacement	-107	-84	-112
<b>Total Dairy Output</b>	<b>1304</b>	<b>1297</b>	<b>1482</b>
Other Livestock	227	200	263
Other	399	523	455
<b>Total Farm Output</b>	<b>1931</b>	<b>2021</b>	<b>2200</b>
<b>Variable Costs</b>			
Home-grown Concentrates	33	31	38
Purchased Concentrates	340	310	336
Coarse Fodder	24	45	33
Other Livestock Concentrates	10	1	17
Vet and Medicine	59	54	64
Other Livestock Costs	128	131	154
Seed	14	24	73
Fertiliser	66	54	67
Crop Protection	11	23	16
Other Crop Costs	11	13	13
<b>Total Variable Costs</b>	<b>696</b>	<b>688</b>	<b>812</b>
<b>Fixed Costs</b>			
Labour	217	281	247
Contract	77	94	103
Machinery Depreciation	110	110	121
Other Machinery	120	123	118
Miscellaneous	208	212	184
Rent and Rental Equivalent	234	204	251
<b>Total Fixed Costs</b>	<b>966</b>	<b>1024</b>	<b>1025</b>
<b>Net Farm Income</b>	<b>269</b>	<b>309</b>	<b>364</b>
Farmer / Spouse Labour	262	212	296
<b>Management &amp; Investment Income</b>	<b>6</b>	<b>98</b>	<b>68</b>

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

<b>LOWLAND</b>	Lower quartile	Upper quartile
Number of farms	57	57
Area (Ha)	58.02	122.63
	£/ha	£/ha
<b>Output</b>		
Milk	1207	1915
Calf	55	68
Lease Quota (net)	-6	-2
Other Dairy	1	0
Herd Replacement	-100	-120
<b>Total Dairy Output</b>	<b>1156</b>	<b>1862</b>
Other Livestock	247	292
Other	332	623
<b>Total Farm Output</b>	<b>1735</b>	<b>2777</b>
<b>Variable Costs</b>		
Home-grown Concentrates	45	33
Purchased Concentrates	305	406
Coarse Fodder	29	58
Other Livestock Concentrates	19	22
Vet and Medicine	61	68
Other Livestock Costs	143	144
Seed	17	118
Fertiliser	60	69
Crop Protection	14	18
Other Crop Costs	12	16
<b>Total Variable Costs</b>	<b>705</b>	<b>951</b>
<b>Fixed Costs</b>		
Labour	203	312
Contract	95	100
Machinery Depreciation	111	132
Other Machinery	124	129
Miscellaneous	206	191
Rent and Rental Equivalent	230	264
<b>Total Fixed Costs</b>	<b>968</b>	<b>1128</b>
<b>Net Farm Income</b>	<b>62</b>	<b>699</b>
Farmer / Spouse Labour	446	160
<b>Management &amp; Investment Income</b>	<b>-384</b>	<b>540</b>

### **3.6: LFA: Influence of Farm Size**

Table 3.1 above provided the results for all less favoured area (LFA) farms. Table 3.5 examines the influence of farm size on LFA dairy farms. There is marked contrast in milk output between the less than 60 hectare, and the 60 to 120 hectare groups, when compared with the greater than 120 hectare group. Specifically, the greater than 120 hectare group record average per hectare milk output of less than 50% of the smaller two size groups. This lower milk output for the greater than 120 hectare group considerably influences the overall results for LFA farms presented in Table 3.1. When examining the average milk output for LFA less than 60 hectare and LFA 60 to 120 hectare groups in Table 3.5, the milk output is broadly similar, albeit slightly lower, than for the lowland group overall, as detailed in Table 3.1. Hence, the data suggest that the LFA greater than 120 hectare group are particularly less intensive in their milk production in comparison to the smaller farms within the LFA category. This observation is reinforced by examining the cost structures of the three size groups in Table 3.5. With only a few minor exceptions, the greater than 120 hectare group record the lowest per hectare costs for all cost categories; particularly noteworthy are substantially lower costs for purchased concentrates, fertiliser, contract, depreciation, other machinery costs, miscellaneous, and rent and rental equivalent. Net farm income for the greater than 120 hectare group is the lowest of the three groups at £127/ha. However, after accounting for the value of farmer and spouse manual labour, the greater than 120 hectare group records a positive MII, in contrast to the negative returns of the remaining two size groups.

### **3.7: LFA: Influence of Region**

The influence of the EU super regions of production on the LFA results is detailed in Table 3.6. Insufficient data exists for the East region to present results. The North region records larger average farm size than the West region, by 30 hectares. Following the observations detailed in Table 3.5, the North region, with its larger average farm size, represents more extensive production systems than the West, with milk output per hectare in the West being substantially greater than in the North. Other, non-dairy, output, is also greater in the West, leading to total farm output exceeding that from the North by £653/ha. However, the North region consequently has lower variable costs of production, most notably in relation to purchased concentrates, other livestock costs and fertiliser, leading to total variable costs being approximately £170/ha lower than for the West. The less intensive LFA systems of the North also have lower fixed costs, with lower labour, and rent and rental equivalent costs, contributing substantially to the lower fixed costs of £580/ha in contrast to the total fixed costs of £862/ha for the West region. From Table 3.5 the more extensive, greater than 120 hectare farm size group, recorded a positive MII. However, the regional influence indicates that on average, the more intensive LFA dairy farms in the West achieved a positive return after accounting for the value of farmer and spouse manual labour, whilst, on average those in the North recorded negative returns.

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

<b>LFA</b>	< 60 ha	60 – 120 ha	> 120 ha
Number of farms	19	18	24
Area (Ha)	44.46	82.39	205.56
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	1291	1329	602
Calf	77	44	25
Lease Quota (net)	5	-1	1
Other Dairy	0	0	0
Herd Replacement	-77	-90	-53
<b>Total Dairy Output</b>	<b>1296</b>	<b>1281</b>	<b>575</b>
Other Livestock	257	195	198
Other	410	249	235
<b>Total Farm Output</b>	<b>1963</b>	<b>1725</b>	<b>1009</b>
<b>Variable Costs</b>			
Home-grown Concentrates	20	22	26
Purchased Concentrates	361	377	170
Coarse Fodder	18	19	17
Other Livestock Concentrates	1	0	7
Vet and Medicine	48	50	29
Other Livestock Costs	136	123	72
Seed	3	3	4
Fertiliser	82	58	34
Crop Protection	5	6	7
Other Crop Costs	8	11	7
<b>Total Variable Costs</b>	<b>682</b>	<b>669</b>	<b>371</b>
<b>Fixed Costs</b>			
Labour	198	143	142
Contract	73	63	43
Machinery Depreciation	121	98	52
Other Machinery	120	111	59
Miscellaneous	205	158	87
Rent and Rental Equivalent	223	180	127
<b>Total Fixed Costs</b>	<b>940</b>	<b>754</b>	<b>510</b>
<b>Net Farm Income</b>	<b>341</b>	<b>303</b>	<b>127</b>
Farmer / Spouse Labour	451	304	96
<b>Management &amp; Investment Income</b>	<b>-110</b>	<b>-1</b>	<b>32</b>

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

LFA	North	East	West
Number of farms	34	Insufficient data	17
Area (Ha)	103.33		73.26
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	783		1279
Calf	33		59
Lease Quota (net)	2		3
Other Dairy	0		0
Herd Replacement	-65		-73
<b>Total Dairy Output</b>	<b>752</b>		<b>1268</b>
Other Livestock	212		230
Other	245		363
<b>Total Farm Output</b>	<b>1208</b>		<b>1861</b>
<b>Variable Costs</b>			
Home-grown Concentrates	17		38
Purchased Concentrates	229		331
Coarse Fodder	18		18
Other Livestock Concentrates	6		1
Vet and Medicine	38		43
Other Livestock Costs	87		128
Seed	3		4
Fertiliser	48		65
Crop Protection	7		5
Other Crop Costs	9		7
<b>Total Variable Costs</b>	<b>462</b>		<b>639</b>
<b>Fixed Costs</b>			
Labour	126		226
Contract	55		63
Machinery Depreciation	76		87
Other Machinery	74		113
Miscellaneous	113		164
Rent and Rental Equivalent	137		210
<b>Total Fixed Costs</b>	<b>580</b>		<b>862</b>
<b>Net Farm Income</b>	<b>166</b>		<b>360</b>
Farmer / Spouse Labour	175		331
<b>Management &amp; Investment Income</b>	<b>-10</b>		<b>28</b>

### **3.8: LFA: Comparison by Profitability Quartiles**

The analysis presented above from Table 3.5 suggests that the most profitable LFA dairy farms, as measured by MII, were larger farms with less intensive production systems. However, the analysis from Table 3.6 suggests that the most profitable are the more intensive systems often found in the West, which, on average, are typically smaller in farm size than the farms in the North. These two tables suggest that, on the one hand, the more extensive systems found on larger farms are providing greater economic returns, yet also the more intensive systems in the West are also providing greater returns on average than farms in the North. Table 3.7 examines the characteristics of the most and least profitable as measured by the lower and upper profitability quartiles. This data suggests that the most profitable LFA dairy farms are both larger and more intensive; milk output and concentrate costs on the lower quartile are approximately 50% of the respective measures recorded for the upper quartile, whilst average farm size of the lower quartile is approximately two-thirds of the average size of the upper quartile. The substantially greater total farm output of the upper quartile is accompanied by higher overall costs, however, these increased costs do not outweigh the increased output achieved when compared to the lower quartile group, and consequently, the upper quartile record a MII £514/ha greater than the lower quartile.

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

The above commentary in sections 3.1 to 3.8 provides a summary of the costs and returns to dairy farms on a per hectare basis, across production system type (lowland / LFA), and for each system, across farm size groups, EU super regions and profitability quartiles. Further analysis of this data has also been undertaken to examine the influence of farm size within each of the EU super regions, for lowland dairy farms. The results of this analysis are presented in Tables A1 to A3 in the appendix. Where the number of farms by EU super region and farm size group are less than 15, these data have not been provided to ensure that confidentiality of the data is not compromised. Due to sample size restrictions it was not possible to provide meaningful results for LFA production by EU super region and by farm size. The tables in the appendix detail where insufficient data exists.

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

<b>LFA</b>	Lower quartile	Upper quartile
Number of farms	15	15
Area (Ha)	64.64	97.00
	£/ha	£/ha
<b>Output</b>		
Milk	743	1538
Calf	37	69
Lease Quota (net)	0	4
Other Dairy	0	0
Herd Replacement	-53	-114
<b>Total Dairy Output</b>	<b>727</b>	<b>1498</b>
Other Livestock	171	210
Other	255	374
<b>Total Farm Output</b>	<b>1152</b>	<b>2082</b>
<b>Variable Costs</b>		
Home-grown Concentrates	16	56
Purchased Concentrates	195	334
Coarse Fodder	10	24
Other Livestock Concentrates	0	0
Vet and Medicine	33	55
Other Livestock Costs	73	142
Seed	1	9
Fertiliser	42	90
Crop Protection	2	15
Other Crop Costs	5	12
<b>Total Variable Costs</b>	<b>377</b>	<b>736</b>
<b>Fixed Costs</b>		
Labour	196	188
Contract	24	106
Machinery Depreciation	96	103
Other Machinery	77	120
Miscellaneous	133	178
Rent and Rental Equivalent	169	202
<b>Total Fixed Costs</b>	<b>694</b>	<b>897</b>
<b>Net Farm Income</b>	<b>81</b>	<b>449</b>
Farmer / Spouse Labour	351	205
<b>Management &amp; Investment Income</b>	<b>-270</b>	<b>244</b>

### 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, whereby the results included data from the dairy enterprise and 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. In doing so the results are presented to Gross Margin (GM) level (total dairy output minus total variable costs). Table 3.8 provides the dairy enterprise results for all farms and for lowland and LFA as separate data. The data are provided on a £/cow basis. Of note in Table 3.8 is that the pattern of higher output on lowland farms, noted previously, is also evident in the dairy enterprise results. The results of the lowland herds show an average output per cow £106 greater than from LFA herds. Total variable costs are also greater on lowland herds, albeit that concentrate costs are very similar between the two farm type groups. Overall, for all farms, total variable costs account for 39% of total dairy output, leaving a GM of just under £750/cow. The difference in performance between lowland and LFA herds is highlighted by the lowland herds returning a GM £88/cow greater than the GM for the LFA herds.

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

	All Farms	All Lowland	All LFA
Number of farms	258	204	54
Average number cows	91.70	96.2	72.7
Average yield (litres)	6738	6797	6416
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1275	1292	1178
Calf	52	52	51
Lease Quota (net)	0	0	2
Other Dairy	0	0	0
Herd Replacement	-93	-94	-86
<b>Total Dairy Output</b>	<b>1234</b>	<b>1251</b>	<b>1145</b>
<b>Variable Costs</b>			
Concentrates	267	266	269
Coarse Fodder	21	22	15
Vet and Medicine	44	45	38
Other Livestock Costs	101	101	100
Forage Costs	54	54	49
<b>Total Variable Costs</b>	<b>486</b>	<b>489</b>	<b>471</b>
<b>Total Gross Margin</b>	<b>748</b>	<b>762</b>	<b>674</b>

### 3.11: Dairy Enterprise Results: Influence of Farm Size on Lowland Herds

Table 3.9 presents the dairy enterprise results for three herd size categories for lowland herds. There is a trend in the overall results that average milk yield increases with herd size. Consequently, milk output, total dairy output, variable costs and GM all follow this pattern, with the intensity of production increasing with herd size. Whilst total dairy output ranges from £1083/cow to £1347/cow, from the less than 80 cow herd size group to the greater than 130 cow herd size group respectively, concentrate costs only increase by £28/cow between these two herd size groupings. Thus, the substantial difference in output is not fully eroded by increased variable costs, which results in variable costs varying by £60/cow across these average results. The greater than 130 cow herd size records the largest GM at £839/cow; approximately £200/cow more than the average GM from the less than 80 cow herd size group.

**Table 3.9: Gross Margin Results: Lowland by Herd Size**

<b>LOWLAND</b>	< 80 cows	80 – 130 cows	> 130 cows
Number of farms	67	75	62
Average number cows	52.5	97.7	221.9
Average yield (litres)	5925	6903	7330
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1114	1307	1406
Calf	54	52	51
Lease Quota (net)	-2	-1	1
Other Dairy	1	1	0
Herd Replacement	-84	-77	-111
<b>Total Dairy Output</b>	<b>1083</b>	<b>1281</b>	<b>1347</b>
<b>Variable Costs</b>			
Concentrates	250	266	278
Coarse Fodder	10	25	29
Vet and Medicine	37	47	48
Other Livestock Costs	103	105	98
Forage Costs	48	60	55
<b>Total Variable Costs</b>	<b>448</b>	<b>503</b>	<b>508</b>
<b>Total Gross Margin</b>	<b>635</b>	<b>778</b>	<b>839</b>

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

The results for lowland herds by EU super region are presented in Table 3.10. Average herd size and yield are similar between the East and West regions, however, the North region records substantially lower average herd size and yield. Examining output across the regions, the East achieves total dairy output in excess of £100/cow more than the West, which subsequently records a total dairy output in excess of £100/cow more than the North. The high output of the East region is achieved partly from the higher concentrate input in this region, and thus this region records the highest total variable costs. With a GM of £848/cow the East region achieves the highest gross return, whilst the North region records a GM of £673/cow.

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

<b>LOWLAND</b>	North	East	West
Number of farms	60	44	100
Average number cows	82.5	107.8	102.2
Average yield (litres)	6382	7000	6966
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1190	1409	1307
Calf	53	50	53
Lease Quota (net)	-2	-1	1
Other Dairy	0	0	1
Herd Replacement	-93	-85	-98
<b>Total Dairy Output</b>	<b>1148</b>	<b>1373</b>	<b>1263</b>
<b>Variable Costs</b>			
Concentrates	273	289	253
Coarse Fodder	16	28	23
Vet and Medicine	43	44	46
Other Livestock Costs	93	107	104
Forage Costs	50	57	56
<b>Total Variable Costs</b>	<b>475</b>	<b>525</b>	<b>482</b>
<b>Total Gross Margin</b>	<b>673</b>	<b>848</b>	<b>782</b>

### 3.13: Dairy Enterprise Results: Lowland Herds by Performance Groups

Table 3.11 presents the results for the lowland herds when analysed by the upper and lower quartiles as measured by GM performance. The upper quartile is characterised by substantially greater average herd size, which is 113% greater than the herd size for the lower quartile group. The average yield for the upper quartile is the main performance driver, with the average yield of 7755 litres/cow being 42% greater than the average yield for the lower quartile. This substantial yield difference translates into a total dairy output for the upper quartile of £1520/cow which is approximately £600/cow greater than the output for the lower quartile. This substantial difference in output is only partly reduced by the higher variable costs in the upper quartile (£50/cow greater than the lower quartile group), which leaves the GM for the upper quartile of £1025/cow being approximately £560/cow greater than the average GM for the lower quartile group. It is worthy to note that in achieving this difference in performance, the upper quartile group incurs lower replacement costs than the lower quartile group suggesting that the upper quartile have lower replacement rates than the lower quartile group; the latter could indicate issues of cow fertility problems leading to greater culling rates or buying in or transferring high value or high costs replacements to the dairy herd.

**Table 3.11: Gross Margin Results: Lowland by Performance Quartiles**

<b>LOWLAND</b>	Lower quartile	Upper quartile
Number of farms	51	51
Average number cows	63.4	141.5
Average yield (litres)	5443	7755
	£/cow	£/cow
<b>Output</b>		
Milk	967	1534
Calf	51	56
Lease Quota (net)	-1	5
Other Dairy	1	0
Herd Replacement	-104	-75
<b>Total Dairy Output</b>	<b>914</b>	<b>1520</b>
<b>Variable Costs</b>		
Concentrates	240	285
Coarse Fodder	16	12
Vet and Medicine	38	43
Other Livestock Costs	103	102
Forage Costs	49	54
<b>Total Variable Costs</b>	<b>446</b>	<b>496</b>
<b>Total Gross Margin</b>	<b>468</b>	<b>1025</b>

### 3.14: Dairy Enterprise Results: Influence of Farm Size on LFA Herds

The results of the GM performance for LFA farms analysed by herd size are presented in the Table 3.12. Section 3.11 noted that for lowland herds, milk output increased with herd size. For LFA farms, the results of two herd size groups are available (Table 3.12) showing that for the less than 80 cow herd size group, lower yields are achieved than in the larger, 80 to 130 cow herd size group. Examining the variable costs of production highlights that the 80 to 130 cow herd size group records a greater concentrate cost per cow than the smaller herd size group, indicating that in the 80 to 130 cow herd size group the output achieved follows from a more intensive system of production. However, the substantially greater total variable costs for the 80 to 130 cow herd size group produces an average GM similar to that for the less than 80 cow herd size group which recorded lower yields and output.

**Table 3.12: Gross Margin Results: LFA by Herd Size**

LFA	< 80 cows	80 – 130 cows	> 130 cows
Number of farms	30	15	Insufficient data
Average number cows	51.9	100.3	
Average yield (litres)	6185	6636	
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1094	1260	
Calf	56	43	
Lease Quota (net)	3	-1	
Other Dairy	0	0	
Herd Replacement	-66	-100	
<b>Total Dairy Output</b>	<b>1088</b>	<b>1201</b>	
<b>Variable Costs</b>			
Concentrates	254	311	
Coarse Fodder	10	20	
Vet and Medicine	37	37	
Other Livestock Costs	93	115	
Forage Costs	45	53	
<b>Total Variable Costs</b>	<b>440</b>	<b>535</b>	
<b>Total Gross Margin</b>	<b>648</b>	<b>666</b>	

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

The results analysed by EU super region for LFA dairy enterprises are reported in Table 3.13. Variation in average performance by EU super region for LFA farms is much less than that observed for lowland farms (see section 3.12). For LFA farms the North region records a marginally greater yield than the West, however total dairy output across these two regions is very similar, with the North region achieving only slightly greater total dairy output than the West. Concentrate costs are greater in the North, albeit that the difference in average variation across these two regions is only £22/cow. Total variable costs differ much more however, with the North incurring total variable costs of £498/cow in contrast to the £433/cow in the West. The lower variable costs in the West, coupled with similar total dairy output to the North, result in the West achieving a GM approximately £50/cow greater than in the North.

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

LFA	North	East	West
Number of farms	33	Insufficient data	15
Average number cows	67.9		79.2
Average yield (litres)	6542		6182
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1194		1144
Calf	51		50
Lease Quota (net)	2		3
Other Dairy	0		0
Herd Replacement	-97		-63
<b>Total Dairy Output</b>	<b>1150</b>		<b>1134</b>
<b>Variable Costs</b>			
Concentrates	277		255
Coarse Fodder	16		14
Vet and Medicine	43		32
Other Livestock Costs	105		91
Forage Costs	57		42
<b>Total Variable Costs</b>	<b>498</b>		<b>433</b>
<b>Total Gross Margin</b>	<b>652</b>		<b>701</b>

### 3.16: Dairy Enterprise Results: LFA Herds by Performance Groups

The differences identified between the upper and lower performance groups for lowland herds, as measured by lower and upper GM quartile analysis (Table 3.11), are also evident for the LFA performance groups, where a smaller sample size has restricted analysis to the lower and upper 33% of enterprises as measured by GM performance (Table 3.14). The results by performance groups show that the upper third have a substantially larger average herd size when compared to the lower third, and achieve an average yield that is 2157 litres greater than the lower third. This large differential in yield leads to total dairy output in the upper third being approximately £500/cow greater than the average for the lower third, and follows the pattern noted above for the difference in performance quartile groups for lowland herds. The greater output from the upper third group is accompanied by greater total variable costs, that are themselves driven by higher concentrate costs, producing a GM for the upper third approximately £400/cow greater than the lower third. The observation of lower replacement costs in the upper quartile for lowland farms is also observed for the upper third of the LFA farms, the rationale for the difference in replacement costs for the lowland herds is equally relevant to the variation observed for LFA herds noted in Table 3.14.

**Table 3.14: Gross Margin Results: LFA by Performance Groups**

<b>LFA</b>	Lower third	Upper third
Number of farms	18	18
Average number cows	56.2	86.9
Average yield (litres)	5325	7482
	£/cow	£/cow
<b>Output</b>		
Milk	937	1410
Calf	48	55
Lease Quota (net)	4	2
Other Dairy	0	0
Herd Replacement	-96	-75
<b>Total Dairy Output</b>	<b>893</b>	<b>1392</b>
<b>Variable Costs</b>		
Concentrates	239	305
Coarse Fodder	16	18
Vet and Medicine	35	46
Other Livestock Costs	97	104
Forage Costs	45	51
<b>Total Variable Costs</b>	<b>432</b>	<b>524</b>
<b>Total Gross Margin</b>	<b>461</b>	<b>867</b>

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

Further analysis of the results for dairy enterprises for lowland production, analysed by region and farm size, are available in the appendix in Tables A4 to A6. Following the pattern adopted for the results presented for dairy farms on a per hectare basis, where the number of farms in a specific group are less than 15, these data have not been provided to ensure that confidentiality of the data is not compromised. Due to sample size restrictions it was not possible to provide meaningful dairy enterprise results for LFA production by region and farm size.

## Chapter 4: Discussion and Conclusion

### 4.1: Introduction

Chapter 3 provided the results of the outputs, inputs, and margins from dairy farms in England on a per hectare (ha) basis together with the results specifically for dairy enterprises to gross margin level. With the results in Chapter 3, the analysis considered outputs, inputs and returns by lowland and LFA categories and by farm size (herd size for the enterprise results), EU super regions and performance groups. This chapter briefly considers these results in a broader context to assess the performance and returns to dairy farming in England in 2005/06. When examined at the per farm level, dairy farms in England in 2005/06 returned a MII of £46 per hectare, which equates to 2.4% of total output.

### 4.2: Lowland Dairying

Smaller farms (<60 ha) tend to be more specialist dairy farms, but after accounting for the value of farmer and spouse unpaid labour are left with negative economic returns to their dairy farming operations. By contrast, on average, the farms that are greater than 60 hectares return a positive MII of approximately £120/ha. Dairy farms in the East tend to have more income from other non-dairy sources and also operate larger farms. The most profitable dairy farms tend to be large and more intensive in their production of both milk, and non-dairy enterprises, as evidenced by higher output and variable costs of production. Examining the returns to dairying at the enterprise level, the results indicate that yield, total dairy output and GM per cow, increase with herd size, indicating that the larger herds are more intensive in their production (as evidenced by slightly higher concentrate use). In relation to regional variation, the East and West regions record higher average yields than the North, but the lower concentrate usage in the West is indicative of the greater reliance on this region's greater ability to produce traditional forage (e.g. grazing and silage); however the East records the highest GM associated with the largest concentrate cost. These aspects of production are reinforced by the performance quartile analysis, where the characteristics that typify the best returns to dairy farming are high-input – high-output systems with relatively larger herd sizes, yet with lower replacement costs despite the intensity of production.

### 4.3: Less Favoured Area Dairying

Examining the data for dairy farming in the LFA's of England, on larger LFA dairy farms, output from dairy production represents a smaller proportion of total output per hectare than on smaller LFA dairy farms; indicating that dairying on smaller farms is relatively more specialised (as a farm activity when compared to other enterprises). However, it is the larger farm size group which records a positive MII from the more extensive farming systems. Regionally, the West represents the more intensive (and smaller) LFA dairy farms, with substantially greater farm output and higher costs of production, but returning a positive MII. As noted above, these two factors suggest that for farms in the LFA that have dairy enterprises, in general it is the large, more extensive, farming systems that are more profitable. On a regional basis, it is the smaller, more intensive, systems in the West that are more profitable. However, the analysis by farm size and by region potentially masks the variation in performance that exists within these sub-groups. Specifically, when examining the returns by profitability groups at the farm-level it is the larger *and* more intensive LFA dairy farms which are the more profitable. From a regional perspective, the West achieves a higher GM result than the North. The GM performance analysis reinforces the earlier observation that the higher performing dairy farms have larger herd sizes, achieve higher yields and use more concentrates in achieving this greater output and return.

#### 4.4: Comparison with Previous Research

Previous analyses into the outputs, inputs and returns to dairy farming and milk production in England and Wales have identified that whilst smaller herds can be profitable, typically dairying profitability (as measured by net returns to the dairy enterprise) increases with herd size; this increase in net returns with herd size follows from increased yields and increased concentrate costs (Colman *et al.*, 2004). Colman *et al.* provide returns by quartile groups (lowland and upland combined), as grouped by Gross Margin returns, making comparison with this current report possible. The results from Colman *et al.* indicate that the upper quartile (as measured by GM per cow) achieve a greater yield than the lower quartile, however the associated concentrate usage for the upper quartile is substantially lower than for the lowest quartile, contrasting directly with the results presented here. However, Colman *et al.*'s analysis by net margin quartile groups reinforces the results presented in this current study that finds that the high performing (as measured by GM) producers tend to operate large herds, achieve higher yields and use relatively high concentrates per cow. The stocking rate on the most profitable producers from the study by Colman *et al.* is a further indication of the high-input – high-output characteristics typical of the most profitable dairy production systems. Franks *et al.* (2002), using data relating to milk production in England and Wales in 1996/97, reinforce the findings from this report and from Colman *et al.*, by noting that there are substantial economies of scale in dairy production, including higher yields per cow. However, Franks *et al.* also note that there are many factors that affect the net returns to milk production which are independent of scale; of particular importance is the concentrate to milk conversion ratio.

#### 4.5: Conclusion

The introduction to this report indicated that there is substantial and on-going adjustment in the dairy sector in the UK. The number of dairy farms continues to fall, and whilst the number of dairy cows is also in decline, this is less marked than the reduction in dairy farms as a number of producers that remain in the industry expand production with a view to efficiency savings and increased output per cow. This trend in increased herd size and a lower number of dairy farmers is likely to continue. In agreement with previous research, this report finds that the larger, more intensive dairy herds and farms tend to be more profitable and high performing, when measured by Management and Investment Income at the farm-level, and by Gross Margin at the enterprise-level respectively. The UK yet again did not meet national quota in 2005/06. The level of milk supplies, and moreover, the direction of the trend in milk production, has recently been recognised by Tesco's commitment to offer 850 producer supply contracts at a base price of 22 ppl, with a further 150 contracts at 23 ppl for smaller producers. These contracts will be offered with specific quality and environmental obligation conditions, but the base price will also be linked to the price of a number of key inputs (Farmers Weekly, 2007). Whilst Tesco is not the first supermarket to put in place contract arrangements with dairy farmers, the dominance of this retail outlet, with 27% of the liquid milk market, could yet prove to have wider impacts on the milk market than on Tesco's suppliers alone. It must also be set against the total number of dairy producers of 13270 as of December 2006 as noted in section 1.6. However, such developments in the milk market serve to reinforce the importance of this sector to English and UK agriculture, and given the perishable nature of the product, to the supply of liquid milk. New developments in the milk market are likely to continue to be put in place and, as such, the results presented in this report are of crucial importance to all those seeking independent analysis of the performance and profitability of *Dairy Farming in England*.

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MDC Datum (2007f)  
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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.

**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**

<b>LOWLAND (North)</b>	< 60 ha	60 – 120 ha	> 120 ha
Number of farms	22	24	16
Area (Ha)	41.65	87.31	153.80
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	1347	1366	1348
Calf	77	54	49
Lease Quota (net)	-5	0	-2
Other Dairy	0	0	0
Herd Replacement	-115	-99	-110
<b>Total Dairy Output</b>	<b>1304</b>	<b>1321</b>	<b>1284</b>
Other Livestock	239	237	204
Other	505	400	302
<b>Total Farm Output</b>	<b>2048</b>	<b>1959</b>	<b>1791</b>
<b>Variable Costs</b>			
Home-grown Concentrates	20	48	27
Purchased Concentrates	373	315	339
Coarse Fodder	33	15	27
Other Livestock Concentrates	0	27	0
Vet and Medicine	56	57	63
Other Livestock Costs	144	123	118
Seed	6	17	17
Fertiliser	73	60	67
Crop Protection	6	13	12
Other Crop Costs	13	12	8
<b>Total Variable Costs</b>	<b>724</b>	<b>689</b>	<b>678</b>
<b>Fixed Costs</b>			
Labour	141	221	280
Contract	92	73	69
Machinery Depreciation	151	92	94
Other Machinery	151	101	113
Miscellaneous	228	209	190
Rent and Rental Equivalent	232	236	232
<b>Total Fixed Costs</b>	<b>996</b>	<b>931</b>	<b>979</b>
<b>Net Farm Income</b>	<b>328</b>	<b>339</b>	<b>134</b>
Farmer / Spouse Labour	483	216	116
<b>Management &amp; Investment Income</b>	<b>-155</b>	<b>123</b>	<b>18</b>

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

<b>LOWLAND (East)</b>	< 60 ha	60 – 120 ha	> 120 ha
Number of farms	Insufficient data	25	27
Area (Ha)		81.46	222.09
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk		1542	1153
Calf		49	28
Lease Quota (net)		1	2
Other Dairy		0	0
Herd Replacement		-119	-65
<b>Total Dairy Output</b>		<b>1473</b>	<b>1118</b>
Other Livestock		218	191
Other		625	501
<b>Total Farm Output</b>		<b>2316</b>	<b>1809</b>
<b>Variable Costs</b>			
Home-grown Concentrates		17	43
Purchased Concentrates		349	260
Coarse Fodder		76	30
Other Livestock Concentrates		1	2
Vet and Medicine		56	47
Other Livestock Costs		182	103
Seed		23	24
Fertiliser		51	53
Crop Protection		13	30
Other Crop Costs		14	11
<b>Total Variable Costs</b>		<b>783</b>	<b>603</b>
<b>Fixed Costs</b>			
Labour		303	260
Contract		117	76
Machinery Depreciation		99	106
Other Machinery		134	115
Miscellaneous		272	177
Rent and Rental Equivalent		213	198
<b>Total Fixed Costs</b>		<b>1138</b>	<b>931</b>
<b>Net Farm Income</b>		<b>395</b>	<b>275</b>
Farmer / Spouse Labour		302	104
<b>Management &amp; Investment Income</b>		<b>93</b>	<b>171</b>

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

<b>LOWLAND (West)</b>	< 60 ha	60 – 120 ha	> 120 ha
Number of farms	26	51	31
Area (Ha)	39.83	84.00	191.19
	£/ha	£/ha	£/ha
<b>Output</b>			
Milk	1622	1487	1531
Calf	68	63	58
Lease Quota (net)	0	-2	3
Other Dairy	3	1	0
Herd Replacement	-82	-94	-141
<b>Total Dairy Output</b>	<b>1611</b>	<b>1455</b>	<b>1452</b>
Other Livestock	275	289	232
Other	302	600	386
<b>Total Farm Output</b>	<b>2189</b>	<b>2344</b>	<b>2070</b>
<b>Variable Costs</b>			
Home-grown Concentrates	25	36	46
Purchased Concentrates	381	320	332
Coarse Fodder	38	30	32
Other Livestock Concentrates	15	18	18
Vet and Medicine	77	62	60
Other Livestock Costs	159	151	154
Seed	15	149	25
Fertiliser	74	66	66
Crop Protection	6	13	23
Other Crop Costs	12	14	13
<b>Total Variable Costs</b>	<b>803</b>	<b>860</b>	<b>770</b>
<b>Fixed Costs</b>			
Labour	167	228	300
Contract	90	101	111
Machinery Depreciation	122	134	108
Other Machinery	122	111	123
Miscellaneous	244	181	162
Rent and Rental Equivalent	266	249	246
<b>Total Fixed Costs</b>	<b>1012</b>	<b>1005</b>	<b>1049</b>
<b>Net Farm Income</b>	<b>374</b>	<b>479</b>	<b>250</b>
Farmer / Spouse Labour	621	332	121
<b>Management &amp; Investment Income</b>	<b>-247</b>	<b>147</b>	<b>129</b>

**Table A.4: Gross Margin Results: Lowland (North) by Herd Size**

<b>LOWLAND (North)</b>	< 80 cows	80 – 130 cows	> 130 cows
Number of farms	26	18	16
Average number cows	53.8	97.0	205.5
Average yield (litres)	5863	5894	7417
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1040	1160	1410
Calf	57	48	51
Lease Quota (net)	-1	-6	-1
Other Dairy	0	0	0
Herd Replacement	-84	-113	-93
<b>Total Dairy Output</b>	<b>1013</b>	<b>1090</b>	<b>1368</b>
<b>Variable Costs</b>			
Concentrates	255	257	308
Coarse Fodder	14	17	19
Vet and Medicine	36	35	57
Other Livestock Costs	92	96	91
Forage Costs	45	51	57
<b>Total Variable Costs</b>	<b>442</b>	<b>457</b>	<b>532</b>
<b>Total Gross Margin</b>	<b>571</b>	<b>633</b>	<b>836</b>

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

<b>LOWLAND (East)</b>	< 80 cows	80 – 130 cows	> 130 cows
Number of farms	Insufficient data	20	15
Average number cows		101.2	193.9
Average yield (litres)		7363	7495
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk		1384	1506
Calf		57	49
Lease Quota (net)		1	-1
Other Dairy		0	0
Herd Replacement		-71	-108
<b>Total Dairy Output</b>		<b>1371</b>	<b>1446</b>
<b>Variable Costs</b>			
Concentrates		285	304
Coarse Fodder		22	45
Vet and Medicine		42	52
Other Livestock Costs		111	100
Forage Costs		59	56
<b>Total Variable Costs</b>		<b>519</b>	<b>557</b>
<b>Total Gross Margin</b>		<b>852</b>	<b>889</b>

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

<b>LOWLAND (West)</b>	< 80 cows	80 – 130 cows	> 130 cows
Number of farms	31	38	31
Average number cows	49.0	95.9	242.8
Average yield (litres)	6212	7167	7233
	£/cow	£/cow	£/cow
<b>Output</b>			
Milk	1154	1337	1367
Calf	57	50	52
Lease Quota (net)	-3	1	3
Other Dairy	2	1	0
Herd Replacement	-91	-65	-121
<b>Total Dairy Output</b>	<b>1120</b>	<b>1325</b>	<b>1301</b>
<b>Variable Costs</b>			
Concentrates	239	261	256
Coarse Fodder	7	30	27
Vet and Medicine	41	55	43
Other Livestock Costs	110	107	100
Forage Costs	49	65	54
<b>Total Variable Costs</b>	<b>446</b>	<b>519</b>	<b>480</b>
<b>Total Gross Margin</b>	<b>674</b>	<b>807</b>	<b>821</b>

## Appendix 2: Reports in Series

### Reports in this series:

#### **Crop Production in England 2005/06**

<http://www.landecon.cam.ac.uk/research/eeprg/rbu/rbupubs.htm>

#### **Dairying Farming in England 2005/06**

<http://www.nottingham.ac.uk/rbru/publications.html>

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<http://www.cornwall.ac.uk/rbs/index.php?page= Home>

#### **Pig Production in England 2005/06**

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#### **Poultry Production in England 2005/06**

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