Project number: 5799
Funding source: Teagasc
Date: November, 2011
Project dates: Jan 2008 - Dec 2010

Development of a benchmarking system to increase the sustainability of Irish dairy farmers

Key external stakeholders:

Dairy farmers, dairy processors, extension officers, financial agencies, Department of Agriculture, Food and the Marine and accountancy firms

Practical implications for stakeholders:

Useful data is generated from farm transactions that could be used to increase the sustainability of the dairy farm business. This data is currently stored in independent databases and is not used to its full potential. Dairy farm sustainability could be increased by amalgamating this data to allow the generation of useful reports for benchmarking.

- This study has developed a pilot benchmark system using data from Dairygold and ICBF
- A number of key performance indicators have been developed and calculated within the benchmarking system
- A Grassland data capture application with reporting functionality database has been developed for Research farms
- Reports have been developed that can be used by farmers
- Data Envelopment Analysis (DEA) has been used to quantify efficiency, quantify the factors effecting efficiency and to determine the total productivity growth on Irish dairy farms between 1996 and 2010

Main results:

- This project has identified the key factors effecting efficiency and productivity on Irish dairy farms
- Key performance indicators have been identified and quantified
- A pilot benchmarking system has been developed to capture, validate and report the information back to farmers

Opportunity / Benefit:

Increased focus on key performance indicators will result in increased profitability at farm level. The factors affecting profitability have been published in technical conferences, Open days and at farmer meetings. The pilot benchmarking system is producing reports with live information.

Collaborating Institutions:

UCD, Teagasc Advisory, Teagasc/Dairygold Joint Program

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1. Project background:

Benchmarking one dairy farmer against a group of relevant dairy farmers is one of the most useful methods of determining both physical and financial performance. The usefulness of any benchmarking exercise depends on the quality of the information supplied as well as the number and type of farmers participating in the system. There are various benchmarking systems in operation around the world; these include Eprofit Monitor in Ireland, FinBin in USA and the OABS in South Africa. These systems have a common theme; that is they compare farmers based on a number of key performance indicators (KPI). A common objective of all of these systems should be that they are user friendly and that the information can easily be recorded in the systems. A variety of performance indicators are currently being captured electronically in Ireland, but this information is not subsequently being used to increase the sustainability of dairy farmers. This information is being accumulated by numerous groups including milk processors, banks, meat processors, marts, accountants, the Irish Cattle Breeding Federation, Department of Agriculture and Food, etc. Through the development of a central database and an application to provide reports, this data could be used to help farmers to increase their overall sustainability.

2. Questions addressed by the project:

- Could a pilot benchmarking system with data flowing from Dairygold and ICBFbe developed?
- Could a grassland database for the capture of grassland related information be developed?
- Could the factors affecting efficiency on farm be quantified?
- Could the productivity change over time and the factors affecting productivity change be quantified?

3. The experimental studies:

Efficiency is the ratio of observed to optimum performance. DEA is a non parametric linear programming form of frontier analysis used for the measurement, analysis and evaluation of the performance of a business. DEA was used to measure the technical, economic and allocative efficiency of dairy farms for 2008 and to quantify productivity change between 1996 and 2010. A second stage analysis was used to determine the factors that were associated with efficiency and productivity change.

A pilot benchmarking system was developed using the Moorepark Oracle database. Three hundred and eighty Dairygold dairy farms signed up for the project with data flowing from Dairygold on a daily basis and ICBF on a weekly basis for these farms. Four reports have been developed around milk production and milk quality both current and historical. The reports can be generated at discussion group level or can be generated individually for a particular farmer. Various benchmark criteria can be used depending on the requirements of the individual such as a comparison to a particular region, discussion group, performance level, etc.

A Grassland data capture application with reporting functionality has been developed using the Oracle database. The system which captures on farm data provides the users with a decision support tool, while also allowing the capture of on farm data in the background.

4. Main results:

This study has highlighted that a potential to increase production through increased technical efficiency exists on Irish dairy farms. Productive factors such as milk solids per hectare and milk solids per cow have been highlighted as key performance indicators which differ significantly among more technically efficient producers and technically inefficient producers. Land quality and managerial differences remain the key factors associated with differences in efficiency at farm level. Increasing the quantity of grazed grass through a longer grazing season has been shown in this study to result in greater production and profitability. Producers with an early Spring mean calving date, a shorter breeding season, greater milk quality and greater use of services such as milk recording and AI were found to be more efficient. Greater levels of specialisation in dairying and membership of a discussion group resulted in greater technical and economic efficiency. This study also investigated the associations of demographic information with efficiency and it was found that efficiency increased and then declined with age. Despite quota constraints this study has found that a potential exists to increase productivity through increasing scale of operation which highlights the huge

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potential of the Irish dairy industry to expand efficiently post quota. Greater levels of technical efficiency were found with larger scale farms. It was found that hired labour and land were also key factors associated with optimum scale of production. Productivity increased by 10.4% between 1996 and 2010 with milk yield per cow, costs per lire, nitrogen per hectare and milk price the key factors associated with differences in productivity.

5. Opportunity/Benefit:

- DEA has quantified the factors effecting efficiency and productivity change over time on Irish dairy farms
- Key performance indicators have been developed from these components
- The Teagasc Pilot Benchmarking system demonstrates a system where information flows are automated and live which allows report generation of up to date data. ICBF currently have developed a capture mechanism for data from the processors with components from this research integrated into their system.
- The potential use of grassland information that has been captured through a mechanism such as that developed here will significantly add to potential productivity of grassland systems.

6. Dissemination:

Research findings were presented at numerous conferences including the 62nd Annual Meeting of the European Federation of Animal Science (2011) and the Agriculture Research Forum (2009 & 2011).

Main publications:

Kelly E., Shalloo, L., Geary, U., Kinsella, A. & Wallace, M. (2011) An Application of DEA to measure technical and scale efficiency on a sample of Irish Dairy Farms *Irish Journal of Agricultural and Food Research* (submitted)

Kelly E., Shalloo, L., Geary, U., Kinsella, A., Thorne, F. & Wallace, M. (2011). The associations of management and demographic factors with technical, allocative and economic efficiency of Irish dairy farms *Journal of Agricultural Science* (accepted)

Kelly E., Shalloo, L., Geary, U., Kinsella, A., Thorne, F. & Wallace, M. (2011). An analysis of the factors associated with technical and scale efficiency of Irish dairy farms. *Farm Management (*submitted).

Popular publications:

Shalloo, L., Kelly, E. & Geoghegan, A. (2009) 'Benchmarking will improve dairy farm sustainability' Article in *Moorepark News* Spring 2007 Issue 27

Kelly, E., Shalloo, L., O'Loughlin, J. & Geoghegan, A. (2009) 'Performance evaluation and benchmarking on specialist dairy farms' Poster Moorepark Open Day 2009

Shalloo, L., Kelly, E. & Geoghegan, A. (2008) 'Benchmark for useful reports' Article in *Teagasc Today's Farm November-December 2008*; 19 (6) Pg14-16.

7. Compiled by:

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