



# An economic analysis of heifer rearing and breeding selection in Great Britain – an empirical analysis

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Results of calf and heifer rearing survey

Report prepared for DairyCo

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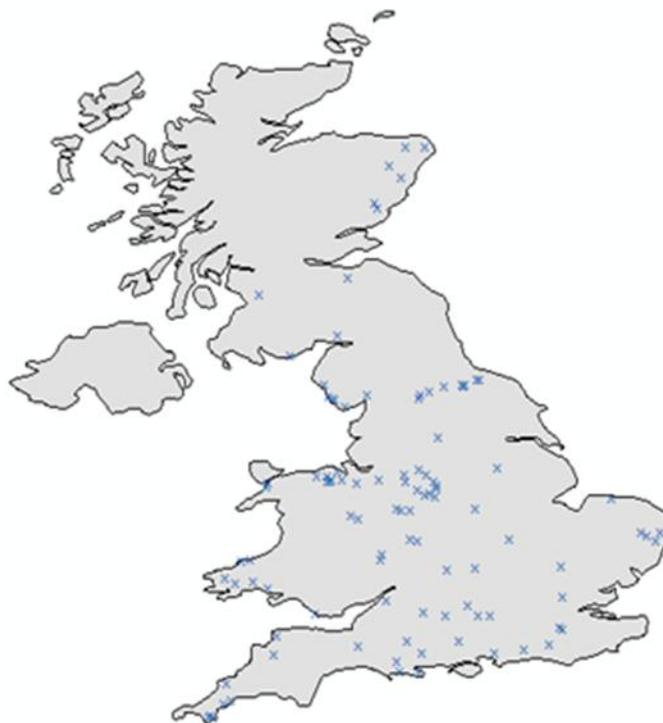
## Introduction

After the cost of feed for the milking herd, the second largest annual expense to a dairy farmer is the cost of rearing replacement heifers. It accounts for approximately 20% of the farm's production costs after feed for the milking herd. Recent estimations in the agricultural press for the cost of rearing a heifer from birth to first calving is £1,200 (range £1,000 to £1,500 including its own value).

The aim of this research was to determine the true cost of heifer rearing and to identify critical factors that influence the cost of rearing. In order to achieve this aim, a heifer rearing and farm breeding survey was conducted. The survey included 124 questions recording details of on-farm calf and heifer management. Input costs were also obtained during the interview in order to calculate the cost of rearing.

In total, 102 dairy farms across 39 counties in England (76 farms), Scotland (10 farms) and Wales (16 farms) were visited between March and August 2013. The location of the farms reflects the distribution of dairy farms in GB (Figure 1).

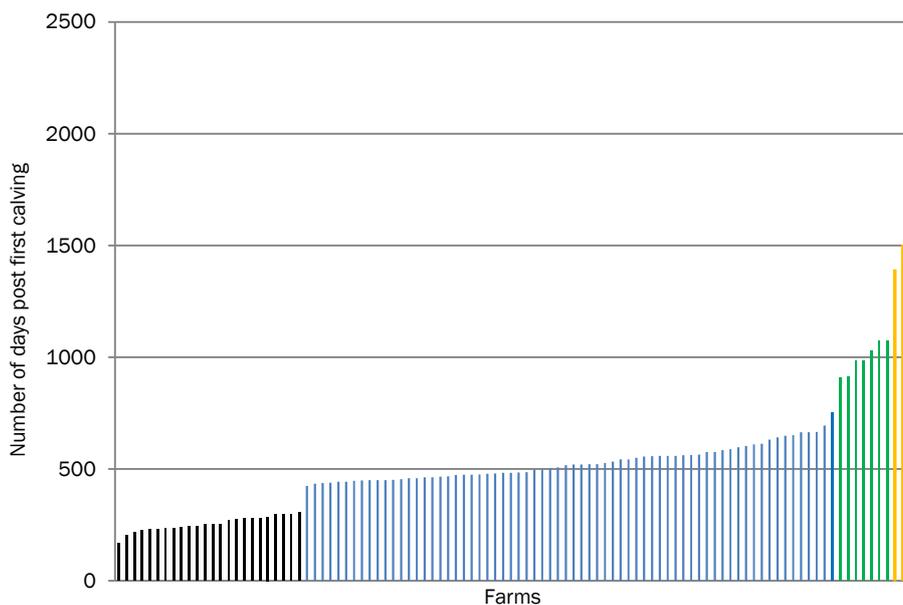
**Figures 1** Location of study farms across England, Scotland and Wales



## Key findings:

- The average age at first calving was 25.8 months (784 days)
- The average total cost of rearing including fixed and variable costs, interest on capital and opportunity costs was £1,819.01 per heifer ranging from £1,073.36 to £3,070.46
- The average daily cost of rearing per heifer was £2.31 ranging from £1.47 to £3.35
  - birth to weaning had the highest average daily cost of £3.14
  - weaning to conception had intermediate average daily cost of £1.65
  - conception to calving had the lowest average daily cost of £1.64
- Feed accounted for the largest proportion of costs. Excluding interest and opportunity cost, purchased feed and home grown forage contributed on average 36.8% and grazing 6.9% to the cost of rearing
- The most expensive input per unit cost was milk powder which averaged £1,800.00 per tonne in this study; however, feeding whole milk from the bulk tank was not significantly different in cost per litre
  - Milk feeding accounted for on average 37% of input costs during the preweaning period
  - The average volume of milk fed to a heifer calf per day was 4.58 litres ranging from 2.15 to 12.59 litres
- The analysis identified the most significant factors affecting cost of rearing as age at first calving (AFC), the percentage of time the heifer spent at grass during the rearing period, calving pattern, herd size and breed
  - Each extra day of AFC increases the average cost of rearing by £2.87
- Gross margins per heifer ranged from £-367.63 to £1,120.08 with an average of £441.66
- Approximately 70% of farms paid back the investment in their youngstock during the second lactation. This equates to an average number of days post first calving of 530 ranging from 168 to 2321 days (Graph 1).

**Graph 1** Bar chart showing the number of days post first calving when heifers pay back their cost of rearing by lactation number



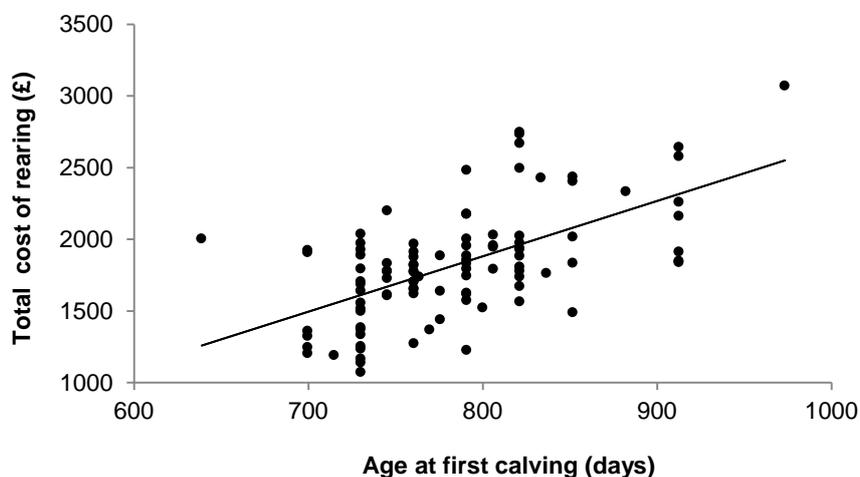
■ Lactation 1 ■ Lactation 2 ■ Lactation 3 ■ Lactation 4 ■ Lactation 6

## The cost of reproductive management

One of the key findings of the study was that the average AFC is a major determinant of cost of rearing. Graph 2 below represents the AFC in days of each farm and their associated cost of rearing. When interpreting graphs where a best fit line is included such as Graph 2, it is useful to consider the R-value. This measures how well the line describes the relationship between two variables. The closer the  $R^2$  is to 1 the better the line fits the data and the stronger the relationship between the two variables. The  $R^2$  in Graph 2 suggests that the AFC explained 35% of the variation in the cost of rearing of the farms in the study.

**Graph 2** Relationship between the total cost of rearing and age at first calving (days)

$R^2 = 0.35$  • each dot on the graph represents one farm



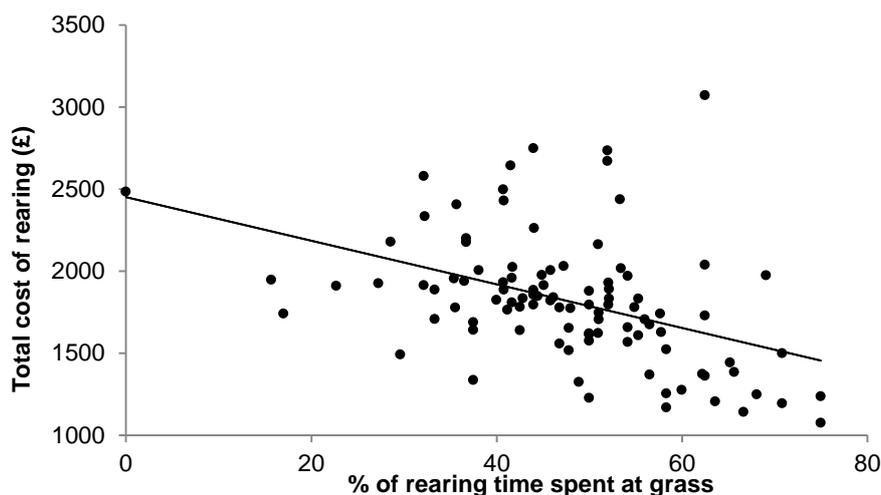
If 26 months AFC is taken as a baseline (0%), the percentage difference in average cost of rearing for changes in AFC suggests that calving at 25 months will reduce cost of rearing by 3.6% and by approximately 15.7% when calving at 24 months. Cost of rearing increases on average by 14.3% for AFC of 27 months and by 17.2% for AFC of 30 months.

## The cost of grazing

The percentage of time that heifers spent at grass also had a significant effect on the cost of rearing. For each percentile increase in time spent at grass during the rearing period, cost of rearing decreased by £6.06. Time spent at grass accounted for 19% of the variation in the cost of rearing of the farms in this study (Graph 3).

**Graph 3** Relationship between the total cost of rearing and the percentage of time that heifers spent at grass

$R^2 = 0.19$



• Each dot on the graph represents one farm

## Conclusions

Individual farms and farm inputs showed great variation in costs however this reflects the current landscape of GB dairy farms where the majority of farms are conventional, all year round calving with black and white genetics.

While decisions surrounding plane of nutrition during the weaning period has a large impact on the cost of rearing from birth to weaning, the weaning period only accounts for on average 10.8% of the total cost of rearing



Management decisions relating to breeding and nutrition had the greatest impact on the cost of rearing with AFC and % of time spent at grass having statistically significant associations with the total cost of rearing. While changes to the rearing system can be easily made that will reduce the age at conception and AFC, changes to the time spent grazing may prove more difficult due to the amount of grazing land available and the regional climate.



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