

# Annual Report 2014 & Financial Statements





**Introduction**

The 2014 Annual Report is built around the goals outlined in the Teagasc Statement of Strategy. Examples of key achievements and developments for the Research, Knowledge Transfer and Operations directorates are described in the context of these goals.

**Mission**

To support science-based innovation in the agri-food sector and wider bioeconomy so as to underpin profitability, competitiveness and sustainability.

**Vision**

Teagasc wishes to be nationally and internationally recognized as the knowledge provider of choice for Ireland’s agri-food sector.

**Statement of Values**

We aim to be professional, responsive, efficient, accountable and independent while endeavouring to attain scientific excellence in all our activities and working in partnership with other organisations to meet the needs of our stakeholders.

**Contents**

Introduction	1
Chairman’s Statement	2
Report of the Director	4
Authority Members	6
Authority Committee Members	7
Senior Management	8
Organisational Chart	9
Office Locations	10
Goal 1 - Improve the competitiveness of agriculture, food and the wider bioeconomy	11
Goal 2 - Support sustainable farming and the environment	29
Goal 3 - Encourage diversification of the rural economy and enhance the quality of life in rural areas	
Goal 4 - Enhance organisational capability and deliver value for money	49
Financial Statements	63
Notes to the Financial Statements	73

# Chairman's Statement



Dr. Noel Cawley

Teagasc's advisory, education and research efforts continue to focus on assisting Irish farmers to improve the efficiency of their operations, improve the competitiveness of the sector globally, and support sustainable farming systems.

2014 was a good year for most farmers with average farm income increasing by 6% to €26,974 as measured by the Teagasc National Farm Survey. Dairy farmers had a particularly good year while winter beef finishing farms had a difficult time. By year end it was already evident that dairy markets were on a downward trajectory, which has continued during 2015.

In response to the poor safety record on farms, Teagasc redoubled its efforts in 2014 to increase awareness among rural communities of the hazards on farms and to encourage and persuade farmers, and those visiting farms, to adopt safe practices.

One of the highlights of the year was the publication of a harmonised soils map of Ireland. The Irish soils information system project was completed which details the pattern and properties of all of Ireland's 213 soil types. This project was completed with the support of the Environmental Protection Agency.

The Beef 2014 Open Day in Grange was a major success with technical messages delivered in a clear and concise way. The interest in the event was reflected in an excellent attendance.

Teagasc were active participants in the Commission for the Economic Development of Rural Ireland (CEDRA), which produced a report entitled 'Energising Ireland's Rural Economy'. Research undertaken for this report by Teagasc showed that small and medium sized towns have been affected to a greater extent by the economic downturn than cities and large towns.

A €2.5 million investment in new teaching and learning facilities at the Teagasc College of Amenity Horticulture, National Botanic Gardens, Dublin was completed and officially opened. Work on the Paddy O Keeffe Innovation Centre for the Advancement of Irish Grassland and Dairying in Moorepark was completed and is now open.

The former advisory offices in Athy, Tullow and Birr were sold during 2014. Works on a new pig research facility in Moorepark, Fermoy and on the facilities in Ashtown, Dublin for staff moving from Kinsealy, are both on-going.

I would like to thank the Minister for Agriculture, Food and the Marine, Simon Coveney TD and Ministers of State, Tom Hayes TD and Ann Phelan TD for their support for Teagasc's knowledge transfer and research activities during the year. At the end of the year, Tom Moran retired as Secretary General of the Department of Agriculture, Food and the Marine, and I would like to acknowledge his contribution over the past ten years and wish him well. I congratulate Aidan O'Driscoll on his appointment and I look forward to continuing to work with him for the advancement of the Irish agriculture and food sector.

During the year there were a number of changes to the Teagasc Authority. Eddie Downey, Marie Christie, Tom Collins and Tom Tynan stepped down from the Authority. All four made valuable and important contributions to Teagasc during their terms on the Authority and I would like to thank them for their commitment and dedication to the role. Tim O' Leary, and Joe Larkin were appointed by the Minister to the Authority in 2014, and since the year end, Liam Woulfe and Cliona Murphy have also joined the board.

I would like to thank the Director Professor Gerry Boyle, the management team, and all the staff for their professional and high quality output.

**Dr. Noel Cawley**  
*Chairman of the Teagasc Authority*

# Report of the Director



**Professor Gerry Boyle**

Fluctuations in prices for farm produce from year to year are becoming one of the biggest challenges for farmers and the agricultural sector. With reduced market supports due to successive reforms of the CAP, the prices that farmers receive are increasingly being influenced by global developments, not just in agricultural commodities but by the wider economic and political developments in countries and markets across the world. 2014 was the UN International Year of the Family Farm, and it is this family farm model that helps the Irish agricultural sector maintain its resilience in the face of such global challenges.

In Teagasc our continuing focus is on improving the efficiency of individual farms and the sector as a whole. One of the most efficient communication channels for achieving technology uptake on farms is through discussion groups. The benefits of Beef Discussion Groups were quantified in an independent report, which showed that participants in groups achieved higher output, higher costs, and higher overall gross and net margins.

The Suckler Beef Genomics Scheme is a great opportunity to bring the advantage of genomic technology to suckler farmers as has been demonstrated in the dairy industry. Teagasc and its partners are embarked on a new direction for sheep breeding, focussing on the future prospects for genetic improvement in sheep. A new research project called OVIGEN involving Teagasc, UCD, Sheep Ireland and Irish ram breeders, is assessing the possibility of identifying desirable genes in our sheep.

In dairying, we have established new joint programmes and renewed existing partnerships, with the main dairy processing companies.

The Teagasc Technology Foresight project commenced and aims to support the long-term development of a competitive, sustainable and profitable Irish Agri-Food and Bioeconomy (AFB) sector. The sector must continue to be innovative in seizing market opportunities for food and non-food products and services.

Teagasc signed a Memorandum of Understanding with the Tyndall Institute at UCC to develop a partnership to pursue projects aimed at making agriculture smarter and more efficient.

The Teagasc Pasture Profit Index is a new index for perennial Ryegrass cultivars which was developed in conjunction with the Department of Agriculture, Food and the Marine. It puts an economic value on the 16 cultivars on the recommended list.

A new white clover variety called Iona, bred by Teagasc, was released in 2014. Over the 50 years of clover breeding in Teagasc, our varieties continue to contribute significantly to Ireland's grass based livestock production systems.

The Teagasc forestry service worked with Coillte, the forest service and DAFM to provide guidance to forest owners affected by the windblow damage caused by the storm in February.

The pig research department's work is focusing on production efficiency, ante and post-mortem meat inspection as a welfare diagnostic tool, and net energy feed systems.

In mid-2014, a new cheese, Kilderry was launched to the market in Germany under the Kerrygold brand. It was developed in the food research centre in Moorepark as part of the Teagasc/Irish Dairy Board partnership.

Demand for education was at an all-time high in 2014, with demand increasing further in the current year. Last year almost 2,000 learners enrolled in agricultural college Further Education Courses and Higher Education Programme. In addition, Teagasc received 1,500 applicants for Green Cert courses in 2014, which was three times the normal level.

Farmer client numbers at the end of 2014 stood at over 43,000. Following a tender process, a strategic partner, Farm Relief Service, was appointed to assist in the delivery of a GLAS planning service for farmer clients of Teagasc.

I would like to thank all of my colleagues, both in front line and support functions in the organisation, for their commitment and hard work during the year.

**Professor Gerry Boyle**  
*Teagasc Director*

# Teagasc Authority



## Teagasc Authority

1. Mr. Brendan Gleeson, 2. Mr. Tim O'Leary  
3. Dr. Karina Pierce, 4. Dr. Noel Cawley – Chairman - Teagasc, 5. Professor Gerald Fitzgerald,  
6. Mr. Joseph Larkin, 7. Mr. Tommy Cooke, 8. Mr. Padraig Gibbons,  
9. Mr. Alan Jagoe

### New Staff Representative Appointed to Teagasc Authority 05 November 2014

Mr. Joseph Larkin was appointed to the Teagasc Authority for a five-year term by the Minister for Agriculture, Food and the Marine, Simon Coveney TD. Joe fills the position on the Teagasc authority vacated by Marie Christie who completed a five-year term in August. Joseph is the staff representative on the Authority and attended his first meeting of the Teagasc board in November.

### Nominations Committee

In 2014 the Teagasc Board established a Nominations Committee as part of the process of filling the vacancies on the Teagasc Authority. Its aim was to identify the skill set needed by potential members. The Authority approved the establishment of the Nominations Committee at its meeting on 07/01/15.



9. Mr. Alan Jagoe

## Attendance at Authority Meetings

Name	08 Jan	29 Jan	05 Feb	05Mar	02 Apr	07 May	04 Jun	02 Jul	03 Sept	01 Oct	05 Nov	03 Dec
Cawley, Dr. Noel (Chairman)	•	•	•	•	•	•	•	•	•	•	•	•
Christie, Ms. Marie	–	•	•	•	•	•	•	•				
Collins, Mr. Tom***	•	•	•	•	•	•	•	•	•	•	•	•
Cooke, Mr. Tommy	•	–	•	•	•	•	•	•	•	•	–	•
Downey, Mr. Eddie	•											
Gibbons, Mr. Padraig	•	•	•	•	•	•	•	•	•	•	•	•
Gleeson, Mr. Brendan		•	•	•	•	–	•	•	•	•	–	–
Pierce, Dr. Karina	•	•	•	•	•	•	•	•	•	•	•	•
Tynan, Mr. Tom****	•	•	•	•	•	•	•	•	•	•		
Fitzgerald, Prof. Gerald	•	•	•	•	•	•	•	•	•	•	•	•
Jagoe, Mr. Alan	•	•	•	•	–	–	•	•	•	•	•	•
O'Leary, Mr. Tim*		•	–	•	•	–	•	•	•	•	•	•
Larkin, Mr. Joe **											•	•

\*Mr. O'Leary (replacing Mr. Eddie Downey) joined the Authority effective from the February meeting.

\*\* Mr. Larkin (replacing Ms. Marie Christie) joined the Authority effective from the October meeting.

\*\*\*Mr. Collins finished on the Authority in February 2015

\*\*\*\*Mr. Tynan finished on the Authority in October 2014

Note: This schedule of attendances at meetings is provided in accordance with paragraph 3.8 of the Code of Practice for the Government of State bodies dated June 2009.

## Audit Committee

	25-Feb	02- July	29-Oct	03-Dec
Tynan, Tom (Chair)	•	•	•	
Gibbons, Padraig*	•	•	•	•
Gleeson, Brendan	–	•	•	–
Collins, Tom	•	•	•	•

\*Appointed Acting Chairman of the Committee at Authority Meeting of 3 December 2014.

## Advisory & Education Committee

	02-Apr	18-Jul	03 Sept	25 Sept	28 Oct	21 Nov	19 Dec
Cooke, Tommy (Chair)	•	•	•	•	•	•	•
Collins, Tom	•	•	•	•	•	•	•
Gibbons, Padraig	•	•	•	•	•	•	•
Christie, Marie	•	•					
Jagoe, Alan	–	•	•	•	•	•	•
O'Leary, Tim	•	•	•	•	•	•	•

## Research Committee

	04-Jun	28-Oct	19-Dec
Pierce, Dr. Karina (Chair)	•	•	•
O'Leary, Tim	–	•	•
Christie, Marie	•		
Collins, Tom	•	•	•
Fitzgerald, Ger	•	•	•
Cooke, Tommy*	•		

\*Though not a member Mr. Cooke attended this meeting.

## Operations Committee

	25-Feb	29-Aug	19-Dec
Gleeson, Brendan (Chair)	–	•	•
Cawley, Dr. Noel	•	•	•
Cooke, Tommy	–	•	•
Christie, Marie	•		

# Senior Management Team



Professor Gerry Boyle  
Director

Dr. Frank O'Mara  
Director of Research

Mr. Tom Doherty  
Chief Operating Officer

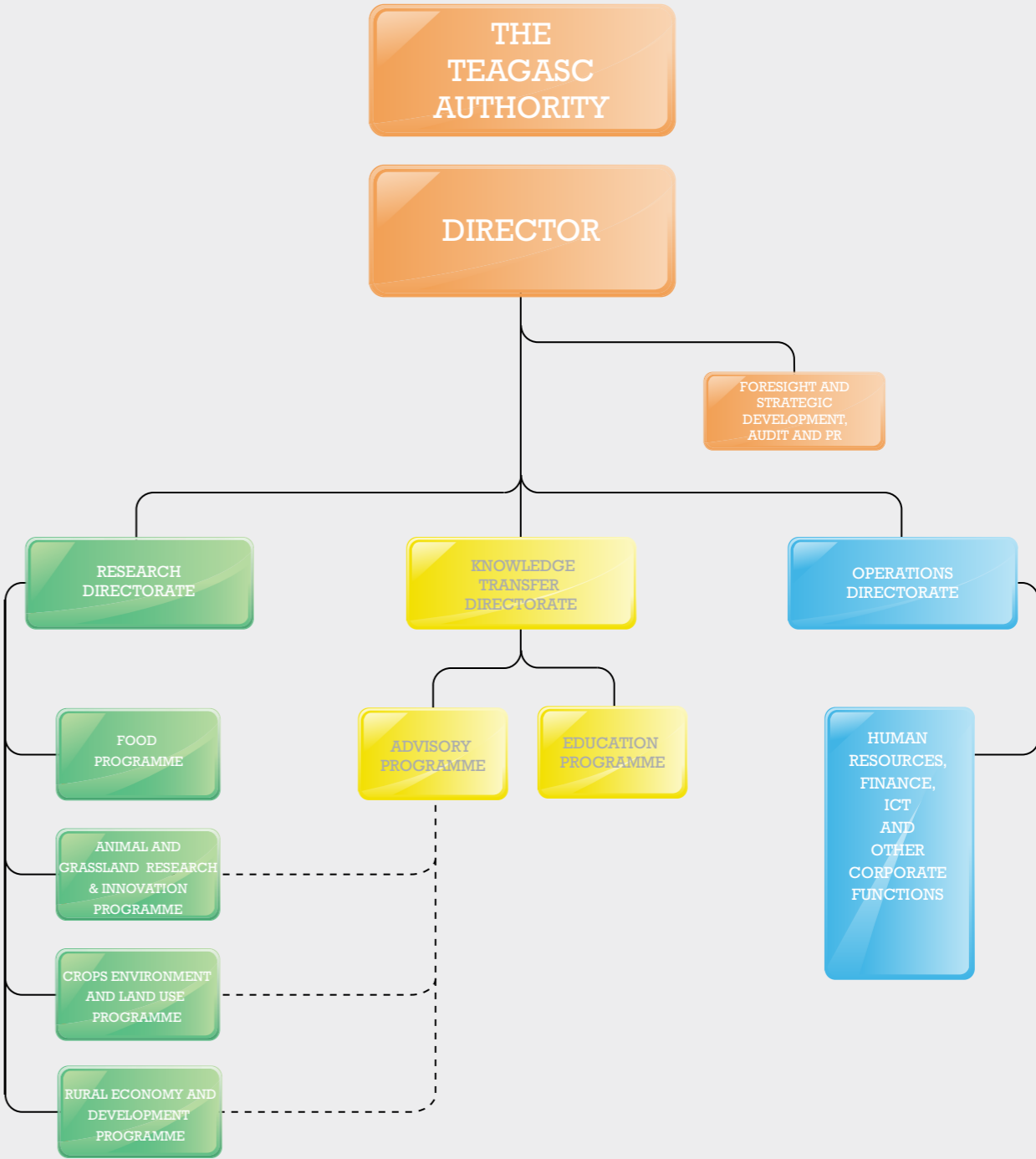
Dr. Tom Kelly  
Director of Knowledge Transfer

**Teagasc Director Reappointed**

The Teagasc Authority reappointed Professor Gerry Boyle as Director of Teagasc for a second term. The appointment, subject to contract, will be for a three year period with the option of a further four years. The Authority approved the appointment, with the consent of the Minister for Agriculture, Food, and the Marine, Simon Coveney T.D., at its meeting in Ashtown, in July 2014.

# Organisational Chart

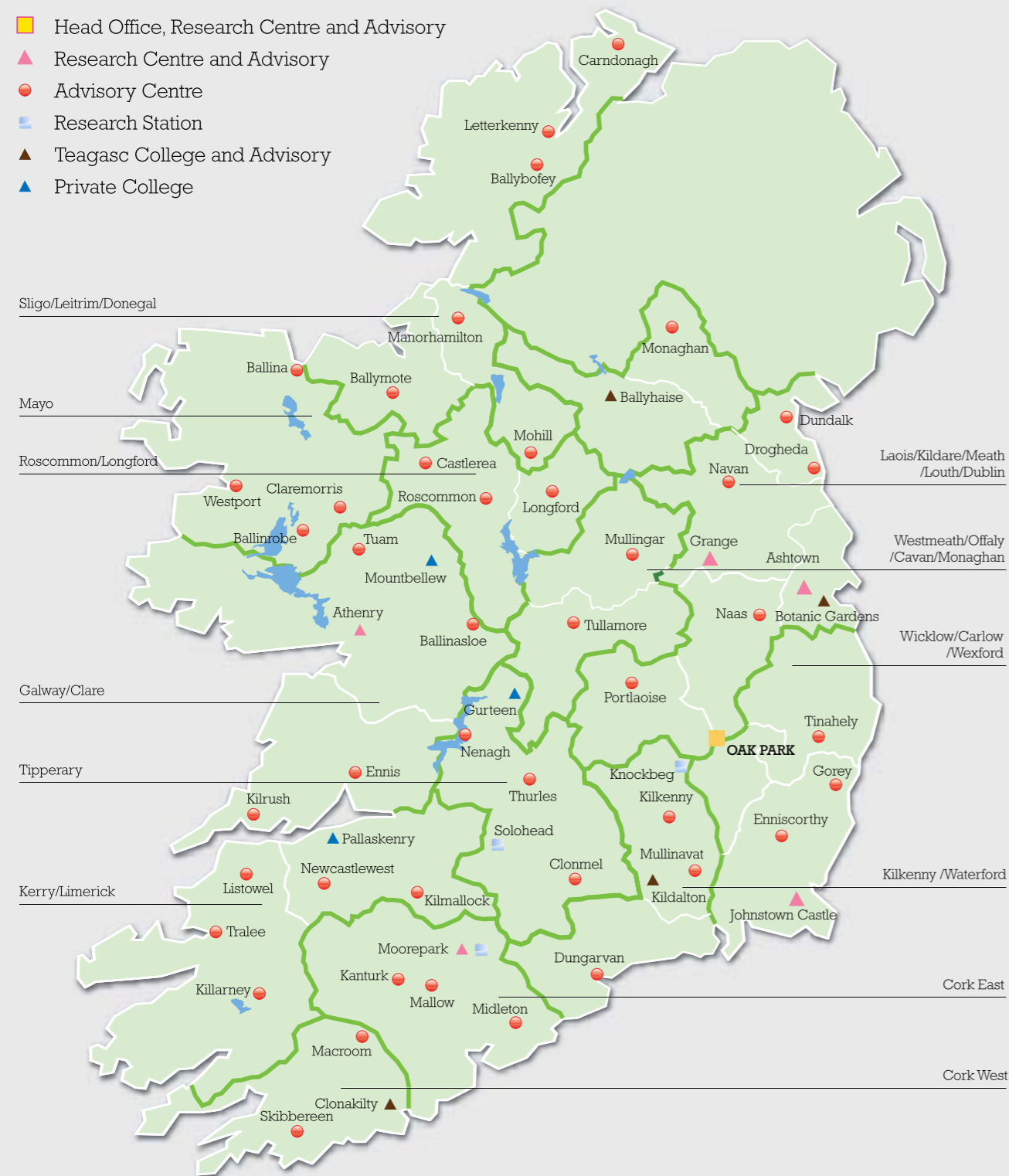
January 2014



# Teagasc Office & Centres

January 2014

- Head Office, Research Centre and Advisory
- ▲ Research Centre and Advisory
- Advisory Centre
- Research Station
- ▲ Teagasc College and Advisory
- ▲ Private College



Agriculture and Food Development Authority

Goal 1- Improve the competitiveness of agriculture, food and the wider bio-economy



# Goal 1

## Improve the competitiveness of agriculture, food and the wider bio-economy



### BEEF

Pearse Kelly, Head of Drystock Knowledge Transfer addresses some of the ca. 8,500 farmers who attended Beef 2014.

#### Beef 2014: The Business of Cattle

Eight and half thousand beef farmers attended Beef 2014 at Teagasc, Grange, county Meath in June to see the largest display of beef technologies ever staged. Beef farmers were informed that the competitiveness of their farming business depends on the adoption of superior beef genetics, grassland management, herd health and efficient beef production systems.

The latest results from the Derrypatrick and Maternal Index herds were presented, with the Derrypatrick herd achieving an average gross margin of €900/ha over the last three years. Additionally beef farmers in the Teagasc/ Irish Farmers Journal BETTER Farm Beef Programme were shown to have increased profit by 66% over a three year period through gains in productivity.

Pearse Kelly, Head of Drystock Knowledge Transfer in Teagasc, said: "It is critically important that beef farmers have a farm plan which sets out the production strategy for the farm including breeding, pasture management and a system such as weanling, store, or finishing, to optimise profitability."

#### Newford beef farm

Teagasc and Dawn Meats established a new stand-alone suckler herd at Athenry, Co Galway. The herd will be run on a commercial basis and will demonstrate the potential of a moderately large suckler beef farm to generate a viable family farm income when operated to the highest level of technical efficiency. It will develop and demonstrate world-best practice in suckler beef farm systems in terms of

economic, environmental and animal welfare sustainability while setting new benchmarks for achievable performance, and will be an important aid in the transfer of the successful technology to beef farms throughout Ireland.

#### Farmers benefit from participating in Teagasc Beef Discussion Groups

Farmers who are members of Teagasc beef discussion groups have higher output, higher costs and higher overall gross and net margins than non-members. That's according to an independent evaluation report, 'Impact of Farmers Participating in Teagasc Beef Discussion Groups, 2012 to 2014', which was carried out by Broadmore research for Teagasc.

On average, beef farmers who are members of groups had higher output (€363+ per hectare) and higher net margin (€95+ per hectare) than non-members.

Discussion group members had higher stocking rates and achieved higher prices per head for their livestock. The report found that discussion group members were mainly in suckler-to-weanling production, tended to have larger farms, had a higher level of agricultural education and training and were younger on average than non-discussion group members.

Prof. Gerry Boyle, Pearse Kelly and Dr. Pat Bogue at the launch of research findings on the benefits of Beef Discussion Group membership.



## Goal 1 Improve the competitiveness of agriculture, food and the wider bio-economy

### Grass key to profitability.

The Teagasc National Beef Conference entitled: 'Improved Breeding & Feeding of Suckler Cows to Increase Profitability', heard that grazed grass is the cheapest feed and suckler beef producers must optimise the proportion of grazed grass in the total annual feed budget. Teagasc researcher Dr. Paul Crosson said that profitability is greatest where the calving date for suckler cows is aligned with the commencement of the grazing season. He pointed out that where there is a long grazing season of 243 days a net margin per hectare of €454 can be achieved, whereas if the grazing season is short at 178 days or fewer, the net margin falls to €185 per hectare for suckler calf-to-beef production systems.

The latest breeding statistics for Irish suckler herds show that major improvements can be made on many farms when it comes to achieving a calf per cow per year.

Teagasc researcher Dr. David Kenny said: "The BeefGenomics scheme launched by the Department of Agriculture, Food and the Marine, in conjunction with ICBF will put Ireland in prime position to implement a genomic selection programme for beef cattle, which should accelerate the rate of genetic gain for improved reproductive efficiency. Teagasc research has underpinned the initiation and continued development of this technology."

### Anthelmintic resistance on two Teagasc beef research farms.

The efficacy of anthelmintics currently available in Ireland was examined using a faecal egg count (FEC) reduction test in dairy calves. In study A, treatment resulted in mean FEC reductions of 49%, 99% and 100% for ivermectin, fenbendazole and levamisole treated groups, respectively. In study B, treatment resulted in a mean FEC reduction of 37% for ivermectin-treated calves.

The presence of Cooperia in post-treatment cultures on day 14 in ivermectin-treated calves in both studies indicated resistance in this genus. Both levamisole and fenbendazole demonstrated high efficacy in treating gastro intestinal nematode challenge. This study is the first report of anthelmintic resistance in cattle in Ireland and is a very important finding in relation to control of these major parasites in our cattle herd.

*Paul McEnaney in Monaghan and his son, Conor, are optimistic about expansion, providing costs can be controlled.*



*Farm attending sheep demonstration.*

## SHEEP

### A new direction for sheep breeding

Sheep production is a significant contributor to the agricultural and national economy with an output valued at €209 million, with about 80% of this exported. This was one of the key messages at the Teagasc National Sheep Conference that took place in Athlone and Letterkenny in February.

Dr. John McEwan, from AgResearch in New Zealand spoke about the future prospects for genetic improvement in sheep. He pointed to the gains that genetics has already delivered: increased numbers of lambs born, improved lamb survival, higher weaning weights, heavier carcass, reduced carcass fat, and heavier fleeces. Teagasc researcher, Dr. Noirin McHugh of Teagasc said that genetic evaluations are a powerful tool for sheep farmers enabling them to make more informed breeding decisions and potentially increase productivity and profitability at farm level.

### Resistance to gastrointestinal nematodes in Hill Sheep.

The Food Harvest 2020 report targets a 20% increase in Irish sheep output value by 2020. The technical efficiencies required to meet this target will include improvements in animal health and reducing losses due in animal diseases.

Gut worms can cause ill-thrift and disease, and good worm control is currently highly dependent on effective worming products. However, a direct and unavoidable result of continuous use of wormers is the development of drug resistant worms. Therefore, alternative methods of gut worm control are required such as the development of worm resistant flocks through genetic selection.

Teagasc researchers have established that there is variation among lambs in their ability to resist gastrointestinal nematode infection and resistant Scottish Blackface lambs could be reliably identified using faecal egg counts from two independent natural infections.

Resistant lambs have lower faecal egg count than susceptible lambs and this is a result of lower worm fecundity in resistant lambs rather than a lower worm burden. Resistant lambs produce more anti-nematode Immunoglobulin A than susceptible lambs and attracted immune cells to the site of infection faster than susceptible lambs. A panel of genetic markers show some promise in identifying resistant lambs.



## Goal 1 Improve the competitiveness of agriculture, food and the wider bio-economy

### DAIRYING

#### Aurivo and Teagasc launch joint dairy development Programme

Aurivo Co-op and Teagasc joined forces to launch a new joint Farm Focus initiative aimed at enhancing output and profitability of milk production on farms in the Aurivo region centred on north-western counties. The initiative will bring together the full resources of Teagasc and Aurivo in mounting an intensive and co-ordinated advisory programme on all aspects of efficient milk production for Aurivo's milk suppliers.

The initiative is being led by Dr. Roberta McDonald, Farm Profitability Programme Manager with Aurivo.

A key part of the programme will involve the establishment of Focus Farms which will be used to demonstrate the application of proven research and to benchmark best practice on efficient milk production. The network of 34 discussion groups established in the region under previous Aurivo/Teagasc programmes will continue. Around 35% of Aurivo suppliers are currently participants in discussion groups.

An intensive effort will be undertaken to increase the number of participants through expanding numbers in existing groups and by establishing new groups.

*Brian and Pamela Conlon are host farmers within the Teagasc/Aurivo joint Focus Farm Initiative.*

*John Daly, head of Agribusiness Aurivo; Roberta McDonald Farm Profitability Programme Manager, Prof. Gerry Boyle, Dr. Tom O'Dwyer Teagasc Head of Dairy Knowledge Transfer, Dr. Pdraig French, Teagasc, and Pat Duffy Aurivo vice chairman.*



*Mike Magan, Chairman of the CellCheck Industry Implementation Group and Chairman of AHI, Peter Byrne, CEO FRS Network, Minister Simon Coveney, Tom O'Dwyer, Head of Dairy Knowledge Transfer Teagasc.*

#### Certified Milking Course

A Certified Milking Course to develop the skills of dairy farmers was launched by the Minister for Agriculture, Food and the Marine Simon Coveney T.D. The course was developed by Teagasc, FRS (Farm Relief Services) Network and AHI (Animal Health Ireland) and is part subsidised by the Department of Agriculture, Food and the Marine.

Dairy farmers with 80 cow herds can lose up to €560 per week because of high somatic cell count (SCC) and the course, costing a fraction of this, has been developed to improve milking practices on dairy farms to help alleviate these and other inefficiencies affecting farmers' pockets and herd health.

Successful completion of the 'Best Practice in Milking' course results in a FETAC/QQI Level 6 Certificate. It involves two days training followed by an assessment and includes practical on-farm milking sessions.

#### The 1-2-3 of calf rearing

The first of four Calf Care Open Days took place on the farm of Kevin and Mairead Heavin, Fearaghalee, Belmont, Co. Offaly, in January.



More than 200 farmers attended the event, which was organised by Teagasc, Animal Health Ireland (AHI) and Volac. The communication campaign centred on 'Calf care is as simple as 1, 2, 3.'

1. Use colostrum from the 1st milking for the 1st feed
2. Give colostrum within 2 hours from the calf's birth
3. Give at least 3 litres of colostrum

#### Optimal management practices for replacement dairy heifers

Optimum performance from the dairy herd is influenced by realising heifer target weights at key points, such as at mating start date at 15 months of age (MSD) and pre-calving.

In practice, heifer rearing receives low priority on Irish dairy farms and achieving target weights is neglected by many. Reduced levels of management will result in lower profit, as heifers may calve later than 24 months, be underweight and produce less milk compared to more well managed heifers. Feed costs account for approximately 80% of the total variable costs associated with costs of production. One of the methods of reducing feed costs in particular, is by sourcing lower cost feeds.

Kale grazed in-situ ranked as the cheapest alternative to grazed grass and was considerably cheaper than grass silage in a recent Teagasc study. Kale tends to have a low neutral-detergent fibre (NDF) concentration, suggesting that feeds with a higher NDF concentration (>500 g/kg DM) - such as grass silage - may need to be offered in order to avoid acidosis.

A short-term (20-day) indoor feeding experiment conducted at Teagasc Moorepark examined the effect of feeding a 100% kale diet in comparison to varying combinations of a kale and silage diet. A 100% kale diet did not reduce rumen pH below 6.0 nor did it induce acidosis. Conventional feeding systems (i.e. grass silage + concentrate) were also investigated to ascertain the rate of weight gain that could be expected over the winter period.

#### Precision Dairy raises the



Pictured at the launch were Paddy Halton, True North Mapping, Prof. Willie Donnelly, TSSG, Mr. Simon Coveney, Minister for Agriculture, Food & the Marine, Dr. Bernadette O'Brien, Teagasc, Prof. Gerry Boyle & Dr. Frank O'Mara, Director of Research, Teagasc.

## stakes

Minister for Agriculture, Food and the Marine, Simon Coveney T.D. launched a new research project, Precision Dairy, at the National Ploughing Championships. Teagasc and Waterford Institute of Technology's Telecommunication Software and Systems Group (TSSG) were awarded Science Foundation Ireland (SFI) funding in conjunction with a commercial Shannon-based company, True North Mapping (TNM), to undertake the research within the research theme known as 'Future Agri-Food'.

The project will use ICT to develop communication platforms to transfer the sensor data to a central database and enrich it with external databases (both animal and grassland) in order to create "Big Data".

A key outcome will be to provide the end user with real time solutions to both animal- and pasture-based management issues.

Dr. Laurence Shalloo, Teagasc, in collaboration with Dr. William Donnelly of TSSG, is coordinating the project.

Teagasc will be focusing on the development, interpretation and integration of precision technologies in pasture-based systems. TSSG will focus on the development of sensors and biosensors to capture data at farm level, using ICT to develop communication platforms to transfer the data to a central database. TNM will focus on the development of technologies for automated pasture measurement and sensors for monitoring animal activity.

## Effects of stocking rate and calving date in dairy systems

The reduction in milk production per cow associated with a stocking rate (SR) increase is a consequence of increased grazing intensity associated with a reduction in daily herbage allowance and a reduction in lactation length.

The animal response to an increase in stocking rate appears to be different for larger cows compared with smaller cows.

The existence of SR by strain interactions for a number of reproductive variables suggests that the NZ strain of Holstein-Friesian is more suited to intensive grazing systems and can cope better with potentially reduced feed allowances at increased SR.

These Teagasc results indicate that adjusting mean calving date can be an effective strategy to align animal requirements and grass supply, increase herbage allowance and reduce supplementary feed requirements at increased SR in early lactation. The results also showed that, although reducing daily milk production and lactation length, delaying mean calving date had no effect on total lactation performance but did influence the seasonality of milk supply.

## Optimised milk cooling

A trend is emerging where only large farms invest in energy/water saving technologies due to the high capital cost involved. A Teagasc project has developed a low capital cost solution to the control of plate cooling, (especially the implementation of more sophisticated cooling control of existing plate coolers).

This will help to improve the energy efficiency and hence the market position of both well-established farms and smaller start-up new entrant farms where capital is limited. In turn this will reduce long term running costs of cooling systems, improve competitiveness and reduce carbon dioxide impacts associated with milk production.

## GRASS Teagasc launch Pasture Profit Index)

A prototype profit based index, called the Pasture Profit Index (€/ha) for perennial ryegrass cultivars in Ireland has been developed by Teagasc in conjunction with the Department of Agriculture, Food and the Marine (DAFM). The index will assist grassland farmers to identify the best perennial ryegrass cultivar(s) for their farm.

The Pasture Profit Index consists of six sub-indices: spring, mid-season and autumn grass Dry Matter (DM) production, grass quality (April to July, inclusive), 1st and 2nd cut silage DM production and persistency. The economic merit of a cultivar for each trait is calculated by determining the difference between its performance and the base value for that trait, and is then multiplied by the economic value for that trait using the Teagasc Moorepark Dairy Systems Model.

The economic value of an extra kilogram of grass DM in spring and autumn is higher than in mid-season because it supports an extended grazing season. The performance values included in the Pasture Profit Index are based on data collected from the DAFM grass evaluation trials. Pasture Profit Index ranges from €226/ha to €8/ha per year for 16 cultivars on the current DAFM Recommended List, however as more data becomes available the index will be assigned more Recommended Listed Grass varieties. The index can only be assigned to varieties that have data generated from DAFM's grass variety evaluation protocol.

Dr. Deirdre Hennessy and PhD student Stephen McAuliffe managing paddocks at Teagasc Moorepark.



## Goal 1 Improve the competitiveness of agriculture, food and the wider bio-economy

### Developing white clover varieties

Teagasc has been breeding white clover for over 50 years at Oak Park, Carlow. Chieftain, Avoca, Susi, Tara and Aran, are some of the successful and well known Teagasc-bred varieties. In 2014, Iona, a medium-leaf size variety, offering outstanding early season growth, was released.

Three further white clover varieties – Buddy, Coolfin and Dublin – are currently undergoing seed increase and are scheduled for release in 2015, 2017 and 2018, respectively. Coolfin, a small leaf size variety, is the highest yielding white clover variety in the Ireland Recommended List trials.



*Teagasc tillage adviser Dick O'Shea, tillage farmer Hugh Hutchinson and Teagasc arable specialist Tim O'Donovan.*



## TILLAGE

### Improving Precision and Profit on Tillage Farms

As a result of our temperate climate, Ireland achieves the second highest yields per hectare of barley in the world. But yields are variable. Research at the Teagasc crops research centre Oak Park centre is looking at ways to further increase yields. This work suggests that future yield increases may lie in achieving high numbers of grains per ear, in conjunction with high shoot numbers per metre squared. Speaking at the Teagasc annual Tillage Conference Teagasc researcher Shane Kennedy said that increasing shoot numbers per metre squared has been identified as the most powerful tool for achieving high grain numbers.

Results from the BETTER Farm Crops programme which increased the profitability and sustainability of three commercial tillage farms from 2010 to 2012 were outlined. During the programme, 2,000 farmers attended events on the farms and 11 major research trials were on view.

Phase 2 of the Teagasc BETTER Farm crops programme was introduced at the Conference. Its aim will be to assess and demonstrate precision farming technology. The work will have three components:

- Quantify and investigate within-field variability
- Evaluate appropriate crop management responses
- Demonstrate precision agriculture technologies.

Teagasc researcher Dermot Forristal said precision agriculture can be considered in two categories – managing within-field variability and machine guidance.



He said that managing spatial variability involves the gathering and mapping of information from different parts of the field and using GPS systems to give locations and computer applications to generate yield and soil nutrient maps. He said that machine guidance systems such as 'auto steer' and GPS controlled headland management systems have made significant strides both in development and adoption.

### Protein in malting barley

Malting barley growers can experience considerable problems in producing malting barley with protein levels that meet market specifications.

Teagasc research has identified fertilizer N strategies that maximise the probability of achieving required protein levels without compromising yields. Implementation of these strategies at farm level (through the Teagasc KT specialists and tillage advisors, as well as private sector advisors) has reduced problems with unsuitable protein levels.

The work also found that seasonal factors, outside the control of the grower, have a significant part to play and this knowledge has contributed to the development, by the malting industry, of markets for barley that fails to meet the normal malting specification.

## Goal 1 Improve the competitiveness of agriculture, food and the wider bio-economy

### FOOD

#### International Cheese Symposium

One hundred and ninety international scientists working in cheese research from 27 countries gathered in Cork for the 9th International Cheese Symposium. The symposium series is currently the second largest rolling cheese science conference held anywhere in the world. Hosted by Teagasc Food Research Centre, Moorepark in collaboration with University College Cork and INRA (L'Institut National De La Recherche Agronomique) France, the 9th cheese symposium provided an opportunity for the most recent developments in cheese research to be unveiled and discussed.

It's a platform for cheese scientists from research providers, as well as from industry, to consider new concepts and latest developments, to share experiences and knowledge, and to promote new applications of cheese research.

#### Development of a continental cheese

In June 2014, Kildery cheese was launched to market in Germany under the Kerrygold brand. It is the first commercial output of the Dairy Innovation Centre which is a Teagasc-Irish Dairy Board public private partnership and was developed in conjunction with Tipperary Co-op.

Kildery is a Maasdammerstyle eye-type cheese, but differentiated by its intense and mature flavour.

Maasdam is the largest branded cheese category in Germany and Kildery will move Kerrygold from being a specialty cheese player to a mainstream cheese brand in the German market. It has already won three international cheese awards.

Development and commercialisation of Kildery was achieved through the application of scientific and technological advances and expertise developed through: the Teagasc cheese diversification programme; the capacity of the Irish Dairy Board to identify market opportunities and to utilise its market distribution infrastructure; and the production expertise and technical capabilities of Tipperary Co-op.

*Delegates attending the 9th International Cheese Symposium hosted by Teagasc Food Research Centre, Moorepark, UCC & INRA.*



*Pictured at the 9th International Cheese Symposium hosted by Teagasc Food Research Centre, Moorepark, UCC & INRA in Cork are Dr. Tom Beresford, Moorepark, Anne Thierry, INRA, Sophie Jeanson, INRA & Paul O'Regan, Coosheen.*

#### Endocrine disruptors

Endocrine disruptors are chemicals which mimic natural hormonal compounds or that can otherwise interfere with normal endocrinal function and have significant implications for human health, being implicated in cancers, malformations, infertility and obesity. A large number of chemicals can be classed as endocrine disrupting.

In a research Teagasc project, two different approaches were employed to detect and measure endocrine disrupting chemicals in milk. The first was a targeted test based on liquid chromatography coupled to tandem mass spectrometry, which is suitable for accurately quantifying known endocrine disruptors. The other approach was based on cell based assay, which can detect the overall endocrine disruptor activity and is suitable for unknown agents.

The research highlights the importance of on-going screening of food commodities for EDA contamination and highlights the advantages of employing combined biological and chemical assays to facilitate accurate risk assessment.

#### Communicating the potential benefits of Marine-Derived Functional Foods

NutraMara, the Marine Functional Foods Research Initiative is a multi-centre research consortium focussing on the identification and characterisation of novel bioactives as potential ingredients for functional foods. Teagasc and partner researchers in the programme have carried out a consumer study to gain an understanding of general consumer attitudes to functional foods and, in particular, to expand on the concept of marine-derived bioactive compounds as ingredients in functional foods.

*Commissioner Maire Geoghegan Quinn and Dr. Noirin McHugh pictured during a visit to Teagasc, Athenry.*



The study found that consumers had a strong awareness of the health benefits of eating fish and seafood. While few consumers were aware of the concept of foods with additional health benefits, they were not familiar with the term functional foods. Once this had been explained to them, on balance, most were comfortable with the concept of these foods

#### Futurology

Minister for Agriculture, Food and the Marine, Simon Coveney, T.D., launched the recent 'Futurology' module of the Agri-Food Graduate Development Programme (UCC, UCD and Teagasc). The AFGDP is funded by the Department of Agriculture, Food and the Marine, and holds monthly training events for agri-food postgraduate researchers. The AFGDP management team is: Dr. John Finn, Teagasc; Professor Dolores O'Riordan, UCD; Julie Dowsett, UCD; Professor Alan Kelly, UCC;

## Goal 1

### Improve the competitiveness of agriculture, food and the wider bio-economy

## FARM MANAGEMENT

### Transferring the Family Farm

Teagasc held a series of clinics throughout the country entitled “Transferring the Family Farm”. James McDonnell, Teagasc financial specialist, said: “Inheritance and succession, is an on-going issue for Irish farm families and must be dealt with in a timely fashion.

“At these clinics farm families gained insights into, not only the legal, social welfare, and tax implications, but also the best way to go about having the conversation in the family setting.”

At each of the 11 clinics (many of which attracted several hundred people), a Teagasc specialist made a short address covering all aspects that need to be considered when writing a succession plan. The clinic was then opened up to the farm families present to have “one to one” private conversations with legal and tax professionals set up in booths at the venues.

### Business Strategy course

The best defence against an increasingly volatile business environment is to have a well formulated business strategy. In 2014 Teagasc, in partnership with the Michael Smurfit Business School offered an executive level Certificate Course in Farm Business Strategy to Irish farmers.

The course, which was delivered by staff from the Smurfit Business School and Teagasc attracted 22 farmers with all enterprise categories represented. The course required the farmers to attend two residential modules and complete a business strategy for their family business.

They also individually ‘defended’ their strategy at an interview conducted by industry and academic professionals. The level 8 course is accredited by UCD and all participants completed the course.

Anonymous feedback reported that the ‘students’ strongly agreed that participation on the course had met their expectations and would benefit their businesses.

*Below: Teagasc clinics on ‘Transferring the family Farm’ proved highly popular.*



FETAC students from Teagasc Ballyhaise Agricultural College launched a Children’s Farm Safety Awareness Campaign, as part of the Community Project of their Leadership Module.

### Review of agri-taxation

The Department of Agriculture, Food and the Marine along with the Department of Finance engaged in a review of agri-taxation in 2014. The objective of the agri-taxation review was to: evaluate existing reliefs; to propose new measures to promote the mobility of land and the intergenerational transfer of farms; and better align taxation policy with Government policy towards the agri-food sector (e.g., Food Harvest 2020).

Economic research conducted by Teagasc on the age structure, capital structure and viability of farms was used to provide a context for the need to address land mobility and intergenerational transfer.

Teagasc expert farm financial advice was instrumental in assisting in the evaluation of the benefits of existing and proposed new measures, especially around issues such as the long-term leasing of land, alternative farming models and farm restructuring. The agri-taxation review led to the establishment of a number of new tax incentives in Budget 2015 that are likely to benefit a large number of farmers and improve the overall structure and productivity of the farm sector in the future.

### Teagasc Ballyhaise agricultural students lead the way in farm safety awareness

FETAC students from Teagasc Ballyhaise Agricultural College launched a Children’s Farm Safety Awareness Campaign last week, as part of the Community Project of their Leadership Module.

This campaign saw almost 250 school children from eight local rural national schools participate in farm safety awareness. This will be the first farm safety campaign of its type to occur in Ireland.



## FORESTRY

### Windblow Damage

Wet weather and storms led to considerable windblow damage in some Irish forests in 2014. The Munster area was especially hard hit. Estimates of the area blown over and/or damaged range from 4,000 – 8,000 hectares nationally. Teagasc, in conjunction with Coillte and the Forest Service, DAFM, organised two major demonstrations on windblow clearance and forest restoration. These two forestry events provided guidance to forest owners whose plantations had suffered windblow damage.

### Forestry in Ireland – modelling its economics

An analysis of the economics of the farm afforestation decision was undertaken by Teagasc which contributed to the development of the government's 2014-2020 Afforestation Programme. The economics of the farm afforestation decision were examined by building a forest

bioeconomic model to integrate direct costs, opportunity costs, forest subsidies and market returns into the decision-making framework.

The model shows that the Net Present Value (NPV) of changing from an agricultural enterprise to selected forestry options offers a positive NPV for the majority of cattle and sheep farmers. Further research using Teagasc National Farm Survey (NFS) data showed that the larger a farm and the older the farmer, the more likely it is that the farmer has planted part of their land. This research gives policy makers a better insight into the farm characteristics of those farmers likely to afforest land.

### Birch

Currently birch, which is native to Ireland, is not on the recommended species list for afforestation grants. This is mainly due to the poor stem quality of naturally regenerated birch and the poor survival and growth rates that have followed importation of seed from abroad.

The development of birch as a commercial forestry tree species supports government policy to increase forestry area, increase the broadleaf component of forestry, use more native species and to increase the diversity in Irish forestry.

The physiology of birch means that it can be planted on land not suitable for other broadleaf species e.g. common oak. The discovery of ash dieback (*Chalara fraxinea*) on our native ash has resulted in a ban on ash planting. This in turn has focused further emphasis on alternative native broadleaf species.

Teagasc is a partner in the Birch Project which began with an initial study: 'Pilot project for the genetic improvement of Irish Birch' (1998-2000) and this has been followed by a series of other National Council for Forest Research and Development (COFORD) funded projects. The improvement of alder (*Alnus glutinosa*), a species that is on the Forest Service schedule, was initiated in 2005. This has been tied in with the birch project to take advantage of similarities in the techniques of tree breeding.

## PIGS

### Teagasc Pig Development

The focus of the Teagasc Pig Development Department Programme is to improve profitability, increase sow productivity, to grow the national sow herd and produce quality pig meat while operating to the highest pig welfare and environmental standards.

### Knowledge Transfer/Advisory

The core advisory work is carried out by 5.5 Specialist Pig Development Officers (two funded via the Teagasc/IFA Pig Joint Programme) and is based around Farm Visits & ePM PigSys Herd Performance Recording.

*Pictured at the National Pigs Conference Shane Brady, Michael McKeown, seamas Clarke, Kaitlyn Glover, Walsh Fellowship Student, Ciaran Carroll, Ger McCutcheon and Kevin Connolly.*

There are 119 herds currently recording their herd performance on this system, accounting for 84,000 sows (56% of total sow numbers in Ireland). The system enables Teagasc to provide more timely updates on herd performance and allows for more effective benchmarking as producers strive to improve technical performance.

The database is an invaluable source of information for more detailed investigations and is enabling more research and investigation to be carried out. 2014 saw the development of Pig Discussion Groups. There are now six regional groups, accounting for 54,000 sows, and there are plans for a further two groups in 2015. Other industry support is provided via monthly newsletters, office consultations, business planning and cash flow preparation.

### Research

There are six Research Officers (two funded via the Teagasc/IFA Pig Joint Programme) in the Pig Development Department. Research is carried out on a number of areas of importance for the pig sector, including: Nutrition, Health & Welfare, Food safety and Environment.

Some key research areas for 2014 included OPTIPIG (increasing the number of viable piglets born alive and minimising pre-weaning piglet mortality), PIGWELFIND (ante and post mortem meat inspection of pigs as a welfare diagnostic tool), WELPIG (link between poor welfare, disease, antimicrobial usage), ECOFCE (influence of the gut on FCE), Net Energy (moving the Irish feed sector to the Net Energy system), Feed Analysis, Salmonella (link between feed and salmonella and low cost solutions at farm level), PigSys (barriers to herd recording).



**Goal 1**  
**Improve the competitiveness of agriculture, food and the wider bio-economy**

**Pig Production Education/Training**

The Specialist Advisors are also involved in delivering Education/ Training in pig production through the FETAC Level 5 pig course (There are over 45 students registered on this course), workshops and Discussion Groups.

A new module at Teagasc Agricultural Colleges is being introduced which aims to expose the “general” Ag student at Agricultural College to pig production, informing them about the sector and the potential for gaining employment there. It involves lectures and visits to a pig farm, feed mill and pig meat processing plant. It will conclude with an industry day where representatives from the pig sector will talk to the students about job opportunities in the sector.

Lectures were presented by Teagasc Pig Development Department (PDD) staff at Clonakilty, Ballyhaise and Kildalton Ag Colleges in 2014.

**EDUCATION**

**Demand for Teagasc Education at all Time High**

Teagasc saw a surge in demand for its agricultural courses in 2014. Almost 2,000 learners enrolled in agricultural college further education programmes and Teagasc linked higher education programmes. This is a continuation of the very strong underlying demand for Teagasc courses of recent years.

Teagasc has also seen an exceptional level of demand for its part time and distance education Green Cert courses. Teagasc received almost 1,500 applications for its Green Cert courses. This is about three times the normal level of applications. On an annual basis over 3,700 learners participate in Teagasc further education programmes and linked higher education programmes. In addition Teagasc provides customised short courses to 5,000 or so adult farmers and agri-industry personnel annually.

**Teagasc/FBD Student of the Year**

Edward Payne, Ballymoe, Castlerea, Co Roscommon is the 2014 winner of the Teagasc Student of the Year award. The awards, sponsored by FBD Trust for the 30th successive year, were presented by the Minister for Agriculture, Food and the Marine, Simon Coveney T.D.

Edward Payne completed a level 6 Specific Purpose Certificate in Farm Administration at the Agricultural College in Mountbellew in Co Galway. Edward jointly manages the family farm with his father.

Originally a suckler/sheep farm five years ago, the decision was made to convert to dairy farming and 140 dairy heifers were purchased.

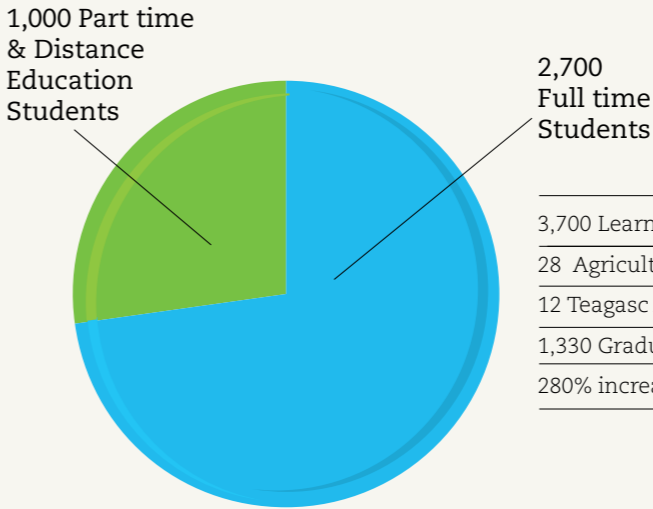
Edward now manages the dairy enterprise which has expanded to 260 cows. He is convinced of the need to use genomic bulls and in 2014 the replacement heifer calves had an EBI of 202. He aims to maximize milk from grass with concentrates kept to just 0.5 tonnes per cow per annum. He measures and budgets grass weekly and has an ongoing grass reseeding programme. Edward’s goal is to establish another dairy farm in the next five years. He works very closely with his Teagasc Adviser, Seamus Nolan and is involved in two farmer discussion groups.

Speaking at the event Tony Pettit, Head of Education in Teagasc said: “In 2015 Teagasc will commence a comprehensive review of the level 5 and level 6 Agriculture Award curricula to ensure that young farmer education reflects the changing requirements of Irish farming. Teagasc has in recent years located significant research programmes at the education colleges which are also providing an invaluable teaching resource.”



Christy Doherty, Head of Farm and Business, FBD; Minister of Agriculture, Food and the Marine, Mr. Simon Coveney, T.D.; Edward Payne, Ballymoe, Castlerea, Co. Roscommon, 2014 winner of the Teagasc/FBD Student of the Year Award, Prof. Gerry Boyle, Director, Teagasc.

**Teagasc Further Education Programmes 2013.**



- 3,700 Learners in Teagasc Further Education Programmes
- 28 Agricultural Education Programmes
- 12 Teagasc Advisory Regions
- 1,330 Graduates in 2013
- 280% increase in Graduates since 2003

**Paddy Smith from Warrenstown, Drumree, Co. Meath.**

**Technician/Lecturer at the Teagasc College in the National Botanic Gardens.**

Roddy works with students on the Teagasc FETAC level 5 and 6 and Teagasc/Waterford Institute of Technology level 7 students in Horticultural Mechanisation, Mechanisation/Safety, Horticultural Production Mechanisation/Landscape construction and design, Garden Management.

Paddy joined Teagasc in 1999 as a technician in Warrenstown Horticultural College and moved to the Botanic Gardens in 2009. In 2011 Paddy returned to education to complete a one-year add-on to earn a level 7 degree in conjunction with ITBlanchardstown and Teagasc Botanic Gardens. Paddy is currently completing a level 8 degree in ITB. Paddy's day-to-day activities include preparing and delivering practical sessions and evaluating/assessing students.

"Increasingly we are integrating e-learning (MOODLE) into the education of students," says Paddy. "This can be a challenge for some students who may have limited computer/IT proficiency. We are currently creating on-line tutorials which students can access in their own time and follow at their own pace.

"There is consistent high demand for these courses from school leavers but there is also a very strong interest from people working in the industry who want to gain National Framework



qualifications."

**Tyndall and Teagasc form partnership to develop a SMART agri-food sector Memorandum of Understanding**

The MOU will provide the foundation for a series of projects aimed at making agriculture smarter and more efficient and it formalises an already fruitful partnership with a number of beneficial projects to the Irish agricultural sector currently in progress.

One such project is called IBR-Nano, which enables the early detection of the harmful, and highly virulent, Infectious Bovine Rhinotracheitis (IBR) herpes virus, which has a range of symptoms including respiratory infections, drop in milk production and foetal abnormalities.

This herpes virus can affect an entire herd even though some may be carrying IBR latently with no symptoms, only to infect further members of the herd at a later stage. Novel Nanosensor technology will enable rapid detection of the infected members of a herd, allowing farmers to remove or treat the affected cattle, limiting the spread and minimising risk to the herd.

Current laboratory diagnosis techniques can require up to 7-days to get a result. The rapid detection abilities of IBR Nano will reduce the need to widely administer antibiotics, cutting the costs to farmers and alleviate animal suffering. In recent years, the application of biosensors to diagnostics has experienced substantial growth with the global point of care biosensor market estimated to exceed \$6.496 billion by 2016. (See also Goal 4).





## Goal 2- Support sustainable farming and the environment



## Goal 2- Support sustainable farming and the environment

### GREENHOUSE GASES

#### Long term GHG emissions: Projections for Irish Agriculture

The projections developed within this project show the likely future path for various sectors of Irish agriculture, the associated animal populations, levels of crop production as well as the input requirements needed to generate this output. In turn this data is converted into projections of overall GHG emissions from the agriculture sector in Ireland.

The research provides the first insights into the possible level of GHG emissions from Irish agriculture over the long term, with 2050 used as a horizon point for the first time. This research is particularly of use to policy makers who are charged with negotiating the terms of the agreements on emissions reductions targets at the EU level.

Research showed that as Irish agricultural output increases, the relative importance of different sectors as a source of emissions will change. Due to a projected increase in milk production, GHG emissions associated with the dairy herd are projected to increase.

However, GHG emissions from the specialist beef herd are anticipated to decline, as the number of suckler cows in the national herd is expected to fall. Overall, in this reference scenario it is projected that there will be an increase in emissions from the agriculture sector in aggregate, meaning that there is a strong incentive to find mechanisms to address the source of these emissions, so that emissions are decoupled from the growth in food production.

#### Soil microorganisms can cut Greenhouse Gasses

Newly published research into soil microbes shows how, eventually, farmers might reduce greenhouse gas production through the way they manage their soils.

The work, by an EU wide consortium including Teagasc and researchers from Scotland's Rural College (SRUC), shows how effectively a newly discovered group of soil microbes breaks down nitrous oxide, a major contributor to global warming and a gas blamed for depleting the ozone layer. It suggests that if the growth of the beneficial micro-organisms could be encouraged, soils could make a greater contribution to addressing climate change.

The research, published in the respected journal Nature Climate Change, was led by the INRA agroecology centre in France. The consortium involved scientists from Teagasc, the Swedish University of Agricultural Sciences and from Scotland, the James Hutton Institute and SRUC.

"Compared with what we know about carbon dioxide and methane we don't understand enough how different soil microorganisms create nitrous oxide or break it down," said SRUC Soil Ecologist, Professor Bryan Griffiths.



### SOILS

#### Irish Soil Information System completes the soils jigsaw

A harmonised soil map of Ireland with an associated web-based soil information system has been produced by Teagasc and the Environmental Protection Agency (EPA). Freely available through a public web site, the Third Edition National Soil Map details the pattern and properties of all of Ireland's 213 soil types at a scale of 1:250,000. The Irish Soil Information System is the largest research project funded by the EPA, with a total budget of €4.8m.

The new map now provides soil information on soil series, mapped as associations. In addition to the soils map, this project provides a database of soil profile information relating to both the original 450 soil series recorded by An Foras Talúntais, as well as an additional 240 soil series recorded in the Irish Soil Information System project.

The Soils Map of Ireland will be used by a large range of stakeholders, including researchers, agricultural advisors, farmers, teachers, policy makers and the European Commission. Since its launch in September 2014, the soils website has been visited by 4,200 users and has had more than 31,000 individual page views.

This project was completed with the support of thousands of farmers, Teagasc advisors and the Department of Agriculture, Food and the Marine.

Launching the Irish Soil Information System at Johnstown Castle, Co. Wexford, Prof. Gerry Boyle, said: "The publication of the Irish Soil Information System opens a new chapter for agriculture and for our environment. For the first time, after three generations of soil science, we have a complete picture of the diversity and properties of soils in Ireland. Figuratively speaking, this is equivalent to 'the initial sequencing of Ireland's soil genome'."



Dr. Rachel Creamer, Prof. Gerry Boyle, Mr. Brendan Howlin T.D. Minister for Public Expenditure and Reform, Mrs. Laura Burke, Director General, EPA.

Goal 2-  
Support sustainable farming and the environment

WATER

Non-market benefits from high water quality.

Originally, water quality policy was concerned with public health protection. Latterly it has evolved to encompass wider aims with respect to protecting the environment. The Water Framework Directive (WFD) adopted by the European Commission in 2000 requires the integrated management of water resources throughout the EU.

The aim of the WFD is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and ground waters. The Directive aims, as a minimum, to achieve ‘good’ and ‘non-deteriorating’ status for surface, underground and coastal waters and sets common approaches and goals for water management in the EU Member State countries.

The Directive calls for consideration of all the benefits as well as costs of improvements to good status in catchment management plans. Hence, the identification of benefits and linking these benefits with physical measures of water quality.

A Teagasc study found significant regional variation in the distribution of various non-market benefits. For example, participants in long distance swimming events are heavily concentrated in Dublin and Cork and to a lesser extent Galway. On the other hand, triathlon events are much more evenly distributed across the country.

The Moy water management unit in the west of Ireland is by far the most important for recreational angling when it comes to salmon and sea trout, with 12,760 salmonoids harvested out of a national total of 40,146.

For canoeing and kayaking activity, results indicate that there is a good spatial distribution across the country with a relatively larger number of service providers along the west coast. Cork, Dublin and Galway have the highest number of rowing clubs and events and Dublin City and west Cork are popular sailing centers.

Results highlight how quality ratings and non-market benefits provided by specific rivers may often only be weakly related as many of the river water bodies that provided significant recreational value had relatively lower Q values than those providing less recreational services and vice versa.

Hence, when it comes to assessing river water bodies, policymakers should take into consideration not just quality ratings based on biological data or otherwise, but also the wider range of recreational benefits that river bodies provide to the general public.

Water quality is likely to be only one of a suite of attributes that play a part in determining the range of benefits that can be enjoyed by the general public.

Farmers and management of watercourses

A new publication “Minding our Watercourses” jointly produced by Teagasc and Inland Fisheries emphasises that proper management of farm watercourses, whether large rivers or small streams, is critical to ensuring high levels of biodiversity.

There are twenty-nine species of freshwater fish found in Irish freshwater with fourteen native species present since the last Ice Age. The leaflet shows there are different places for different species and life stages within watercourses: salmon and trout spawn on gravels in winter; lamprey spawn on gravels in late spring and summer; coarse fish lay their eggs in weedy parts of the channel; salmon and trout use riffles in the first year and move to deeper water as they grow larger; and juvenile lamprey live buried in silty margins of watercourses.

The new leaflet details best practice management of watercourses. Fencing and providing an alternative source of water is recommended as this avoids damage to the river bank and bed, reduces siltation, prevents fouling with pathogens and prevents the escape of nitrogen and phosphate.

Allowing native trees to grow along watercourses stabilises banks, creates a natural buffer zone, provides valuable habitat for flora and fauna, controls in-stream temperature and weed growth and provides shade and shelter for livestock.



Buffer strips alongside watercourses intercept silt, nutrients and improve bank stability. Farmers are reminded to watch out for and report invasive plant species which smother out smaller native species, which die back to leave large bare areas in winter, resulting in soil erosion.

Sediment Fingerprinting

Teagasc research is using forensic geoscience to determine the source of sediment in our watercourses. Delivery of sediment to watercourses can have environmental and economic impacts. Elevated suspended sediment in rivers, as a result of enterprises such as agriculture and forestry, can result in decreased light penetration in rivers, affecting aquatic flora and fauna.

Excessive sediment in a river bed can smother aquatic habitats for species such as the Freshwater Pearl Mussel and Atlantic Salmon.

Sediment fingerprinting is a novel technique for quantifying the relative contribution of sediment from different sources in a catchment. The approach collects soil samples from potential sediment source areas (e.g. channel banks, tillage fields, forestry).

The distinctive signature from each source area can then be identified from natural properties such as geochemistry, radionuclides, magnetics and colour. Sediment collected in a stream is a mixture of sediments from each of the source areas. Sediment fingerprinting involves separating stream sediment out into the different source area sediments, thus allowing each source to be quantified.

Teagasc researcher Dr. Daire Ó hUallachain points out that it is important to identify sediment sources in order to target cost-effective watercourse management. Dr. Ó hUallacháin said that: “research on sediment fingerprinting is being undertaken in three catchments from the Teagasc Agricultural Catchments Programme.

The technique offers valuable insights into the relative importance of different sources within agricultural landscapes. It helps identify source areas and facilitates targeting of mitigation measures, in turn helping to achieve water quality objectives under the EU Water Framework Directive”.



## Goal 2- Support sustainable farming and the environment

### Farm Hazardous Waste Collection Campaign 2014

A cross government collaboration provided farmers with bring centres for the collection of farm hazardous waste at ten locations throughout the country during October and November 2014. The Environmental Protection Agency (EPA) teamed up with Teagasc, the Department of Agriculture, Food and the Marine, local authorities in Kilkenny, Offaly, Dublin Fingal, Cavan, Donegal, Mayo, Waterford, Cork, Limerick and Wexford, WEEE Ireland, European Recycling Platform (ERP) and RILTA Environmental Ltd to operate the bring centres.

Teagasc environmental specialist, Tim Hyde said, 'Safe disposal of Farm Hazardous Waste is important to maintain "Ireland's green and sustainable image."

## SUSTAINABLE FARMING

### Greener Dairy Farms

Minister for Agriculture, Food and the Marine, Mr. Simon Coveney T.D., launched Carbery Group's innovative 'Greener Dairy Farms Project' at Clonakilty, Co. Cork. This project, the first of its kind in Ireland, aims to identify practical ways to help milk suppliers improve their environmental and economic sustainability. Carbery Group is headquartered in Ballineen, West Cork, and owned by Bandon, Barryroe, Drinagh and Lisavaird Co-ops.

Data collecting and analysis for the Greener Dairy Farms Project is currently being conducted by Teagasc, on behalf of Carbery Group, on 20 West Cork farms.

The project aims to identify specific technologies and management changes that could be carried out on farms to improve the efficient use of resources and reduce the impact on the environment.

Some of the techniques used so far to identify areas of potential improvement include: Energy Audits, which analyse energy costs; the calculation of carbon footprint and use of the 'Carbon Navigator'; completion of Sustainability Plans which analyse areas where carbon footprint could be reduced, such as breeding (EBI), calving interval, feed and fertilizer usage, the monitoring of farm outputs, nutrient management advice and grassland management advice. Both the Carbon Navigator and the Sustainability Plans link potential improvement to greenhouse gas reductions and financial gain.



The Minister of State at the Department of Agriculture, Food and the Marine, Tom Hayes T.D. third from left, launched the Farm Hazardous Waste Collection scheme at Cillin Hill Livestock Mart in Co. Kilkenny.



Pictured at the launch of the Carbery Group's Innovative "Greener Dairy Farms Project" Dan MacSweeney, CEO, Carbery Group. Cyril Draper, Carbery Greener Dairy Farms Project participant and Vice Chairman, Minister for Agriculture, Food and the Marine, Simon Coveney, T.D., Donal Tobin, Chairman, Pat Dillon, Head of Animal and Grassland Programme, Teagasc, Moorepark.

Potential Areas of Improvement Identified include:

- Soil fertility: 87% of soils were tested being low in either an essential nutrient or being too acidic.
- Electricity costs varied greatly – from 0.37 cent/litre to 0.63 cent/litre. Taking the average numbers of litres produced in the group, this signifies a difference of almost €1,400. The reasons for this variation were explored in detail.
- The amount of water required to produce milk also varied significantly, the average being 6.5 lts of water per litre of milk. However, while, on average the group recycles approximately 20% of the water that they use, one individual recycles more than 60%.

### AranLIFE

The Minister of State in the Department of Arts, Heritage and the Gaeltacht, Dinny McGinley, T.D., officially launched the AranLIFE project on Inis Oírr in June 2014. The key objective of the project is the further development and demonstration of best practice management as it relates to conservation among the farmers of the Aran Islands. Local farming knowledge and experience will be harnessed, as well as scientific expertise to overcome some of the challenges associated with island-farming.

The AranLIFE project, which is worth €2.6 million is an integrated project between the Department of Arts, Heritage and the Gaeltacht, Teagasc, the Institute of Technology Sligo and the farming communities of the Aran Islands.

Additional funding is provided by the Department of Agriculture, Food and the Marine, the Heritage Council, Galway County Council and Fáilte Ireland.

Approximately 70 farms across the three islands will participate in the project, which will last four years.

## Goal 2- Support sustainable farming and the environment

### Open Source Sustainable Farm initiative

Teagasc and Glanbia Ingredients Ireland announced details of the new Kildalton Open Source Sustainable Farm initiative at the 2014 National Dairy Conference.

The Kildalton Open Source Sustainable Farm initiative will measure success across four key pillars with economic sustainability underpinning all:

Resource use efficiency - Water, Energy and Nutrients; Land Management to maintain and develop biodiversity; Animal Welfare and Health & Safety. Progress in each of these important areas will be benchmarked globally and measured against target on an annualised basis. The farm will be used to demonstrate best practices which will ensure sustainable farming systems into the future.

The first development by the Kildalton Open Source Sustainable Farm is testing the application of a number of useful tools for farmers such as The Carbon Navigator - an on-line system which supports farmers and their advisors in reducing the carbon intensity of dairy or beef farms.

Speaking at the launch of the initiative, Minister Simon Coveney said: "I wish to acknowledge this leadership initiative by Glanbia Ingredients and Teagasc. Ireland is already recognised globally as a leading proponent of sustainable farming, and today's announcement will ensure that our next generation of farmers are at the cutting edge of developing and utilising new and emerging practices to secure Ireland's leadership position in this area."

### Agricultural Environment Conference

Meeting the ever increasing challenges of supporting Irish agriculture to deliver increased output and improved environmental outcomes was the focus of the Teagasc National Agri-Environment Conference. Highlights included:

An econometric analysis presented by Head of Teagasc Rural Economy and Development programme, Professor Cathal O'Donoghue explored the effects of land use, geomorphological and climatic variables on river water quality which indicated that the effect of agricultural activities such as livestock, cereal and pig production is significantly reducing over time.

*Attendees at the Teagasc Agricultural Environment Conference.*



*Teagasc Director, Prof. Gerry Boyle, Prof. Cathal O'Donoghue, Dr. Thia Hennessy and Brian Moran at the launch of the 2014 National Farm Survey Incomes report.*

Dr. David Wall, Teagasc researcher Johnstown Castle, outlined work on the effect of Nitrogen (N) fertilizer formulation and inhibitors on N efficiency and GHG emissions. He presented results that are contrary to accepted wisdom in the industry, that urea based N fertilizers produce grass yields comparable to CAN fertilizer throughout the year. He also outlined how the use of urea based N fertilizers show promise for reducing N<sub>2</sub>O emission risk relative to CAN.

Dr. Brendan Horan, Teagasc researcher Moorepark, demonstrated that implementing a number of agronomic changes led to improved groundwater quality over a 10 year period. These included reductions in inorganic fertilizer usage, improvements in timing of slurry application, the movement of a dairy soiled water irrigator to less vulnerable areas of the farm, and the usage of minimum cultivation reseeding on the farm.

### National Farm Survey Incomes 2014

Teagasc National Farm Survey results show that family farm income increased by 6% in 2014, bringing the average income figure for the farming sector to €26,974.

Speaking at the launch of the results Dr. Thia Hennessy, Head of the Teagasc National Farm Survey said: "The value of farm output decreased in 2014, but farmers benefitted from very good weather conditions as well as a recovery from the fodder crisis in the previous year and the total costs of production were down by 6%". She also noted that "it was a particularly good year for dairy farmers with average income reaching the unprecedented high of €68,887. Although milk price declined slightly in 2014, production levels were up and costs of production were down significantly" she said.

"However, many farmers were penalised for over quota production in the last year of the milk quota and they will be paying for that through superlevy bills in 2015," she added.

"It was a mixed year for cattle farmers" said Brian Moran of Teagasc's National Farm Survey. "Cattle rearing farms, those involved in the production of young animals, saw their incomes increase by 8 percent, largely on the back of falling production costs. However, cattle fattening units suffered from lower animal slaughter prices in 2014. The average annual slaughter price was down 11 percent and income on these farms fell by 12% in 2014", he said.

*Continued on next page....*

## Goal 2- Support sustainable farming and the environment

The €26,974 figure is the average income for the full population of approximately 80,000 farms which includes many part-time and small farm holdings.

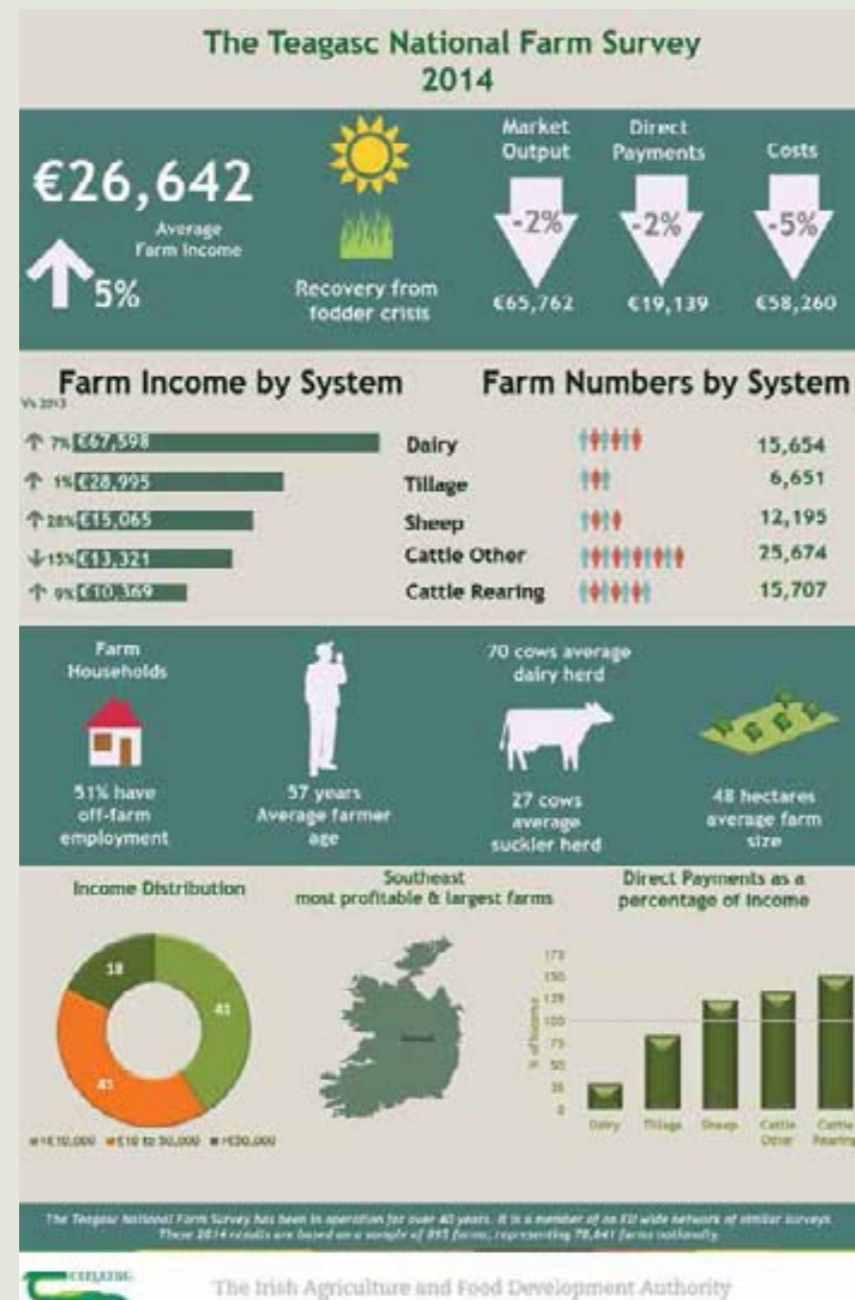
Income varies considerably by farm size and system with the average income on dairy farms almost €69,000 in 2014 compared to an average of just over €10,000 on Cattle Rearing farms. Less than 20 percent of Ireland's farms earned an income of €50,000 or more, while 40% earned less than €10,000.

Strong lamb prices and production combined with reduced input expenditure increased the average income on sheep farms by 24 percent in 2014. However, it should be noted that incomes on sheep farms fell considerably in 2013 and the 24 percent increase in 2014 is still not sufficient to ensure a full recovery to the 2012 levels.

Good growing conditions led to increased cereal yields in 2014, however falling prices meant that average tillage farm incomes remained more or less unchanged at €28,468.

Just over half of all farm households have an off-farm income source and almost 30% of farmers work off the farm. The rate of off farm employment peaked in 2006 and was in decline up to 2013. The number of farm households with off-farm employment increased in 2013 and 2014.

Farming continues to remain highly reliant on direct payments. The average direct payment per farm was €18,859 comprising 70 percent of farm income in general and over 100 percent on cattle and sheep farms.



## Goal 3 - Encourage diversification of the rural economy and enhance the quality of rural life



Pictured arriving at the Family Farming Conference in Dublin are IFA President Eddie Downey, Chairman Dr. Noel Cawley and President Michael D. Higgins.

## Goal 3 - Encourage diversification of the rural economy and enhance the quality of rural life



### Year of the Family Farm

2014 was the UN Food and Agriculture 'Year of the Family Farm'. Around the world, during the year, the profile of family farming and smallholders was raised by focusing attention on its significant role in providing food security and nutrition, improving livelihoods, protecting the environment, and achieving sustainable development.

Given the critical role of the family farm in Ireland, Teagasc is proud to support the Irish family farm. As part of its activities to mark the International Year of the Family Farm, Teagasc produced a series of online videos, featuring farming families in different parts of the country, looking at the role of the family and their contribution to farming throughout the year.

### International Family Farming Conference

Speaking at the International Family Farming Conference in Dublin, Teagasc Director Professor Gerry Boyle said: "Irish farming families have a long and proud tradition as food producers for Irish, European and global consumers, producing high quality produce from our grass based production systems.

Left: Pictured with An Taoiseach, Enda Kenny T.D. and Mr. Pat Spillane (Chairman of CEDRA) at the launch of the CEDRA report entitled 'Energising Ireland's Rural Economy' in Castlebar, Co Mayo were (back row, from left) Dr. David Meredith and Dr. Kevin Heanue, Senior Research Officers, Prof. Cathal O'Donoghue and Prof. Gerry Boyle.

The family farming model is accepted, not just in Europe but globally as an excellent way to organise and produce food efficiently in an environmentally, socially and economically sustainable way. Farming families are the backbone of rural communities and are involved in all that is good about rural Ireland."

## RURAL DEVELOPMENT

### Commission for the Economic Development of Rural Areas (CEDRA)

'Energising Ireland's Rural Economy' is the title of the report from the Commission for the Economic Development of Rural Areas which was launched in Castlebar, county Mayo by the Taoiseach Enda Kenny and EU Commissioner, Phil Hogan.

The CEDRA report produced in 2014 contains 38 recommendations which, if implemented, will enable the rural economy and communities contribute to and benefit from national economic recovery, according to Teagasc Head of Rural Economy and Development and CEO of CEDRA, Prof. Cathal O'Donoghue. Prof. O'Donoghue said, "A new strategy for the economic development of rural Ireland is critical as unemployment increased in rural areas by 192% since the crash, but by only 114% in urban areas. The main reason for this is that construction was our rural development strategy for the previous decade which turned out to be unsustainable.

Rural Ireland requires both a short term strategy to reduce unemployment and a long term strategy to improve the economic structure of rural areas."

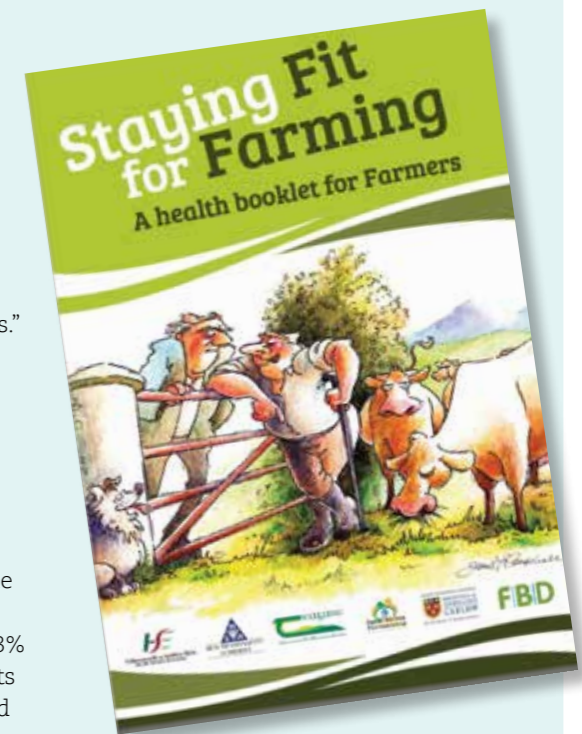
### Economic analysis of rural towns

Research undertaken by Teagasc revealed that small- and medium-sized towns have been affected to a greater extent by the economic downturn, with unemployment increasing by 193% in towns under 10,000 inhabitants compared with 115% in cities and 150% nationally. Further findings were that:

- Education levels are lower than the national average in small- and medium-sized towns and the open countryside.
- Small- and medium-sized towns and the open countryside are disproportionately reliant on declining industrial sectors (construction, manufacturing industry).
- Poverty rates are higher in small and medium sized towns.
- The share of working age households with no one in work (jobless households) is 20% higher than the national average at 31%.

### Farmer Health

A new publication entitled 'Staying Fit for Farming' was distributed nationally to farmers in January 2014. The booklet aims to promote enhanced health practices among farmers nationally. Production of the booklet follows alarming research by HSE medical consultant in public health, Dr. Breda Smyth M.D. which indicates that farmers have much higher death rates than other groups in the occupational age range of 15 to 64.



The research found that the death rate of farmers was over five times higher than salaried employees, who had the lowest death rate.

Farmers have particularly high death rates from circulatory diseases, cancers, injuries and poisonings. Research for preparation of the booklet was directed by Dr. Noel Richardson, Director of the Centre for Men's Health at Carlow Institute of Technology. This involved both farmer interviews and focus groups to explore farmers' attitudes and practices which are key determinants of health behaviour.

Dr. Shane Whelan completed a doctoral degree conducted at both Teagasc and the UCD School of Agriculture and Food Science. His research found that 6% of farmers in Ireland reported a disability, that dissatisfaction existed with the level of services available and that both farm income and off farm employment were reduced after acquiring the disability.

## Goal 3 - Encourage diversification of the rural economy and enhance the quality of rural life

### The importance of gut flora

Recent evidence from animal and human studies indicates that the composition of the gut microbiota may be involved in the development of obesity. Other studies highlight the role of the gut microbiota in the regulation of energy homeostasis, insulin resistance, non-alcoholic fatty liver disease and energy, lipid and amino acid metabolism. These findings highlight the opportunity for new research to examine the ability of selected bioactives and interventions to modulate the composition of the gut microbiota in a manner that may contribute to the prevention of obesity and obesity-related conditions.

Through a variety of animal and human studies, Teagasc researchers have investigated the obesity associated gut microbiota and have employed a variety of approaches with a view to changing this population in a beneficial way. The work has revealed a desirable, high microbial diversity in the gut of elite athletes and has shown a correlation between this high diversity with exercise and protein consumption, respectively.

Scientists at the Science Foundation Ireland-funded Alimentary Pharmabiotic Centre (APC) at University College Cork and Teagasc Food Research Centre, Moorepark, have carried out a study in conjunction with the Irish Rugby Football Union that has revealed that exercise and associated dietary changes influence gut microbial diversity. The research has been published in the leading international journal Gut.

## ORGANIC FARMING

### Demonstration Farm Walks Highlight Organic Opportunity

A nationwide series of twelve organic demonstration farm walks (pictured below) highlighted the opportunities which exist in the organic sector. The walks were organised by Teagasc in conjunction with the Department of Agriculture, Food, and the Marine.

Irish organic food enjoys an excellent reputation both at home, and especially across Europe. There are shortages in the domestic market especially in grain, milk, fruit and vegetables. There is considerable scope for import substitution of organic fruit and vegetables.



Demand for Irish organic beef is on the rise, particularly in Europe. The Irish organic market is worth around €98 million, up from €63 million in 2004. The EU market has quadrupled in size over the last 10 years and is now worth over €20 billion.

In Ireland, just over one percent of land is farmed organically, a doubling of the area since 2000. There are in excess of 1,500 organic operators including 40 organic farmers in Co. Mayo. The majority of these (about two-thirds) are drystock farms.



Prof. Gerry Boyle, Teagasc Forestry Advisor Mr. Liam Kelly, Minister of State at the Department of Agriculture, Food and the Marine, Tom Hayes T.D., Dr. Nuala Ni Fhlatharta, Trevor McHugh, John Ryan, Murray Timber Group.

## FORESTRY

### Talking Timber

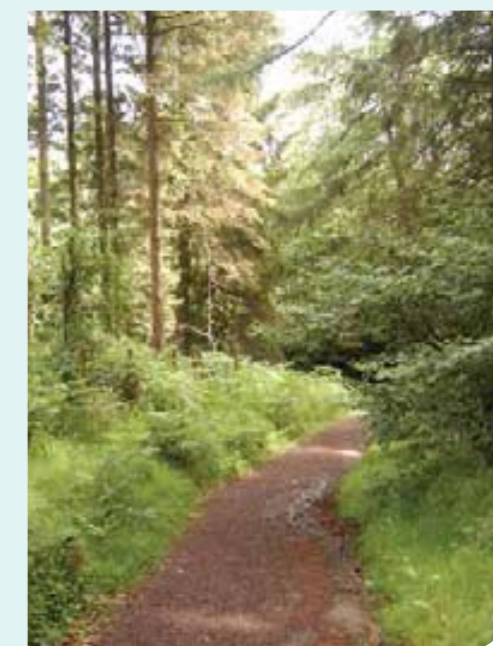
Teagasc, in association with the Forest Service and the Irish timber industry, held two regional timber marketing events in counties Kilkenny and Westmeath in 2014. More than five hundred forest owners, with forests coming up for thinning, attended. The forest and timber processing sector were also strongly represented at both events.

Dr. Nuala Ni Fhlatharta, Head of Teagasc's Forestry Development Department commented on these Talking Timber events: "There is an ever increasing demand for timber from the wood processing and wood energy sectors and farm forest owners are now in a position to help fill this gap.

"The Talking Timber events served to increase forest owners' awareness of the opportunities and issues surrounding the marketing and sale of timber and provided a forum for forest owners to interact with timber buyers."

Michael Somers, Forestry Advisor with Teagasc said: "It's important that forest owners understand the value of their timber, which varies based on the size, quality and species of the timber on their land. Issues such as location and distance to the market are also very important."

Each event started with an outdoor demonstration facilitated by the Irish Forestry and Forest Products Association. Outdoor demonstrations provided participants with an understanding of the quality of timber required by Irish sawmills.



Goal 3 - Encourage diversification of the rural economy and enhance the quality of rural life

Teagasc National Berry Seminar

The Teagasc National Berry Seminar and Trade show, which took place in Carlow, heard how further growth in the Irish berry sector is expected. Dr. Eamonn Kehoe of Teagasc said that the Irish berry sector continues to be one of the most challenging, rewarding and profitable sectors of Irish horticulture. He said that protected strawberry production continues to be the mainstay of the berry industry in Ireland.

Gary McCarthy, strawberry grower, Mr. Paddy Browne, Head of Teagasc Crops, Environment and Land Use Programme, Dr. Eamonn Kehoe and Jim O'Mahony.



The fresh strawberry industry, in particular, continues to grow each year and consumers are now eating €37 million worth of these berries every year.

The seminar was organised by Teagasc in association with the Irish Soft Fruit Growers Association and Bord Bia. Michal Slawski from Bord Bia outlined how total fruit volume sales in Ireland are growing. The value of blueberry sales has been increasing and the value of raspberry sales are growing.

DIVERSIFICATION

Teagasc Options Workshops

What are the options for increasing family farm income? Are they through on-farm efficiencies or through diversification? To help farmers make wise financial decisions and inspire diversification ideas, Teagasc organised a series of "Options" workshops for farm families at 12 locations throughout the country in autumn 2014.



Participants in the Food Works programme.

Each workshop consisted of five sessions run over five consecutive weeks and included visits to local farms and entrepreneurs who have succeeded in diversifying their farming activities. Topics covered at the workshops included:

- assessing your enterprise
- developing your idea
- family farm finances
- farm succession planning
- food enterprise possibilities
- rural tourism
- energy crops/ forestry
- organic opportunities
- alternative land use options
- a business plan - the basics
- applying for grant aid.

Innovative All Ireland Artisan Producer Network Established

Teagasc, together with the Causeway Coast and Glens Heritage Trust from Northern Ireland, hosted the Économusée All Ireland Business and Networking Forum in the Ballinahown Craft Village, Co. Westmeath, at which the All Ireland Économusée Network was established.

At the Forum, a brochure and a specially designed web based sales platform for the newly established All Ireland Économusée Network were launched by Carl-Éric Guertin, CEO of the International Économusée Network Society which is based in Québec (Canada).

An Économusée is an artisan business that opens its doors to the public to provide a learning and interpretive experience for visitors.

Food Works

Ice-cream, biodegradable chewing gum, premium Irish vodka and sustainable seafood butter are a flavour of the innovative food and drink products developed by Irish entrepreneurs participating in Food Works, a training and development programme jointly run by Bord Bia, Enterprise Ireland and Teagasc.

Established in 2012, Food Works was set up to identify and nurture export-orientated entrepreneurs who want to be part of Ireland's growing food and drink industry. Through a series of workshops and one to one mentoring, successful participants are given an invaluable range of practical business supports

required to develop an initial concept into a winning food product with international appeal and global export potential.

The available supports include consumer market research, business plan development, technical advice, commercial viability testing in addition to access to fast track access to research and development (R&D) facilities and possible investors and state funding.

Sensory Food Network Ireland

Sensory Food Network Ireland is a new national network of excellence, funded by the Department of Agriculture, Food and the Marine, under the FIRM programme. The network is coordinated by Dr. Eimear Gallagher and Dr. Sinéad McCarthy from Teagasc, Ashtown, and also includes all leading institutions with expertise in sensory science from the island of Ireland. The network works as a sustainable unit to address documented needs and gaps by the food industry in relation to sensory science.

## EQUINE

### Sport Horse Industry Strategic Planning Process Launched

The Minister for Agriculture, Food and the Marine, Simon Coveney, launched a strategic planning process for Ireland's Sport Horse sector in early 2014.

The strategy development was undertaken by Horse Sport Ireland, Teagasc and the Royal Dublin Society, with an emphasis on export-led growth and increasing employment in the sector. The strategic planning process was overseen by a Steering Group chaired by Professor Patrick Gibbons, Professor of Strategic Management, UCD Smurfit Business School.



The Steering Group included: Professor Pat Wall, HSI Chairman; Damian McDonald, HSI CEO; Professor Cathal O'Donoghue, Head of Teagasc's Rural Economy & Development Programme (Chair of the Working Group); Declan McArdle, Teagasc Equine Specialist Advisor; Michael Duffy, RDS CEO and Pat Hanly, Deputy CEO of the RDS and Dublin Horse Show Director

Minister Simon Coveney said: "A recent UCD study found that the Sport Horse sector is worth over €700m to the Irish economy with over 47,000 participating in the sector on a regular basis. The sector is crucial to the fabric of rural Ireland and I welcome this initiative to put a plan in place for the commercial development of the sector."

A consultation process involved seeking submissions from interested parties and a number of regional meetings were held to invite input from participants in the sector. The strategy was launched in 2015.

*The Minister for Agriculture, Food & the Marine, Simon Coveney T.D. pictured with Prof. Cathal O'Donoghue, Teagasc equine specialist Mr. Declan McArdle, with Mr. Damian McDonald and Prof. Pat Wall.*



## Teagasc Agriculture and Food Development Authority www.teagasc.ie STAFF PROFILE

### Dr. Dilip Rai, Senior Research Officer at Teagasc Ashtown

Dr. Dilip Rai is a Senior Research Officer at Teagasc, Ashtown. He grew up in Daifam a small town in the east of Bhutan. The mountainous country is half the size of Ireland and borders India to the south and China to the north.

Dilip completed an Under-graduate degree in Applied Sciences which was jointly awarded by DIT Kevin Street and Trinity College Dublin. Subsequently he earned a PhD in Medical Biochemistry from Karolinska Institute, Stockholm, Sweden. The subject of the thesis was molecular and mass spectrometry investigation of human blood disorders.

"Soon after my PhD, I did six months post-doctoral research in Biological Mass Spectrometry lab in Karolinska Institute. Then I returned to Ireland in October 2013 as a post-doctoral research scientist in the UCD School of Chemistry and Chemical Biology, where I currently hold an adjunct lecturer position. I have been in Teagasc for six years now.

"I am leading a research team in the field of nutraceuticals; recovering and characterising food molecules that possess health-promoting effects from terrestrial plants, marine and meat. The emphasis of my research is on the utilisation of food-processing by-products and under-utilised plant resources to generate sustainable source of functional food ingredients.



"In addition, my research interest covers assessing the effect of various food-processing (domestic, industrial and novel physical) technologies on the levels of health-benefiting plant-molecules with emphasis on Irish grown vegetables such as carrots, broccoli and onions.

Irish Organic Herbs Ltd. (Drumshambo, Co. Leitrim, Ireland) provided us with dandelion roots for a research study. This farm supplies dandelion roots to health-stores where the root extracts have been sold to treat digestive problems and as an anti-diuretic agent.

Like dandelion, there are many other folk-lore food plants, e.g. nettle plants now farmed commercially in Ireland that have been associated with anti-inflammatory properties. However the scientific evidence to support the health-benefit claims are lacking.

"There is certainly scope for Irish farmers to grow such unusual crops considering many consumers are becoming health-conscious".



Goal 4 - Enhance organisational capability  
and deliver value for money



## Goal 4 - Enhance organisational capability and deliver value for money



### The Economic Returns to Formal Agricultural Education

There is a positive and significant economic return to formal agricultural education for Irish farmers and Irish society according to Professor Gerry Boyle, Director of Teagasc speaking at the launch of a new Teagasc research report 'The Economic Returns to Formal Agricultural Education' at the Teagasc College of Amenity Horticulture, National Botanic Gardens, Dublin.

Mr. Tony Pettit, Prof. Gerry Boyle, Dr. Kevin Heanue and Prof. Cathal O'Donoghue at the launch of the report on returns on agricultural education.

In a rapidly changing technological and economic environment, agricultural education is most important. Professor Boyle said that the study confirms a positive return to agricultural education both in terms of the internal rate of return from a human capital perspective and also the benefits from agricultural education to farm level yields, intensity, and income. The study was based on Teagasc National Farm Survey data on 1,100 farms for the period 2000 to 2011.

The analysis shows that holding an agricultural education qualification increases family farm income. Professor Cathal O'Donoghue, Head of Teagasc's Rural Economy and Development Programme and co-author of the report, said that the pathways through which formal agricultural education increased income was by improving farm-level yields and intensity in terms of livestock units per hectare. Typically, average gross margins per hectare were between 1.3 and 1.7 times higher for those farmers who have formal agricultural education compared to those who do not.

### €2.5 Million Investment in Teagasc College of Amenity Horticulture, Botanic Gardens

A new teaching and learning facility at the Teagasc College of Amenity Horticulture in the National Botanic Gardens was officially opened in May by the Minister of State at the Department of Agriculture, Food and the Marine, Tom Hayes, T.D.

The developments at the College of Amenity Horticulture cost €2.5m and involved construction of new teaching facilities as well as renovation of an old building dating back to the 1700's which now includes a dedicated landscape design teaching studio. At the opening, Minister Hayes praised the recent developments at the College which will see a doubling of its student capacity.

Chairman of Teagasc Dr. Noel Cawley said; "The Teagasc College of Amenity Horticulture at the

National Botanic Gardens provides the perfect setting for a horticultural course where the vast resources of this great national garden are placed at the disposal of students. Expert staff, the plant collections, an extensive library, the research work and the benefits of a massive renewal programme over the past decade all contribute to making the National Botanic Gardens a unique place to study horticulture."

Teagasc Director Professor Gerry Boyle said; "The courses that are offered in the college are geared at people who want to get involved in the business of horticulture. The college is currently offering level 5, 6, 7 and 8 programmes in horticulture.

Simply stated, level 5 is a one year Certificate, level 6 is a two year Advanced Certificate, level 7 is a three year ordinary Degree and level 8 is four year honours Degree.

Teagasc Chairman, Dr. Noel Cawley, Minister of State at the Department of Agriculture, Food and the Marine, Tom Hayes T.D., Dr. Matthew Jebb, Prof. Gerry Boyle.

By combining classwork with practical skills training in the Botanic Gardens and external practical learning placements, students receive a balanced approach to the work of amenity horticulture while on the courses."

Dr. Matthew Jebb, Director of the National Botanic Gardens said; "Science and Education have been at the heart of the National Botanic Gardens' mission from its very beginnings. It is wonderful to see this state of the art addition that puts us at the heart of Irish horticulture.

We are proud of our connections with the horticultural college, not only for fostering the early careers of so many of our staff, but because it enables us to play our part in training future custodians of our national gardening heritage."



Goal 4 - Enhance organisational capability and deliver value for money

Christy Watson wins Teagasc Gold Medal

The 2014 winner of the Teagasc Gold Medal was Christy Watson, Drystock Business and Technology Advisor in the Laois, Kildare, Meath, Louth, Dublin advisory region. The Teagasc Gold Medal is awarded annually to a serving staff member who has made an outstanding contribution to the organisation and to the agri-food sector.

The award was presented to Christy Watson in recognition of his outstanding leadership in influencing his farmer clients, students and colleagues.

The presentation of the Gold Medal Award was made at a meeting of the Teagasc Authority in April, Chairman Dr. Noel Cawley congratulated Christy Watson, saying that he has earned the utmost respect from his farmer clients and colleagues for his commitment to his advisory work and the interest he has shown in promoting the highest standards as an advisor and in the farming industry.

Dr. Cawley said: “Christy’s performance has been exceptional as a Business and Technology advisor, working with over 200 drystock farmer clients and through his contribution to open days, farm walks, seminars, and national and international conferences. He has supported the discussion group programme for farmers and the BETTER Farm Beef Programme.

With his help many of his clients have hosted visiting groups, presenting an important shop window for Irish family farm based food production.



Dr. Noel Cawley, Christy Watson and Prof. Gerry Boyle.

A native of Curraghboy, County Roscommon, Christy Watson graduated with a B.Agr. Sc. from University College Dublin before completing a Master in Agricultural Science in UCD. He joined ACOT, (Teagasc’s predecessor) in 1985 and worked initially as an agricultural advisor in counties Leitrim and Wicklow. He also worked in the Teagasc Kildalton agricultural College. He has been based in the Naas office in County Kildare since 1995. He is currently participating in the Leadership Development Programme in the IMI.

Teagasc Supporting Smart Futures and SciFest

Teagasc is partnering with Smart Futures and SciFest to promote careers in science, technology, engineering and maths (STEM).

Smart Futures is a collaborative programme between government and industry that promotes careers in STEM to post-primary students, parents and guidance counsellors. This year, Smart Futures is partnering with SciFest (www.SciFest.ie), a national science competition which sees schools across Ireland take part in science fairs. Students with winning projects go to compete in regional heats in the Institutes of Technology in a bid to make it to the national final.

Impact of Teagasc research highlighted

Students with winning projects go to compete in regional heats in the Institutes of Technology in a bid to make it to the national final. Researchers are involved in promoting STEM careers to young students,” said Teagasc Director of Research, Dr. Frank O’Mara. “I am sure students will be excited, and maybe a little surprised, about the great opportunities for STEM related careers in the agri-food industry. We recognise the importance of bringing new talent into the industry, and as one example, our Walsh Fellowship programme currently has over 200 students.

They are mostly engaged in research towards PhD degrees across a range of exciting topics and many will subsequently develop STEM related careers.”

Teagasc launched a new document ‘Teagasc Research Impact Highlights 2013’ in Dublin in July. Dr. Frank O’Mara, Director of Research in Teagasc, said: “This document is a collection of some of the highlights of where Teagasc research has impacted positively on the agri-food industry in 2013.

While our researchers published over 400 A1 scientific papers in 2013, as an organisation that conducts mainly applied research, we work hard to ensure our research programmes will have impact and are relevant to the Irish agricultural and food sectors.

These 20 highlights of some recent impacts of our research show that the investment in research in Teagasc does pay dividends.”

“I am delighted that six of our

Director of Knowledge Transfer, Tom Kelly, with Mr. Eamon Ó Cuiv, T.D., at an Oireachtas briefing.



## Goal 4 - Enhance organisational capability and deliver value for money

### Centenary Lecture marks birth of Dr. Tom Walsh

July 18th marked the centenary of the birth of the late Dr. Tom Walsh, an internationally renowned Irish scientist and leader, who over a career of more than 40 years, made fundamental contributions to the development of Irish agriculture, the economy and society. Dr. Tom Walsh was the first Director of An Foras Talúntais (AFT), and later of ACOT (AFT and ACOT merged to form Teagasc in 1988).

He worked untiringly for the development of Ireland's natural resources in general, and for the agricultural and food industries in particular.

To mark the centenary of Dr. Walsh's birth, Teagasc held a special centenary lecture in Johnstown Castle, Wexford on 5th December - World Soils Day. The lecture was delivered by Professor John Ryan on the 'Evolution and Achievements of Irish Soil Science'. Professor Ryan is himself an internationally distinguished soil scientist and was the recipient of the prestigious International Service in Agronomy Award for 2004 from the American Society of Agronomy.

Professor Ryan is a Fellow of the American Society of Agronomy, Fellow of the Soil Science Society of America, recipient of the International Soil Science Award, and Distinguished Citizen of the University of Arizona.

### Walsh Fellowship Seminar

The Teagasc Walsh Fellowships Programme, named in honour of Dr. Walsh, has grown in scale and significance since it was launched in Johnstown in 1995. Up to 2,000 postgraduate students have participated in the scheme over the past twenty years.

The Walsh Fellowships is one of the largest postgraduate schemes in Ireland, providing research opportunities for significant numbers of high calibre graduates.

Eighteen Walsh Fellows presented their research findings at the seminar with an additional 17 Fellows presenting posters.

This year's winner of the Walsh Fellowships seminar and winner of the RDS medal is Mary Harty a native of Co. Kerry for her presentation on Nitrogen fertilizer formulation: the impact on yield and gaseous emissions. The winner of the best poster was Conor Murphy

The Institute of Food Science and Technology Ireland (IFSTI) medal was presented to Aidan Casey for the best food science and technology presentation.

### Teagasc agrees Strategic Partnership for GLAS Planning

In 2014 Teagasc set up a strategic partnership arrangement with the National Co-Op Farm Relief Services Limited (NCFRS) to provide a GLAS planning and support service to Teagasc farmer clients. NCFRS were selected following a tender process. The decision was approved by the Teagasc Authority.

GLAS is the Green Low-Carbon Agri-Environmental Scheme which is expected to open for farmers to apply in 2015. Head of Knowledge Transfer in Teagasc Dr. Tom Kelly said: "This new partnership allows us to continue to provide clients with a top quality agri-environmental planning and support service. Working with the Farm Relief Service we are delivering a GLAS planning service to farmers."

### Tyndall and Teagasc form partnership to develop a SMART agri-food sector

Through the partnership the two organisations will work together to secure maximum EU Horizon 2020 funding and create up to 10 new graduate research positions.

This new strategic partnership will foster and encourage researchers in both organisations to actively explore synergistic and complimentary research opportunities, which will result in an increase in Ireland's European and global competitiveness. The combined expertise at Tyndall and Teagasc will enable the development of new technologies, products and services in the agri-food sector.



Prof. Gerry Boyle, Simon Coveney T.D., Minister for Agriculture, Food & the Marine and Dr. Kieran Drain, CEO Tyndall National Institute.

The partnership will deliver economic impact by developing new ICT and production approaches that can be mapped onto the diverse requirements of agriculture to:

- Increase the efficiency and sustainability of the Irish agri-food sector through the application of advanced sensor and communication technologies.
- Become a world leader in research and development, and the commercialisation of state-of-the-art precision agri-food technologies. (See also Goal 1)

### Teagasc Soil Analysis Contract Awarded to Southern Scientific Services

Teagasc and Southern Scientific Services Ltd signed a new contract for the provision of soil analysis services to farmers for the next three years. The awarding of the contract followed a competitive tender process. Southern Scientific Services have provided this service to Teagasc and their clients for the past five years.

Director of Teagasc Professor Gerry Boyle said: "The service provided by Southern Scientific to the farmer clients of Teagasc has been a seamless continuation of the high quality of service that had been provided by the Teagasc laboratory at Johnstown Castle for many years. A detailed knowledge of the nutrient and pH status of individual fields is the starting point for farmers to produce high quality and high yielding crops of grassland, cereals and other crops."

### CIMS

The latest phase of the Client Information Management System (CIMS) business process review (BPR) project went live in February. From now on, the statement run for farm clients in all units will be carried out every month by a central unit located in Ennis, Co. Clare. The first batch of statements was issued in March for all advisory regions.

The second aspect of the project is the batch renewal of contracts. This is being piloted in two units. The new procedure commenced for Kerry-Limerick and Mayo in March, starting with May contract renewal notices. Rollout to remaining units commenced in April, starting with June contract renewal notices.

### SPS

Over six weeks Teagasc advisors met individually with over 40,000 clients to review their individual farming plans for 2014 and submit Single Payment Scheme (SPS) applications. The majority of applications (38,000) were submitted through the online service.

## Goal 4 - Enhance organisational capability and deliver value for money

### Teagasc International Scientific Advisory Board

Members of the Teagasc International Scientific Advisory Board (ISAB) are pictured with Frank O'Mara (Director of Research) - 3rd right - and Jane Kavanagh (Head of Research Operations) during their meeting at Ashtown in July. Teagasc established ISAB in 2010 to provide advice and guidance on the strategic direction of its research programmes from an international perspective. This was the last meeting of the current Board which was elected for a four-year term.

Professor Dietrich Knorr (Berlin University of Technology), Professor Geoffrey Campbell-Platt (University of Reading), Dr. Tim Mackle (Chief Executive, Dairy NZ), Dr. John Kennelly (University of Alberta, Canada and Chairman of ISAB), and Professor Simon van Heyningen (formerly Edinburgh University), pictured here with Jane Kavanagh and Dr. Frank O'Mara.

### Property Disposals 2014

The Athy, Tullow and Birr offices were sold in 2014.

### Energy Usage

The Annual Energy Usage Report 2014 shows Teagasc operates out of 55 locations nationwide varying in scale from Campus type facilities with 100+ staff (e.g. Research Centres & Colleges) to small local Advisory offices with approximately 10 staff. The Teagasc built environment is the principal user of energy resources accounting for approximately 76% of total consumption.

In 2014, Teagasc consumed 24,643 MWh of energy consisting of:

- 10,409 MWh of electricity, or 42% of total energy

Professor Dietrich Knorr (Berlin University of Technology), Professor Geoffrey Campbell-Platt (University of Reading), Dr. Tim Mackle (Chief Executive, Dairy NZ), Dr. John Kennelly (University of Alberta, Canada and Chairman of ISAB), and Professor Simon van Heyningen (formerly Edinburgh University), pictured here with Jane Kavanagh and Dr. Frank O'Mara.



- 7,199 MWh of fossil fuel for space heating, or 29% of total energy
- 5,838 MWh of vehicle fuel (agricultural, commercial transport and car fleet), or 24% of total energy
- 1,197 MWh of renewable fuels or 5% of total energy

Teagasc has an on-going programme in place to upgrade the building fabric of its facilities to reduce heat loss (double glazing, roof and wall insulation etc.). This programme will continue in 2015. Renewable fuel sources accounted for 5% of total energy use in 2014. This figure does not take account of the portion of purchased electricity which is generated from renewable resources.

### ICT Investments

In 2014 Teagasc completed the replacement of standard desktop PC's and Laptops, and their upgrade to Windows 7. Teagasc established a rudimentary disaster recovery site for ICT services and moved from tape to disk backups.

The development of a Nutrient Management Planning system was commenced, as was the development of an online system for managing applications for research projects. Considerable work was also carried out on improving the Local Area Networks on campus sites and the rollout of Voice over IP telephony commenced.

### Induction Programme for Post-Doc Fellows

Thirty-five Teagasc Post-Doctoral Fellows attended the first Post-Doctoral Fellow Induction Programme in Ashtown on 15th and 16th July. The highlight of the programme was an inspirational presentation by Professor Matt Lucy, University of Missouri.



Teagasc developed a new Post-Doctoral Fellowship programme of up to six years duration in 2013. Post-Doctoral Fellows have access to training and development opportunities that will enhance their experience of learning and equip them with the necessary skills for the next stage of their chosen career in industry or academia.

### Teagasc Fulbright scholar to investigate peptides

Niamh Murray is the winner of the 2014 Teagasc Fulbright Irish Scholar Award. Niamh is currently enrolled in a Research Masters with Food for Health Ireland (FHI) in UCD.

Milk peptides have been shown to have a number of health benefits, including anti-inflammatory, anti-hypertensive effects. In addition, they have the ability to control glycaemic response, appetite infection and enhance immune responses.

Niamh Murray, the winner of the 2014 Teagasc Fulbright award, pictured at Teagasc Oak Park.

They therefore have excellent potential for the development of innovative foods with health benefits.

## Goal 4 - Enhance organisational capability and deliver value for money

### Teagasc features in TV awards Science Week

Maria Hayes and Ciaran Fitzgerald (Teagasc Food Research Centre, Ashtown) starred in New Decade TV's award-winning series entitled 'How seaweed could be big business'. This won the TV category of the Guild of Agricultural Journalists Awards. Catriona Boyle, Eric Donald and Dr. Frank O'Mara worked with New Decade on content development for this series.

John Noonan and Mark Moore who won Best Technical category at the awards for their 'unique breed preservation' article (Today's Farm). Two articles from TRResearch were also nominated for this category.

Students participating in Science Week in Teagasc Grange.



During Science Week in November 2014 Teagasc research centres and colleges invited local schools to meet research and teaching staff and learn about the work Teagasc does to support science-based innovation in the agri-food sector and the broader bioeconomy that will underpin profitability, competitiveness and sustainability. Over 1,000 students attended Teagasc Science Week events. In Athenry, students from local schools undertook a series of practical experiments to see how science is being used by Teagasc to address issues related to reproduction and parasitism in sheep.

Teagasc Grange research campus featured a demonstration of the beef and animal bioscience research at the campus.

Students visiting the Teagasc Crops Research Centre in Oak Park, Co. Carlow, met researchers who gave them an insight into the science that supports the tillage industry, and described the current cutting-edge crops research areas. Teagasc Moorepark Dairy Research Centre in Co. Cork gave students from the surrounding area the opportunity to meet current PhD and Masters Students who showed them the facilities and provided insights into their work. Visiting students had the opportunity to learn about grassland management, breeding and genetics.

The Teagasc Food Research Centre, Ashtown, Co. Dublin, also hosted students giving them an insight into the science behind the agri-food industry.

Students also learned about remote sensing in agriculture, sensory analysis of food, food safety, the science of bread, sausage-making and seaweed. The Teagasc Crops, Environment, and Land Use Research Centre at Johnstown Castle, Co. Wexford, also hosted students and demonstrated a variety of environmental experiments being undertaken there in areas such as ecology, carbon cycling, water quality and soils, nutrient efficiency and sustainability. Teagasc Kildalton Agricultural and Horticultural College, Co. Kilkenny and some advisory offices also welcomed students and explained the role of Teagasc, qualifications such as the Green Cert and other courses and careers in agriculture.

### Award winners

Staff Excellence and Open Innovation Award winners received their accolades at a reception held at the Teagasc Food Research Centre, Ashtown on 6th June. There were 27 successful proposals for the Open Innovation Awards, which were announced on the day.

Brendan Burke and Oak Park farm Staff were first place winners with their proposal on utilisation of RTK GPS for field experimentation. Edward Burgess (Agri Catchments Programme), who was awarded second place, put forward a proposal on colour coded soil analysis maps.

Daire O hUallacháin (Johnstown Castle) was awarded third place for his proposal on a support tool for greening measures (STORM).

The Leadership Development Award went to Ciara Johnson, Fintan Phelan, Majella Moloney, Noreen O'Rahilly and Siobhan Culleton for their proposal on the creation of curriculum development teams.



Team members including Frank O'Mara, Catriona Boyle, Alison Maloney, Catherine Power, Cian Condon, and Steven Meyen received Excellence awards for a Teagasc project on Social Media.



Director of Research Dr. Frank O'Mara presenting an Excellence Award to Anne Birch of Teagasc HQ.

This was the first year of the Lily Nolan Award. It was won by John Kelly, Marie McGlynn and staff at Ballyhaise Agricultural College for their proposal on farm safety awareness among primary school children as part of the Leadership module.

The Staff Excellence winners also received their awards on the day. They were announced in December 2013.

# Goal 4 - Enhance organisational capability and deliver value for money

## Quality Customer Service

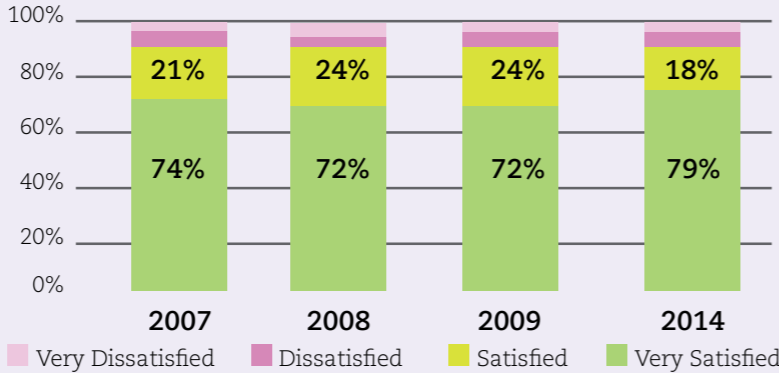
It has been challenging for Teagasc to maintain the standard of service delivery since 2008 during a period of increased service demand, decreasing staff numbers and restrictions on recruitment or replacement.

In November 2014 Teagasc Advisory Clients were asked to complete a postal “comment card” survey. Comment Cards were posted to in excess of 40,000 Advisory clients. There was a response rate of 5% (1827 responses compared to 995 for a similar exercise in 2009).

Respondents in 2014 (as in 2009) expressed high levels of overall satisfaction with the service they are receiving (Figure 1), the promptness and efficiency (Figure 2). The level of formal written complaints remains quite low despite the challenging staffing situation.

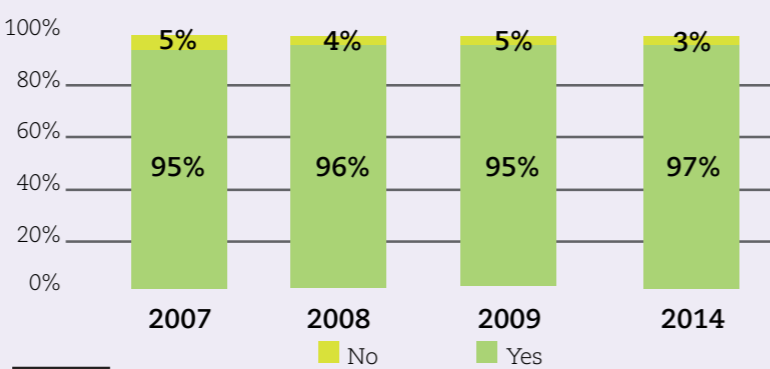
When asked about the positive aspects of the service they receive, respondents frequently referred to the expertise of staff in providing high quality advice and the willingness of staff to put in extra effort in service delivery. Taking the same group of respondents, their main concerns were in areas such as staffing levels and the replacement of staff to maintain that level of service into the future.

Fig 1: Oversall Satisfaction with the Service



N= 1827. Source: Postal Comment Card Survey

Fig 2: Satisfactory Levels with Promptness & Efficiency



N= 1827. Source: Postal Comment Card Survey



## Brid Burns, Procurement Officer, Letterkenny office.

Brid is procurement officer for Teagasc nationally. Her role involves the development of a procurement structure and best practice within Teagasc; she provides assistance and support to Staff undertaking procurement projects and advises them on current Teagasc/Public Procurement guidelines and thresholds. She assists Teagasc staff in the tendering process for goods and services. This involves help with definition of their requirements, setting of qualification and award criteria and frequently uploading tender documentation to eTenders.

Brid provides help with the evaluation and award process and provides template documentation to support best practice. Procurement rules dictate that goods and services with a value of greater than €25,000 are advertised on eTenders. In 2014 Teagasc advertised 35 projects for goods/services on eTenders with an approximate value of € 13.2million.

Any goods/services contract with a value in excess of €207,000 must also be advertised in the Official Journal of the European Union (OJEU). There were five of those in 2014. “We do get expressions of interest from foreign suppliers; while moderately few tend to be successful it is always useful to have competition.”

Brid has been in Teagasc for 35 years. She is a native of Donegal and began her career with the Donegal County Committee of Agriculture in the Lifford office (long since closed). There were ten office locations in the County then and only three now.



Her biggest challenge is managing her workload as everybody thinks their tender is the most important one. She communicates updates, changes or new Directives notified to Procurement by OGP/eTenders to all relevant staff.

The Office of Government Procurement (OGP) replaced the National Procurement Service and Brid has constant contact with the OGP. The OGP are responsible for putting in place centralised government contracts which Teagasc are obligated to use. Teagasc availed of up to twelve centralised government contracts during 2014.

Part of Brid’s role is to ensure that Teagasc Staff are aware of, and use these contracts.

“I meet 3-4 times a year with the Teagasc buyer’s group to communicate detail of current changes and alert them of future change.”

We save both time and money by participating in National Contracts. “In the past you could have had each office going through a tendering process for copier paper for example. “Availing of the government contract for the supply of copier paper saves Teagasc time and money.”

“It’s all about achieving value for money for the 55 Teagasc locations and the taxpayer.” Teagasc can benefit as an organisation by working with the OGP. “The aim is always to get the best value for money for Teagasc and the taxpayer, which does not necessarily mean the absolute lowest price.”



Wexford beef farmers Alan Kehoe, Joe Watchorn, David Kinsella and Jimmy Dempsey regularly use plate meters to measure grass covers. They are members of a discussion group facilitated by Teagasc advisor Martina Harrington.

## Financial Statements

for the Year Ended 31st December 2014



Contents	Page
REPORT OF THE COMPTROLLER AND AUDITOR GENERAL	65
STATEMENT ON INTERNAL FINANCIAL CONTROL	66
STATEMENT OF RESPONSIBILITIES OF THE AUTHORITY	67
ACCOUNTING POLICIES	68 - 69
INCOME AND EXPENDITURE ACCOUNT	70
STATEMENT OF TOTAL RECOGNISED GAINS AND LOSSES	70
BALANCE SHEET	71
CASH FLOW STATEMENT	72
NOTES TO THE FINANCIAL STATEMENTS	73 - 86

**Teagasc - The Agriculture and Food Development Authority**  
I have audited the financial statements of Teagasc for the year ended 31 December 2014 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 cashflow statement and the related notes. The financial statements have been prepared in the form prescribed under Section 12 of the Act, and in accordance with generally accepted accounting practice in Ireland.

**Responsibilities of the Board of the Authority**  
The Authority is responsible for the preparation of the financial statements, for ensuring that they give a true and fair view of the state of the Authority's affairs and of its income and expenditure, and for ensuring the regularity of transactions.

**Responsibilities of the Comptroller and Auditor General**  
My responsibility is to audit the financial statements and report on them in accordance with applicable law. My audit is conducted by reference to the special considerations which attach to State bodies in relation to their management and operation. My audit is carried out in accordance with the International Standards on Auditing (UK and Ireland) and in compliance with the Auditing Practices Board's Ethical Standards for Auditors.

**Scope of audit of the financial statements**  
An audit involves obtaining evidence about the amounts and disclosures in the financial statements, sufficient to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or error. This includes an assessment of

- whether the accounting policies are appropriate to the Authority's circumstances, and have been consistently applied and adequately disclosed
- the reasonableness of significant accounting estimates made in the preparation of the financial statements, and
- the overall presentation of the financial statements.

I also seek to obtain evidence about the regularity of financial transactions in the course of audit.  
In addition, I read the Authority's annual report to identify material inconsistencies with the audited financial statements. If I become aware of any apparent material misstatements or inconsistencies, I consider the implications for my report.

**Opinion on the financial statements**  
In my opinion, the financial statements, which have been properly prepared in accordance with generally accepted accounting practice in Ireland, give a true and fair view of the state of the Authority's affairs at 31 December 2014 and of its income and expenditure for 2014.  
In my opinion, proper books of account have been kept by the Authority. The financial statements are in agreement with the books of account.

**Matters on which I report by exception**  
I report by exception if

- I have not received all the information and explanations I required for my audit, or
- my audit noted any material instance where money has not been applied for the purposes intended or where the transactions did not conform to the authorities governing them, or
- the information given in the Authority's annual report is not consistent with the related financial statements, or
- the statement on internal financial control does not reflect the Authority's compliance with the Code of Practice for the Governance of State Bodies, or
- I find there are other material matters relating to the manner in which public business has been conducted.

**VAT settlement**  
I draw attention to the statement on internal financial control which discloses that in June 2015 the Authority concluded a settlement with the Revenue Commissioners in relation to the non-payment of VAT on goods and services procured by the Authority over the previous four years. The settlement amount was €399,000 and included interest of €79,000 and penalties of €9,000.

Seamus McCarthy  
Comptroller and Auditor General  
31 August 2015

## 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:

- an 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 2012. 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 2014 the Authority retained an external expert to advise the Audit Committee.

The audit of the 2014 financial statements identified payments totalling €348,000 where the procurement procedures did not follow the procurement guidelines. €300,500 of this amount refers to the procurement of fuel by one Teagasc office under a contract completed following a procurement competition where 7 quotes were received from fuel suppliers - as opposed to following the EU guidelines. With effect from 13 February 2014 all of the other 54 Teagasc offices were procuring fuel oil under a Government framework contract. The balance of €47,500 refers to brokerage fees paid to an insurance broker following a challenged procurement competition.

The Authority has been notified of a number of claims arising from allegations that losses were incurred by third parties as a result of the actions of a Teagasc employee. Teagasc is conducting an investigation into the matter which is ongoing at the date of signing of these financial statements.

General operating expenses includes a charge of €399,593 being a charge in respect of the costs of settling a VAT liability, including penalties of €9,327 and interest of €79,356. In June 2015, the Revenue Commissioners accepted this amount in final settlement of the case. Teagasc has strengthened controls and delivered additional training to prevent a recurrence of this issue.

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 2014.

Dr. Noel Cawley  
Chairman  
28 August 2015

## Statement on 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, Food and the Marine 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  
28 August 2015

Joe Larkin  
Member of the Authority  
28 August 2015

Accounting Policies
Year Ended 31 December 2014

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, Food and the Marine 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.

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. Teagasc has decided that it is not appropriate to consolidate the results of Moorepark Technology Limited. The reason for the departure from the applicable accounting standard is that the corporate structure of Moorepark Technology Limited and its size are very different from Teagasc. The chosen treatment in the financial statements gives the reader more information about Moorepark Technology Limited and its relationship with Teagasc than would be the case if the Financial Reporting Standards were adopted.

State funding

State funding for food research and agriculture research, for the Stimulus collaborative research programme and for the Agricultural Catchments 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. Assets under construction are 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.

Financial assets

Financial Assets are carried at the value attributed to them at the date of acquisition less a provision for diminution in value, where appropriate.

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.

Accounting Policies
Year Ended 31 December 2014

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 on the open market. 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.

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, Food and the Marine, 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, Food and the Marine.

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, Food and the Marine.

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 2014

	Notes	31 December 2014 €'000	31 December 2013 €'000
<b>Income</b>			
State funding	2	127,700	127,982
EU funding	3	2,434	2,483
Operational income	4	27,795	28,981
Net deferred funding for pensions	9	26,785	28,542
Surplus on disposal of fixed assets	12	158	713
Other grants, donations and voluntary levies		4,842	3,000
		<u>189,714</u>	<u>191,701</u>
<b>Expenditure</b>	5	<u>190,887</u>	<u>191,371</u>
		(1,173)	330
Transfer from / (to) Capital Account	11	<u>1,798</u>	<u>(1,533)</u>
<b>Surplus / (deficit) for the financial year</b>		<u>625</u>	<u>(1,203)</u>
<b>Balance at beginning of year</b>		<u>9,030</u>	<u>10,233</u>
<b>Balance at end of year</b>		<u>9,655</u>	<u>9,030</u>

## STATEMENT OF TOTAL RECOGNISED GAINS AND LOSSES

	Notes	31 December 2014 €'000	31 December 2013 €'000
<b>Surplus / (deficit) for the financial year</b>		625	(1,203)
Experience gain on pension scheme liabilities	9	129,274	26,988
Changes in assumptions underlying the present value of pension liabilities	9	(152,973)	0
Actuarial (loss) / gain on pension liabilities		<u>(23,699)</u>	<u>26,988</u>
Adjustment to deferred pension funding		<u>23,699</u>	<u>(26,988)</u>
<b>Total recognised gain / (loss) for the year</b>		<u>625</u>	<u>(1,203)</u>

The above amounts relate entirely to continuing operations. The Statement of Accounting Policies and notes 1 to 27 form part of these financial statements.

Dr. Noel Cawley  
Chairman  
28 August 2015

Professor Gerry Boyle  
Director  
28 August 2015

## Balance Sheet

### Year Ended 31 December 2014

	Notes	31 December 2014 €'000	31 December 2013 €'000
<b>Fixed assets</b>			
Tangible assets	12	94,786	96,584
Financial assets	14	<u>285</u>	<u>2</u>
		<u>95,071</u>	<u>96,586</u>
<b>Current assets</b>			
Stocks	16	4,689	4,441
Debtors	17	16,718	15,496
Bank balances		6,454	1,397
Short term deposits		<u>15,796</u>	<u>21,758</u>
		<u>43,657</u>	<u>43,092</u>
<b>Creditors - Amounts falling due within one year</b>			
Creditors and accruals	18	14,917	12,559
Deferred income	19	<u>19,370</u>	<u>21,505</u>
		<u>34,287</u>	<u>34,064</u>
<b>Net current assets</b>		<u>9,370</u>	<u>9,028</u>
<b>Total assets less current liabilities before pensions</b>		104,441	105,614
Deferred pension funding	9	1,327,326	1,276,842
Pension liabilities	9	<u>(1,327,326)</u>	<u>(1,276,842)</u>
		0	0
<b>Net assets</b>		<u>104,441</u>	<u>105,614</u>
<b>Represented by</b>			
Capital account	11	94,786	96,584
Income and Expenditure account		<u>9,655</u>	<u>9,030</u>
		<u>104,441</u>	<u>105,614</u>

The Statement of Accounting Policies and notes 1 to 27 form part of these financial statements.

Dr. Noel Cawley  
Chairman  
28 August 2015

Professor Gerry Boyle  
Director  
28 August 2015

## Cashflow Statement

Year Ended 31 December 2014

		31 December 2014 €'000	31 December 2013 €'000
	Notes		
<b>Reconciliation of operating surplus to net cash inflow from operating activities</b>			
Operating surplus / (deficit)		625	(1,203)
Depreciation	12	6,602	6,694
Asset Impairment	12	483	0
Transfer (from) / to capital account	11	(1,798)	1,533
Interest received		(218)	(567)
Profit on sale of fixed assets		(158)	(713)
(Increase) / decrease in financial asset holding		(283)	0
(Increase) / decrease in stocks		(248)	135
(Increase) in debtors		(1,222)	(1,791)
Increase / (decrease) in creditors and long term liabilities		2,358	(3,487)
(Decrease) / increase in deferred income		(2,135)	2,657
Net cash inflow from operating activities		<u>4,006</u>	<u>3,258</u>

## CASH FLOW STATEMENT

<b>Net cash inflow from operating activities</b>		<u>4,006</u>	<u>3,258</u>
<b>Return on investment and servicing of finance</b>			
Interest received		<u>218</u>	<u>567</u>
Net cash inflow from returns on investment and servicing of finance		<u>218</u>	<u>567</u>
<b>Investing activities</b>			
Payments to acquire tangible fixed assets	12	(5,780)	(8,341)
Receipts from disposals of tangible fixed assets		651	827
Net cash outflow from investing activities		<u>(5,129)</u>	<u>(7,514)</u>
<b>(Decrease) in cash</b>	23	<u>(905)</u>	<u>(3,689)</u>
<b>Reconciliation of net cashflow to movement in net funds</b>			
(Decrease) in cash	23	(905)	(3,689)
Net funds at 1 January		23,155	26,844
<b>Net funds at 31 December</b>		<u>22,250</u>	<u>23,155</u>

The Statement of Accounting Policies and notes 1 to 27 form part of these financial statements.

Dr. Noel Cawley  
Chairman  
28 August 2015

Professor Gerry Boyle  
Director  
28 August 2015

## Notes to the Financial Statements

Year Ended 31 December 2014

### 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, Food and the Marine with the concurrence of the Minister for Public Expenditure and Reform. This approval was given on 14 August 1998.

2 State funding	Subhead	2014 €'000	2013 €'000
The amount shown under this heading comprises:			
Vote 31: Agriculture, Food and the Marine			
Grant-in-aid for general purposes	A.5	108,710	110,838
Grant for human resource purposes	A.3.4	10,500	11,000
Food research and agriculture research	A.3.1	4,336	3,842
Stimulus collaborative research programme	A.3.2	3,573	1,647
Grant for forestry publicity and awareness and training	C.6.4	550	610
Grant for forestry education	C.6.4	31	45
		<u>127,700</u>	<u>127,982</u>

3 EU funding	2014 €'000	2013 €'000
Farm Survey Income	135	150
INTERREG	180	193
Other EU Income	87	0
Framework Programme VI	2	94
Framework Programme VII	<u>2,030</u>	<u>2,046</u>
	<u>2,434</u>	<u>2,483</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 Programme VI ran up to the end of 2006. Framework Programme VII started on 1 January 2007 and ran 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

### Year Ended 31 December 2014

#### 4 Operational income

	Operations €'000	Knowledge Transfer €'000	Research €'000	2014 €'000	2013 €'000
Advisory service fees	0	9,749	326	10,075	10,443
Other fees	39	3,192	8,218	11,449	11,852
Livestock trading surplus (Note 7)	0	683	1,523	2,206	2,701
Other farming operations	0	960	2,153	3,113	2,654
Canteen receipts	0	61	29	90	84
Publications and miscellaneous	253	334	275	862	1,247
	<u>292</u>	<u>14,979</u>	<u>12,524</u>	<u>27,795</u>	<u>28,981</u>

#### 5 Expenditure

	Operations €'000	Knowledge Transfer €'000	Research €'000	2014 €'000	2013 €'000
Pay (Note 8)	5,377	29,528	33,137	68,042	69,256
Pensions (Note 9)	67,130	0	0	67,130	69,351
Travelling and subsistence	399	1,822	2,254	4,475	4,132
Staff training	487	3	41	531	534
General operating expenses (Note 6)	6,154	8,651	19,669	34,474	32,901
Financial charges	51	31	47	129	35
Depreciation (Note 12)	315	1,289	4,998	6,602	6,694
Impairment (Note 12)	0	446	37	483	0
Grants to private colleges (Note 15)	0	2,719	0	2,719	2,958
Other grants	93	941	5,268	6,302	5,510
	<u>80,006</u>	<u>45,430</u>	<u>65,451</u>	<u>190,887</u>	<u>191,371</u>

Total pay of €68.042m includes

	2014 €'000	2013 €'000
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Overtime	988	1,000
Allowances	1,903	2,322
Redundancy	14	1,044

In 2014 165 staff received overtime payments. The highest individual amount totalled €22,207.

Travelling and subsistence	Domestic €'000	Foreign €'000	2014 €'000	2013 €'000
Subsistence	1,345	378	1,723	1,469
Motor travel	2,405	0	2,405	2,352
Airline and ferries	0	347	347	311
	<u>3,750</u>	<u>725</u>	<u>4,475</u>	<u>4,132</u>

General operating expenses includes a charge of €399,593 being a charge in respect of the costs of settling a VAT liability, including penalties of €9,327 and interest of €79,356. In June 2015, the Revenue Commissioners accepted this amount in final settlement of the case. Teagasc has strengthened controls and delivered additional training to prevent a recurrence of this issue.

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### 6 Analysis of general operating expenses

	Operations €'000	Knowledge Transfer €'000	Research €'000	2014 €'000	2013 €'000
Farming supplies / services	0	1,002	3,428	4,430	3,937
Maintenance / repairs	104	2,380	4,319	6,803	5,890
Rents / rates / insurances	47	620	1,169	1,836	2,155
Postage / telephones	639	1,001	385	2,025	2,073
Power / fuel / petrol	155	757	1,888	2,800	2,697
Laboratory supplies	0	5	4,278	4,283	3,612
Printing / stationery / publicity	926	773	791	2,490	2,370
Seminar / classroom / library supplies	80	897	745	1,722	1,536
Services of external agencies	0	809	678	1,487	1,381
Student and staff canteen supplies	65	227	285	577	676
Audit fee	52	0	0	52	47
ICT supplies / services	2,926	44	138	3,108	3,927
Legal / professional fees	754	11	966	1,731	1,923
Miscellaneous programme costs	399	110	592	1,101	636
Special events and miscellaneous	7	15	7	29	41
	<u>6,154</u>	<u>8,651</u>	<u>19,669</u>	<u>34,474</u>	<u>32,901</u>

#### 7 Livestock trading surplus

	2014 €'000	2013 €'000
Sales	2,203	3,101
Grants and subsidies	563	566
Total livestock trading revenue	<u>2,766</u>	<u>3,667</u>
Opening stock	3,641	3,915
Purchases	835	692
	<u>4,476</u>	<u>4,607</u>
Less: Closing stock	(3,916)	(3,641)
Total cost of livestock sales	<u>560</u>	<u>966</u>
Surplus to Income and Expenditure account (Note 4)	<u>2,206</u>	<u>2,701</u>

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### 8 Staff

2014 2013

The average number of staff employed during the year was as follows:

Professional	641	623
Technical	153	145
Administrative / clerical	192	201
Farm / domestic	147	155
	<u>1,133</u>	<u>1,124</u>

2014 2013  
€'000 €'000

The Director's remuneration was as follows:

Basic pay	141	147
Benefit in kind (Car)	12	12
	<u>153</u>	<u>159</u>

The Director's pension entitlements do not extend beyond the model public sector defined benefit superannuation scheme. Pension related deductions of €4,219,031 has been deducted from salaries and paid to the Department of Agriculture, Food and the Marine.

In accordance with Department of Public Expenditure and Reform circular 13/2014 the following outlines the employee benefits greater than €60,000 in 2014:

#### Employee benefits

#### Number of employees

€60,000 to €70,000	218
€70,000 to €80,000	100
€80,000 to €90,000	23
€90,000 to €100,000	40
€100,000 to €110,000	17
€110,000 to €120,000	3
€120,000 to €130,000	0
€130,000 to €140,000	0
€140,000 to €150,000	3
€150,000 to €160,000	1

#### 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, Food and the Marine, 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.

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

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 1,684 (2013 – 1,682).

#### Superannuation costs

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

	2014 €'000	2013 €'000
Current service cost	26,111	28,962
Interest on scheme liabilities	44,325	43,858
Staff contributions	(3,306)	(3,469)
	<u>67,130</u>	<u>69,351</u>

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

	2014 €'000	2013 €'000
Net pension liability at 1 January	1,276,842	1,275,288
Current service cost	26,111	28,962
Benefits paid	(43,651)	(44,278)
Interest on scheme liabilities	44,325	43,858
Actuarial loss / (gain)	23,699	(26,988)
Net pension liability at 31 December	<u>1,327,326</u>	<u>1,276,842</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 below 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, Food and the Marine, Teagasc has no evidence that this funding policy will not continue to meet such sums in accordance with current practice.

Net deferred funding for pensions in the year

	2014 €'000	2013 €'000
Funding recoverable in respect of current years pensions	70,436	72,820
Resources applied to pay pensions	(43,651)	(44,278)
	<u>26,785</u>	<u>28,542</u>

The deferred funding asset for pensions as at 31 December 2014 was €1,327 million (2013 - €1,277 million).

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### (iv) History of defined benefit obligations

	2014 €'000	2013 €'000	2012 €'000	2011 €'000	2010 €'000
Experience gain	129,274	26,988	6,571	1,838	71,517
Percentage of present value of scheme liabilities	9.7%	2.1%	0.5%	0.2%	8.1%
Changes in assumptions	(152,973)	0	(329,741)	(43,171)	(68,898)
Percentage of present value of scheme liabilities	11.5%	0%	25.3%	4.4%	7.8%
Actuarial (loss) / gain recognised in the STRGL	(23,699)	26,988	(323,170)	(41,333)	2,619

The cumulative actuarial loss recognised in the Statement of Total Recognised Gains and Losses amounts to €208.087m.

#### (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 65<sup>th</sup> birthday, and pre 2004 members have an entitlement to retire without actuarial reduction from age 60. Pensions in payment (and deferment) may be adjusted in accordance with Government policy.

With effect from 1 January 2013 all new entrants, as well as former public servants returning to the public service after a break of more than 26 weeks, are required to join the Single Public Service Scheme. Retirement for those entrants will be compulsory on reaching age 70.

The valuation used for FRS17 disclosures has been based on an actuarial valuation by a qualified independent actuary on 25 January 2015 in order to assess the scheme liabilities at 31 December 2014.

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

	2014 % per annum	2013 % per annum
Inflation rate increase	1.75	2.00
Salary rate increase	3.25	3.50
Pension rate increase	2.50	3.50
Scheme liabilities discount rate	1.90	3.50

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 2014 and 2039.

Year of attaining 65	2014	2039
Life expectancy - males	87.9	91.0
Life expectancy - females	89.6	92.0

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:

	2014 €'000	2013 €'000
Total accrued pension liability	<u>1,327,326</u>	<u>1,276,842</u>

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### 10 Authority members' fees and emoluments

	2014 €'000	2013 €'000
Cawley, Dr. Noel, Chairman	21	21
Christie, Ms. Marie	8	12
Pierce, Dr. Karina	0	12
Collins, Mr. Tom	12	12
Downey, Mr. Eddie	1	12
Tynan, Mr. Tom	10	12
Jagoe, Mr. Alan	12	3
Fitzgerald, Prof. Gerald	0	3
Gleeson, Mr. Brendan	0	0
Cooke, Mr. Tommy	12	12
Gibbons, Mr. Padraig	12	12
O'Mahony, Mr. Frank	0	9
O'Leary, Mr. Tim	11	0
Larkin, Mr. Joseph	0	0
	<u>99</u>	<u>120</u>
<b>Total expenses paid to Authority members</b>	<u>35</u>	<u>38</u>

Department of Public Expenditure and Reform guidelines on One Person One Salary were implemented in 2014.

#### 11 Capital account

	2014 €'000	2013 €'000
Balance at 1 January	<u>96,584</u>	<u>95,051</u>
Transfers from income and expenditure account		
Amount capitalised in respect of purchased assets	5,780	8,341
Net amount released on disposals	(493)	(114)
	<u>5,287</u>	<u>8,227</u>
Less: Amortised in line with asset depreciation	(6,602)	(6,694)
Asset impairment (Note 12)*	(483)	0
	<u>(1,798)</u>	<u>1,533</u>
Balance at 31 December	<u>94,786</u>	<u>96,584</u>

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

<b>12 Tangible fixed assets</b>	Land	Buildings	Assets under construction	Plant & equipment	Total
	€'000	€'000	€'000	€'000	€'000
<b>Cost or valuation</b>					
At beginning of year	5,810	114,896	4,852	73,576	199,134
Additions	0	248	3,573	1,959	5,780
Reclassification	571	(642)	0	71	0
Buildings completed	0	7,811	(7,811)	0	0
Disposals	0	(1,187)	0	(430)	(1,617)
At end of year	6,381	121,126	614	75,176	203,297
<b>Accumulated depreciation and impairment</b>					
At beginning of year	0	45,080	0	57,470	102,550
Charge for year	0	2,823	0	3,779	6,602
Impairment *	446	37	0	0	483
Disposals	0	(770)	0	(354)	(1,124)
At end of year	446	47,170	0	60,895	108,511
<b>Net book amounts</b>					
At beginning of year	5,810	69,816	4,852	16,106	96,584
At end of year	5,935	73,956	614	14,281	94,786

\* In accordance with FRS11 – 'Impairment of Fixed Assets' Teagasc reviewed the carrying value of a site held for resale at Raheen, Co. Limerick and has provided for an impairment charge of €446,000. The recoverable amount of the site was based on market value as supplied by an independent third party. Teagasc also reduced the carrying value of a mushroom tunnel in Kinsealy from €37,000 to zero as it was taken out of use in 2014 and has no resale value.

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

Teagasc has the use of 34.15 ha (84 acres) of land owned by the Department of Agriculture, Food and the Marine, 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.

Teagasc has a total of 55 offices / centres of which 50 are owned by Teagasc and the remaining 5 are under rental agreements. Three of the rental agreements are short term and expire within five years, one in seven years and the remaining agreement is a long term lease with the end date yet to be finalised.

During 2014, Teagasc completed a building at a total cost of €4.1 million at its premises at Moorepark, Co Cork. A contribution of €2m (net of VAT €1.6m) was received from an agricultural trust to part fund the construction of this building.

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

At 31 December 2014 Teagasc held the following assets for sale:

	Carrying amount at 31 December 2014 €'000			
Site at Athenry, Co. Galway				0
Site at Raheen, Co. Limerick				125
<b>Disposal of fixed assets</b>	Proceeds/ Costs 2014 €'000	Proceeds/ Costs 2014 €'000	Proceeds/ Costs 2013 €'000	Proceeds/ Costs 2013 €'000
Proceeds from sale of property				
Property sales during year	570	803		
Cost of sales	(48)	522	(65)	738
Proceeds from sale of other assets		129		89
		651		827
<b>Net book value of fixed assets disposed</b>				
Property assets	(417)		(45)	
Other assets	(76)	(493)	(69)	(114)
		158		713

There was no transfer to the Exchequer of asset sales proceeds in 2014.

## 13 Operating leases

At 31 December 2014 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	29	24	53
Between two and five years	50	71	121
After five years	237	0	237
	316	95	411

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### 14 Financial assets

Teagasc holds the following investments:

	Number of Shares	Value at 31 Dec 2014 €'000
Moorepark Technology Limited	5,100	1
Wexford Creamery	5,288	5
Wexford Milk Producers Limited	71,388	71
Lakeland Dairies	104,371	5
Aurivo	1,715	2
Glanbia	9,004	114
Kerry Co-op Creameries Ltd	87	1
Kerry Group plc	522	30
Dairygold Co-Op Society Ltd	28,694	29
Dairygold Co-Op Society Ltd (Revolving Fund)		27
		<u>285</u>

Milk production is an essential part of the Teagasc education and research programmes. Milk producers must be members of the dairy co-ops which they supply and are required to hold shares in these co-ops. In 2014 some dairy co-ops have retained a portion of the price per litre of milk from producers in return for additional shares in the co-ops. The funds generated by the co-ops in this way are used to provide increased processing capacity required for additional milk production arising on the abolition of dairy quotas in April 2015. When, through the sale of milk, Teagasc acquires any shares above the minimum required shareholding in the co-ops supplied, and where a market exists for these shares, they will be disposed of in the short term in a manner designed to yield optimum return.

Dairygold Co-Op Society Ltd requires producers to contribute to a revolving fund and the contributions to the fund plus interest will be repaid at the end of seven years. The contributions paid in 2014 will be repaid in full in 2021. The assets above include amounts totalling €26,637 which are receivable after more than one year.

The following dividends were received in relation to the shareholding set out above. They are included as part of operational income – Publications and Miscellaneous (Note 4).

	2014 €'000	2013 €'000
Dividend income	15	2

#### Moorepark Technology Limited

Teagasc has invested €650 in Moorepark Technology Limited and has a 57% holding in the paid up share capital of the Company (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 2014 were as follows:

	2014 €'000	2013 €'000
Turnover	<u>1,716</u>	<u>1,527</u>
Operating profit before depreciation, interest and tax	490	397
Depreciation (net of grants amortised)	(232)	(211)
Interest receipts	6	9
Tax	(88)	(1)
Profit after taxation	<u>176</u>	<u>194</u>
Accumulated profits to 31 December	<u>535</u>	<u>359</u>

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

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:

	2014 €'000	2013 €'000
Moorepark Technology Limited sales to Teagasc (included in turnover)	368	383
Other recoupments from Teagasc (deducted from cost of sales)	<u>205</u>	<u>132</u>
Total	<u>573</u>	<u>515</u>

Amounts owed to Moorepark Technology Limited at 31 December	<u>30</u>	<u>97</u>
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Teagasc sales to Moorepark Technology Limited	<u>56</u>	<u>72</u>
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Amounts owed to Teagasc at 31 December	<u>0</u>	<u>48</u>
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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:

	2014 €'000	2013 €'000
Staff	176	179
Other	29	30

These totals are included in Teagasc expenditure under Research (Notes 5 and 6)

Moorepark Technology Limited utilises assets owned by Teagasc as follows:

	2014 €'000	2013 €'000
Original costs	1,196	1,196
Net Book Value at 31 December	0	0

These amounts are included under Plant and Equipment (see Note 12 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.

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### 15 Private Colleges

Teagasc provides support to three private agricultural colleges as follows:

	2014 €'000	2013 €'000
Grants to private colleges	2,719	2,958
Salary costs of staff seconded to private colleges (included in the total pay expenditure in Note 5 above)	592	605
External service provider costs for teaching services provided to private colleges (included in the general operating expenditure in Note 5 above)	130	98
	<u>3,441</u>	<u>3,661</u>

Grants to private colleges are shown net of the cost of workbooks provided by Teagasc to the private colleges being €98,000 (2013 - €91,050).

#### 16 Stocks

	2014 €'000	2013 €'000
Livestock	3,916	3,641
Farm produce, fertilizers and feeding stocks	538	535
General supplies	235	265
	<u>4,689</u>	<u>4,441</u>

#### 17 Debtors and prepayments

	2014 €'000	2013 €'000
Trade debtors	6,558	6,237
Other debtors, prepayments and accrued income	10,160	9,259
	<u>16,718</u>	<u>15,496</u>

All amounts included above fall due within one year.

#### 18 Creditors - Amounts falling due within one year

	2014 €'000	2013 €'000
Creditors accruals *	9,446	7,553
Trade creditors	829	1,153
PAYE/PRSI	2,218	2,371
Value added tax	1,125	269
Withholding tax	122	95
Research advances	6	64
Other payroll deductions	961	864
Refundable deposits	210	190
	<u>14,917</u>	<u>12,559</u>
Creditors for taxation and social welfare included above	<u>3,637</u>	<u>2,735</u>

\* Included in the creditor accruals of €9.446m are: equipment and capital items €1.47m, repairs and maintenance €1.35m, wages and salaries and other employee costs €1.32m, student grants €1.25m, professional fees including legal and analytical services €0.91m, general operating costs including utilities €0.82m, other accruals €0.63m, ICT costs €0.59m, farm running costs €0.52m, travel and subsistence €0.36m and public relations and advertising €0.22m.

## Notes to the Financial Statements - continued

### Year Ended 31 December 2014

#### 19 Deferred income

Teagasc carries out public funded research in accordance with contracts with other State Institutions, principally the Department of Agriculture, Food and the Marine. 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:

	2014 €'000	2013 €'000
Department of Agriculture, Food and the Marine – advance for FIRM projects	4,872	4,899
Department of Agriculture, Food and the Marine – advance for Stimulus projects	6,375	7,261
European Science Foundation – Food Safety Promotion	125	183
Other research related deferrals	6,884	8,048
Amounts received in advance for work associated with the completion of sale of at Athenry	1,114	1,114
	<u>19,370</u>	<u>21,505</u>

#### 20 Finance leases

At 31 December 2014 Teagasc had no obligations under finance leases (2013 - Nil). There were no finance charges incurred during the year under finance leases (2013 - Nil).

#### 21 Capital commitments

Teagasc had no capital commitments outstanding at 31 December 2014 (2013 - €3.24m).

#### 22 Grant commitments

Teagasc had grant commitments outstanding at 31 December 2014 amounting to €9.149m which relate to Walsh Fellows €5.128m, Private College Grants €3.126m and Other Grants €0.895m (2013 - €9.073m).

#### 23 Analysis of changes in net funds during the year

	1 January 2014 €'000	Cashflows €'000	31 December 2014 €'000
Cash at bank and on hand	1,397	5,057	6,454
Bank overdraft	0	0	0
Short-term deposits	21,758	(5,962)	15,796
	<u>23,155</u>	<u>(905)</u>	<u>22,250</u>

#### 24 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.

25 Contingent liabilities

The Authority has been notified of a number of claims from (a) clients resulting from the provision of services and (b) in respect of certain industrial relations matters.

The Authority has made provision in the financial statements reflecting its best estimate of the liability arising. The Authority believes that disclosure of information on its provisions would prejudice the outcome of litigation arising from the claims.

26 Capital Investment / Proceeds of asset sales

The Authority's accumulated surplus includes €6.7m in respect of the sale of assets in the years 2007 to 2014. The Authority has received sanction from the Minister for Agriculture, Food and the Marine and the Minister for Public Expenditure and Reform to retain these funds for capital investment purposes.

Below is a summary of the sales and capital expenditure figures:

	€'000
Accumulated sales proceeds retained between 2007 and 2014	39,757
Related accumulated capital expenditure between 2007 and 2014	(33,060)
Included in accumulated surplus on Income and Expenditure Account	<u>6,697</u>

Teagasc has secured sanction to invest in the following projects which are scheduled, underway or completed:

	Progress of Project	Invested at 31 Dec 2014 €'000
Animal Bioscience Centre, Grange, Co. Meath	Completed	4,600
Sheep Research Facilities, Athenry	Completed	971
Student Facilities, Botanic Gardens	Completed	2,399
Demonstration / Technology farm, Athenry	Completed	36
Development of facilities at Ashtown	Underway	169
Research and Innovation Facility, Moorepark	Completed	3,269
Pig Biotest Facility, Moorepark	Scheduled	12
Anaerobic Digester, Grange	Scheduled	32
Kildalton College	Completed	4,090
Oak Park House	Completed	4,000
Neutraceutical Laboratories Ashtown	Completed	3,500
Functional Foods Laboratories Moorepark	Completed	4,974
Mellows Building Refurbishment	Completed	1,646
Oak Park Biofuel Laboratories	Completed	1,003
Environment Building Johnstown Castle	Completed	1,000
Other capital projects	Scheduled	1,359
		<u>33,060</u>

27 Approval of the financial statements

The Authority approved the financial statements on 28 August 2015.

