A Strategic Review of UK Dairy Farming's priorities for R &D and Knowledge Exchange for 2011-2021

Executive summary

Over the next decade, strong growth in global dairy product consumption is expected, with diet change driven by population increase, social development and greater wealth. For the UK dairy industry, a review of funding and research priorities is needed, not just to promote a sustainable and profitable industry, but also to meet the extra demand on supply in the future.

The fundamental challenge for the UK dairy industry is to continue to improve competitiveness based on efficient use of all inputs. It needs to be improving its effectiveness (doing the right thing) and efficiency (doing it well) in production.

However, although many farming businesses have made significant improvements in farm technical efficiency, there remains a large variation within systems. The variation in technical performance between farms with similar production systems can be as much as a third.

The drivers of behaviour change and barriers to adoption of new technology need to be better understood. In planning for the future, apart from technical efficiency, dairy farmers face a raft of relatively new issues: water and air quality, human health attributes of the food they produce, and sustainability challenges in relation to fossil fuel, water, phosphate (P) and nitrogen (N).

Excellent standards of animal health and welfare will continue to be high on the list of consumer requirements in addition to being vital for profitable and sustainable milk production.

The Dairy Science Forum, a panel of experts each specialised in a particular segment of the dairy industry, believe there is a fundamental need to achieve a better balance of basic and applied research and importantly, better co-ordination of UK and EU funded dairy research and knowledge exchange.

The Forum is calling for an urgent review to rationalise not only the funding for new research, but also to ensure that existing research knowledge is appropriately disseminated into the industry where it can be of value. Mechanisms need to be explored to ensure that research findings are taken out into the field and a meaningful difference achieved. It is considered that the main "pinch point" is in the area of knowledge exchange and implementation.

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Introduction

In 2008 the Dairy Science Forum (DSF) published a paper entitled 'Provision of a scientific knowledge transfer-base for 21st century dairy farming in the UK'. The paper expressed the Forum's firm belief that there were excellent opportunities for a profitable and sustainable future for the UK dairy industry, but that this achievement was dependent on positive action both by the industry and Government. (See Appendix 1 for more information on the DSF and its members).

This follow-up paper undertakes a strategic review of dairy farming's R &D and knowledge exchange (KE) requirements for the next ten years. A two-way flow of information between researchers and farmers is favoured. This is the concept of knowledge exchange as opposed to knowledge transfer (KT) which is only one-way. (See Appendix 2 for a review of changes in dairy industry structure, R&D objectives, and funding policies).

This paper was compiled following a meeting organised by the DSF in December 2010, which included representatives from Government and across the UK dairy chain. It was supported by the Royal Association of British Dairy Farmers, DairyCo, the National Farmers Union and The Farmers Club.

Knowledge Exchange in the UK Dairy Industry

The 1990s witnessed a withdrawal of Government support for free advice including the closure of research and development farms across England and Wales. The responsibility for knowledge exchange with the farming industry was passed to levy bodies.

For British dairy farmers, DairyCo is the levy-funded, not-for-profit organisation working on their behalf, and to whom a statutory levy of 0.06p per litre is paid on all milk sold. In Northern Ireland dairy farmers pay a voluntary levy of 0.05p per litre of milk to AgriSearch.

DairyCo's remit is to solve 'market failure' in the dairy industry and to tackle issues not currently being dealt with sufficiently to meet the needs of the industry. In addition to providing an information service, DairyCo's strategies include helping farmers to manage environment needs and regulatory requirements, and to increase their profitability through better business management . It is also charged with the task of promoting a positive perception of dairy farming by the general public.

DairyCo has a small staff compared to the number previously engaged in advice and information provision under the former Government-funded service. It has therefore had to establish different communication methods with the industry.

DairyCo's main approach is a combination of open meetings and the use of forums and discussion groups, which can be topic or issue driven; in some cases, farmers set the objectives. Benchmarking and mentoring (farmer to farmer) are among the tools used.

DairyCo believes that farmers, researchers, vets and advisers are all well positioned to set the priorities for research, development and KE, and to agreeing the agenda and reviewing progress.

Knowledge Exchange Priorities for 2011-2021

The absence of a Government supported service of highly trained people is a barrier to efficient knowledge exchange. The Forum considers the following is required to ensure existing research is effectively disseminated out to the industry:

- DairyCo must ensure a high level of communications skills amongst its KE staff and continue to develop the links with retailers and processors in relation to environmental issues.
- The use of monitor farms for demonstration of environmental management should be extended.
- The available skill pool should be developed, for example, CPD for vets could include communication and training skills which would allow them to undertake extension work.
- Research is needed on the social aspects of farming and the psychology of farmers; what is important to them; how to engage them in the bigger issues; how information is best exchanged.

R&D priorities for 2011-2021

The Forum considers that the topics below should be considered as key R&D priorities in relation to consumers, environment and animal health and welfare.

- ***Improving forage feed value***
  There has been no real improvement in the feed value of grazed grass or grass silage in the last 20 years, and milk production from forage has decreased. In parallel there is the increased requirement for cereals for human consumption, which must result in increased production from forage being a major driver in the years ahead.

- ***Tailoring of milk constituent levels to market demand***

  There has been no change in milk fat or protein concentration in 15 years and no real response to reflect changing market trends. Milk composition needs to better reflect market demand both in relation to gross composition and component constituents

- ***Reversing the decline in dairy cow fertility***
  Internationally, dairy cow fertility is falling at the rate of 1% per annum, and the decline is similar in the UK. Application of genomic selection in dairy cattle breeding offers considerable scope to address this problem.

- ***Improving cow longevity***
  The national dairy herd replacement rate currently is estimated at 33%, in other words, the average UK dairy cow survives for only three lactations. This has a dramatic negative effect on overall industry efficiency while improved longevity would significantly reduce climate change effects per unit of output.

- ***Better utilisation of available data***
  As systems for managing dairy herds become increasingly automated and computerised, greater quantities of high quality data are recorded on farms. However, much of this information is not utilised. So harnessing the potential of automatic data capture is critical. For example: despite the existence of excellent national databases, there remains an absence of comprehensive national statistics on dairy herd fertility.

- ***Improving nutrient management***
  Compliance with EU Nitrates and Water Framework Directives present a significant management challenge to dairy farmers in many parts of the country. Currently the losses of N and P to watercourses are a major problem. Research and KE is needed on how to improve efficiency of fertiliser use, increase manure storage requirements, process manure prior to application, and advanced spreading methods.

- ***Understanding factors affecting greenhouse gas emissions and air quality***
  The livestock sector is a contributor to climate change, mainly through methane and nitrous oxide emissions. In addition, the livestock sector is a source of ammonia. Ammonia contributes to atmospheric particulate levels, which are a concern for human health. In order to comply with EU, UK and Devolved Administration Climate Change Legislation, and any future legislation concerning ammonia emissions, there is a need to better understand the factors influencing emission levels and appropriate mitigation strategies.

- ***Improving animal health***
  Excellent animal health is integral to a productive and sustainable industry and also has a direct effect on reducing environmental impact (health animals are more productive and so less are required).

Specific research priorities for animal health:
- *Strategies for better detection, prevention and control of endemic diseases*
- *Promotion to generate better uptake of herd health plans*
- *Development of prevention strategies for exotic diseases*
- *Assessment of the* implications of climate change
- *Eradication of bovine TB*.

- **Measuring and assessing animal welfare**

The need to objectively measure and record cattle welfare remains a key issue, particularly across different disease scenarios and management systems. A growing number of very large herds can be expected in the coming years and a study of the management of such systems and in particular the high-yielding 'housed cow' will be required. There is currently little scientific investigation of the effect of herd size on cow health and/or welfare.

Specific research priorities for animal welfare:
- *Evaluation of health and welfare in large herd systems, combined with*
- *Evaluation of indoor housing and automation on cow health and welfare*

- **Educating the consumer**

Consumers are becoming increasingly well-informed and are challenging methods of food production. In particular, the public perception of different cattle management systems and effect on animal welfare needs addressing (as listed above). Evidence is required to reassure the public and create a positive image for the industry.

Closer co-operation is required between researchers and industry so that clear messages are delivered to consumers about milk production, feeding and housing systems, impact on greenhouse gases.

Dairy organizations should assist food retailers to formulate positive messages about dairy products with health and information on the properties of milk products such as fats, the importance of protein in diets, and the high UK standards of food safety.

The European Dimension

The Dairy Science Forum believes that in order to maximise scientific capability and avoid duplication of research, greater international collaboration on R&D, at least across Europe, should be encouraged.

The need for greater links with European countries has been highlighted by the project 'Development and KT in the EU cattle industry'. The project, supported by key UK stakeholders, the Dutch Dairy Board and The European Forum of Farm Animal Breeders (EFFAB), has identified the opportunity for better coordination with European partners. In several countries levy boards or similar farmer-funded bodies have been established. Between them they manage a wide range of development, knowledge exchange and promotional programmes to farmers, consumers and businesses.

There is considerable benefit to be had by countries working more closely together, discussing priorities, and sharing best practice on development and knowledge exchange. Taking a more co-ordinated approach will have greater impact through sharing of costs, and by agreeing priorities countries can have more influence on EU Framework Programmes.

Another example is the Collaborative Working Group (CWG) on European Animal Health and Welfare Research, which currently involves almost 30 funding organisations in over 20 countries. Its goal is to deliver the animal health and welfare research needs of policy makers and the European livestock industry.

There is a growing recognition within the EU of the gap between research and application in practice. This provides an excellent opportunity for a co-ordinated approach to knowledge exchange across the EU, and there is the real possibility of EU funding to support such an initiative.

Funding opportunities

A fundamental need is to achieve a better balance of basic and applied research and importantly, better co-ordination of UK and EU funded dairy research and knowledge exchange.

In general the sources of funding for R&D will continue to be Defra, BBSRC, DARD and REDAD (Sustainable Agriculture Development Network). DairyCo and AgriSearch are sources of support for the farming industry. The agricultural supply industry provides support for the supply sector of the industry.

Until 2010, industry support for research has been both private and in partnership with the public sector through the LINK Sustainable Livestock Programme.

Funding for research by business led consortia is also available from the Technology Strategy Board (TSB). It supports research into, and development and exploitation of, technology and innovation for the benefit of UK businesses.

It is noteworthy that there is currently very limited funding support from the processing and retail sectors. Securing involvement of retailers and processors in funding of dairy related R&D should be considered a priority.

Appendix 1

About the Dairy Science Forum

The Dairy Science Forum is a long-established group of individuals, each well recognised and specialised in a particular segment of the industry. Membership is limited and by invitation to ensure representation at an appropriate level across the breadth of the industry.

The DSF membership includes:

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John Allen	Peter Alvis	John Baines
David Beever	David Black	Roger Blowey
Christopher Bourchier	Tim Brigstocke	Mike Coffey
David Colman	Jimmy Dickinson	Hilary Dobson
Willie Donachie	Julie Fitzpatrick	David Garwes
James Greenhalgh	Clive Gurney	Eric Hillerton
David Homer	Stewart Jamieson	Euryn Jones
Wynne Jones	Ray Keatinge	Chris Knight
David Logue	Sinclair Mayne	Jonathan Mills
Jon Moorby	John Newbold	John Oldham
Chris Reynolds	Mark Roach	Dave Roberts
John Sumner	Duncan Sinclair	Cled Thomas
Phil Thomas	John Twigge	Angus Weilkopolski

Dairy Farming Structures

Dairy Farming in the UK has and continues to experience rapid and remarkable structural change. The table below illustrates how the industry has restructured over the past half century.

Year	Producers	Dairy cows ('000)	Herd size	Milk Yield (litres/cow)
1960	151,625	3,165	20	3,380
1970	100,741	3,244	30	3,750
1980	56,247	3,224	51	4,670
1990	41,248	2,846	67	5,145
2000	29,000	2,350	80	5,800
2009/10	16,154	1,850	115	7,096

As the industry has restructured, improved genetics, nutrition and management have produced significant increases in individual cow yields in parallel with a decline in cow numbers.

Trends in the UK Dairy Industry
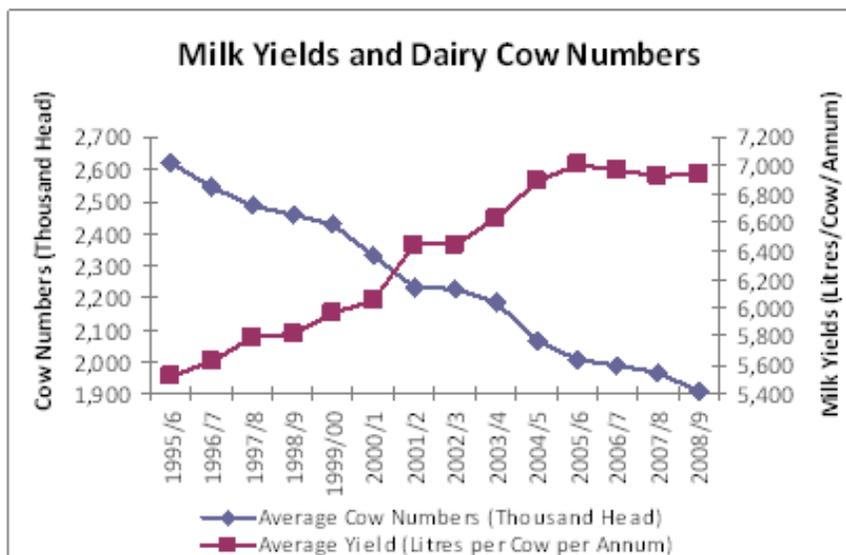
Source: www.dairyco.net

Policy and Strategy Evolution

Over the last 20 years the Government and other funding bodies have significantly changed their approach to R &D. In the early part of the period the focus was on maximising milk production. In the later years of the 1990s the emphasis switched to increasing sustainability.

As global concerns over the natural environment came on the political agenda, research funding was directed to farming systems that lowered the impact on the environment. So the overall aim of recently funded R & D has been to support a competitive UK dairy industry whilst reducing the environmental footprint of milk production. Since 1995, the UK dairy herd has reduced by 27% with no reduction in national milk production, thereby reducing the diffuse pollution per litre of milk. This has been associated with the need to increase food production from fewer inputs yet with lower emissions. In parallel was the need to reduce zoonoses and losses due to animal disease and improve the welfare of the high yielding cow.

Underlying these technical demands were, and continue to be, the evolving challenges that need sustained effort to meet the demands of a growing world population which has an increasing demand for animal protein. Today, there is an even sharper focus on the sustainable intensification of food production whilst reducing the environmental impact of production and maintaining food security.

MAFF/Defra (Department for Environment, Food and Rural Affairs), SEERAD (Scottish Executive Environment and Rural Affairs Department)/RERAD (Rural and Environment Research and Analysis Directorate), DARDNI (Department of Agriculture and Rural Development Northern Ireland) and EU (European Union) all followed similar routes to funding priorities. BBSRC (Biotechnology and Biological Sciences Research Council) provided core Institute support and response mode funding for fundamental biology and genomics of the dairy cow and her diseases.