

2008

ANNUAL REPORT 2008 and Financial Statements

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2008

Contents

INTRODUCTION

The 2008 Annual Report is built around the goals outlined in the Teagasc Statement of Strategy 2008-2010. Key achievements and developments for the Agriculture Research, Food Research, Training and Development, Advisory, Corporate and Management Services, and Administration Directorates are described in the context of these goals.

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TEAGASC 2030 FORESIGHT PROJECT



The Teagasc 2030 Foresight project was launched in December 2006 and concluded with the launch of the project report at an international conference in Dublin Castle on 30 May 2008.

The project aimed to establish a broadly-shared vision for the Irish agri-food and rural economy in 2030, identify its knowledge requirements and strengthen the strategic capabilities of Teagasc and its relevance to its stakeholders, thereby enabling it to provide proactive leadership in a rapidly changing open-market environment. Teagasc 2030 was undertaken in collaboration with the key agrifood and rural stakeholders. The project was overseen by a Steering Committee, chaired by Professor Seamus Smyth, President Emeritus, NUI Maynooth, and comprised national and international representatives from government institutions, industry and universities. The Steering Committee was assisted by a broadly representative Foresight Panel, which was responsible for information gathering and analysis, scenario building, strategy development and reporting.

A Foresight Working Group, drawn from the research, advisory and training directorates, was responsible for day-to-day running of the project. The work of the project was built around seven major workshops and a number of other special information gathering events, including an international 'Out-of-the-Box Thinking' workshop held in the RDS Dublin in July 2007. Drawing on likely developments in the agri-food sector and rural economy and global developments over the next 20 years or so, Teagasc 2030 developed alternative scenarios, outlined different possible 'futures', and how they could impact on Teagasc.

These were designed to stimulate thinking on the ability of the organisation to prepare for different eventualities or 'futures' as they emerge. These scenarios formed the basis for the development of a long-term organisational strategy for research and knowledge management.

The project was undertaken against a rapidly changing market, policy and scientific environment for the agri-food sector. Associated concerns about food and energy security, climate change and environmental sustainability are now to the forefront of global concerns.

At the same time, rapid advances in the biosciences are already helping to meet these urgent global challenges and, in the process, are creating a multitude of new business opportunities for agriculture and the broader natural resource sector. The report concluded that responding to these fundamental opportunities and concerns will provide a new and central focus for agriculture globally over the coming decades.

The report stated that Ireland, too, can benefit from these new opportunities and our natural resource sector could play a central role in the country's economic development in the post-Celtic-Tiger era. The potential for new business development is so great that it is necessary to re-configure the traditional scope of the sector to encompass its greater potential. The focus of this report is, therefore, on the broader concept of the bioeconomy. Teagasc's role into the future will be to support the Irish bioeconomy in playing a central role in the 'knowledge economy' through supporting innovation by farms and firms.

A key outcome of the Foresight project was the establishment of a Foresight Unit headed by Dr. Lance O'Brien. The primary role of the unit is to lead in the implementation of the report's recommendations.



Mr. Mike Feeney, Executive Director, Internationally Traded Business Sectors, Enterprise Ireland; Ms. Olivia O'Leary, Broadcaster and Journalist; Mr. Jackie Cahill, President, ICMSA; Dr. Hugh Brady, President, Irish Universities Association Council; Mr. Padraig Walshe, President, IFA; Ms. Catherine Buckley, President, Macra na Feirme; Mr. John Moloney, Group Managing Director, Glanbia plc; Prof. Gerry Boyle, Director of Teagasc and Dr. Lance O'Brien, Foresight Project Manager.

Dr. Tom O'Dwyer, Mr. Brendan Smith, T.D., Minister for Agriculture, Fisheries and Food and Prof. Gerry Boyle, Director of Teagasc.



Prof. Gerry Boyle, Director of Teagasc; Dr. Gale Buchanan, Under Secretary for Research, Education and Economics, USDA; Dr. Tom O'Dwyer, then Teagasc Chairman and Mr. Brendan Smith, T.D., Minister for Agriculture, Fisheries and Food.



Dr. Gale Buchanan, Under Secretary for Research, Education and Economics, USDA.

Highlights 2008

GROWING KNOWLEDGE Fifty Years of Research and Development in Irish Farming and Food

The 1950s was a dismal period for the Irish economy. The population was at its lowest since the famine and agriculture, the dominant industry, was grossly under-developed. 1958 marked a new beginning. The First Programme for Economic Expansion encouraged foreign investment and promoted exports.

And a new agricultural research institute - An Foras Talúntais - was established.

This book charts the events, the politics and the personalities behind the formation of An Foras Talúntais and highlights the central part played by US funding under the Marshall Plan.



Prof. Gerry Boyle, Director of Teagasc; Dr. Tom O'Dwyer, then Teagasc Chairman; Mr. Brendan Smith, T.D., Minister for Agriculture, Fisheries and Food and Michael Miley, Editor, Growing Knowledge at the launch of the Teagasc 'Growing Knowledge' book which marked 50 years of research and development in Irish farming and food.

It portrays the vision of pioneers, notably Dr. Tom Walsh, in building an internationally-renowned research body and their role in transforming the Irish agriculture and food industry during the last half-century. The vibrancy of the early decades, the financial traumas and policy changes of the 1980s and 1990s to the exciting opportunities for farming and food in this century are all vividly captured.

Anyone with an interest in the dramatic changes in farming, food and rural Ireland and the people who helped to shape them, will find this book essential reading.



Far Left: Paddy O'Keeffe, Chairman, FBD Trust and Pat Markey, former Director of Administration in ACOT and former Head of Personnel in An Foras Talúntais.

Left: Dr. Tom O'Dwyer, then Teagasc Chairman;



Michael Diskin, Teagasc Athenry and Judy Chambers, Teagasc, Oak Park at the launch of the Teagasc 'Growing Knowledge' book



Tilly O'Donnell, Teagasc Kildalton and Eileen Lehane, Teagasc Moorepark pictured at the launch of the Teagasc 'Growing Knowledge' book



Mark Moore, Teagasc, Oak Park; James J. Brett, Teagasc Authority Member and Michael Miley, Editor, Growing Knowledge

FARMFEST 2008

Building sustainable farming and rural businesses was the main theme running through Farmfest '08, the major Teagasc outdoor event of the year.

Speaking at the official opening of Farmfest and Bioenergy '08 in Athenry, on Friday, 20 June, Professor Gerry Boyle said: "Teagasc is all about the long-term sustainable development of agriculture, the food industry and rural-based business. While other industries have gone through a recent boom, farming and rural business have been developing on a steady, even keel over the past ten years during the Celtic Tiger.

Now as some other sectors of the economy are slowing the sustainable development that has been taking place on farms and in innovative indigenous food and rural-based businesses is coming to the fore."

Professor Boyle said: "The fruits of all that hard work are everywhere to be seen here in Athenry today, in terms of sustainable businesses for the future. In the core farming enterprises, Teagasc research shows how dairy farming has a competitive advantage relative to other European and global milk producers on a cash cost basis and so will provide a viable future for many dairy farmers.



Despite the contraction in the sheep industry, some of the finest animals in the country are on show and competing for the coveted rosettes in their various championships.

"The hundreds of artisan food and speciality food producers displaying their unique range of products are a brilliant example of how innovative rural businesses can carve out niche markets, and develop in a sustainable way to survive and prosper in the years ahead.

The speciality food market is now one of the fastest growing, worth €500 million annually in Ireland with a large European market worth €33 billion on our doorsteps."

Professor Boyle continued: "The Bioenergy '08 event in Athenry is highlighting ways of finding sustainable solutions to meet the growing energy needs of the country. Teagasc is committed to finding land-based energy solutions especially for domestic and consumer heating. Forestry, with its stock of ready to thin forests, will provide the material to meet the first wave of demand for biomass, while alternative energy crops such as willow and miscanthus are becoming more established.

The big challenge for our researchers is to find sustainable plant-based alternatives, the so called second and third generation biofuels, which will provide long-term sustainable alternatives to petroleum based products," he said.

◀ Ruth Hamill and Mohammad Hossain, Teagasc, Ashtown.

Teagasc researcher Anne Bailey with Dimitra Khalil



Gerry Scully, Teagasc Athenry with Mr. Brendan Smith, T.D., Minister for Agriculture, Fisheries and Food at Farmfest 08 which was held in Athenry on 20 June 2008.

CHAIRMAN'S STATEMENT



Irish agriculture faces a period of change and challenge during the next five years. Adapting individually and collectively will determine the success of the sector during the period ahead. The agri-food processing industry must strive to maintain and improve its competitiveness, while at farm level producers face a challenge to protect their businesses from the impact of greater price volatility in the future. All available technologies should be tailored to suit the requirements of each individual set of circumstances. To support this, Teagasc has prioritised the transfer of technology and knowledge to farms and to small and medium sized food businesses.

A process to prioritise programme areas and activities across the business units in Teagasc was undertaken to ensure that scarcer financial resources are utilised most effectively to support the Irish agriculture and food industry. A comprehensive Change Programme for Teagasc was drafted in the year under review, agreed in early 2009 and is currently being implemented. The organisation will be positioned to support the sector in a more cost effective way, pursuing relevant research, finding new ways to transfer technologies to the farming and food industry and providing educational courses to meet the needs of the next generation.

The Teagasc budgeted grant-in-aid at the beginning of 2008 was €145.114 million. The outturn at the end of the calendar year was €139.964 million. At the time of writing, the budgeted grant-in-aid for 2009 is €131.927 million. These downward adjustments to the Teagasc budget made in 2008 and in 2009 reduced the funding available by €13 million.

Faced with this level of reduction in its state budget, the Authority was mindful of the need to ensure the maximum efficiency and effectiveness of all its operations. The Authority conducted a review of the effectiveness of the systems of internal financial control in 2008 and implemented appropriate actions. The Audit Committee of the Teagasc Authority requested the Internal Auditor to carry out a review of expenses incurred by staff. In the course of the audit it was noted that certain expenditure incurred by staff was not wholly business related. The gross outlay involved was of the order of €80,000. However, because of the mixed objectives of the spend, some of which related to staff development, it was not possible to precisely quantify the non-effective element.

Appropriate policies on entertainment and foreign travel have now been devised and communicated to staff, improved guidance on the application of budgets has been put in place and staff have been reminded of the acceptable use of public funds in relation to entertainment type expenditure.

The Minister for Agriculture, Fisheries and Food, Brendan Smith T.D., appointed three new members to the Teagasc Authority.

Four authority members completed their terms. Dr. Tom O'Dwyer retired on 14th September having completed two five-year terms as Chairman of the Authority. He made a lasting contribution to the organisation over that period. As Chair of the Authority he led the organisation in formulating and implementing the Teagasc Vision Programme, which identified areas of science in which Teagasc should excel, and the facilities needed to conduct the required research.

The late Michael O'Dwyer from Tipperary had just retired in September after 20 years on the Teagasc Authority, before his sad and untimely passing in December. His wise counsel, practical approach, and friendly, yet business-like manner, were greatly appreciated, while his commitment of over 20 years to the Teagasc Authority was a reflection of his support for the organisation's work on behalf of farmers.

Patrick Kelly from Killygordon, Co. Donegal, and Jerry Henchy, Kilmallock, Co Limerick stepped down on completing their five-year terms and the Authority and staff also acknowledges their contribution to the organisation. Padraig Gibbons from Bullaun, Co. Mayo, a dairy farmer, and Chairman of Connacht Gold co-op was appointed to represent ICOS on the Authority. Frank O'Mahony, a dairy farmer from Ballyorban, Monkstown, Co. Cork, was appointed having been nominated by Macra Na Feirme.

A strong working relationship exists between Teagasc, the Minister and his Department led by the Secretary General Tom Moran. On behalf of the Authority I thank the Director, Professor Gerry Boyle and staff for their professional and dedicated contribution to Teagasc and to the farming, and food sectors. It is a challenging time but one that Teagasc will face with vigour and enthusiasm.

A handwritten signature in dark ink, appearing to read 'Noel Cawley'.

Dr. Noel Cawley
Chairman of the Teagasc Authority

REPORT OF THE DIRECTOR



An extensive foresight exercise was concluded last year which identified some of the anticipated key drivers of change in the agriculture and food industry over the longer term. The Teagasc 2030 report was published and presented at a major international conference in Dublin Castle in May. The report provided a top-level strategic direction for both the industry and for Teagasc. It identified key technology platforms for the future. The report has fed into the Teagasc Statement of Strategy for 2008-2010, published last year. It has also informed decisions taken in forming the Teagasc Change Programme which was drafted in 2008 and finalised and agreed since the year end. It prioritises the programme areas which Teagasc will pursue and the necessary reorganisation of resources that will be required given the severely restricted public budget.

The environment continues to be important for the agricultural sector and Teagasc continues to commit resources to this sector though the environmental research centre in Johnstown Castle and by the environmental specialists working in the advisory service. An important conference took place in Wexford on climate change and the role of agriculture, with research work from New Zealand also featuring. In the autumn an international conference on water quality took place, with contributions from experts around the world. Both conferences highlighted the importance of harvesting knowledge from international sources to complement research work being undertaken in Ireland.

An 'agricultural catchments' programme, to provide intensive on-farm environmental advice to assist land owners maintain and improve water quality in a number of selected river catchments was set up and will run for five years. This research will provide science-based factual data on the influence of farming on water quality.

The Technology, Evaluation and Transfer farms (TETs) already set up for the sheep sector, have been rebranded as BETTER farms and the model extended to other enterprises. A Better Farm beef programme, involving fifteen commercial suckler beef farmers, has been established with support from the Irish Farmers Journal and industry.

To aid in the transfer of technology to small and medium sized food companies, a new service is being provided by Teagasc. SME's are key drivers of the Irish economy, providing sustainable employment for significant numbers of people, and this new service will assist them to identify research based technologies capable of enhancing the competitiveness of individual businesses.

Teagasc advisers assisted 6,400 farmers by preparing REPS plans for submission, while 14,400 applicants for the Farm Waste Management Scheme were assisted with the final paperwork necessary to secure grant aid. Three thousand nine hundred clients attended Teagasc organised 20-hour REPS courses. In the latter part of 2008 the advisory service provided training to large numbers of farmers who participated in the Suckler Cow Welfare Scheme.

A more targeted scientific approach to animal breeding is now possible having been developed by researchers at the Moorepark Dairy Production Research Centre in collaboration with industry and the ICBE and the potential benefits of genomic selection are estimated at €8 million to the Irish dairy sector. The potential for application across the livestock enterprises is exciting.

In 2008 Teagasc celebrated fifty years since the establishment of An Forus Talúntais or the Agricultural Institute as it was also known. A series of events were held during the year to acknowledge the scientific achievements and their contribution to the development of the agriculture industry over the fifty years. Some of these research highlights are captured in a book, *Growing Knowledge*, published last year.

Farmfest, the main Teagasc outdoor open day of the year took place in Athenry in June. It was a major success, showcasing the latest applied research, providing the best enterprise specific advice and outlining the educational options for young farmers and adult training courses. Bioenergy '08, the annual bioenergy event organised jointly by Teagasc, COFORD and SEI, took place as part of Farmfest and helped to attract an attendance of over 30,000 people.

An international biotechnology conference, organised jointly by Teagasc and University College Cork, brought together leading scientists working in the biosciences in different sectors, to Ireland last summer for a four day event.

Teagasc's research capacity was enhanced through the recruitment of leading senior scientific investigators to deliver the vision programme for the organisation. These included scientists for the animal bioscience centre, the crops bioscience centre, and for the food research programme.

Significant investment in capital projects included new research facilities at the Moorepark Food Research Centre; educational facilities at the Kildalton College; extension to head office in Oak Park, Carlow; new laboratories at the Ashtown Food Research centre; and renovations to existing offices at the Mellows Centre, Athenry.

A major re-organisation of directorates commenced in late 2008 that will see the establishment of a single directorate for research and a new directorate for knowledge transfer and education. Further changes in administration structures also were implemented, including a change, whereby the Internal Auditor now reports to the Director in order to improve the efficiency of the internal financial control process and to streamline reporting arrangements.

Professor Gerry Boyle
Director

THE AUTHORITY



DR. NOEL CAWLEY
Chairman
Appointed on the 17
September 2008 for a
term of five years.



MR. MARTIN HERAGHTY
Minister's Appointee



MR. JAMES J. BRETT
Minister's Appointee



MR. STEPHEN FLYNN
Staff Representative



MR. DEREK DEANE
IFA Nominee



MS. MARGARET SWEENEY
Minister's Appointee



MR. JOE FITZGERALD
ICMSA Nominee



PROF. PATRICK FOTTRELL
Minister's Appointee



MR. PADRAIG GIBBONS
ICOS
Appointed on the
15 September 2008
for a term of five years.



MR. FRANK O'MAHONY
Macra Na Feirme
Appointed on the
15 September 2008 for
a term of five years.



DR. TOM O'DWYER
Chairman
Term of office ended on
the 14 September 2008.



MR. MICHAEL O'DWYER
RIP
ICOS
Term of office ended
on the 14 September 2008.
Mr. O'Dwyer died on the
16 December 2008.



MR. PATRICK J. KELLY
Macra Na Feirme
Term of office ended on
the 14 September 2008.



MR. JERRY HENCHY
Minister's Appointee
Term of office ended on
the 11 November 2008.

TEAGASC AUTHORITY COMMITTEES

Remuneration Committee

Dr. Noel Cawley (Chairman)
Mr. Martin Heraghty
Mr. Padraig Gibbons
Ms. Margaret Sweeney

Advisory and Education Committee

Mr. Frank O'Mahony (Chairman)
Mr. Derek Deane
Mr. Stephen Flynn
Mr. Joe Fitzgerald
Mr. Padraig Gibbons

Research Committee

Prof. Patrick Fottrell (Chairman)
Mr. Derek Deane
Mr. Frank O'Mahony
Mr. Stephen Flynn

Audit Committee

Mr. James Brett (Chairman)
Ms. Margaret Sweeney
Dr. Noel Cawley
Mr. Martin Heraghty

Finance & HR Committee

Mr. Martin Heraghty (Chairman)
Dr. Noel Cawley
Mr. Stephen Flynn
Mr. James Brett
Mr. Joe Fitzgerald

TEAGASC SENIOR MANAGEMENT*



PROF. GERRY BOYLE
Director



MR. PAT BOYLE
Head of Advisory
Services Directorate



MR. DONAL CAREY
Head of Education and
Development Directorate



DR. SEAMUS CROSSE
Head of Agriculture
Research Directorate



PROF. LIAM DONNELLY
Head of Food Research
Directorate



MR. TOM KIRLEY
Head of Administration
Directorate



MR. TOM COLLINS
Head of Corporate and
Management Services
Directorate

TEAGASC OFFICES AND CENTRES

TEAGASC LOCATIONS



MAP CORRECT AS OF JANUARY 2009
AREA UNITS BASED ON COUNTY
BOUNDARIES EXCEPT WHERE INDICATED.

* STATUS JANUARY 2009

ORGANISATIONAL CHART

December 2008





COAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

RESEARCH

DAIRY

Design of a National Mating Programme
Software to screen the Irish population of milk recorded cows to identify genetically superior candidate bull dams was developed in close collaboration with the Irish Cattle Breeders Federation (ICBF) and the National Cattle Breeding Centre (NCBC). Criteria for selection of potential bull dams such as depth of pedigree, EBI and genetic merit for fertility were imposed. Bull dams no longer have to be pedigree registered.

Software was also developed to design a mating programme to mate the best bulls (primarily ranked on EBI) to the candidate dams to maximise the EBI of the progeny (i.e., young test sires) while minimising any long term repercussions from the accumulation of inbreeding.

This system was implemented by the NCBC in 2008. This is a vital step in ensuring the long term capacity of Ireland to continuously generate genetically superior young test sires most suited to Irish production systems.

Restricted Access Time to Pasture in Early Lactation
In wet weather conditions if cows remain in the paddock treading damage will result in reduced grass growth rates during subsequent grazing rotations. Allowing animals access to pasture for a few hours per day has previously been shown to increase milk production and milk protein concentration when compared to grass silage based diets and may be a strategy that can be implemented during periods of wet weather.

Following analysis of grazing behaviour during a study in spring 2008 it was clear that cows offered two three-hour periods of pasture access only were the most efficient grazers as they grazed for 98% (353 mins/day) of their time compared to cows out fulltime (487 mins/day; 37%).



GOAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

From this study Teagasc conclude that two three-hour periods of pasture access is sufficient for dairy cows in early lactation. Furthermore, animals should not be supplemented with grass silage while indoors as this reduces their motivation to graze and also results in lower milk protein concentration.

Herd Health

Infectious diseases can seriously impact production efficiency and sustainability on dairy farms. The European Union's (EU's) animal health strategy 2007 - 2013 aims to achieve consistency across EU countries in the area of animal health. Ireland is currently lagging behind its global trading partners in the implementation of best-practice disease control based on farm health planning including biosecurity. A total of 450 dairy farmers were surveyed in 20 counties to determine how aware they are of biosecurity and how prepared they are to meet the challenges of effective disease control.

Dr. Eddie O'Callaghan addressing a group on a tour of Teagasc Moorepark at the 50th anniversary celebrations of the founding of An Foras Talúntais.



The majority (72%) of farmers considered biosecurity important. However, 53% stated that a lack of information prevented them from implementing biosecurity practices. With 93% and 78% stating that they 'rarely' or 'never' requested biosecurity information from their Teagasc adviser or veterinary practitioner. The importance of a closed herd in the prevention of infectious disease introduction is under-promoted, with over half of dairy farmers operating open herds.

The survey also highlighted that 90% of dairy farmers do not test purchased animals for diseases other than tuberculosis and brucellosis. A lack of knowledge and advice was most commonly stated as the reason for the under-utilisation of diagnostic testing (65%). Only 20% of farmers stated that they always implemented proper quarantine procedures. The study highlighted the need to present biosecurity as an economically feasible package.

Increasing Dairy Farm Profitability in the North-East

In 2004, a new research initiative was set up in the North East based at Ballyhaise Agricultural College. The objective of the programme led by Moorepark is to increase the efficiency of milk production in the region. In the initial stages, a commodity group was established with representatives from the four dairy co-ops in the region (Lakeland Dairies, Town of Monaghan, Connacht Gold, Donegal Co-op) as well as representatives from Teagasc advisory and research to provide direction and evaluation of the programme. A similar collaborative programme is being carried out in Northern Ireland by the Agri-Food and Bioscience Institute.

The programme involves two approaches; firstly grazing system studies at Ballyhaise Agricultural College to develop high profit sustainable milk production systems and secondly on-farm studies to identify the various constraints and limitations to increased farm profitability in the region.



On-farm systems research carried out on 16 commercial dairy farms from 2005 to 2007 showed that large potential exists for substantial cost reduction on the dairy farms analysed. Highest profitability was achieved through higher EBI animals, higher milk protein percentage, a more fertile and compact breeding period, lower concentrate supplementation and higher stocking rates.

BEEF

Carcass Quality and Market

Beef carcass prices should reflect meat yield and market price. Late-maturing continental breeds and their crosses now account for over 70% of suckler cows, of which nearly 90% are bred to continental sire breeds. This has led to an increased proportion of animals suitable for the higher-priced continental EU market where prices are highest for lean animals of good conformation. As 85% of Irish carcass beef is exported, it is important that the animals meet the requirements of those markets.

Having a beef price structure, which reflects the value of the animal, is in the long term interest of the beef industry. Typical beef prices in France and Italy are only nine cents/kg greater than Ireland for conformation and fat score O3 carcasses but are over 60c/kg greater for U3 carcasses, showing the extent to which carcasses of

good conformation are under-priced in Ireland. The original EU beef carcass classification scheme involved a visual appraisal on a five-point scale for conformation (E, U, R, O, P with E best) and fatness (1 to 5 with 5 fattest).

A comprehensive study was undertaken by Teagasc Grange to determine the effect of carcass conformation and fat scores on meat yield and carcass value.

A total of 507 steers, representing the various sections of the carcass classification grid for conformation and fatness, were used. In addition, 115 young bulls and 40 heifers were dissected. Carcasses were mechanically graded according to the EU Beef Carcass Classification Scheme.

The results showed that: on a scale of 1 to 5, a one unit increase in carcass conformation score (e.g. O to R) at constant fat score increased meat yield by 3.5 percentage units and carcass value by 18c/kg (5.8%), which is double that paid by meat processors in Ireland in 2007. In the high-priced continental EU markets a one unit increase in carcass conformation score can increase value by up to 80c/kg.

A one unit increase in carcass fat score on a scale of 1 to 5 decreased meat yield by 2.9 percentage units and carcass value by 17c/kg (5.2%).

Better differentiation of carcasses is now required for Ireland as 87% of steers and 91% of heifers are confined to just two conformation classes - R and O. Likewise, 87% of steers and 85% of heifers are confined to fat classes 3 and 4. Therefore, a 15-point scale is deemed essential for payment to be based on conformation and fatness, which is readily achieved using mechanical classification.

Using a 15-point scale, a one unit increase in carcass conformation score should result in a price increase of at least six cents/kg (i.e. 18c/kg on the 5-point scale). This suggested difference in price is solely based on meat yield and distribution and does not take into account additional factors such as the higher processing costs associated with poorer meat yield or the increased value of better quality carcasses in certain continental EU markets. This would result in further price differentiation.

GOAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

Meat Authentication – What Did the Animal Eat?

It is well established that the pre-slaughter diet of animals can influence the nutritional and elemental composition of meat. It follows that analysis of meat can yield information about the pre-slaughter diet of animals. This is increasingly relevant as consumers become more concerned about the connection between animal diet and the nutritional quality and safety of the meat they consume.

Information on the dietary background of animals is also important in validating claims around the production of branded products such as “grass-fed” beef or “corn-fed” chicken. A group of scientists from Grange, UCD, France and the UK, have used light element stable isotope ratio analysis (SIRA) to obtain information about the dietary background of food animals.

Red Clover

Red clover (*Trifolium pratense*) is considered a short-lived perennial herbage legume that can be highly productive for two and sometimes three years, and whose upright growth habit makes it particularly suited for hay and silage making. In Ireland, where permanent grassland dominates farmland, it is important to define aspects of the management of red clover that will improve its persistence and its contribution to feed supply.

An experiment commenced in 2001 and concluded in 2008 to quantify the impacts of cultivar, companion grass, harvest schedule and nitrogen fertiliser on the yield and the estimated nutritive value and ensilability of swards based on red clover. In addition, a major aim was to assess the impacts of these treatments on persistence of red clover over several years. There were 16 treatments with red clover.

Two cultivars of red clover (Merviot and Ruttinova) were each sown in monoculture or with perennial ryegrass (cv. Greengold) in August, 2001. They received 0 or 50kg inorganic N fertiliser/ha in mid-March each year and had a first-cut harvest date in late-May or mid-June.

Within each of these harvest schedules there were three further harvests by mid-November. In addition to the red clover plots, there were a further eight treatments to provide a more conventional benchmark to which red clover could be compared.

Monoculture plots of perennial ryegrass (cv. Greengold) received 0, 50, 100 or 150kg inorganic N/ha in mid-March and immediately after the first three harvests, and had similar harvest dates to the red clover. Both red clover varieties were equally successful. All plots were similarly harvested and received adequate P and K inputs.

Treatments that resulted in high yields of good quality herbage and persistent swards involved sowing red clover in a binary mixture with perennial ryegrass, applying no inorganic nitrogen fertiliser in March, and taking the first harvest in late-May rather than mid-June. Under these conditions, perennial ryegrass receiving 0 or 200kg N/ha/year had an average annual yield of 9.5 and 14.8 tonnes dry matter/ha whereas the optimum red clover-based treatments had an average annual yield of 15.6 tonnes dry matter/ha.



Patrick Gowing (right) with
Sligo dairy farmer Joseph Dunphy.

PATRICK GOWING Dairy Adviser Teagasc, Sligo

Laois native Patrick Gowing joined Teagasc in late 2006 and has worked on the Business and Technology (B&T) service for Sligo/Leitrim since its launch in 2007. The key objective of the programme is to improve farm profits in the area. Since the launch, the number of farmers completing Profit Monitor analysis has been increased from 5 to 30 which has enabled benchmarking based on real data.

“As with any part of the country we focus on grassland management,” says Patrick. “The aims are the same but the research practices sometimes have to be tailored to suit the area as there is huge variance in soil type across the two counties. The main difference in the wetter parts of the area is the growth potential mid-season. This can be seen very clearly in Leitrim where there is a huge peak of grass production mid-season and comparatively little in late spring or autumn.”

Discussion groups are a huge focus of the dairy programme in Sligo/Leitrim. There are now five discussion groups running across the area. “The groups are managed to give all farmers a chance to participate and tailored to their needs,” says Patrick. “Most groups are made up of full-time commercial dairy farmers but we also have one discussion group which was set up in 2008 to accommodate small scale farmers and part-time dairy farmers. This group meets during the evening in summer months and allows farmers with similar issues, in particular labour, to discuss how best to implement new management techniques on smaller scale farms.”

The B&T programme in the area is still growing and adapting. But the focus remains to deliver increased farm profits to dairy farmers. The effect can be clearly seen across the region, Connacht Gold the local milk processor had the largest increase in milk protein percentage in 2008.



Dr. Alastair Black (right) explains grass plant structure at the Teagasc Grange open day.



SHEEP

Maize silage can be produced about 20% cheaper than grass silage potentially offering significant savings on ewe feeding costs during mid and late pregnancy. Studies at Teagasc Athenry show that the maturity of the maize crop has no effect on lamb birth weight or subsequent growth, although ewes offered maize silage from a mature crop were significantly heavier at lambing compared with these ewes on silage from maize harvested at a less advanced stage of maturity. Protein supplement studies showed that concentrate input in late pregnancy can be reduced when ewes are offered maize silage and it can replace good quality grass silage in the diet of pregnant ewes.

Fascioliasis Studies in Sheep

Liver fluke represent a major challenge for sheep production on farms with wet areas that provide a suitable habitat for the mud snail, which is the obligatory intermediate host in the life cycle of fluke. Control of the impact of fluke on animal performance has typically relied on appropriate anthelmintics. A study at Leenane hill sheep farm evaluated the efficacy of four classes of anthelmintic. Results showed that the fluke on this farm are resistant to triclabendazole as the egg reduction observed at 21 days post treatment was only 70% compared with 100% for the other anthelmintics tested. It is likely that this situation exists on many sheep farms and planned surveys are urgently needed to establish the extent of the resistance.

Enhancing Lamb Litter Size

Evidence for a third gene with profound effects on ovarian function has emerged from on-going studies on the genetic control of ovulation rate in sheep. Teagasc researchers have identified mutations in the genes of Cambridge sheep. If this effect is confirmed then this mutation could be exploited to significantly increase the incidence of twin births while keeping the incidence of triplet litters low. This would make increased prolificacy more acceptable at farm level and also reduce the costs associated with rearing and management of triplet litters.

Artificial Insemination (A.I.) for Sheep

Research to facilitate more widespread use of A.I. in sheep breeding programmes continues. These studies include the evaluation of new diluents for semen and the shelf life of fresh-diluted semen. Studies have shown that the reduction in pregnancy rate when semen is stored for 24 hours, compared with fresh semen, is only nine percentage points. This means that semen used up to 24 hours post collection under practical conditions yields an acceptable pregnancy rate. This finding represents a significant advance on the current practice and protocol which requires semen to be used on the day of collection.

Adviser John Cannon leads a sheep discussion.



GOAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

TILLAGE

Minimum Tillage ("MinTill")

Traditional crop establishment, where the soil is inverted during ploughing and cultivated intensively, is successful but high costs, slow work rates and concerns about sustainability, has led to interest in more energy efficient minimum tillage techniques.

A review of eight years' winter wheat trial results indicates that crop yields were not affected by adopting min-till. While min-till established winter barley and oilseed rape yields have also been competitive, results to date from spring barley are not conclusive. Grass weed control costs are generally increased where min-till is adopted, but machinery costs can be reduced by €66/ha. The machinery cost and reduced labour requirements make the system attractive to larger growers.

Grass Breeding

Oak Park continues to deliver exceptional output from the forage grass and clover breeding team. In 2008, seven new perennial ryegrasses were awarded National Listing and three varieties, Tyrconnel, Kintyre and January, were added to the Recommended List. Their yield, persistence and quality characteristics will contribute to lower cost grass-based production systems.

Evaluation of the Agronomic Potential of Oilseed Rape in Ireland

The search for an attractive break crop continues. Work on winter oilseed rape indicated that the optimum seed rate may be higher under Irish conditions than has been reported for other European countries. Hybrid cultivars have not shown any consistent benefit over conventional cultivars when sown at the optimum sowing time into good soil conditions.





Teagasc potato specialist, Matt Molloy (right) and host farmer Seamus Lynch examining potatoes at a potato farm walk in Donegal.

Potato Blight

The existence of A1 and A2 mating types of the potato blight fungus may pose significant new problems for blight control. Mixed populations of A1 and A2 can recombine sexually, producing oospores, which facilitate a whole new route of infection early in the season. An all-island study of the potato blight population was undertaken in 2008 in collaboration with the Agri-Food and Biosciences Institute (AFBI) in Northern Ireland. The survey revealed a dramatic increase in the number of A2 blight strains, with over 25% of isolates tested being A2. As part of the study further phenotypic and molecular characterisations are ongoing, and will determine if sexual reproduction occurs. This will aid the continuing development of integrated disease control strategies.

Plant Genomics

In the area of plant genomics Oak Park researchers made several valuable contributions to available public datasets which will increase the potential for bioscience-based approaches for the improvement of plant species important to Irish agriculture. Teagasc is currently involved in the international initiative to sequence the potato genome. In 2008 Oak Park released over five million nucleotides of potato genomic sequences into the public sequence database (Genbank), making it the fourth largest contributor of publicly available potato genome sequence in the world to date.

Results from the sequencing data are already impacting the potato breeding programme, where genetic markers for resistance to potato cyst nematode (PCN), developed using the genome sequencing data, are now actively being used by potato breeders for the selection of PCN resistant lines in the field. Oak Park is also leading the way in genomics of grass species and in 2008, sequenced and released the chloroplast genome of perennial ryegrass.

Risk Assessment of GM Crops

In the area of co-existence, and assessment of the impact of cultivating GM crops in Ireland, in 2008, the Oak Park programme continued to provide data relevant to both the farming community and those involved in the legislative decision-making process. Co-existence guidelines, and the cost/benefit of cultivating genetically modified, herbicide tolerant oilseed rape in Ireland was estimated. Field-based and computer-modelling studies on gene flow to wild relatives and conventional crops in oilseed rape and potato were continued. A list of GM traits relevant to the Irish tillage sector up to 2020 in light of predicted climate and legislative change was developed.

GOAL 1

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FOOD RESEARCH

Novel Biocontrol Agents for Food Pathogens:

Research conducted on novel biocontrol agents showed that a dairy extract could inhibit a range of bacterial pathogens on beef carcasses. It has potential to become a beef carcass and beef product decontamination/antimicrobial technology for application in assuring beef safety. The dairy extract is particularly attractive to the beef industry because it is a 'natural' product. The antimicrobial effect is instantaneous which means it does not require approval nor would its application necessitate a reduction in line speed.

Recommendation for Control Method for Clostridia Species Linked to Blown Pack Spoilage of Meat:

Vacuum packed meat primals are intermittently contaminated with gas producing spoilage *Clostridia* species, which results in 'blown' spoiled packs and major economic losses for the beef sector. A novel *Clostridia* species was identified from blown packs and work was completed on the development of a molecular assay for this spoilage organism.

The effect of spore inoculum, storage time and temperature on blown pack spoilage and the role of Vacuum Pack heat shrinkage in activating spores and reducing shelf-life was established.

A control strategy was developed based on removing the heat shrinkage stage in vacuum packing and this has been communicated to beef processors, many of whom have incorporated this change into their processes.

Patents and Technology Transfer of Novel Microbial Assays:

In 2008 research on novel molecular assays for food borne micro-organisms resulted in a European patent application for a novel gene which can be used in a molecular assay to determine the bacterial load (total viable count) of a food sample. A European patent application on a novel gene present in *Clostridia* species linked to Blown Pack Meat Spoilage was also filed. With the intellectual property now protected discussions are underway with commercial diagnostic companies and testing laboratories re licensing options for these assays.

A novel molecular assay for *Salmonella* was also developed and its application to meat samples validated. The assay has been successfully transferred to the Zoonoses Reference Laboratory at the Department of Agriculture, Fisheries and Food Laboratories in Backweston. Discussions are also ongoing with commercial testing laboratories re potential licensing options for the assay.

New Food Databases:

In 2008, the Food for Health database programme was launched. This ambitious programme co-ordinated by Ashtown Food Research Centre aims to develop three food databases on chemical residues, microbial pathogens and nutritional composition. These databases will give a highly transparent picture of the safety and healthiness of the Irish food supply and will facilitate the application of new risk based approaches for the control and management of contaminants in Irish food.



Paddy Ward Teagasc, Ashtown, Food Research Centre.

GOAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

Food Based Bio-Delivery Systems/Healthier Meats:

The know-how to produce meat products containing a range of functional ingredients such as plant extracts or beneficial fats has been developed. The safety and efficacy of a range of nutraceuticals was tested and their effect on meat-product quality and their efficacy in the final product was examined. The safety of using plant extracts from Rosemary, Oregano, Sage and Echinacea in meat products has been established. IC50 values have been determined for lutein, sesamol and elagic acid. Positive effects such as reduced oxidation have been identified with few or no negative effects on sensory properties, colour and texture.

Some nutraceuticals reduced lipid oxidation in raw pork sausages stored aerobically and in modified atmosphere for up to 35 days, without adverse effects on colour. Similar results were found for cooked pork sausages indicating the thermal stability of the added nutraceuticals. All meat products had similar or enhanced microbial stability at the end of the 35 day storage period. The nutraceuticals had no effect on tenderness, juiciness, texture or flavour suggesting that they have considerable potential for incorporation into pork products. These results can help the Irish industry to develop meat products as a functional food delivery system.

Fingerprint Spectroscopic Models for Food Authenticity

Screening of food samples for food authenticity is a requirement for the food processing and retailing industries. A variety of rapid, non-destructive spectroscopic methods for meeting this need have been completed. A significant, international competence in the deployment of these methods to food classification issues has been demonstrated and disseminated internationally.

Commercialisation of New Gluten-Free Bread Formulations:

Gluten-free bread formulations developed at Ashtown are being commercialised in an Irish gluten-free bakery. The formulations for healthy gluten-free breads were developed during a three year project under Enterprise Ireland's Commercialisation Fund. They contain healthy gluten-free alternatives to wheat flour.

Such flours include the pseudocereals amaranth, buckwheat and quinoa, which have been shown to have significantly higher protein, Vitamin E, antioxidant and polyphenol contents compared to wheat flour, while at the same time functioning as viable ingredients for gluten-free breads. Optimal levels of these flours have now been established, and the follow-up commercialisation activity is being undertaken by the private company with aid from Enterprise Ireland.

Pilot Scale Extraction of Antioxidants from Apple Pomace:

A pilot scale method for the extraction of antioxidants using food grade solvents was developed in 2008. Several technologies were compared to identify which combination of temperatures and extracts yielded the optimum amount of the potentially health-enhancing molecules.



Food for Health

Highly significant five-year collaborative research projects were awarded to Moorepark Food Research Centre (MFRC) during 2008: funding was renewed for the Alimentary Pharmabiotic Centre for a second five-year period and the Industry-led, Enterprise Ireland Food for Health Ireland (FHI) and the ELDERMET projects were launched.

A research programme aimed at identification and extraction of biologically active components from marine sources - Marine Functional Foods, NUTRAMARA, also got underway in conjunction with colleagues at Teagasc Ashtown.

Collectively, these projects form part of a major initiative by Teagasc on Foods for Health through its VISION programme which aims to improve understanding of human metabolic processes that are influenced by lifestyle and dietary behaviour while at the same time providing opportunities for the development of functional foods and ingredients with the necessary scientific evidence to support health claims based on improved physiological performance.

A particular feature of this programme is that the performance of gut health in age groups spanning the young born (early infant nutrition) to the elderly (ELDERMET) is being researched in conjunction with UCC collaborators. Furthermore, the programme's focus on the role of early infant nutrition fits well with the Centre's increasing underpinning research and R&D involvement with multinational infant milk formula manufacturers - many of whom have substantial manufacturing operations in Ireland.



Mary Rea demonstrates intestinal bacteria growing on agar plates to dairy farmers Andrew and Hannah O'Shaughnessy.

Food structure studies during the year were augmented when the facilities of Moorepark's recently established National Food Imaging Centre (NFIC) were commissioned. Increasingly, food structure research is linking into the Foods for Health programme where current studies relating a sensory attribute such as creaminess of low fat foods to structure impacts on both the consumer's enjoyment of that product and the satiation that is experienced following ingestion.

Lactic Acid Bacteria

Lactic acid bacteria (LAB) are key to the successful manufacture of cheese and fermented milk products, and offer researchers a lot more potential now that the genome of one particular strain, *Lactobacillus helveticus*, has been sequenced and published by researchers in the Food Cultures & Safety Dept. This strain is noted for improvement of cheese flavour. During 2008 two novel beta-glucan (an exopolysaccharide) producing lactic acid bacteria (one from kefir grain i.e. *Lactobacillus kefir* and one from human intestine i.e. *Bifidobacterium longum*) were identified and characterised. These strains have potential to be exploited for the production of functional food ingredients.

Food and Health

The role of composition of gut flora to overall intestinal health is being studied in conjunction with UCC collaborators especially at an early stage in life e.g. 4-day-old babies fed a *Lactobacillus* probiotic strain excreted very high levels of the probiotic in their faeces for over two weeks. These babies are currently being followed up in the study one year later.

Genetics and Genomics

Genomics is transforming our ability to understand how bacteria function and how best to exploit them. In 2008, the sequence of *Lactobacillus helveticus*, a strain which is used for improvement of cheese flavour, was published by the Moorepark group.

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Antimicrobials – Biopreservation to Anti-infectives

This research programme theme aims to improve food safety and human health using novel antimicrobials. The project represents a close collaboration with Professor Colin Hill and concerns the discovery and exploitation of novel peptides (bacteriocins) which kill undesirable bacteria.

A novel bacteriocin thuricin which has a very narrow spectrum of inhibition against *Clostridium difficile* was discovered. Molecular and genetic analyses of the antimicrobial demonstrate that it defines a whole new class of antimicrobials. These findings have been patented and licensed to an Irish company.

The antimicrobial Salivaricin has been identified as a probiotic trait which probably contributes to the ability of a probiotic mix to reduce *Salmonella* carriage in pigs. In 2008 the Dutch starter culture company CSK renewed a further two year client contract with the Department. To date this project has delivered improved starter cultures to the company. In 2008, this project discovered a *Lactobacillus* strain that was associated with strong anti-mould and anti-*Listeria* properties. This strain looks likely to having major applications for cheese manufacture.

Cell Biology

The Biotechnology Department also conducts research on how eukaryotic genes respond to bioactives in vitro and in vivo. The programme spans a wide range of research topics including, for example, immune gene response to probiotics for the treatment of mastitis.

Mastitis trials were performed in order to understand the udder response to a *Streptococcus dysgalactiae* challenge. Such work has demonstrated the ability of the pathogen to evade the immune system and work is on-going to design novel therapeutics to evict internalised pathogens.

Food Structure

Advanced microscopy techniques provided by the FIRM 2006 Special Equipment fund enabled the NFIC at Moorepark to undertake research and provide analytical services to industry and academia. This capability is assisting food researchers to generate protein microparticles as fat mimetics – the performance of which are being studied in terms of the relationship between creaminess and texture of low- and zero-fat yoghurt systems.

Bio-Functional Ingredients

Buttermilk, a by-product of buttermaking, was studied as an important source of milk's naturally occurring emulsifying layer known as milk fat globule membrane (MFGM). MFGM consists of many protein and phospholipid components which are also known to perform important physiological functions but have not been explored in terms of their potential as functional ingredients.

During 2008, buttermilk fractions produced using various processing treatments were demonstrated to have anti-microbial and anti-cancer activity. Anti-cancer properties are also of significance in the case of -lactalbumin, a major whey protein fraction that is a key ingredient when aiming to further 'humanise' infant milk formula. However, this particular bioactivity occurs following complex formation between -lactalbumin and oleic acid, and the Moorepark research team succeeded in simplifying the chemical steps involved in such complex formation.

Artisan Food Technology Support Program

A two-year programme, funded jointly by the Department of Agriculture, Fisheries and Food and the Department of Community, Gaeltacht & Rural Affairs, commenced at the beginning of 2008. The objective was to provide advice and technical support to the growing number of rural food producers in order to help them comply with the extensive range of legislation governing the production and retailing of foods.

This program was directed by the Food Processing & Functionality Dept and involved placement of two specialist food technologists – one each at Ashtown and Moorepark Food Research Centres. Extensive consultation and reporting on the operation of this program took place with the sponsoring government departments during 2008, including an interface with the Teagasc Rural Development Advisory Service dealing with food producers and tourism activities. Liaison by the Moorepark-based Artisan Food Technologist and the dairy inspectorate of the Department of Agriculture, Fisheries & Food ensured continuity between the advice given to clients and requirements of the regulatory agency.



ROSEMARY GAFFNEY Equine Course Director Kildalton College, Piltown, Co Kilkenny

Rosemary joined Teagasc in 1997 from the University of Limerick where she lectured on their Equine Science Degree Programme.

Rosemary competes in Dressage and in 2008 won two National Championships. In the horse world you need to be able to 'walk the walk' to gain credibility. She is an examiner for the Pony Club and the British Horse Society and is involved in the Horse Sport Ireland and Teagasc' Young Breeders Training. This has been set up to encourage young people to become actively involved in breeding, showing and judging mares and young horses.

In Kildalton Rosemary established a course to deliver knowledge and skills training to students and to maximise their potential and abilities. In 1998 a one year course in horse breeding and training was started with 13 students. This has expanded to a two year course with four programmes and has 50 students.

In 2006 the interest in stud management had grown and Kildalton began a two year stud course, students spend time training in some of the best studs in Ireland – Kildangan, Coolmore and Ballylynch to name but a few and a high percentage are offered full time jobs on graduation.

"We have incorporated the British Horse Society exam system to allow students to qualify as Instructors/Teachers as part of their education allowing them dual certification," says Rosemary.



"We made history by holding the first British Horse Society Instructor exam outside the UK and we are a British Horse Society Instructor training centre, the only one in Ireland qualified to teach to this level."

All courses throw up stars and ours is no different, whilst we have produced students who have gone on to do Farriery, Equine Dentistry, Teaching, Grooms, Stud Managers, Vet Nursing and Special Needs Trainers – two Kildalton alumni that come to mind are Captain Geoffery Curran who competed at the Olympics and won the World Cup and Ciara Hurley who is Assistant Stud Manager for the trainer Aidan O'Brien.



Farmers attending training session for the Animal Welfare, Recording and Breeding Scheme

Adult education courses continued apace during 2008 with REPS, Internet training, Financial and Technical training and Rural Development courses conducted around the country. 140 REPS Courses were held during the year attended by 3,900 farmers.

The BETTER (Business Environment and Technology through Training Extension and Research) farm programme for cattle and sheep was established in 2008 in conjunction with the Farmers Journal. These BETTER farms will form a major part of the Advisory /Research extension programme for drystock farmers in the years ahead.

Over 41,000 farmers availed of intensive Environmental Services from Teagasc Advisory during 2008. There was an 8% increase in REPS participants by the end of the year. Teagasc facilitation of REPS accounted for the transfer of €170m to farmers. Teagasc organised 100 farm safety short courses which included training on Farm Safety Statements.



Teagasc Training for the Animal Welfare, Recording and Breeding Scheme

Over 32,000 beef farmers participated in Teagasc training sessions required for the Animal Welfare, Recording and Breeding Scheme. Teagasc provided over 200 training sessions for producers who applied for the €80 per head payment under this scheme administered by the Department of Agriculture, Fisheries and Food.

These training sessions, (pictured above) which were compulsory for producers participating in the scheme, were provided countrywide by the Teagasc advisory service at marts and other centres.

ADVISORY

A section of the attendance at a Teagasc farm walk in Waterford.

2008 was another very busy year for the Advisory Service with client numbers exceeding 43,000. It was also the first full year of implementation of the new Advisory Programmes – Business and Technology; Environment and Good Farm Practice; Rural Development and Adult Education.

Advisers supported over 39,500 clients with the Single Payment Scheme. There was a significant increase in online applications - up by 20 per cent on 2007.

By year end over 14,400 farmers had been assisted with Farm Waste Management applications. 41,000 farmers were planned and supported in REPS by Teagasc advisers. More than 5,000 farmers attended 45 Public Good Environmental Awareness Events on bio-diversity, cross compliance, and nutrient use efficiency.

A key feature in 2008 was the level of activity among advisers with farmer discussion groups. In all, over 300 discussion groups in dairying ,cattle ,sheep and tillage were facilitated by advisers with more than 3,000 meetings on farms.

Advisers conducted over 105,000 farm visits/planning consultations with farmers during 2008. A total of 1,597 eProfit Monitor plans were completed by advisers with their clients.

A redesigned series of client newsletters were introduced in July 2008 and were centrally distributed to all 43,000 clients monthly.

The Today's farm magazine was sent to all clients bimonthly during the year. On line distribution of soil analysis results was introduced nationwide and was accompanied by a 30 percent increase in soil sampling during the crucial months of September and October.



Pat Moylan, Teagasc, Kilkenny pictured addressing farmers at the Teagasc/Glanbia Dairy Monitor Farm Walk which was held on Michael Power's farm, Graine, Urlingford, Co. Kilkenny.

Edmund and Padraig McCarthy, Lixnaw, members of the joint Kerry Agribusiness/Teagasc programme 'Focus on Profit' with Teagasc Adviser Ger Courtney

Dairying

The year 2008 was difficult for most dairy farmers due to significant increases in meal, fertiliser and fuel related costs, plus a most disagreeable grazing season. This led to lower milk production in some regions and the country as a whole ended up 3% under quota.

Based on Dairy Profit Monitor data, total farm profit fell by 5%, but in some regions it decreased by over 20%. This was due to variable costs increasing by 19% and fixed costs by 8%. Milk price at 35c/litre was more or less the same as 2007 – in part due to a 1.0 and 2.0% increase in protein and fat respectively. However, milk solids per cow decreased by 2% to 397kgs. Net margin per litre was down by 9%.



In the delivery of the Teagasc Dairy Advisory Programme, Dairy advisers held over 200 farm walks throughout the year which attracted a total attendance of over 16,000. National Dairy Conferences which were held in Cork and Athlone had a combined attendance of over 1,100 farmers and Industry personnel.

Discussion group activity formed a major element of our Dairy Advisory Programme with 229 groups facilitated by dairy advisers in all 18 Area Units. Over 2,200 discussion group meetings took place in 2008. Dairy advisers conducted more than 15,000 farm visits and met in excess of 15,000 clients on a consultancy basis in their offices in 2008.

EBI increased by €13 to bring the EBI per herd to €60. The mean calving date of March 17 was maintained in 2008 while A.I. usage increased by 25% to 130,000 inseminations. Milk recorded cow numbers increased by 14% to 498,321 cows which represents nearly half the national herd.

Grass utilised per hectare was a major focus and was maintained even with reduced fertiliser inputs (193kgsN/ha for a stocking rate of 2.31 cows/ha) in very difficult grass growing year. Over 1,000 dairy farmers participated in Teagasc's grass budgeting programme.

Teagasc was involved in joint dairy programmes with Glanbia, Dairygold, Connacht Gold, Tipperary, Kerry, West Cork Co-ops, Wexford and Centenary. A joint venture with Germinal Seeds to promote better grassland management was very successful in its first year. Our joint programme with ICBF to promote better genetics, fertility management, more A.I. use and milk recording continues to be successful culminating in over 900 farmers participating in the EBI discussion Group Competition.

BEEF

Teagasc cattle clients who have completed profit monitors have increased profit by 8% per annum since 2003, with much of this improvement coming from improved technical efficiency and better marketing as premia receipts per hectare actually declined during the period. 26% of suckler farmers and 43% of non-breeding farms, with profit monitors, achieved a gross margin exceeding €500 per hectare.

Beef output per hectare is an important physical measure that influences cattle profitability and is determined by the interaction of stocking rate and individual animal performance. An excellent standard is to achieve or exceed 750kg beef liveweight per hectare – 14% of suckler farms and non-breeding farms exceeded 750kg beef liveweight per hectare while 38% exceeded 600kg beef liveweight produced per hectare.

The top third of suckling farms achieved an extra gross margin per cow of €413 compared with the bottom third. This amounts to over €16,500 for a 40 hectare suckling farm and represents the achievable reward for operating an efficient suckling system.

Two rounds of cattle farm walks took place in each Area Unit - in February/March and July, concentrating on early grazing, grassland management, maximising performance from grass and improved breeding in the suckler herd. 78 farm walks were held with a combined attendance of almost 4,500. Cattle discussion groups were also a key method used in technology transfer in 2008 with 61 active cattle discussion groups holding 244 meetings with a combined attendance of 4,100.

Over 230 clinics on the new Animal Welfare, Recording and Breeding Scheme for Suckler herds were held in spring with an attendance in excess of 8,500. The main training programme commenced in September 2008 with over 200 training sessions held at livestock marts between September and December attracting an attendance of approximately 34,000.

A series of 25 cattle seminars were held in November concentrating on winter nutrition and identifying the key variables within farmers control that influence profitability at farm level.

The BETTER Farm Beef Programme commenced in September and is aimed at improving profitability on beef farms across the country. This is a joint programme with the Irish Farmers Journal over a three-year period and is aimed initially at suckler farms.



Sixteen are already selected and they will be used to set benchmarks for efficient production, to encourage technology transfer, to measure the impact of adoption of new technologies and to identify areas for further research. The information generated will be disseminated through the Irish Farmers Journal and through the Teagasc discussion group network and other Teagasc public events.



Walsh Fellow, Emma McGeough with beef specialist Bernard Smyth at the Teagasc Grange open day.

GOAL 1

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SHEEP

Output per hectare on sheep farms with Profit Monitors increased by 17% on the previous year due mainly to a 22% increase in lambs sold per hectare on foot of improved weaning percentage and stocking rate. The top third of sheep farms with Profit Monitor achieved an advantage of €25 per lamb over the bottom third due to better selling price (€8), lower production costs (€13) and lower replacement costs (€4). This amounts to over €15,000 for a 40 hectare sheep farm showing the huge scope that exists for income improvement on the majority of sheep farms through improved technical performance.

Lamb output per hectare has a huge influence on sheep profitability and Teagasc set a target of 12.5 lambs or higher for commercial producers. 45% of sheep farmers with Profit Monitors exceeded sales of 12.5 lambs per hectare and 26% exceeded sales of 15 lambs per hectare.

Over 550 farmers attended the two Teagasc National Sheep Conferences held in February 2008. Professor Jon Hickford, Lincoln University, New Zealand, world expert in animal breeding and genetics addressed both conferences. Presentations were also made by Bord Bia and leading Teagasc sheep research and advisory specialists.

Two rounds of sheep farm walks took place in sheep producing areas in April and July/August concentrating on maximising production from grass and improved breeding. A total of 46 sheep farm walks were held with an

attendance of almost 1,500. Sheep discussion groups operated in the main sheep areas with 29 groups holding almost 100 meetings with total attendance of over 1,400. Sheep seminars at 19 locations attracted over 1,000 sheep farmers.

The BETTER (Business, Environment and Technology through Training, Extension and Research) Farm Sheep programme also commenced with the selection of three hill and three lowland farms on which recording and base line information is completed. The selection of additional lowland farms is underway. The aim is to have a BETTER sheep farm in all the main sheep areas. In addition to the objectives for the BETTER Beef farms, the BETTER Sheep farms will be key focal points in the development of the new ICBF sheep breed improvement programme (Sheep Ireland).



TILLAGE AND ENERGY CROPS

In 2008 tillage farmers felt the pain of a “price squeeze” resulting from extremely volatile grain and input prices. Grain prices peaked at historically high levels in the spring and dropped to rock bottom at harvest. Similarly, input prices peaked in the spring particularly fertilisers, energy and rented land. Overall cereal production for 2008 is estimated at 2.4 million tonnes, up 21% on 2007, despite the difficult harvest – the wettest August on record.

The soil analysis service has been transformed from a cumbersome paper entry system to a sleek online service where results can be accessed by advisers and farmers online with major efficiency in staff and turnaround time for results. Two hundred and thirty one Teagasc staff were trained on the use of SAOL (Soil Analysis Online). The soil sample numbers for September/October 2008 are up 30% as a result of a focused campaign despite the bad weather.

The National Tillage Crops Conference, National Bio-energy Conference and National Potato Conference attracted over 1,000 growers in the spring. In addition, almost 2,000 growers attended spring seminars around the country. The Tillage Crops Roadshow “Focus on fertilisers” helped farmers to address the massive increase in fertiliser costs.

The National Year of the Potato attracted much attention from Teagasc advisory and research directorates. The “Meet the Spuds” challenge attracted over 1,700 National schools to participate in a growing and knowledge competition. Teagasc Advisory also played a key role in the Potato Conference and the highly successful field event Potato ‘08 “The Quest for Quality”.

The new National Tillage Crops Forum in September secured the involvement of stakeholders, from growers to end users, in dealing with a difficult harvest and formulating plans for 2009.



Pictured at the Potatoes '08 'The quest for quality' event in Teagasc, Oak Park were Prof. Jimmy Burke, Head of Centre; Dr. Trevor Storey, UCD, Joe Dennigan and Trevor Sargent, T.D. and Minister of State at the Department of Agriculture, Fisheries and Food.

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EDUCATION AND DEVELOPMENT

Young Entrant Training

Following the 25% increase in enrolments in 2007 there was a further 36% increase in 2008 bringing the overall increase over two years to 70%. Further education programmes were delivered at eight colleges and at a number of local centres in agriculture, horticulture, horse breeding and training and forestry. Specialised Advanced Courses were also provided in Dairy Herd Management, Machinery and Crop Management, Drystock Management and Agricultural Mechanisation. A total of 755 students enrolled in further training programmes in colleges while the total overall number participating in these programmes was 3,545.

Teagasc deliver eleven higher level education programmes in conjunction with Institutes of Technology. These programmes include Agriculture, Horticulture, Agricultural Science, Agribusiness, Equine Students and Agricultural Mechanisation. A total of 294 students enrolled in higher level training programmes while the total overall number participating in these programmes was 693.

Participants in further education programmes can transfer into higher level courses if they achieve a merit or distinction and all higher level students can progress to level 8 (honours degree level) on the National Qualifications Framework, and beyond.



Professor Gerry Boyle presented certificates to students on the successful completion of a programme which recognises students with special needs. The ceremony was attended by the students, their parents, members of the Teagasc Education & Training Directorate and also by Bernard O'Farrell, Teagasc Special Needs Co-Ordinator and facilitator of the programme.

Adult Farmer Education

The Education and Development Directorate, in conjunction with the Advisory Directorate were also involved in the delivery of a comprehensive Adult Farmer Education programme during 2008. In total, ca. 11,000 adult farmers completed education and training programmes. The biggest category was the REPs training courses with a total of ca. 3,900 participants. In addition to the above adult modules were also delivered in: Technology and Business, Rural Viability, Health and Safety, Forestry, Alternative Enterprises, Hedgecutting, Livestock Haulage, Information Technology and Pesticides.

During 2008 a total of 387 students participated in the new advanced Certificate in Agriculture (180 hr replacement) course. 150 participants are completing programmes at local level, 137 are completing on-line courses in conjunction with the six agricultural colleges and a further 100 commenced a new course in September with the eCollege.

In addition there is a comprehensive programme of Advanced Certificate in Agriculture

courses for part-time farmers throughout the country. These courses are held largely at night and weekends to facilitate part-time farmers. There are a total of 16 courses now running with a total of 503 participants. Of these, nine courses commenced in 2008 with a total of 306 participants. In addition to the courses above, an online course for poultry producers was developed and delivered in 2008.



Farmer David Fennin from Castledermot participated in a computer training course.

EDUCATION

- Following the decision of the Salesians to close Warrenstown Horticultural College the process of amalgamating the programmes, staff and students at Warrenstown with those at the National Botanic Gardens is now underway.
- The programme replacing 180 courses is fully developed and underway at six agricultural colleges (via e-learning) and at four local centres.
- Level 6 ACA discussion groups, in conjunction with benchmarking farmers were fully operational in 2008 with 24 discussion group meeting on 21 benchmarking farms.
- A new Dairy degree programme was developed jointly by Teagasc and UCD and will be available from September 2009.
- The process of migrating all Teagasc awards to the FETAC Common Awards System was initiated in 2008.
- Eight special needs students satisfactorily completed three weeks work placement in Denmark as part of a Leonardo Da Vinci Mobility Project.
- Due to increased number of agricultural students an additional 200 master farmers were recruited.

Teagasc eCollege

In 2008, 250 students registered with the Teagasc eCollege for the online delivery of the FETAC Level 6 Advanced Certificate in Agriculture (ACA). The FETAC Level 6 ACA course is the new replacement course for the 180 hours. Two ACA online courses were developed and initiated by the Teagasc eCollege – one beginning in March 2008 and another in September 2008. The ACA course duration is 18 months and students require 115 credits to pass the course.

Two models were employed for the delivery of the ACA online courses - the Colleges model which is implemented by agricultural college staff only and the online Group Co-Ordinators model which is implemented by Teagasc education officers, AMU staff and agricultural college staff.

There are now 95 eTutors trained to deliver the online programmes. The Teagasc eCollege will continue to provide administration support for the delivery of the online poultry course LL47. Introduction to Free Range Egg Production.

GOAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

Horticultural Development Unit

The Horticultural Development Unit is an integrated Research and Advisory Unit. It has a staff complement of 29 people and a budget allocation of €2.2m. The staff are grouped in four enterprise teams with additional support from colleagues in the Teagasc and private Horticultural Colleges.

- Fruit Development Team
- Nursery Stock Development Team
- Mushroom Development Team
- Vegetable Development Team

The total number of growers is 930 with a farm gate output of €297m. Teagasc has advisory contact with 80% of the growers.

FRUIT

The soft fruit sector is expanding rapidly and is currently valued at approximately €30m. There is potential to double the value by 2018. Soft fruit is a highly viable sector of Irish commercial horticulture, leading to employment and investment in both urban and rural areas. Growers who are now involved in the sector are large scale commercial producers who are investing heavily in their enterprises.

Strawberry module plants are fast replacing traditional bare-root transplants in Ireland as a source of plant material for fruit production. This is particularly the case in protected crop production. The commercial production of module plants is expected to increase significantly over the next few years replacing mainly imported material.

Researchers investigated the factors that influence the production, fruit yield and quality of tray plants. Further factors to be investigated include the timing of taking tip cuttings, and the effect of different nutrient and substrate treatments on flower initiation and subsequent fruit yield.

Other areas of the fruit sector are also expanding, most notably the production of raspberries and a range of other fruits produced under protection for the fresh market.

NURSERY STOCK

Sterile shoot cultures of five commercial varieties of Hebe have been successfully initiated and a micropropagation regime of growth regulators has been developed for one variety. Stock plants of Hebe may carry latent bacterial and fungal infections of pseudomonads, downy mildew and verticillium which result in poor quality plants with low vigour. We aim to produce clean stock plants which will be supplied to the nursery producers from the micropropagation work.

The successful micropropagation of Hebe varieties opens the possibility to develop methods which will induce mutations and the production of new varieties with larger flowers and variegated foliage. First experiments to induce mutations have been completed for one variety. They indicate that mutation induction in Hebe is feasible but the system requires further development.

Teagasc fruit specialist Harry O'Brien (second from right) on an advisory visit.



Technician Fiona Hutton conducting a disease assessment on potatoes at Teagasc Oak Park.

MUSHROOMS

Disease Control

Three mushroom disease research projects are in progress. Two are concerned with understanding and controlling brown mushroom symptoms that are correlated to the presence of dsRNA viruses. The first project is Teagasc funded and is looking at the genetic basis of the symptom expression. This work is being done in collaboration with the University of Warwick, UK.

The second project is Stimulus funded and seeks to identify the cultural factors that cause the brown mushroom symptoms to be expressed, as they are not always present in infected crops. The time of infection and the number and type of dsRNAs present in infected material appear to influence the severity of symptom expression. A new technique has been developed to conduct diagnostic tests on compost samples, traditionally a difficult substrate for sensitive PCR techniques.

A third research project is looking at the epidemiology and control of dry bubble disease, a major pathogen of mushroom cultivation. Molecular diagnostic techniques based on quantitative

real time PCR techniques have been developed and applied to industry samples, in which *Verticillium* has been successfully detected. Aspects of the project are being done in collaboration with the University of Wageningen, Netherlands.

VEGETABLE CROPS

Three new outstanding green broccoli hybrids were identified for summer and autumn production at Kinsealy. The three: Iron (Ironman), Steel and Naxos scored significantly better than the standard Marathon for wet rot, hollow stem, bracting and overall yield and quality.

An added advantage was their different maturities which allowed a continuity of harvest over three weeks at planting dates from July through September. In extension trials in Birr, Steel proved robust enough for production in November suffering least from frost damage.

Two new projects were started on examining phytochemicals in vegetable crops. The first of these in collaboration with Ashtown is FIRM funded and will examine a range of vegetable crops produced

under differing growing regimes for phytochemical content. The second project entails manipulating brassica crops to enhance levels of phytochemicals.

A grower tour to a large scale swede grower in eastern Scotland was held in December to examine the feasibility of crop covering for pest control.

OTHER RESEARCH PROJECTS

A major project is underway, funded by the EPA, to explore the classification, horticultural utilisation and crop disease suppressive properties of green waste composts.

Research has started on a project to manipulate the production and storage conditions of nematodes to enhance biocontrol of horticultural pests. Teagasc is participating in an INRA project to identify turfgrass cultivars most suitable for winter sports use.





Mr. Tony Killeen, T.D. and Minister of State at the Department of Agriculture, Fisheries and Food, with special responsibility for Forestry, Fisheries and the Marine with Dr. Nuala Ní Fhlaitbherrataigh, head of the forestry development unit, at the 2008 Ploughing Championships.

Forestry Development Unit

The Teagasc Forestry Development Unit conducts an integrated forestry advisory, research and training programme. The unit had a staff complement of 22 and a budget of €2.03 in 2008.

The Forestry Advisory and Training Programme is carried out in collaboration with the Forest Service. The objectives of this advisory, training and developmental programme are to improve the awareness and the knowledge among landowners of forestry and all aspects of forest management. The programme also aims to initiate and support forestry development projects.

The broadleaf research programme aims to improve the quality of broadleaves through the development of improved planting material and improved management and silvicultural practices. The soils and thinning and harvesting programmes develop methodologies to improve management practices thereby enhancing the value of forests and creating scale efficiencies and providing access to markets, including timber and wood energy.

The forestry economics project analyzes the impact on afforestation of changes in other sectors, including agriculture. The main research projects undertaken in 2008 were:

Broadleaf Tree Improvement

Research on two of our main broadleaf species, ash and sycamore, was carried out in collaboration with colleagues in the UK. Providing genetically improved seeds of ash and sycamore is a major objective. Selected superior trees from Ireland and the UK were propagated by grafting; they will be the parental trees which will produce genetically improved seeds when they are planted into dedicated seed orchards. In addition, research on vegetative propagation of selected ash trees has demonstrated that selected trees can be rejuvenated and propagated by cuttings on a large scale.

Teagasc is a partner in the Treebreedex project which aims to consolidate all of the know-how and materials in existing forestry trials in Europe so that programmes in member states can be progressively integrated. The work in 2008 consisted of several workshops concerned with breeding zone delineation, adaptation, seed transfer rules, plant variety rights and the production of species monographs.

Progress in 2008 included the identification of 60 new alder-plus-trees for inclusion in an alder tree-breeding programme and the establishment of two progeny trials of alder. In addition 20 new birch trees have been identified. A polytunnel has been prepared for an indoor seed orchard which will be in place by spring '09.

Advisory and Training Programme

The Teagasc forestry advisory and training programme focused on the provision of an independent promotional, advisory, training and development service to landowners considering forestry and existing farm forest owners.

It is a joint programme with the Forest Service of the Department of Agriculture, Fisheries and Food. The programme aim was to promote the planting and management of sustainable farm forests and to provide advice and training on the production of profitable timber and other products from farm forests. This service was enhanced to cater for the needs of people considering forestry, those who were in the process of establishing a farm forest, those with existing woodlands and those whose plantations are at the first thinning stage.

Forestry promotion aimed at those who may not have yet considered forestry was a significant aspect of the 2008 programme. This involved major forestry sections at shows including the Ploughing Championships, Tullamore Show and Farmfest and Bioenergy '08. Two national farm forestry demonstrations were held and information meetings were held nationwide in November which were attended by over 200 people with an interest in planting land.

Training was provided in a range of areas with courses provided on seed collection, native woodland establishment, farm forest establishment, forest management, broadleaf shaping and wood energy. Additionally 1,170 REPS participants were trained on the benefits of farm forestry. Some of the courses were provided through or in association with other organisations including the Sustainable Forestry Training and Education Group, The Organic Centre – Rossinver, Skillsnet and County Councils. Two pilot FEPS courses, to fulfil the requirements of the FEPS scheme, were run in December 2008.



LIAM KELLY Farm Forestry Adviser Mullingar, Co. Westmeath

After graduating in Forestry from UCD in 1991, Liam (pictured above wearing red helmet) initially worked in the private forestry sector.

Subsequently, he joined Teagasc as a Farm Forestry Adviser in 2001. Currently based at the Mullingar office Liam is a Forest Development Officer, and has responsibility for advice, promotion and training on all aspects of forestry in the midland counties of Westmeath, Longford, Laois, Offaly and Kildare.

Grey squirrels are a major threat to broadleaf forests. In 2003, Liam researched control measures to combat grey squirrel damage to broadleaf forests which was identified by woodland owners as a major problem at the time and these techniques are presently still being utilised. In 2005, Liam was appointed as the Teagasc representative to the Advisory Committee of the Forest Service funded project "Securing Ireland's Broadleaf Forests and Conservation Native Red Squirrels through Integrated Management of Grey Squirrel".

In 2005, he developed the annual forestry village concept for the Tullamore show, which allows the forest industry to exhibit their products and services in a dedicated forestry setting at the country's Premier Agricultural Show.

Since 2007, Liam has been National Events Coordinator within the Teagasc Forestry Development Unit.

Pig Production Development Unit

The Irish pig industry is a modern capital-intensive, highly-efficient industry which has been a world leader in terms of one of the indicators of technical efficiency, i.e. the number of pigs produced per sow per year and produces top-class pork and pork products.

Most pig production is carried out in some 450 commercial units and the proportion of pigmeat output concentrated in large-scale units is greater in Ireland than in other EU countries. Large unit size, a high degree of specialisation and highly skilled labour, have all contributed to make the Irish pig industry efficient and internationally competitive.

The objectives of the programme of the Pig Production Development Unit are to reduce the unit-cost of production and improve the quality of pigmeat, while reducing environmental impact and improving animal welfare.



RESEARCH PROGRAMME

The Pig Research Programme covers a wide range of topics related to nutrition and management and meat quality with a continued emphasis on animal welfare, food safety and minimising environmental impact. Walsh Fellows in the pig programme are registered with University College Dublin, Queens University Belfast, University of London (Royal Vet College) and Waterford IT.

Nutrition and Management

A study on feeding and management of sows involved monitoring of breeding gilts entering the Moorepark herd and a large commercial herd and relating their performance to body condition (fatness) at first mating.

A study of reduced crude protein levels and supplementation of diets with crystalline amino acids continued. The objective is to reduce the amounts of nitrogen excreted in manure.

An examination of the effect of nutrition on bone strength of breeding sows and growing pigs continued under the Research Stimulus Fund of the Department of Agriculture, Fisheries and Food.

Health and Welfare

Increasing slaughter weights mean that more male pigs are reaching or have reached puberty at slaughter and are potentially more aggressive. A joint programme with Queens University is examining the behaviour of these heavy pigs including their reaction to selling off the heaviest pigs in a group.

The pig continued to be used as a model for human nutrition studies carried out by the Moorepark Food Research Centre.

GOAL 1

Improve the competitiveness of agriculture, food and the wider bioeconomy

Meat Quality

The study of pregnancy feeding and its effect on muscle development in the pre- and post-natal pig continued. The responses observed in the Moorepark studies have been less than in other published work. A Framework 7 project on identification of biomarkers for safety assessment of novel feeds commenced.

Environmental Management

Two projects on environmental management are being supported by the DAFF Research Stimulus Fund. The first, now in its third year is examining manure composition and manure separation into solid and liquid fractions. The second project is concerned with generation of energy from pig manure including anaerobic digestion and combustion of separated solid fraction.

Advisory and Training Programme

Responding to high feed prices, low pig prices and negative margins drove the Advisory Programme in 2008. Farm visits to contracted clients with the provision of a business and technology service continued to be the main advisory activity. The PIGSYS data processing system of performance monitoring is the basis of most business decisions and Pig Development Officers continued to encourage producers to avail of the service. A suite of financial planning spreadsheets prepared for Advisory Officers were widely used by producers and lenders.

Membership of the InterPig group which is involved in international benchmarking of production efficiency and production costs in EU and

American countries is providing valuable information for assessing the international competitiveness of the Irish pig industry. The Interpig reports highlight areas of weakness in the sector which need to receive attention in the research, advisory and training programmes. It is also allowing Teagasc staff to build up working relationships with contacts in similar roles in participating countries.

Professor Paul Ross, Teagasc Moorepark Food Research Centre, (right) receiving the Enterprise Ireland award for Lifescience and Food Commercialisation from Dr. Joe Healy.





GOAL 2

Support sustainable farming and the environment

RESEARCH

NUTRIENT EFFICIENCY

Research is being conducted to investigate the potential of the trailing shoe application system to reduce ammonia emissions and increase the nitrogen fertiliser replacement value of cattle slurry applications to grassland under Irish conditions. A decision support system for the prediction, based on weather forecasts, of conditions that optimise both environmental safety and nutrient recovery of organic and mineral fertilisers is also underway.

Teagasc advice for major and micro nutrient applications to grassland, tillage, vegetable and fruit crops was revised and published in 2008. This revised nutrient advice has also been incorporated into the decision support tool, created in Johnstown Castle, which is used by advisers for nutrient management planning for cross-compliance with the Nitrates Directive.

Soil Quality and Soil Biology
During 2008 new programmes began to address the issues relating to soils highlighted in the debate over the forthcoming EU soils framework directive and the threats to soil quality. For any national decision making a thorough knowledge of the location and properties of our different soils is required. The Irish Soils Information System (ISIS), funded by the EPA and Teagasc and launched in 2008 will provide that basic information.

The importance of understanding the biology behind key environmental process such as denitrification, nitrification, phosphorus mobilisation and biodiversity was also recognised by the start of a Science Foundation Ireland funded Stoke's Professorship at Johnstown Castle.



Pictured at the Teagasc and IrBEA Bioenergy Conference 2008 in Tullamore, were Professor Gerry Boyle, Teagasc Director; Mary Wallace, T.D. and Minister of State at the Department of Agriculture, Fisheries and Food; Vicky Heslop, President, IrBEA and Barry Caslin, Bioenergy Specialist, Teagasc.

GOAL 2

Support sustainable farming and the environment



Cork dairy farmer Denis Carroll with Teagasc researcher Denis Minogue.

Water Quality

Further research investigating the benefit of over-winter green cover (mustard cover crop or natural regeneration) highlighted the importance of maintaining green cover to reduce nitrate leaching to groundwater. Natural regeneration under reduced tillage management was found to be as good at reducing nitrate leaching as a planted mustard cover crop and both reduced nitrate leaching significantly.

Research commenced in 2008 will quantify the importance of denitrification (the reduction of nitrate to nitrous oxide (N_2O), and di-nitrogen gases) in sub-soil and groundwater systems under a range of hydrogeological settings. The data generated will be used to quantify the potential natural remediation that occurs along the hydrological transport pathways from farms to river bodies.

Further research on ex-situ remediation and control of dirty water using reactive materials such as ochre, woodchip and a biofilm technology aims to decrease dirty water storage volumes and save farmers money by enabling water recycling on Irish farm yards.

Improving nitrogen (N) use efficiency in agricultural systems is important as it reduces fertiliser nitrogen requirements and reduces environmental losses of N and helps achieve the objectives of many environmental directives (e.g. Nitrates and Water Framework Directives). A new project commenced in 2008 which will evaluate the potential role of nitrification and urease inhibitors to improve the efficiency of slurry-N and urea-N utilisation by grassland in Ireland.

Results from previous research conducted jointly between Johnstown Castle and Lincoln University has indicated that in Ireland the nitrification inhibitor DCD has the potential to reduce nitrate leaching by up to 25% and nitrous oxide emissions by up to 45%. The effect of soil type, soil temperature and moisture on the efficacy of DCD are currently being investigated.

Agricultural Catchments Programme

An evaluation of the Good Agricultural Practice guidelines (SI 378), designed to implement the Nitrates Directive Action Programme in Ireland, is being undertaken by Teagasc in the Agricultural Catchments Programme. The Department of Agriculture, Fisheries and Food (DAFF) has funded the project to evaluate changes in nutrient (nitrogen and phosphorus) sources, transfers in hydrological pathways and rivers in eight small catchments (5-12km²) as the guidelines are implemented. These catchment areas represent a range of agricultural enterprises, intensities and soil types on both grassland and arable land.



Demonstration of cattle slurry application systems, Teagasc, Johnstown Castle, Wexford.

Below: Teagasc specialist Andy Boland at the same event.

During 2008, the catchments were chosen using a Geographical Information System multi-criteria decision analysis approach and including, for example, catchment data on stocking density, percentage forage cover, soil type and geology – factors that can influence nutrient use and soil accumulation potential and the potential for nutrient transfer to water bodies. To provide a biophysical and socio-economic evaluation of the Action Programme, recruitment has included a scientific team with backgrounds in soil science, hydrochemistry, hydrogeology and agricultural economics.



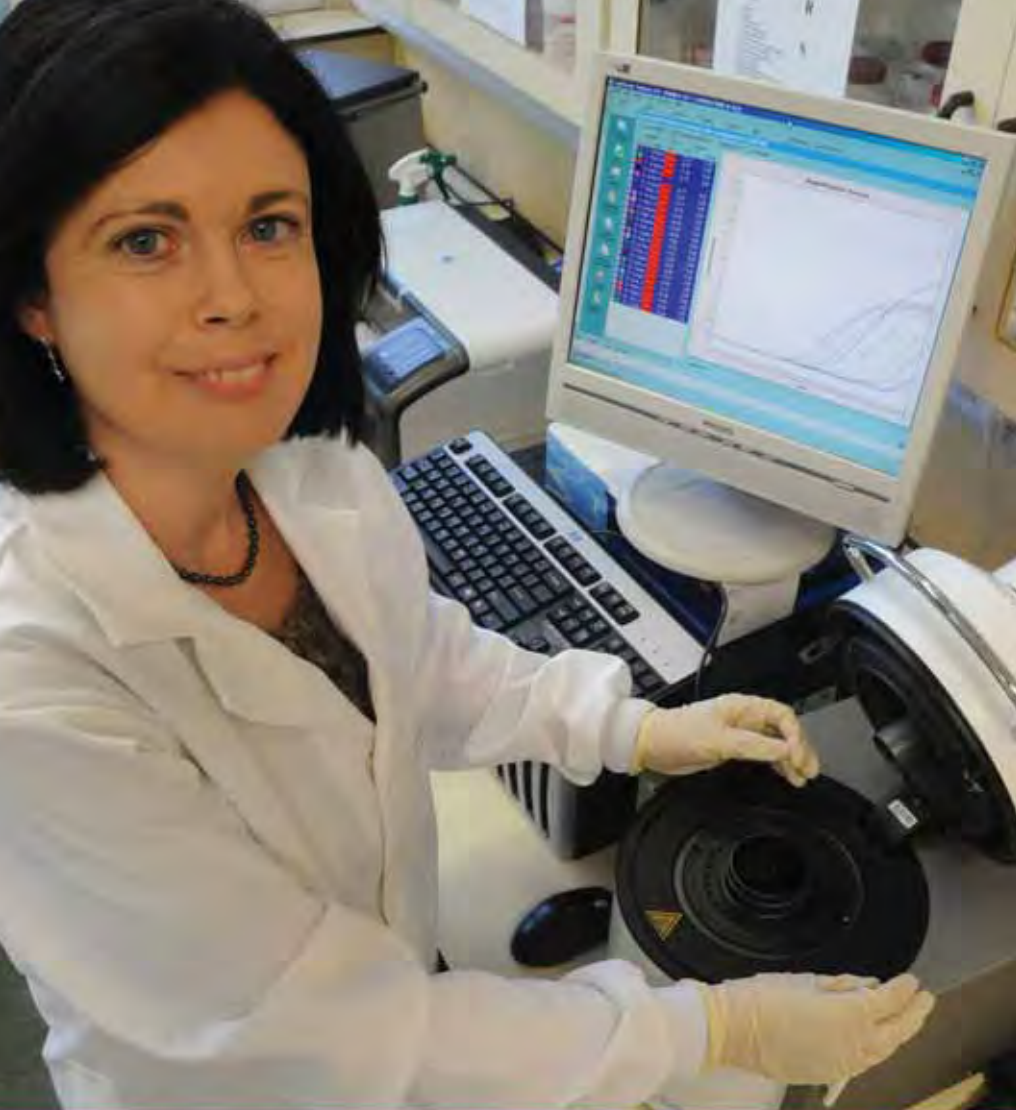
Agricultural Ecology

An EU-wide survey of agri-environment schemes found a strong need for improved definition of policy aims and specific objectives, as well as improved selection of the indicators to measure progress toward the policy aims. The survey also found that many schemes simultaneously aim to achieve different environmental objectives for natural resources, biodiversity and landscape. A methodology was developed to better address the environmental assessment of schemes with multiple environmental objectives. In a feasibility study, the methodology was successfully applied in Ireland to a small number of REPS and non-REPS farms.

The REPS farms scored higher than the comparable non-REPS farms but the limited sample size of 10 farms per treatment was not representative of the national-scale implementation of REPS. A comparison of the change in environmental performance over time (before and after joining REPS) would be one of the best ways to measure the environmental effectiveness of the scheme.

Biodiversity

The type of establishment and management of field margins in intensively-managed grasslands has large effects on farmland wildlife (plant and arthropod diversity). Arthropod diversity was highest on field margins with higher plant diversity, and plant diversity was highest on field margins that were sown with a wildflower mix. In field margins that originally consisted of Lolium-dominated vegetation, there was little improvement in plant diversity after five years, even after exclusion of fertiliser inputs. A new project was initiated to assess the biodiversity options in REPS and conduct a review to identify a range of biodiversity actions that can improve farmland wildlife.



DR. GERALDINE DUFFY

Head of Food Safety Department
Food Research Centre, Ashtown, Dublin.

The Head of the Food Safety Department at Ashtown Food Research Centre, Teagasc, Dublin is Dr. Geraldine Duffy. The food safety programme led by Dr. Duffy conducts research to provide the scientific basis for food safety assurance by the Irish food industry, concentrating on microbiological and chemical contaminants in Irish food.

Geraldine's holds a B.Sc. degree from University College Dublin and a PhD from the University of Ulster. She has carried out international post doctoral fellowships at the University of Nottingham and at the United States Department of Agriculture (USDA) Research Centre in Philadelphia.

Geraldine joined the research staff at Teagasc, Ashtown Food Research Centre in 1996 and has been Head of the Food Safety Department since 2005. Her research focuses on understanding the transmission, behaviour and virulence of microbial pathogens in the food chain.

This research is exploited to develop food safety management systems including quantitative risk assessment models and novel interventions for control of known and emergent food borne pathogens.

She has published widely in the field of microbial food safety with over 70 peer reviewed publications including books and book chapters, of which over 40 are on the highly virulent E. coli O157. Geraldine currently co-ordinates a multi-national EU Framework Project on beef safety and quality "Prosafebeef" and hosted a large international congress under the auspices of this project at the Ashtown Food Research Centre in March 2009. She is a member of the microbiological committee of the Food Safety Authority of Ireland and has served as a food safety expert for the World Health Organisation (WHO) and the European Food Safety Authority (EFSA).

Greenhouse & Transboundary Gases

Ireland is subject to two major pieces of global emissions legislation: The Gothenburg Protocol (and subsequent National Emissions Ceilings Directive) which seeks to limit transboundary pollutants, (such as NOx and ammonia) and the Kyoto Protocol which limits greenhouse gas (GHG) emissions. As agriculture comprises 98% of ammonia and 26.5% of national GHG emissions, a large proportion of Johnstown Castle research is now focused on providing sustainable solutions to farmers in the context of maintaining production potential.

Current research is particularly focussed on abatement of ammonia emissions from landspreading and housing mitigation of nitrous oxide emissions via either intervention strategies or increased nutrient efficiency offsetting of emissions via land management change or land-use change.

Ammonia

The effects of altered timing and application technique for slurry (splash-plate and trailing shoe) have been investigated. By adopting the trailing shoe technique, ammonia emissions have been reduced by an average of 28%. However, by synchronising spreading with periods of cool overcast conditions, emissions from splashplate application have also been observed to decrease by over 50%.

There is currently little information world-wide on ammonia emissions from animal housing. Direct measurement techniques on association Gaussian dispersion modelling techniques have been developed and utilised to quantify ammonia emissions from both slatted sheds and, for the first time, out-wintering pads. Emissions were observed to be highly dependent on windspeed with lower emissions per head from the out-wintering pads.

GOAL 2

Support sustainable farming and the environment

New research will now focus on the synergies and antagonisms of ammonia abatement strategies and greenhouse gas (GHG) emissions. In particular, the effect of slurry application on soil carbon and nitrogen processes will be investigated.

Greenhouse Gases

Nitrous oxide (N₂O) emissions comprise 28% of total agricultural GHG emissions and these arise from a) animal excretion and b) application of mineral fertilisers. A range of DAFF-funded research is currently underway in order to draw up 'best-practice' mitigation strategies. These include assessing the effects on emissions and leaching of dietary N manipulation via alterations in the crude protein content and synthetic amino acid supplementation. Also, research into the use of nitrification and urease inhibitors to reduce emissions on pasture and tillage systems is currently underway with nitrification inhibitors yielding 40% reductions in emissions from pasture systems on heavy soils.

The role of clover in (N₂O) mitigation is also currently being assessed. This research will quantify the emission factor associated with atmospheric N fixation and will also perform a full life-cycle analysis for clover-based dairy systems.

Strategies to reduce GHG emissions from tillage systems are also being investigated. In particular management options to minimise soil organic carbon losses, including winter cropping, cover crops, minimum tillage and residue incorporation are being assessed. Results to date indicate that the reduction in winter fallow is the most important factor in terms of arable GHG balance.

The effect of land-use change on emissions from pasture to biomass crops is also being assessed in light of the national co-firing targets for electricity production.

Winter Cover Crops to Reduce Nitrate Leaching

Investigations at Oak Park into the effect of over-winter covers on land destined for spring barley indicated that while over-winter covers could substantially reduce the amount of nitrate leached during the winter period, there was generally no beneficial effect of incorporating a cover crop on the yield of the succeeding barley crop. This indicates that use of sown cover crops would be a net economic cost to Irish spring barley production systems.

Efficient and Reliable Utilisation of Nutrients in Animal Manures

Research on the use of pig slurry as a nutrient source for cereal crops continued in 2008. Trials indicated that the use of slurry could reduce the fertiliser nitrogen requirement of spring barley, thereby significantly reducing fertiliser costs. The use of slurry by tillage farmers would also provide a much needed outlet for pig farmers for at least a portion of their slurry production.

Home Heating

Pellets for home-heating are primarily produced from sawdust. Limited supplies of sawdust indicate that there is scope to use agricultural feedstocks for a national pelleting industry. The research pelleting facility at Oak Park has successfully produced pellets from willow, miscanthus, rape straw, and cereal straw.

Cereal straw is more difficult to pellet, while rape and cereal straw produce higher ash levels than willow or miscanthus. Mixing of feedstocks can reduce the ash level produced on burning. This programme will lessen dependence on limited sawdust resources and provide a potential income stream for farmers.

Pictured at the Teagasc and IrBEA Bioenergy Conference in Tullamore were Michael Keane, Philip Farrelly & Partners; Dr. John Carroll, Dr. John Finnan, Teagasc, Oak Park.



Draft Environment Programme Report for 2008

Changes in the price of fertilisers in 2008 drew attention to the usage and the management of other valuable nutrient sources such as slurry on farms. These changes also refocused attention on the benefits of clover as a source of nitrogen. These issues were the major focus of the environmental advisory unit exhibits at Farmfest the premier Teagasc agricultural event at Athenry on 20th June. The field scale exhibits demonstrated the benefits of a number of strategies to reduce the quantities of artificial fertiliser needed on farms including spring application of slurry and introducing white clover into swards.

The trend in fertiliser use is an important indicator of future pressures on water quality. Usage figures have been falling for some time. This has saved money and contributed tangible benefits for the environment. Reducing chemical N fertiliser is also an important factor in reducing nitrous oxide, an extremely powerful greenhouse gas emitted from soils. The dissemination of information on the fertiliser planning and recording were given a high priority at Teagasc events throughout 2008.

Overall, the environment programme supported the development of sustainable farming and the transfer of environmental technology. This involved a major 'public good' programme providing practical information on 'good agricultural practice' and raising environmental awareness among farmers generally.



FWMS

Teagasc supported 14,400 FWMS (Farm Waste Management Scheme) applicants to finalise the scheme paperwork requirements ahead of the end of 2008 deadline. The uptake of the scheme exceeded all expectations with the result that the great majority of applicants have provided top class farmyard facilities for their livestock. This enables greater production efficiency, and facilitates better working conditions for farmers.

Teagasc support for the FWMS was important work in the context of the requirements of the Nitrates and Water Framework Directives. Scheme applicants were provided with detailed advice on farmyard layout, building design, manure management and planning. The result will be better overall compliance with environmental regulations.

Regulatory Compliance

A major programme objective was to raise farmer awareness in relation to the new environmental requirements associated with cross compliance. Monies paid to farmers under the Single Payment Scheme are conditional on meeting these requirements.

They include the 18 statutory management requirements (SMRs) and good agricultural and environmental conditions (GAEC). Teagasc, in conjunction with the Department initiated a series of eight public awareness events on Teagasc farms nationwide, in the latter part of 2008.

A further series of at least 10 such events are planned for 2009. The events were attended by more than 2,000 farmers. The dissemination of information on the fertiliser planning and recording aspect of the Nitrates Regulations was given a high priority at the events.

Countryside Management and Biodiversity

Teagasc supported the EU target of halting biodiversity loss by 2010 in its broadly based countryside management programme in 2008. The promotional work in support of the introduction of compulsory biodiversity options in REPS 4 demonstrates this in a practical way. 36 practical hedgerow planting and rejuvenation demonstrations were held nationally, covering every county.

These have been extremely popular and were well attended particularly by REPS farmers. More than 5,000 farmers took part in 2008. The campaign will continue with further demonstrations in 2009. Teagasc has a major input as partner in the BurrenLIFE Project. 2008 was the fourth year of this major five-year environmental research and advisory project designed to map out alternative socio-economic models for sustainable farming in the Burren.

The highlight of the 2008 programme was the hosting of the Burren International Conference on Conservation Farming with Teagasc support.

NATIONAL FARM SURVEY

Results from the 2007 National Farm Survey showed that average Family Farm Income increased from €16,680 per farm in 2006 to €19,687 in 2007 an increase of 18 percent. This followed a decline of 26% in 2006. However the income on full-time farms increased by 27 percent in 2007 to €43,988. As in previous years dairying generated the highest returns with an average income of €51,017 per farm compared to €10,682 and €7,702 per farm on sheep and beef rearing farms respectively.

Changes in FFI ranged from minus 10% on the Mainly Sheep System to plus 42% on the Mainly Tillage farms and by plus 41% on Specialist Dairying farms. There was a decline of 7% and 5% in FFI respectively on the Cattle Rearing and Cattle Other Systems. Nationally average direct payments increased by 1% from €16,346 per farm in 2006 to €16,524 in 2007.

Average direct payments remained stable across all systems of farming from 2006 to 2007. In 2007 direct payment and subsidies contributed 31% of Gross Farm Output and 84% of FFI. The decline in the contribution of direct payments to farm output and income in 2007, compared to previous years, was due mainly to

the increase in market output in both the dairy and tillage sectors resulting from higher farm gate prices for milk and cereals.

Net new investment amounted to €9,937 per farm in 2007 – an increase of 66% on 2006 and accounted for 50% of FFI. This large increase in on-farm investment in 2007 had been forecasted in late 2006, when a survey on the NFS sample showed an 88% increase in planned investment for 2007.

Obviously not all the planned investment was undertaken but the increase of 66% in actual investment in 2007 resulted in farmers investing on average 50% of their FFI. Average investment on specialist dairy farms increased from €11,796 per farm in 2006 to €23,524 in 2007 i.e. by 100% resulting mainly from investment to comply with environmental regulations and slurry control and storage. Investment on tillage farms increased from €7,747 in 2006 to €18,735 in 2007, an increase of 142%.

The incidence of off-farm employment was identical to 2006 at 58 percent on all farms and overall on 80 percent of farms, the farmer and/or spouse had some other source of income resulting in only 20 percent of farms dependant on farming solely for their livelihood.



Drs. Anne Kinsella, Liam Connolly and Cathal O'Donoghue of the Rural Economy Research Centre at the launch of the National Farm Survey 2007.

Understanding Productivity Growth in Irish Agriculture (1996-2006)

Recent reforms of the Common Agricultural Policy and continuous moves toward further trade liberalisation have meant that the competitiveness of agricultural markets has been at the forefront of debate in recent times. This motivation provided the rationale for researchers in the Rural Economy Research Centre (RERC) Teagasc along with colleagues in the Department of Economics in TCD to examine the productivity performance of Irish agriculture.

This research employed an economic tool called Stochastic Frontier Analysis (SFA) for the construction of Total Factor Productivity (TFP) indices for each of the main farming types in Ireland, using National Farm Survey data from 1996 to 2006. An index of TFP measures productivity growth taking into account the relationship between the change in output and the change in the use of all inputs. This measure of productivity growth differs from traditional productivity indicators which are common in the literature such as yield indicators (milk yields per cow or crop yields per hectare) which are known as partial productivity indicators. These indicators compare output to a single input such as land, labour or animal numbers.

An index of TFP decomposes annual TFP change into technical change, technical efficiency change and scale efficiency change. While the analysis is primarily concerned with changes in TFP and its components over time, a complimentary issue was also explored which examined the factors that influence technical efficiency levels on Irish farms.

The findings of this research published in 2008 have shown that productivity growth was highest in the Cattle Rearing sector followed by the Dairy, Cattle Finishing, Sheep and Cereals sectors. Average annual TFP growth rates were 2 per cent, 1.4 per cent, 0.9 per cent, 0.4 per cent and -0.2 per cent respectively.

The research has also shown that that efficiency levels are, in general, positively correlated with extension use (although only significantly in the Dairy sector), soil quality, the overall size of the farm, the level of intensification (livestock systems) and the level of specialisation. The use of artificial insemination was also positively correlated with efficiency in the Dairy sector.

The coefficient for off-farm employment was not significant in any sector and therefore implies that farms with an off-farm job are no less efficient than farms without.

The research also highlighted the importance of the scale of operations. Increasing returns to scale were present in all but the Cattle Finishing and Sheep sectors. The results highlight that larger farms are more efficient. This implies that increasing scale would likely lead to increases in technical efficiency levels.

Given the importance of economies of scale found in the research, this finding presents a serious challenge for policy makers and for those involved in planning the future of Irish agriculture, which at present is characterised by relatively small scale operations (internationally). This finding has recently been used by the researchers in RERC to highlight the economic rationale for farm partnerships in the context of increasing scale of operations in an increasingly competitive international market. This research was funded by the DAFF Research Stimulus Fund.



Drs. Trevor Donnellan and Kevin Hanrahan of the Rural Economy Research Centre (RERC).



DR. DAWN HOWARD Research Officer Athenry, Co. Galway

Joined Teagasc: In March 2008 as a contract Research Officer in Molecular Biology and in January 2009 as Post Doc in the Animal Bioscience Centre based at Mellow Campus, Athenry, Co. Galway.

Current role: The establishment of a DNA bank resource for Irish dairy and beef cattle with accompanying detailed phenotypic data. This resource is being used to exploit current developments in the biosciences. It is underpinning the genomic selection programme for Dairy A.I. sires and for Beef A.I. sires in early 2010.

This puts Ireland at the forefront of the use of genomic selection technology for identification of the genetic merit of young bulls entering A.I. Other ongoing projects aim to identify genomic markers for traits of interest.

The DNA bank resource is already being used to discover novel single nucleotide polymorphisms (SNPs) associated with traits of economic importance in Irish cattle breeds. This will improve the accuracy of the selection process and increase the rate of genetic progress, facilitating the identification of animals best

suited to Irish production systems.

The expansion of this DNA bank to larger numbers of samples and the inclusion of sheep will provide an invaluable national resource for many future projects which intend to identify genomic markers for traits of commercial importance in cattle and sheep. This will contribute significantly to the competitiveness of the Irish agricultural sector.



GOAL 3

Encourage diversification of the Rural economy and Enhance the Quality of Life in Rural areas

Food Industry Profile in Ireland

Gross Output - €20bn; 9% GDP
750 + companies
50,000 directly employed
€8.6bn in exports 2007

Source; Dept. of Agriculture
Fisheries and Food

Speciality Food
320+ companies
3,000 directly employed
Worth €500m

Opportunities in Food

- New lifestyles
- Changing Households
- Convenience
- Speciality
- Organic
- Farmers' Markets

In 2008 six food/rural tourism advisers were recruited and work from locations throughout the country. Direct sales are very important for many producers and a Teagasc direct selling course proved popular. This course has been run at five locations with over one hundred attendees.

A food business course was run at two locations with an average attendance of 15. 2008 also saw the recruitment of two food technologists who have been to the

fore in formulating legislation for their respective sectors, a HACCP plan for the farmhouse cheese industry, for example.

During the year food advisers were involved in mentoring sessions with food producers in areas as diverse as sea salt development, farmhouse crisps, confectionery, baby food, yoghurt, ice cream, liquid milk and cheese.



Left: Mairead and David Tiernan, who produce cheese on their farm near Dunleer, Co. Louth.

Rural Tourism

Rural tourism is part of an industry which was worth €6.5bn in 2007. Development in rural tourism will be driven by (1) a need to overcome the serious imbalance which has occurred in tourism in Ireland over the past number of years, where Dublin receives over half (5.7m) of all the visitors to Ireland and only 1.5m go to the North West and (2) generous supports for rural tourism in the recently announced LEADER initiative.

Already there are over 10,000 small businesses in rural tourism in Ireland to include farmhouses, town & country homes, self catering houses, apartments, lodges and forest homes, caravan and camping sites, hostels, stately homes, health farms; angling facilities, cycling and walking and rambling holidays, water sports, farm restaurants and tea shops, craft centers, open farms, interpretive centres and farm museums and cultural activities. The potential to provide a rural holiday experience is relatively untapped.

As well as providing training, for example a 25 hr course on rural tourism was delivered to 16 participants in Ballyvourney in partnership with LEADER, all participants were offered the opportunity to attend a one to one mentoring session to develop their ideas for a LEADER application and as a submission for FETAC.

Specialist Teagasc tourism advisers have worked with organisations including the Irish Rural Tourism Federation (IRTF), Rural Resource Development Shannon evaluation committee, Clare Culture & Tourism sub-committee, Fáilte Ireland Tourism Networks, Limerick IT to promote rural tourism.



Equine husbandry students at Teagasc, Kildalton.

Equine Advice

Events where the advisory team presented Teagasc equine activities included the Irish Thoroughbred Breeders' Association International Trade Fair and Symposium which took place in Goffs Sales Complex in Kill, Co. Kildare in January 2008 which was attended by more than 2,300 visitors and the RDS International Dublin Horse Show.

Educational Activities

Throughout the year the educational requirements of the industry were served through a number of courses. Horse Skills Courses (including In-Hand Showing, Lungeing and Loose Schooling skills) were delivered in Killarney, Portlaoise, Dungarvan and Piltown.

Horse Breeders Skillnet

Approximately 10-12 participants were on each course. These courses were of 10 day duration spread over 10 weeks.

A number of Horse Breeding and Management Courses were held around the country including in Thurles, Enniscorthy, Dungarvan, Newcastlewest and Ballyhaise. Approximately 25-30 people took part in each course which were of four-day duration over four weeks.

Two very well supported demonstration nights were held (attendance 300 at each approx) in conjunction with the Army Equitation School and other industry professionals and were run with the theme 'From Farm To Market'. The idea behind the demonstrations was to encapsulate the requirements of the market currently and the deficits between the Farm Gate and the Market.

Further highlights included a new brochure entitled 'Horse Ownership – A General Guide for the First Time Horse/Pony Owner' almost 2,000 brochures requested.

A total of 64 farm visits were made to horse owners and breeders throughout the country.

Organic Farming Advice

The Government Action Plan launched in March 2008 lists 64 objectives, of which Teagasc assumes the lead role in 35. The draft plan was collated by Teagasc working with DAFF and Bord Bia. The Teagasc Organic Business Plan was presented to the Minister for Food Trevor Sargent on 19 March 2008.

Minister Sargent wrote to all herd-owners in the country in July & August 2008 encouraging farmers to consider organic as an option. The advisory team contact details were included in the letter, this resulted in us fielding in excess of 1,600 phone calls over a four or five week period.

Organic Demonstration Farm Network

The Organic Demonstration Farm Programme ran from June to mid September, a change from previous years to coincide with National Organic Week. Over 2,800 people attended 20 events nationwide across all enterprises. Each event was coordinated by two of the advisory team.

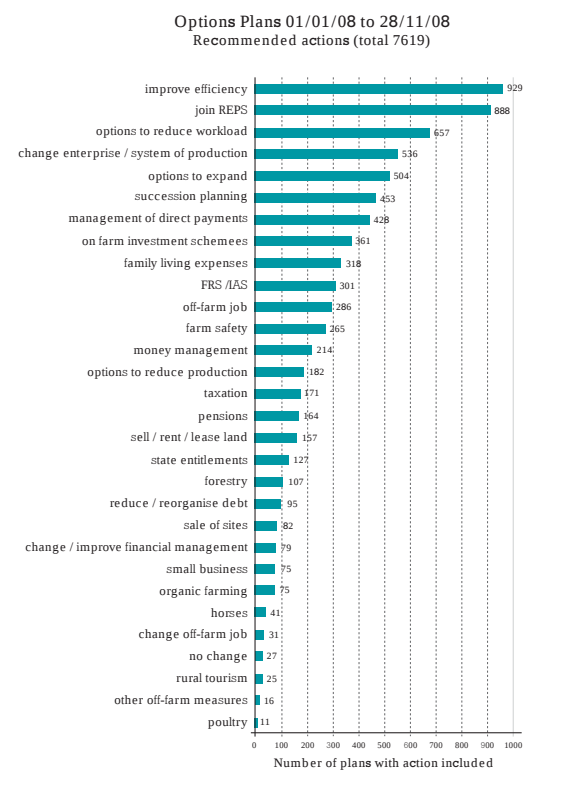
Farm Visits & Significant Consultations

In total the team visited 316 farms nationwide. Most of the farm visits were carried out in conjunction with local advisers and REPS planners.

Education Events

Four 25 hour FETAC accredited courses "Introduction to Organic Farming" were held at Ballinasloe, Ennis, Macroom & Newcastlewest which were attended by an average of 17. Each course was run over four evenings and two half day farm visits.

The four full time organic advisers are currently receiving training as tutors for the Teagasc eCollege.

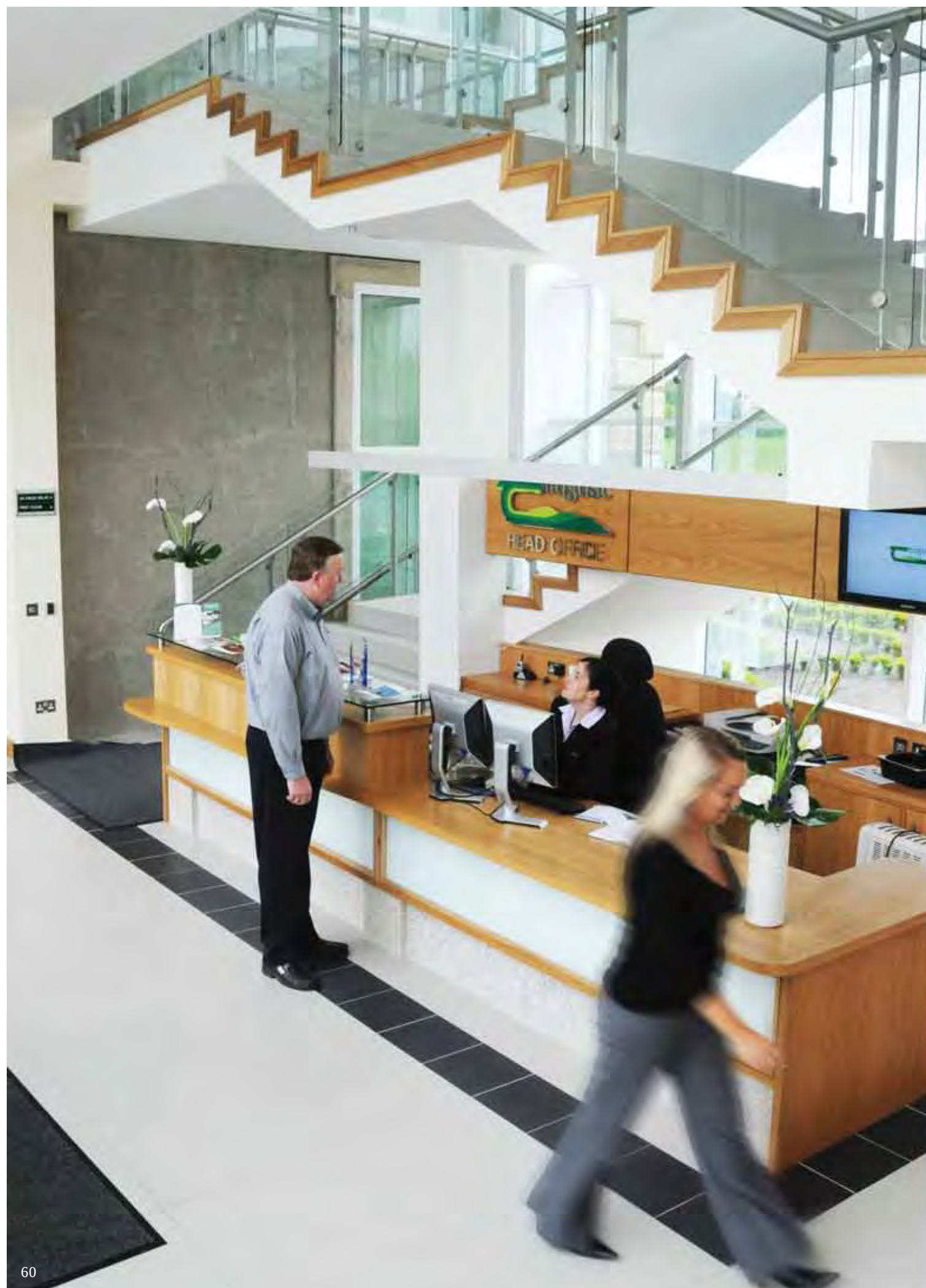


Options Programme

Teagasc advisers provided a detailed planning service for farm families under the Options programme during 2008. Nearly 2,000 farm families were assisted in evaluating the strengths and weaknesses of their farming business and in exploring new opportunities to increase farm household income through diversification or from off-farm employment. This service helped producers to establish the facts in terms of farm income, household income, living expenses, future income need and resulted in 7,619 recommended actions for farm families.

National Technical Organic Conference

The Technical Conference was held in Tullamore on 2 December 2008. 150 delegates heard presentations from 13 speakers. A conference proceedings was published and distributed on the day.



GOAL 4

Enhance organisational capability and deliver value for money

RESEARCH

WALSH FELLOWSHIPS

The Walsh Fellowship Scheme continues to provide grants to postgraduate students to work on projects relevant to the Teagasc Research Programme, while studying for a higher degree.

In 2008 a total of 112 new applications were received from university academics with 41 approved using Teagasc funding and 26 approved with an external source of funding. Currently there is a total of 208 Fellowships ongoing within the scheme with nine MSc projects upgraded to PhD level giving a total of 163 PhD fellowships.

2008 saw the arrival of the first four-year structured PhD's with 13 of the new Walsh Fellowship students enrolled on this programme of study with UCD. A proposal was formalised for the introduction of Industrial PhD's under the Walsh Fellowship scheme with the first entrants expected to be recruited in late 2009.

The 2008 Walsh Fellowship Seminar (13 oral presentations and 22 posters) was held during Science Week 2008. Dr. Don Thornhill, Chairman of the National Competitiveness Council attended



Dr. Don Thornhill, Chairman of the National Competitiveness Council was guest speaker at the Teagasc Walsh Fellowship Seminar in the RDS.

as a guest speaker. The winner Mr. Galatios Moschonas from Ashtown Food Research Centre impressed the audience and judges alike with his presentation on 'Blown Pack Spoilage: Discovery, Innovation and Technology Transfer'.

Post Doctorates
New scheme terms and conditions were drafted and approved and interviews are underway for a number of approved post Doctoral posts.



Teagasc researcher Dr. Sinead Waters, with students visiting the Animal Production Research Centre, Athenry as part of Science Week.

Right: students Marion Ruane and Gary Heagney study a tape worm.



Intellectual Property

A corporate Intellectual Property (IP) function is in place in Teagasc since 2006 to provide support to researchers on all IP issues. A significant increase in funding for Teagasc researchers particularly from Science Foundation Ireland (SFI) and Enterprise Ireland (EI) has lead to a need for high level IP agreements with academic and industry partners and places greater emphasis on commercialisation of such research outputs.

As awareness and buy-in from researchers and Principal Investigator is critical, training of researchers continued in the form of general and project specific presentations and workshops; there has been a subsequent increase in invention reports and patents filed.

Due to extensive links between University College Cork and Teagasc Moorepark researchers in the "Food for Health" area, many patented technologies are jointly owned between by the two parties. A joint IP Commercialisation committee was established in 2007 to manage the patent portfolio and strives to commercialise such technologies which has led to a number of exclusive evaluations and licenses with relevant food and dairy companies in 2008.

Prof. Gerry Boyle, Director of Teagasc; Galatios Moschonas, winner of the annual Walsh Fellowships seminar for his presentation on 'Blown Pack Spoilage'; and Billy Reynolds, Chairman, RDS Committee of Agriculture and Rural Affairs.

Other major achievements in 2008 include the finalisation of agreements for large scale collaborative projects such as the Enterprise Ireland / Industry led "Food for Health Ireland", the "Marine Functional Food Initiative" funded by DAFF / Marine Institute and three Science Foundation Ireland funded strategic research clusters. Such initiatives are expected to lead to a further increase in licensing of Teagasc technologies in the coming years.

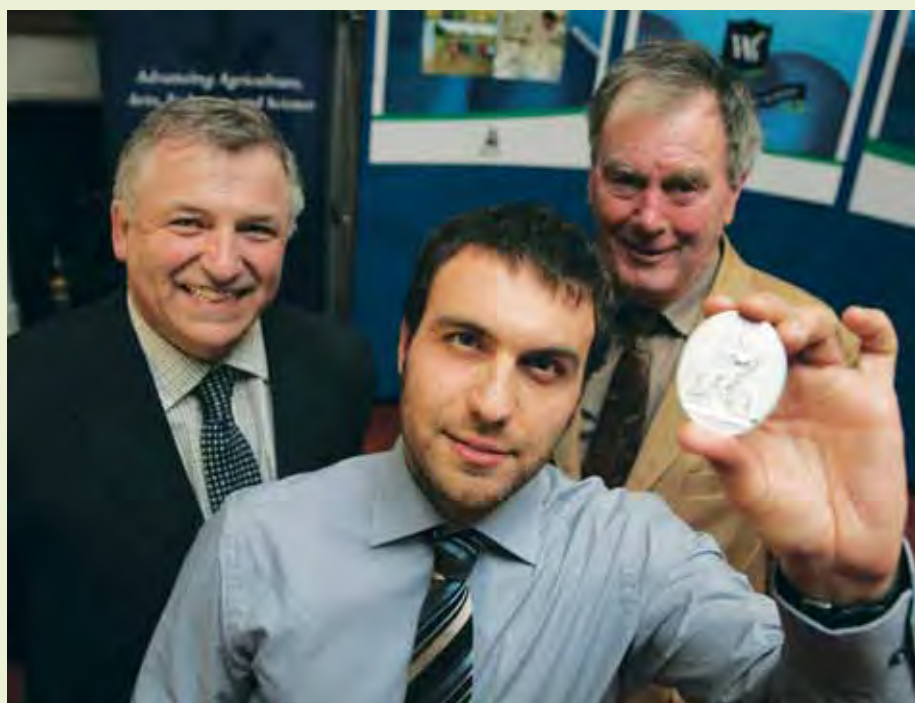
This combination of factors has resulted in almost a doubling of invention reporting, patent applications and evaluation/ licence agreements in 2008 compared with 2007. With net income from

company evaluation and licensing expected to increase in coming years, professional management of intellectual property is a critical factor in increasing competitiveness in the bio-economy and delivering value for money through successful exploitation of research outputs by industry.

Library and Information Services

The main focus of the library service continues to be on the provision of improved electronic services. The Electronic Journals Service was expanded to include over 200 e-journals with 3,000+ user sessions recorded. Access was also provided to Web of Science to improve access to scientific literature as well as citation search and tracking facilities. Training in the use of all the available resources was provided to researchers and the library web site was updated to enable easy access to resources.

The acquisition of relevant print resources to support research programmes continued with over 1,800 document supply requests met during 2008.



A scheme for recruitment of a Graduate Library Trainee, modelled on similar schemes in the academic libraries, was put in place and the trainee started work towards year end.

Science Writing

The Science Writing Function focused on the following areas in 2008

Publications

Four issues of Teagasc's research and innovation magazine TRResearch were produced, including a special issue to commemorate the An Foras Talúntais 50th anniversary celebrations. Two issues of a new look Irish Journal of Agricultural and Food Research were published.

Science Week

Science Week is coordinated by Forfás' Discover Science & Engineering (DSE) programme, which aims to increase interest in science, technology, innovation and engineering among students, teachers and members of the public. Teagasc held a series of events for students at second level (Ashtown, Athenry, Grange and Moorepark), third level (Oak Park), fourth level (Walsh Fellowships Annual Seminar); and the general

public (RDS speaker series – where Professor Gerry Boyle, Director Teagasc, delivered a talk on 'The Twin Global Insecurities: Food and Energy').

Television

Teagasc researchers featured in 'Crops of the Future' in the second series of 'The Investigators' television show on RTÉ (262,000 viewers). Eimear Gallagher and Nigel Brunton (Ashtown Food Research Centre) contributed in the area of "Nutraceuticals", Denis Griffin and Dan Milbourne (Oak Park Crops Research Centre)

contributed on the potato breeding programme and Matthew McCabe (Grange) contributed on 'pharming'.

RMIS

A portfolio of all research projects was placed on the Teagasc web site. The software redevelopment plan is on hold pending organisational restructuring decisions.

Teagasc scientist Dr. Dan Milbourne during the filming of "The Investigators" TV programme.





Pictured at the tree planting in Teagasc, Moorepark at the 50th anniversary celebrations of the founding of AFT were Professor Liam Donnelly; Head of Centre, Moorepark Food Research Centre; Dr. Rita Hickey, newest staff member and Michael Reidy, longest serving staff member.

Business Planning and Risk Management

A new Statement of Strategy for the period 2008 to 2010 was prepared following external and internal consultation.

Key corporate planning documents (Rolling Five Year Business Plan, Corporate Risk Register and Annual Programme) were prepared and submitted to the Department of Agriculture, Fisheries and Food to meet regulatory requirements.

In addition, a formal Level 1 Business plan was prepared for the Authority and reviewed during the year.

Capital Investment Appraisal guidelines were updated and capital project appraisals were reviewed during the year.

Plans for the development of a comprehensive Management Information Framework will move in line with the general reorganisation of structures that is currently underway.

Health and Safety

As part of the Teagasc / HSA prevention initiative approximately 3,000 adult farmers were trained in a new format course. A national geo-spatial study of fatal farm accidents was completed and the findings were presented at an All Island Farm Safety conference.

There were 21 fatal accidents amongst the farming community in 2008, which is a substantial increase on the previous year when 11 fatalities occurred.

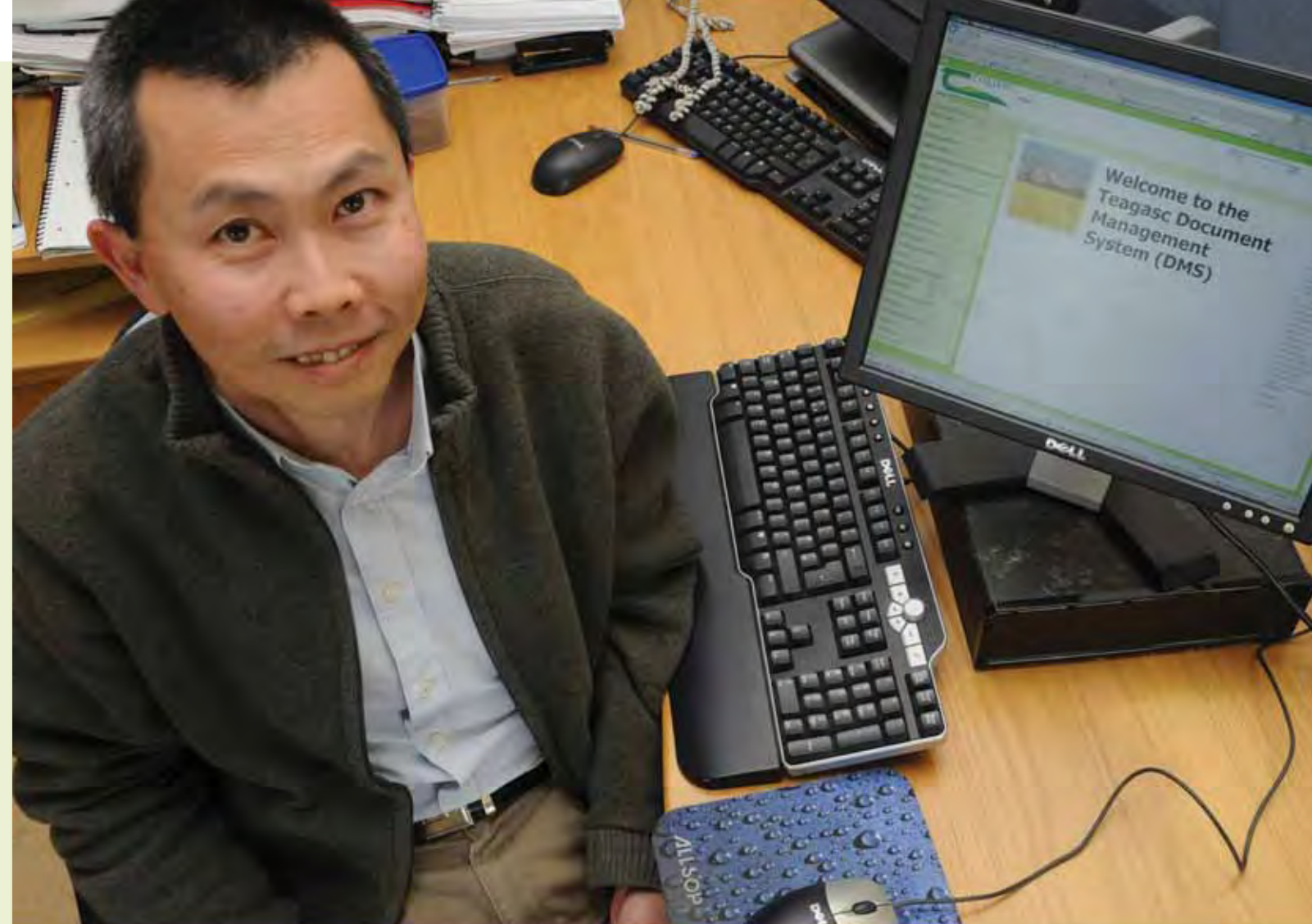
Verification of the Health and Safety management system was completed through four location audits and the training of 92 staff. A radon survey was completed at 18 locations. There were 32 reported accidents in 2008, following which 16 staff were back at work within three days.

Property Services

In line with the annual Capital Budget, sales to the value of €4.755 million were finalised during the year and site acquisitions were completed in Leitrim and Limerick (€0.615m). The Small Capital Programme which funds minor improvement projects at a range of locations throughout the country accounted for a total of €2 million. Six leases were renewed during the year.

Following the completion of the Johnstown Castle Conservation Plan which was finalised in 2007, Teagasc has been working in conjunction with the Irish Heritage Council and the Irish Heritage Trust on the development of a feasibility study to identify potential future uses for the Castle.

Teagasc Headquarters, Oak Park, Carlow.



HUK MOK Applications Analyst Teagasc Headquarters

Teagasc Document Management System

Huk Mok was born in Hong Kong and educated in UCD where he graduated with an M.Sc. in Computer Science. He has worked in the information technology industries in Ireland, Canada, Hong Kong and Malaysia. He joined Teagasc in September 2005 as an Applications Analyst working from Oak Park and is responsible for rolling out the Document Management System within Teagasc.

Teagasc is a knowledge organisation, and vast amounts of information are generated each year. Staff continuously create, use, reuse and distribute information. Significant amounts of Teagasc information are in the form of papers, reports, databases and written advice on a wide range of projects and topics. These information assets must be carefully managed and secured. A Document Management System

(DMS) was introduced into Teagasc in December 2007 to help manage these information assets. It was deployed in the Grange Beef Research Centre as a pilot project. The DMS has now been successfully adopted by other departments including the Agriculture Research Directorate, Administration Directorate and Advisory Directorate. More roll outs are planned for 2009.

The DMS is best for managing unstructured documents such as scanned paper documents, photos, MS-Office documents, PDFs etc. It allows users to quickly retrieve information that they need using the search tools provided by the DMS.

One area that the DMS is well suited to is the management of client documentation in the Advisory Services Directorate. An advance pilot was rolled out to the Wexford Management Unit to capture client documentation for the REPS4 scheme.

All documents related to a client who participates in REPS4 are captured in the DMS. These documents are indexed based on the Client ID, Client Surname, Client Firstname, Document Type and Year of Scheme.

Advisory, Planners and Administrative staff can easily retrieve documents based on these properties which will reduce the amount of time required to service a customer and also the volume of paper documentation. The DMS is designed in such a way to ensure it is flexible enough to accommodate other schemes. Plans to extend the DMS to capture all client documents are in progress, including Options Programme Action Plan, Soil Samples, Student Application etc. The aim is better, more seamless, management of documents and improved service for clients.

Catherine McCague Pensions Officer
conducting a seminar in 2008.

The Research Vision Programme was progressed in 2008 and development work was commenced on the projects identified in the Programme including the establishment of Steering Groups in relation to each of the projects.

A basic access survey of all buildings has been completed and an energy efficiency survey is underway.

Irish Language

An action plan for the implementation of the Irish Language Scheme was identified for 2008 and progress has been made in a number of areas including training initiatives, actions identified in the scheme under ICT and the incorporation of bilingualism at a number of high profile public events within the organisation throughout the year.

Customer Service Action Plan (CSAP) 2008-2010

Outcomes for the 2008 CSAP include:



Quality Service Standards

2,000 comment cards received from Advisory clients in 2008 state that 72% of respondents are very satisfied with the quality of service received. 24% were satisfied, 2% were dissatisfied and 2% were very dissatisfied.

Equality/Diversity

Three FETAC courses translated into Eastern European languages

Physical Access

General access survey of all Teagasc buildings carried out in 2008. Detailed full access audit conducted in:

- Kildalton College
- Portlaoise Advisory and Training offices
- Roscommon Advisory office
- Mullingar Advisory office
- Ballyhaise college (part of)

Information

- 94 press releases issued
- 4 issues of TResearch magazine
- 6 Issues of Today's farm
- Newsletters sent to advisory clients monthly with research updates
- 3 issues of Moorepark News
- 3 issues of the Ashtown Food Innovator

Timeliness and Courtesy

96% of those completing comment cards (2,000 comments cards received) in 2008 stated that the service they received was prompt and efficient. 99% said they were treated with courtesy.

Complaints

Comment cards are available in all offices.

Appeals

Level 5 Agriculture – Satisfaction with assessment appeals procedure – 41% very satisfied, 51% satisfied, 7% moderately satisfied and 1% dissatisfied.

Consultation and Evaluation

21 stakeholder partnership groups met in 2008 representing 12 enterprises. 81 organisations and 79 operators attended stakeholder partnership meetings.

Choice

128 courses delivered over 1,099 evenings. 2,663 participants attended courses outside normal working hours.

Official Languages Equality

8 staff participated in training in 2008 in preparation for delivery of services through Irish.

Better Co-ordination

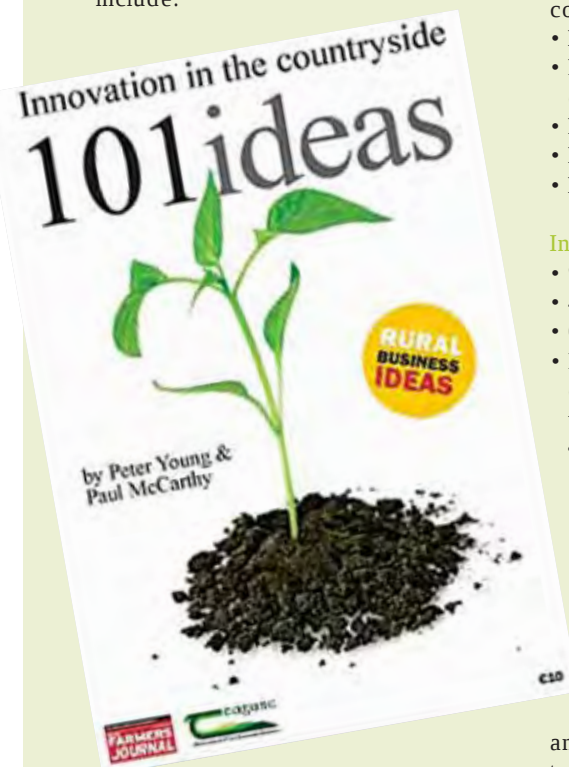
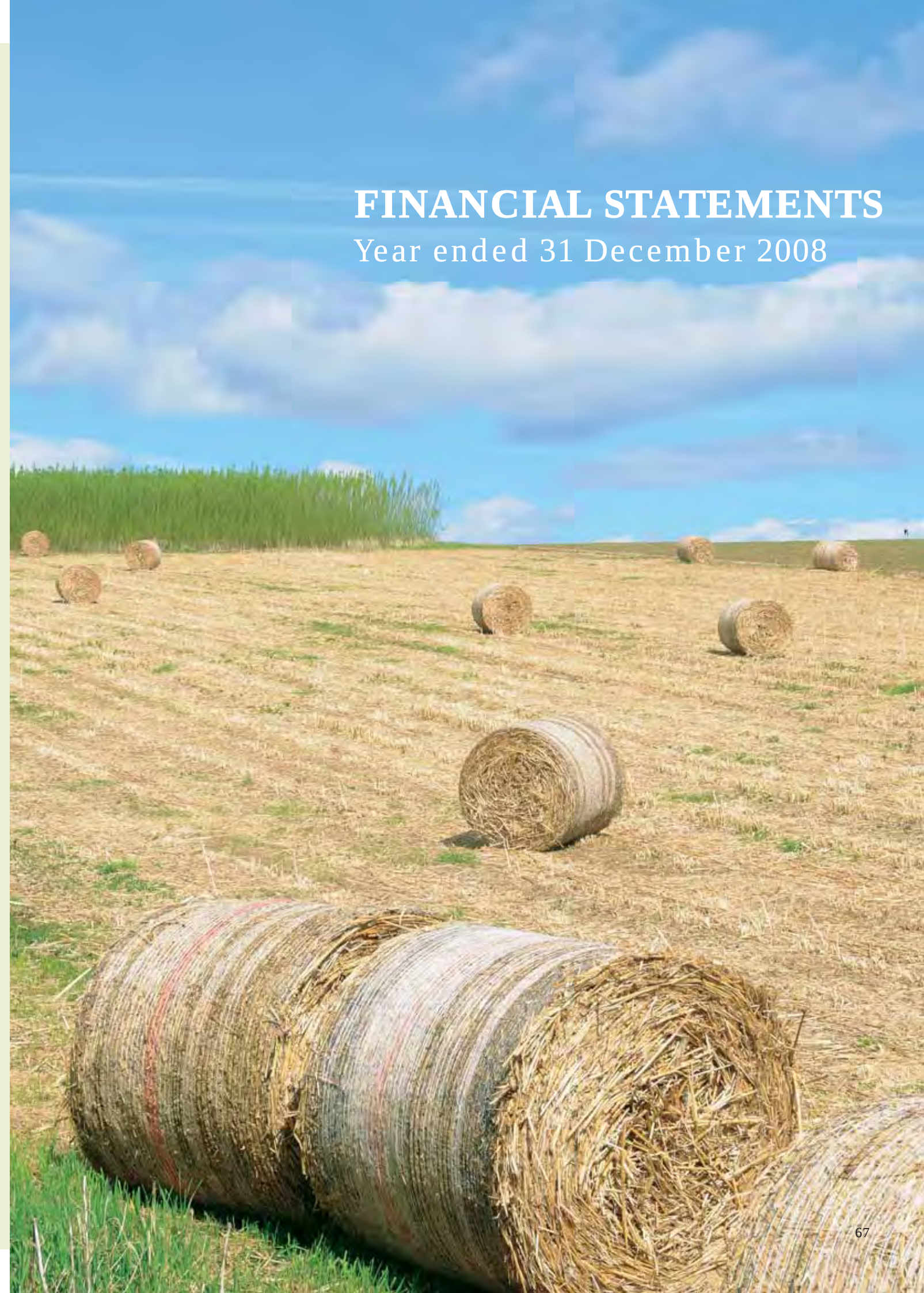
21 stakeholder partnership groups met in 2008 representing 12 enterprises. 81 organisations and 79 operators attended stakeholder partnership meetings.

Internal Customer

Internal Customer Service Protocols agreed by Partnership and Senior Management issued to all staff.

FINANCIAL STATEMENTS

Year ended 31 December 2008





FINANCIAL STATEMENTS

Year ended 31 December 2008

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REPORT OF THE COMPTROLLER & AUDITOR GENERAL

for presentation to the Houses of the Oireachtas

I have audited the financial statements of Teagasc for the year ended 31 December 2008 under the Agriculture (Research, Training and Advice) Act 1988.

The financial statements, which have been prepared under the accounting policies set out therein, comprise the Accounting Policies, the Income and Expenditure Account, the Statement of Total Recognised Gains and Losses, the Balance Sheet, the Cash Flow Statement, and the related notes.

Respective Responsibilities of the Members of the Authority and the Comptroller and Auditor General

The Authority is responsible for preparing the financial statements in accordance with the Agriculture (Research, Training and Advice) Act 1988, and for ensuring the regularity of transactions. The Authority prepares the financial statements in accordance with Generally Accepted Accounting Practice in Ireland. The accounting responsibilities of the Members of the Authority are set out in the Statement of Responsibilities of the Authority.

My responsibility is to audit the financial statements in accordance with relevant legal and regulatory requirements and International Standards on Auditing (UK and Ireland).

I report my opinion as to whether the financial statements give a true and fair view, in accordance with Generally Accepted Accounting Practice in Ireland. I also report whether in my opinion proper books of account have been kept. In addition, I state whether the financial statements are in agreement with the books of account.

I report any material instance where moneys have not been applied for the purposes intended or where the transactions do not conform to the authorities governing them.

I also report if I have not obtained all the information and explanations necessary for the purposes of my audit.

I review whether the Statement on Internal Financial Control reflects the Authority's compliance with the Code of Practice for the Governance of State Bodies and report any material instance where it does not do so, or if the statement is misleading or inconsistent with other information of which I am aware from my audit of the financial statements. I am not required to consider whether the Statement on Internal Financial Control covers all financial risks and controls, or to form an opinion on the effectiveness of the risk and control procedures.

I read other information contained in the Annual Report, and consider whether it is consistent with the audited financial statements. I consider the implications for my report if I become aware of any apparent misstatements or material inconsistencies with the financial statements.

Basis of Audit Opinion

In the exercise of my function as Comptroller and Auditor General, I conducted my audit of the financial statements in accordance with International Standards on Auditing (UK and Ireland) issued by the Auditing Practices Board and by reference to the special considerations which attach to State bodies in relation to their management and operation. An audit includes examination, on a test basis, of evidence relevant to the amounts and disclosures and regularity of the financial transactions included in the financial statements. It also includes an assessment of the significant estimates and judgments made in the preparation of the financial statements, and of whether the accounting policies are appropriate to the Authority's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations that I considered necessary in order to provide me with sufficient evidence to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or other irregularity or error. In forming my opinion I also evaluated the overall adequacy of the presentation of information in the financial statements.

REPORT OF THE COMPTROLLER & AUDITOR GENERAL

for presentation to the Houses of the Oireachtas

Emphasis of Matter - Staff Expenditure

In the course of the audit it was noted that certain expenditure was incurred on staff entertainment and travel which was not wholly business related. The gross outlay involved was of the order of €80,000. However, because of the mixed objectives of the spend some of which related to staff development it was not possible to precisely quantify the non-effective element. I have been assured by the Authority that on foot of a review of the matter appropriate policies on staff entertainment and foreign travel have now been devised and published, improved guidance on the application of budgets has been put in place and staff have been reminded of the acceptable use of public funds in relation to entertainment type expenditure.

Opinion

In my opinion, the financial statements give a true and fair view, in accordance with Generally Accepted Accounting Practice in Ireland, of the state of the Authority's affairs at 31 December 2008 and of its income and expenditure for the year then ended.

In my opinion, proper books of account have been kept by the Authority. The financial statements are in agreement with the books of account.

John Buckley
Comptroller and Auditor General
30 June 2009

STATEMENT ON INTERNAL FINANCIAL CONTROL

On behalf of the Authority of Teagasc I acknowledge our responsibility for ensuring that an effective system of internal financial control is maintained and operated.

Any system of internal financial control can provide only reasonable and not absolute assurance against material error, misstatement or loss. In considering the effectiveness of internal financial controls, the Authority and its Audit Committee have regard, among other things, to the requirements of the Code of Practice for the Governance of State Bodies.

The Authority has taken steps to ensure that an appropriate control environment is in place by:

- clearly defining management responsibilities, authority and accountability;
- establishing formal procedures for monitoring the activities and safeguarding the assets of Teagasc;
- developing a culture of accountability across all levels of the organisation.

The Authority has established procedures to identify business risks within Teagasc by:

- identifying the nature, extent and financial implication of risks facing Teagasc including the extent and categories which it regards as acceptable;
- assessing the likelihood of identified risks occurring;
- assessing Teagasc's ability to manage and mitigate the risks that do occur;
- assessing the costs of operating particular controls relative to the benefit obtained.

The system of internal financial control is based on a framework of regular management reporting, administration procedures including segregation of duties and a system of delegation and accountability including:

- a comprehensive annual budgeting and financial reporting system which is reviewed and approved by the Authority;
- regular reviews by the Authority of overall strategy, business and financial plans and variances against operating and capital budgets.

Teagasc has an internal audit function, which operates in accordance with the requirements of the Code of Practice for the Governance of State Bodies and with the effectiveness criteria set out in the Teagasc Statement of Strategy published in 2007. The work of internal audit is informed by analysis of the risks to which Teagasc is exposed and annual internal audit plans are based on this analysis. The internal audit plans are approved by the Audit Committee. In 2008 the Authority retained an external expert to advise the Audit Committee.

The Authority's monitoring and review of the effectiveness of the system of internal financial control is informed by the work of the internal auditor, the Audit Committee which oversees the work of the internal auditor, the executive managers within Teagasc responsible for the development and maintenance of the financial control framework and comments made by the Comptroller and Auditor General in his management letter.

I confirm that the Authority conducted a review of the effectiveness of the systems of internal financial control in 2008 and implemented appropriate actions.

The report on the 'Review of Effectiveness of System of Internal Financial Control' was approved by the Authority at its meeting of 7 January 2009. The Audit Committee considered the report and some further background information on the review as presented by the Internal Auditor at its meeting of 4 February 2009.

Dr. Noel Cawley
Chairman
24 June 2009

STATEMENT OF RESPONSIBILITIES OF THE AUTHORITY

Under Section 12(1) of the Agriculture (Research, Training and Advice) Act, 1988, the Authority is required to prepare financial statements in such form as may be approved by the Minister for Agriculture, Fisheries and Food with the concurrence of the Minister for Finance. In preparing those financial statements, the Authority is required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that Teagasc will continue in operation;
- disclose and explain any material departures from applicable accounting standards.

The Authority is responsible for keeping proper books of account which disclose with reasonable accuracy at any time the financial position of Teagasc and which enable it to ensure that the financial statements comply with statutory requirements. The books of account are kept at the Authority's headquarters at Oak Park, Carlow. The Authority is also responsible for safeguarding the assets of Teagasc and for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Dr. Noel Cawley
Chairman
24 June 2009

James Brett
Member of the Authority

ACCOUNTING POLICIES

The significant accounting policies adopted by Teagasc are as follows:

Basis of accounting
The Financial Statements have been prepared in accordance with the historical cost convention, subject to certain assets being included at a valuation (see below), and in a form approved by the Minister for Agriculture, Fisheries and Food with the consent of the Minister for Finance under the Agriculture (Research, Training and Advice) Act, 1988. The Financial Statements have been prepared using the accruals method of accounting except as stated below and in accordance with generally accepted accounting practices. Financial Reporting Standards recommended by the recognised accountancy bodies are adopted as they become applicable.

State funding
State funding for research in the Food sector and for the Stimulus collaborative research programme is accounted for on an accruals basis. All other State funding is accounted for on a cash receipts basis.

Research and other projects
Grants in respect of research and other projects are included as income in the year in which the related expenditure is incurred.

Tangible fixed assets and depreciation
Assets were taken over from An Chomhairle Oiliúna Talmhaíochta and An Foras Talúntais on 8th September 1988 at the closing values in the Balance Sheets of those bodies. Additions are stated at cost.

Land is not depreciated. The cost or valuation of other owned fixed assets is written off by equal instalments over their expected useful lives as follows:

Farm Buildings	20 years
Other Buildings	50 years
Plant and Vehicles	5 years
Computer Equipment	3 years
Laboratory and Office Equipment	10 years

Assets held under finance leases are depreciated over the lease term, where this is shorter than their expected useful lives.

A half year's depreciation is charged in the years of acquisition and disposal of assets.

Leases
Fixed assets acquired under finance leases are treated in accordance with the policy noted above under fixed assets. The capital element of related rental obligations is included under liabilities, while the interest element is charged to expenditure over the term of the primary lease period.

Rentals on operating leases are charged to expenditure as incurred.

Capital account
The balance on this account represents the unamortised value of funds used to purchase fixed assets.

Stocks
Stocks have been valued by Teagasc officials. Livestock and own farm produce are valued at estimated net realisable value. Net realisable value is determined on the basis that animals are sold for slaughter. Gains and losses, which arise from these valuations, are reflected in full in operational income. All other stocks are valued at the lower of cost and net realisable value.

Debtors
Known bad debts are written off as they arise and specific provision is made where recovery is considered doubtful.

ACCOUNTING POLICIES

Pensions

Teagasc operates defined benefit pension schemes which are funded annually on a pay as you go basis from monies available to it, including monies provided by the Department of Agriculture, Fisheries and Food, and from contributions deducted from staff salaries.

Pension Scheme liabilities are measured on an actuarial basis using the projected unit method.

Pension costs reflect pension benefits earned by employees in the period and are shown net of staff pension contributions which are retained by Teagasc. An amount corresponding to the pension charge is recognised as income to the extent that it is recoverable, and offset by grants received in the year to discharge pension payments.

Actuarial gains or losses arising from changes in Actuarial assumptions and from experience surpluses and deficits are recognised in the Statement of Total Recognised Gains and Losses for the year and a corresponding adjustment is recognised in the amount recoverable from the Department of Agriculture, Fisheries and Food.

Pension liabilities represent the present value of future pension payments earned by staff to date. Deferred pension funding represents the corresponding asset to be recovered in future periods from the Department of Agriculture, Fisheries and Food.

Moorepark Technology Limited

Moorepark Technology Limited is a joint venture between Teagasc and various agriculture co-operatives. Teagasc has a 57% holding in the paid up share capital of the company. Separate audited financial statements have been prepared in respect of Moorepark Technology Limited. It was not considered appropriate to consolidate the results of the company (Note 14).

Foreign Currency

Transactions denominated in foreign currencies are translated into Euro and recorded at the rates of exchange ruling at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies are translated into Euro at the rates of exchange ruling at the balance sheet date.

INCOME AND EXPENDITURE ACCOUNT

Year ended 31 December 2008

		31 December 2008 €'000	31 December 2007 €'000
	Notes		
Income			
State funding	2	148,873	149,802
EU funding	3	1,684	1,361
Operational income	4	32,252	30,413
Net deferred funding for pensions	9	21,982	26,162
Surplus on disposal of fixed assets	24	4,616	36,878
Other grants, donations and voluntary levies		3,395	3,320
		<u>212,802</u>	<u>247,936</u>
Expenditure	5	<u>213,933</u>	<u>205,106</u>
		(1,131)	42,830
Transfer to Capital Account	12	(10,936)	(3,594)
Transfer to Exchequer	24	<u>0</u>	<u>(9,400)</u>
(Deficit)/Surplus for the financial year		<u>(12,067)</u>	<u>29,836</u>
Balance at beginning of year		<u>31,037</u>	<u>1,201</u>
Balance at end of year		<u>18,970</u>	<u>31,037</u>

STATEMENT OF TOTAL RECOGNISED GAINS AND LOSSES

		31 December 2008 €'000	31 December 2007 €'000
	Notes		
(Deficit)/Surplus for the financial year		(12,067)	29,836
Experience losses on pension scheme liabilities	9	(5,155)	(17,031)
Changes in assumptions underlying the present value of pension liabilities	9	<u>(8,539)</u>	<u>169,389</u>
Actuarial (Loss)/Gain on pension liabilities		(13,694)	152,358
Adjustment to Deferred pension funding		<u>13,694</u>	<u>(152,358)</u>
Total Recognised (Loss)/Gain for the year		<u>(12,067)</u>	<u>29,836</u>

The above amounts relate entirely to continuing operations. The Statement of Accounting Policies and notes 1 to 26 form part of these Financial Statements.

Dr. Noel Cawley
Chairman

Professor Gerry Boyle
Director

BALANCE SHEET

Year ended 31 December 2008

		31 December 2008 €'000	31 December 2007 €'000
	Notes		
Fixed assets			
Tangible assets	13	94,338	83,402
Financial assets	14	2	2
		<u>94,340</u>	<u>83,404</u>
Current assets			
Stocks	16	5,543	5,145
Debtors	17	9,437	7,603
Bank balances		30,236	41,992
Short term deposits		598	677
		<u>45,814</u>	<u>55,417</u>
Creditors - Amounts falling due within one year			
Creditors and accruals	18	13,635	15,294
Deferred income	19	13,211	9,088
		<u>26,846</u>	<u>24,382</u>
Net current assets		<u>18,968</u>	<u>31,035</u>
Total assets less current liabilities before pensions		113,308	114,439
Deferred pension funding	9	871,574	835,898
Pension liabilities	9	(871,574)	(835,898)
		<u>0</u>	<u>0</u>
Net assets		<u>113,308</u>	<u>114,439</u>
Represented by			
Capital account	12	94,338	83,402
Income and Expenditure account		18,970	31,037
		<u>113,308</u>	<u>114,439</u>

The Statement of Accounting Policies and notes 1 to 26 form part of these Financial Statements.

Dr. Noel Cawley
Chairman

Professor Gerry Boyle
Director

CASH FLOW STATEMENT

Year ended 31 December 2008

		31 December 2008 €'000	31 December 2007 €'000
	Notes		
Reconciliation of operating surplus to net cash inflow from operating activities			
Operating (deficit) / surplus		(12,067)	29,836
Depreciation	13	6,953	6,748
Transfer to capital account	12	10,936	3,594
Interest received		(1,643)	(839)
Profit on sale of fixed assets		(4,616)	(36,878)
(Increase) in stocks		(398)	(181)
(Increase) in debtors		(1,834)	(2,383)
(Decrease) / Increase in creditors and long term liabilities		(1,659)	413
Increase in deferred income		<u>4,123</u>	<u>4,718</u>
Net cash (outflow) / inflow from operating activities		<u>(205)</u>	<u>5,028</u>
CASH FLOW STATEMENT			
Net cash (outflow) / inflow from operating activities		<u>(205)</u>	<u>5,028</u>
Return on investment and servicing of finance			
Interest received		<u>1,643</u>	<u>839</u>
Net cash inflow from returns on investment and servicing of finance		<u>1,643</u>	<u>839</u>
Investing activities			
Payments to acquire tangible fixed assets	13	(18,185)	(10,586)
Receipts from disposals of tangible fixed assets		<u>4,912</u>	<u>37,126</u>
Net cash outflow from investing activities		<u>(13,273)</u>	<u>26,540</u>
Financing			
Property loan repayments		<u>0</u>	<u>(4)</u>
Net cash outflow from financing		<u>0</u>	<u>(4)</u>
(Decrease) / Increase in cash	23	<u>(11,835)</u>	<u>32,403</u>
Reconciliation of net cashflow to movement in net funds			
Increase in cash	23	(11,835)	32,403
Net funds at 1 January		<u>42,669</u>	<u>10,266</u>
Net funds at 31 December		<u>30,834</u>	<u>42,669</u>

The Statement of Accounting Policies and notes 1 to 26 form part of these Financial Statements.

Dr. Noel Cawley
Chairman

Professor Gerry Boyle
Director

NOTES TO THE FINANCIAL STATEMENTS

1 Teagasc (the Agriculture and Food Development Authority)

Teagasc (the Agriculture and Food Development Authority) was established under the Agriculture (Research, Training and Advice) Act, 1988. Under Section 21 of the Act, the assets and liabilities of An Chomhairle Oiliúna Talmhaíochta and An Foras Talúntais were transferred to Teagasc upon its establishment.

Section 12 of the Act requires that Accounts shall be kept in such form as may be approved by the Minister for Agriculture, Fisheries and Food with the concurrence of the Minister for Finance. This approval was given on 14 August 1998.

2 State funding	2008 €'000	2007 €'000
The amount shown under this heading comprises:		
Vote 31: Agriculture, Fisheries and Food		
Grant-in-aid for general expenses (including Grant for capital purposes, €3m, 2007 - €5m)	100,610	102,509
Grant-in-aid for superannuation purposes	26,754	25,541
Grant-in-aid for human resource purposes	12,600	12,400
Food research and agriculture research	5,372	6,442
Stimulus collaborative research programme	2,839	2,080
Grant for forestry publicity and awareness	528	795
Grant for forestry training	170	35
	<u>148,873</u>	<u>149,802</u>
3 EU funding	2008 €'000	2007 €'000
Farm Survey Income	269	233
Framework Programme VI	1,343	1,128
Framework Programme VII	72	0
	<u>1,684</u>	<u>1,361</u>

Framework Programmes have been the main financial tools through which the European Union supports research and development activities covering almost all scientific disciplines. Framework Programmes cover a period of five years with the last year of one Framework Programme and the first year of the following Framework Programme overlapping. Framework Programme VI ran up to the end of 2007. Framework Programme VII started on 1 January 2008 and runs to the end of 2013.

Teagasc carries out EU funded research through the Framework Programmes. Grants in respect of such research are taken into account as income when the corresponding expenditure has been incurred.

NOTES TO THE FINANCIAL STATEMENTS ...continued

4 Operational income		2007 €'000	2008 €'000	2007 €'000	2008 €'000
Operational income	Advisory service fees	15,269	16,209		
	Other fees	7,487	7,483		
	Livestock trading (Note 7)	2,541	2,919		
	Other farming operations	2,661	2,835		
	Canteen receipts	380	385		
	Publications and miscellaneous	2,075	2,421		
		<u>30,413</u>	<u>32,252</u>		
	Authority, Headquarters and National				
	€'000				
Expenditure	Pay (Note 8)	90,455	96,802		
	Pensions (Note 9)	57,631	54,957		
	Travelling and subsistence	7,617	8,058		
	General operating expenses (Note 6)	33,715	37,359		
	Interest and lease charges	18	33		
	Depreciation (Note 13)	6,748	6,953		
	Grants to private colleges (Note 15)	4,697	5,286		
	Other grants	4,225	4,485		
		<u>205,106</u>	<u>213,933</u>		
	Food Research				
	€'000				
Operational income	Advisory Service				
	€'000				
	Training and Development				
	€'000				
	Agricultural Production Research				
	€'000				
Expenditure	Food Research				
	€'000				
	Training and Development				
	€'000				
	Agricultural Production Research				
	€'000				

NOTES TO THE FINANCIAL STATEMENTS ...continued

6 Analysis of general operating expenses	Authority, Headquarters and National	Advisory Service	Training and Development	Agricultural Production Research	Food Research	2007	
						€'000	€'000
Farming supplies / services	2	12	1,613	2,370	11	4,008	3,087
Maintenance / repairs	632	1,288	1,670	1,901	2,416	7,907	6,375
Rents / rates / insurances	40	799	380	1,038	482	2,739	2,370
Postage / telephones	672	1,175	169	304	127	2,447	2,417
Power / fuel / petrol	124	448	563	1,006	523	2,664	2,185
Laboratory supplies	1,405	2	122	1,113	1,128	3,770	4,087
Printing / stationery / publicity	1,912	991	417	385	191	3,896	3,768
Seminar / classroom / library supplies	386	274	236	121	311	1,328	1,251
Services of external agencies	1	338	12	287	39	677	454
Student and staff canteen supplies	0	1	518	184	83	786	668
ICT supplies / services	1,058	121	401	473	405	2,458	3,169
Legal / professional fees (Note 10)	1,051	66	204	327	220	1,868	1,953
Miscellaneous programme costs	2	36	204	824	885	1,951	1,737
Special events and miscellaneous	46	371	27	394	22	860	194
	7,331	5,922	6,536	10,727	6,843	37,359	33,715

NOTES TO THE FINANCIAL STATEMENTS ...continued

7 Livestock trading surplus	2008		2007	
	€'000		€'000	
Sales	2,833		2,675	
Grants and subsidies	789		699	
Total livestock trading revenue	3,622		3,374	
Opening stock	4,187		4,167	
Purchases	1,217		853	
Less: Closing stock	5,404 (4,701)		5,020 (4,187)	
Total cost of livestock sales	703		833	
Surplus to Income and Expenditure account (Note 4)	2,919		2,541	

8 Staff	2008		2007	
The average number of staff employed during the year was as follows:				
Professional	824		796	
Technical	199		210	
Administrative/clerical	282		288	
Farm/domestic	285		302	
	1,590		1,596	

9 Superannuation

Section 9 of the Agriculture (Research, Training and Advice) Act, 1988 provides for the establishment of schemes for the granting of superannuation benefits in respect of staff appointed by Teagasc and staff transferred to Teagasc from An Chomhairle Oiliúna Talmhaíochta and from An Foras Talúntais.

Pending the approval of draft superannuation schemes by the Minister for Agriculture, Fisheries and Food, the Minister for Finance and the Oireachtas, Teagasc operates superannuation schemes on an administrative basis.

Teagasc also administers two superannuation schemes (the Agricultural Colleges Staff Superannuation Scheme 1985 and the Agricultural Colleges Spouses' and Children's Contributory Pension Scheme 1985) in respect of certain staff employed by privately-owned Colleges of Agriculture and Horticulture, the cost of whose salaries is borne by the Exchequer through the agency of Teagasc.

The above schemes are defined benefit superannuation schemes. No separate fund is maintained, and no assets are held, to finance the payment of pensions and gratuities. The actuarial estimate of future liabilities accruing in regard to future benefits is shown on the Balance Sheet.

The average number of monthly pensions paid during the year was 1,432 (2007 – 1,425).

NOTES TO THE FINANCIAL STATEMENTS ...continued

Superannuation costs

(i) Analysis of total pension costs charged to income and expenditure account

	2008 €'000	2007 €'000
Current service cost	14,462	18,410
Interest on scheme liabilities	45,454	43,849
Staff contributions	(4,959)	(4,628)
	<u>54,957</u>	<u>57,631</u>

(ii) Movement in net pension liability during the financial year

	2008 €'000	2007 €'000
Net pension liability at 1 January	835,898	962,094
Current service cost	14,462	18,410
Benefits paid	(37,934)	(36,097)
Interest on scheme liabilities	45,454	43,849
Actuarial loss / (gain)	13,694	(152,358)
	<u>871,574</u>	<u>835,898</u>

(iii) Deferred funding asset for pensions

Teagasc recognises as an asset an amount corresponding to the unfunded deferred liability for pensions on the basis of the set of assumptions described above and a number of past events. These events include the statutory basis for the establishment of the superannuation schemes, and the policy and practice currently in place in relation to funding public service pensions including contributions by employees and the annual estimates process. While there is no formal agreement regarding these specific amounts with the Department of Agriculture, Fisheries and Food, Teagasc has no evidence that this funding policy will not continue to meet such sums in accordance with current practice.

	2008 €'000	2007 €'000
Net deferred funding for pensions in the year		
Funding recoverable in respect of current years pensions	59,916	62,259
Resources applied to pay pensions	(37,934)	(36,097)
	<u>21,982</u>	<u>26,162</u>

The deferred funding asset for pensions as at 31 December 2008 was €872 million (2007 - €836 million).

(iv) History of defined benefit obligations	2008 €'000	2007 €'000	2006 €'000
Experience losses	(5,155)	(17,031)	(26,362)
Percentage of present value of scheme liabilities	0.6%	2.0%	2.7%
Changes in Assumptions	(8,539)	169,389	14,999
Percentage of present value of scheme liabilities	0.98%	20.3%	2.6%
Actuarial (loss) / gain recognised in the STRGL	(13,694)	152,358	(11,363)

NOTES TO THE FINANCIAL STATEMENTS ...continued

The cumulative actuarial loss recognised in the Statement of Total Recognised Gains and Losses amounts to €11,329,000.

(v) General Description of the Scheme

The pension scheme is a defined benefit final salary pension arrangement with benefits and contributions defined by reference to current “model” public sector scheme regulations. The scheme provides a pension (eightieths per year of service), a gratuity lump sum (three eightieths per year of service) and spouse’s and children’s pensions. Normal retirement age is a members 65th birthday, and pre 2004 members have an entitlement to retire without actuarial reduction from age 60. Pensions in payment (and deferment) normally increase in line with general public sector salary inflation.

The valuation used for FRS17 disclosures has been based on an actuarial valuation by a qualified independent actuary on 28 January 2009 to take account of the requirements of FRS17 (revised) in order to assess the scheme liabilities at 31 December 2008.

The principal actuarial assumptions used to calculate liabilities under FRS17 are as follows:

	2008 % per annum	2007 % per annum
Inflation rate increase	2.00	2.50
Salary rate increase	3.50	4.00
Pension rate increase	3.50	3.50
Scheme liabilities discount rate	5.70	5.50

The mortality basis adopted allows for improvements in life expectancy over time, so that life expectancy at retirement will depend on the year in which a member attains retirement age (age 65). The table below shows the life expectancy for members attaining age 65 in 2008, 2028 and 2048.

Year of attaining 65	2008	2028	2048
Life expectancy-male	85.7	86.8	86.8
Life expectancy-female	88.8	89.8	89.8

On the basis of these and other assumptions and applying the projected unit method prescribed in FRS17, the present value of pension scheme liabilities is as follows:

	2008 €'000	2007 €'000
Accumulated liabilities in respect of active scheme members	367,429	344,604
Liabilities in respect of existing pensioners and deferred pensions	504,145	491,294
	<u>871,574</u>	<u>835,898</u>

Demographic assumptions have changed and have resulted in an actuarial loss.

(vi) Revised FRS 17 Disclosures

The information on pensions has been presented in line with new disclosure requirements required from 2008 under an amendment to FRS 17.

10 Audit fee

A provision of €50,500 has been included in expenditure in respect of auditor's remuneration for 2008 (2007 - €50,500).

NOTES TO THE FINANCIAL STATEMENTS ...continued

11 Authority fees and emoluments

The following emoluments were paid to members of the Authority:

	2008 €'000	2007 €'000
Chairman	24	24
Other Authority members	124	124
	<u>148</u>	<u>148</u>

These amounts are included in the total pay expenditure included under Note 5 above.

12 Capital account

	2008 €'000	2007 €'000
Balance at 1 January	<u>83,402</u>	<u>79,808</u>
Transfers from income and expenditure account		
Amount capitalised in respect of purchased assets	18,185	10,586
Net amount released on disposals	(296)	(248)
Property loan repayments	<u>0</u>	<u>4</u>
	17,889	10,342
Less: Amortised in line with asset depreciation	<u>(6,953)</u>	<u>(6,748)</u>
	<u>10,936</u>	<u>3,594</u>
Balance at 31 December	<u>94,338</u>	<u>83,402</u>

13 Tangible fixed assets

	Land €'000	Buildings €'000	Plant & equipment €'000	Total €'000
Cost or valuation				
At beginning of year	5,810	86,997	62,155	154,962
Additions	0	13,188	4,997	18,185
Disposals	0	(129)	(7,275)	(7,404)
At end of year	<u>5,810</u>	<u>100,056</u>	<u>59,877</u>	<u>165,743</u>
Accumulated depreciation				
At beginning of year	0	30,107	41,453	71,560
Charge for year	0	2,341	4,612	6,953
Disposals	0	(124)	(6,984)	(7,108)
At end of year	<u>0</u>	<u>32,324</u>	<u>39,081</u>	<u>71,405</u>
Net book amounts				
At beginning of year	<u>5,810</u>	<u>56,890</u>	<u>20,702</u>	<u>83,402</u>
At end of year	<u>5,810</u>	<u>67,732</u>	<u>20,796</u>	<u>94,338</u>

NOTES TO THE FINANCIAL STATEMENTS ...continued

Included in the opening balances is land totalling 522.8 ha (1,291.3 acres) transferred by the Department of Agriculture, Fisheries and Food at nominal values, and certain other assets which were revalued at 31 December 1975 or 1 July 1980.

Teagasc has the use of 38.0 ha (94 acres) of land owned by the Department of Agriculture & Food, while the Department has the use of 27.1 ha (67 acres) owned by Teagasc. There is no charge to either party arising from these arrangements.

Certain fixed assets entrusted to Teagasc are protected by statute, and may not be sold.

14 Financial assets

Teagasc has a 57% holding in the paid up share capital of Moorepark Technology Limited (5,100 shares at €0.127). The Company, which was incorporated on 18 January 1991, is a joint venture between Teagasc and various agriculture co-operatives.

Separate audited financial statements have been prepared in respect of the Company and its results for the year ended 31 December 2008 were as follows:

	2008 €'000	2007 €'000
Turnover	<u>1,123</u>	<u>1,184</u>
Operating profit before depreciation, interest and tax	248	199
Depreciation (net of grants amortised)	(248)	(199)
Interest receipts	4	6
Tax	<u>2</u>	<u>0</u>
Profit after taxation	<u>6</u>	<u>6</u>
Accumulated profits to 31 December	<u>33</u>	<u>27</u>

The Company's Memorandum of Association provides that shareholders are entitled to avail of the Company's services at preferential rates.

Trading transactions between Teagasc and Moorepark Technology Limited (which consists of consultancy, analyses and use of technical and other facilities) were as follows:

	2008 €'000	2007 €'000
Moorepark Technology Limited sales to Teagasc (included in turnover)	378	251
Other recoupments from Teagasc (deducted from cost of sales)	<u>0</u>	<u>0</u>
Total	<u>378</u>	<u>251</u>
Amounts owed to Moorepark Technology Limited at 31 December	<u>69</u>	<u>35</u>
Teagasc sales to Moorepark Technology Limited	<u>140</u>	<u>163</u>
Amounts owed to Teagasc at 31 December	<u>6</u>	<u>47</u>

Under the terms of the Moorepark Technology Limited Promoters' Agreement, Teagasc has undertaken to provide from its own resources specified staff requirements in Moorepark Technology Limited, as well as underwriting the Company's utility, stores, accounts and effluent overheads. These costs were as follows:

NOTES TO THE FINANCIAL STATEMENTS ...continued

	2008 €'000	2007 €'000
Staff	185	177
Other	190	162
These totals are included in Teagasc expenditure under Food Research (Notes 5 and 6).		
Moorepark Technology Limited utilises assets owned by Teagasc as follows:		
	2008 €'000	2007 €'000
Original Costs	1,196	1,196
Net Book Value at 31 December	53	97
These amounts are included under Plant and Equipment (see Note 13 above).		
In accordance with the Promoters' Agreement, Teagasc has also leased to Moorepark Technology Limited at a nominal rent of €127 per annum its existing processing hall at Moorepark Dairy Products Centre together with an adjoining site on which the Company has constructed additional facilities.		
It was not considered appropriate to consolidate the results of the Company.		
Teagasc has three small investments in agricultural co-operatives costing €1,243 in total (2007 - €1,243).		
15 Private Colleges		
Teagasc provides support to four private agricultural colleges as follows:		
	2008 €'000	2007 €'000
Grants to private colleges	5,286	4,697
Staff seconded to private colleges (included in the total pay expenditure in Note 5 above)	513	514
	<u>5,799</u>	<u>5,211</u>
16 Stocks		
	2008 €'000	2007 €'000
Livestock	4,701	4,187
Farm produce, fertilisers and feeding stocks	668	695
General supplies	174	263
	<u>5,543</u>	<u>5,145</u>

NOTES TO THE FINANCIAL STATEMENTS ...continued

17 Debtors and prepayments	2008 €'000	2007 €'000
Trade debtors	4,799	4,357
Other debtors, prepayments and accrued income	4,638	3,246
	<u>9,437</u>	<u>7,603</u>
All amounts included above fall due within one year.		
18 Creditors - Amounts falling due within one year	2008 €'000	2007 €'000
Trade creditors	2,143	2,987
Income tax deducted under PAYE	1,805	1,658
Pay related social insurance	814	707
Value added tax	313	1,866
Withholding tax	163	166
Other creditors and accruals	<u>8,397</u>	<u>7,910</u>
	<u>13,635</u>	<u>15,294</u>
Creditors for taxation and social welfare included above	<u>3,095</u>	<u>4,397</u>

19 Deferred income

Teagasc carries out public funded research in accordance with contracts with other State Institutions, principally the Department of Agriculture, Fisheries and Food. Grants in respect of such research are taken into account as income when the corresponding expenditure has been incurred under each contract.

At 31 December the source and amount of deferred income in respect of research and other projects was as follows:

	2008 €'000	2007 €'000
Department of Agriculture, Fisheries and Food – advance for FIRM projects	2,806	1,625
Department of Agriculture, Fisheries and Food – advance for Stimulus projects	3,879	4,197
European Science Foundation – Food Safety Promotion	480	429
Other research related deferrals	4,859	1,566
Amounts received in advance for work associated with the completion of sale of land at Athenry	1,187	1,271
	<u>13,211</u>	<u>9,088</u>

20 Finance leases

At 31 December 2008 Teagasc had no obligations under finance leases (2007 - Nil).

There were no finance charges incurred during the year under finance leases (2007 - Nil).

21 Capital commitments

Capital commitments outstanding at 31 December 2008 amounted to €7.20 million (2007 - €5.08 million).

NOTES TO THE FINANCIAL STATEMENTS ...continued

22 Operating leases

At 31 December 2008 Teagasc had annual commitments under non-cancellable operating leases as follows:

	Land and buildings €'000	Plant and machinery €'000	Total €'000
Leases which expire:			
Within one year	11	46	57
Between two and five years	269	101	370
After five years	119	0	119
	<u>399</u>	<u>147</u>	<u>546</u>

23 Analysis of changes in net funds during the year

	1 January 2008 €'000	Cashflows €'000	31 December 2008 €'000
Cash at bank and on hand	41,992	(11,756)	30,236
Bank overdraft	0	0	0
Short-term deposits	677	(79)	598
At end of year	<u>42,669</u>	<u>(11,835)</u>	<u>30,834</u>

24 Disposal of Fixed Assets

	Proceeds/ Costs €'000	Proceeds/ Costs €'000
Proceeds from sale of property*		
27.1 Hectares (67 acres) at Athenry	4,702	
15 Hectares (6 acres) at Grange	150	
Cottage at Ballyhaise College	105	
Cost of sales	<u>(161)</u>	
		4,796
Proceeds of sale from other assets		116
		<u>4,912</u>
Net book value of other fixed assets disposed		<u>(296)</u>
		<u>4,616</u>

*The written down value at the start of the year of the property sold was nil.

25 Authority members – disclosure of transactions

The Authority has adopted procedures in accordance with the guidelines issued by the Department of Finance in relation to the disclosure of interest by Authority members and the Authority has adhered to these procedures. There were no transactions in the year in relation to the Authority's activities in which board members had an interest.

26 Approval of the financial statements

The Authority approved the financial statements on 6 May 2009