



# ANNUAL REPORT 2016

## & FINANCIAL STATEMENTS



*Delegates at the Teagasc-hosted  
IALB/EUFRAS conference held at the  
University of Limerick.*



## Introduction

The 2016 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 recognised as the knowledge provider of choice for Ireland's agri-food sector.

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# CHAIRMAN'S STATEMENT



**Dr. Noel Cawley**

The Teagasc Mission is to support science-based innovation in the agri-food sector and wider bio-economy so as to underpin profitability, competitiveness and sustainability. In 2016 Teagasc concentrated on implementing various national programmes in order to achieve this objective.

The Teagasc National Farm Survey showed that Family Farm Income decreased by 9% in 2016, bringing the average income figure for the farming sector to €24,060.

The continued roll-out of GLAS and the Beef Data Genomics

Programme (BDGP) saw direct payments on cattle farms increase by between 5 and 11% in 2016. This increase helped offset lower cattle prices and it meant that the average farm income on cattle farms increased by between 2% and 4% in 2016. Despite this increase, average cattle farm incomes at €12,908 remained quite low for these farms in 2016.

Milk production continued to expand in 2016. However, milk price was down almost 10% resulting in income on these farms falling by 17% to an average of €51,809.

Tillage farms were severely affected by a decline in crop yields in 2016. Coupled with a reduction in the price of cereals, this resulted in a 10% fall in average tillage farm income to €30,816. Lamb prices decreased by 2% in 2016 and with direct payments receipts relatively unchanged the average sheep farm income remained stable at €16,011.

The final report of the Teagasc Technology Foresight 2035 Project was published in 2016. The report was presented to the European Commissioner for Agriculture and Rural Development, Phil Hogan, at a conference in Brussels, in June. As part of the Technology Foresight Project, over 200 experts and industry stakeholders were consulted to identify breakthrough technologies which will transform the Irish agri-food and bio-economy sector by 2035.

Teagasc identified five technology themes as the priorities for Irish research and innovation in the coming years: Plant and Animal Genomics and Related Technologies; Human, Animal and Soil Microbiota; Digital Technologies; New

Technologies for Food Processing; Transformation in the Food Value Chain System.

During 2016 Teagasc launched its sixth Statement of Strategy (SoS), which sets out the goals, priorities and high-level strategic actions for the period 2017-2020. The Statement was prepared in consultation with staff and a range of external stakeholders and represents Teagasc's response to the opportunities and challenges facing the organisation and the agri-food sector.

In addition to supporting the industry in addressing the on-going challenges of competitiveness and sustainability, it will help underpin the sector's response to the new challenge arising from the decision of the UK to exit the European Union (Brexit). While the short-term implications of this decision are already apparent in terms of the impact of changes in the value of Sterling against the Euro, the medium-to-long-term impact will only become clear as the exact terms of Brexit are agreed over the coming years.

A new Education, Research and Conference Centre at Teagasc Ashtown, Dublin was officially opened by the Minister for Agriculture, Food and the Marine, Michael Creed TD in December. This €3 million investment was used to produce an integrated facility, covering Food Research, Horticultural Development, Forestry Development, Horticultural Education and Food Industry training. The Conference Centre complements the provision of a dedicated glasshouse, poly-tunnels, general utility building, and mushroom research facility which will be shared between

forestry, horticulture and education. The 116-seater lecture theatre and teaching laboratory are state-of-the-art. This significant investment will provide the necessary additional training facilities for horticulture students on courses at the Teagasc College of Amenity Horticulture in the National Botanic Gardens.

Teagasc published a set of 2025 sectoral roadmaps. The nine roadmaps cover suckler beef, dairy, sheep, pigs, tillage, forestry, horticulture, environment and food. Each roadmap outlines the anticipated key market and policy issues likely to face the sector up to 2025, along with the expected size and shape of the individual sectors. The environment and land use implications of anticipated changes are also explored and the critical technical performances required in different enterprises are published for farmers to benchmark the performance of their own farm.

I would like to thank Secretary General, Aidan O'Driscoll, and his staff at the Department of Agriculture, Food and the Marine with whom we work closely for the benefit of the agri-food sector.

The general election and formation of a new government led to changes at ministerial level with Michael Creed TD replacing Simon Coveney TD. Ann Phelan TD and Tom Hayes TD have been succeeded by Andrew Doyle TD. I would like to acknowledge the immense support which all of the outgoing ministers provided for Teagasc and wish them well in their new roles.

Teagasc continues to have an excellent working relationship with Minister for Agriculture, Food and the Marine, Michael Creed

TD and Minister of State at the Department for Agriculture, Food and the Marine, Andrew Doyle, TD.

I wish to acknowledge Tim O'Leary's contribution during his term on the Teagasc Authority. He advised and encouraged the organisation to continue to develop and assist Irish farming to be competitive and profitable in order to achieve a viable living for farm families.

Tommy Cooke was reappointed to the Teagasc Authority for a second term by the Minister for Agriculture, Food and the Marine, Micheal Creed TD. The Minister also appointed Richard Kennedy, Deputy President of the IFA to the Authority. Richard brings a wealth of farming experience and a track record of leadership in farming agribusiness and in community development to the Teagasc Authority.

In conclusion, I wish to thank Director Gerry Boyle and all Teagasc staff for their dedication and contribution to the organisation in 2016.

**Dr. Noel Cawley**

*Chairman of the Teagasc Authority*

## REPORT OF THE DIRECTOR



**Professor Gerry Boyle**

Production efficiency improvements are possible for suckler farming systems in Ireland and can lead to substantial increases in profitability. That was the message from Beef 2016, the Teagasc Open Day at the Animal & Grassland, Research and Innovation Centre in Grange, County Meath.

Brexit (the UK's departure from the EU as a result of the referendum in June 2016) could profoundly change the trade relationship between Ireland and the UK and affect the level of support provided by the Common Agricultural Policy.

Teagasc research has quantified the possible impact of Brexit on Irish agriculture, Irish agri-food exports and on Irish family farm incomes. Analysis highlighted the vulnerability of the sector both from higher trade barriers and the negative impact on the EU (and CAP) budget of Brexit.

The beef sector in Ireland is the most vulnerable agri-food sector due to current dependence on the UK market and reductions in direct payments that could arise

as a result of Brexit. This research has informed Government and industry understanding of the Brexit process and the threat it poses to the Irish agri-food and wider economy.

Teagasc completed in excess of 40,000 Basic Payment Scheme applications on behalf of farmer clients this year and 39,000 of these were done on-line. Agricultural advisory and education professionals from all over Europe were in Limerick in June for a conference themed 'Innovation Support for a Diverse Agriculture'. Teagasc hosted the 55th International Academy of Rural Advisors (IALB) and third European Forum for Agricultural and Rural Advisory Services (EUFRAS) conference at the University of Limerick campus.

This event brought together key agricultural professionals from advisory and education including arable, beef, milk, organics, energy and forestry from across Europe. The role of rural advisors in innovation support is becoming much more valued and appreciated, both globally and at European level.

Overall college enrollments for Teagasc Level 5, Level 6, and Teagasc linked higher education courses in agriculture, horticulture, equine and forestry for the 2016/17 academic year stand at 1,873. While 5% lower than for 2015, overall enrollments remain at 2014 and 2013 levels.

The demand for adult Green Cert courses for the distance education and part time options remains exceptionally high. Teagasc enrolled nearly 4,400 enrolees to the adult Green Cert programme in the period from autumn 2014 to the end of 2016.

A further 3,600 people who have formally logged their interest in the Teagasc Green Cert programme have yet to be accommodated.

InCites is a customised research evaluation tool that allows an organisation to analyse benchmark research paper output against peers worldwide. Two subject categories of relevance to Teagasc are: Agriculture, Dairy and Animal Sciences; and Food Science and Technology.

Teagasc's performance can be compared with that of the Irish Higher Education Institutes within these categories. In the period 2012-2016, Teagasc ranks first in each of these categories with 314 publications in the category Agriculture, Dairy and Animal Sciences and 642 papers in the category Food Science and Technology.

The EC-funded project CommBeBiz – which supports bioeconomy researchers across Europe to speed up transfer of their knowledge to relevant stakeholders – held a Bioeconomy Impact conference. The event highlighted that delivery of the bioeconomy will involve significant change management.

The bioeconomy will require new ways of doing research, new ways of doing business, and new ways of creating policies in addition to the obvious change required in the production, consumption, processing and recovery of biological feedstocks.

Teagasc has developed a new web portal known as "Opt-In" which provides information in relation to employment related skills development and diversification opportunities for rural families. The portal has been initially developed for two pilot

counties, namely Limerick and Tipperary.

Opt-In is a deliverable under the Commission for Economic Development of Rural Areas (CEDRA) implementation programme funded by the Department of Agriculture, Food and Marine. The portal was commissioned following identification of the need in rural areas to inform the public about opportunities in relation to up-skilling and personal development.

A highlight of 2016 was the completion of the Pig Research Facility at Teagasc Moorepark. This culminated with a “walk-through” of the new facility in late May, which saw almost 300 people attend over two days. Teagasc now has a state-of-the-art 200 sow integrated herd research facility, a growing number of research staff and students, and a research programme driven by pig producer and industry input.

The merger of PastureBase and AgriNet Grass places Teagasc at the forefront of Smart Agriculture. PastureBase Ireland will greatly aid the role out of KT groups and will be used in the completion of grassland technologies such as the Teagasc spring rotation planner, grass wedge and autumn grass budget.

The Teagasc potato breeding programme demonstrated potato lines that exhibit complete resistance to the potato cyst nematode species *Globodera pallida*. The resistance is based on pyramiding two partially effective loci conferring resistance to *Globodera pallida*.

Scientists at the APC Microbiome Institute in Cork have confirmed that gut microbes are at the centre of heart health. The

scientists found that consumption of oat beta glucan (in porridge) not only lowered blood cholesterol in mice, but that it also helped keep body weight down and benefited the gut microbiota – the community of bacteria living in the intestines.

Ornua, Ireland’s largest exporter of Irish dairy products, opened a new cheese manufacturing facility in Riyadh, Saudi Arabia. The €20 million state-of-the-art facility will manufacture white cheeses for the Saudi Arabian market, the fifth largest dairy importer in the world.

The new facility will use pioneering technology developed by Ornua and Teagasc to produce a range of bespoke fresh white cheeses for the increasingly sophisticated bakery sector, retail delis and food service customers. White cheeses are hugely popular in the Middle East North Africa region. The technology allows milk ingredients to be recombined for fresh white cheese production.

A Health and Safety Authority commissioned report in 2013 indicated that a higher percentage of the farming population suffered from poorer wellbeing (16%) than the general Irish population (12%). Teagasc operates a number of initiatives in the area of health and safety for rural stakeholders, including an on-going study of farmers’ health in association with health professionals from the Waterford Institute of Technology (WIT), Centre for Men’s Health, IT Carlow and the UCD Schools of Physiotherapy and Performance Science and Agriculture and Food Science.

The Teagasc Farm Safety Code of Practice Training Programme offers farmers half-day courses

in all counties to assist them to comply with the requirement to complete, or revise, a farm Risk Assessment under the Farm Safety Code of Practice. Significant funding is available under TAMS 11 to support farmers to make their farms both safer and more efficient workplaces.

Teagasc is undertaking a project (pioneered in Wexford) within the Knowledge Transfer Walsh Fellowship Programme which examines the engagement between farm women and advisory services. Teagasc potential outcomes might include initiatives such as women-only Discussion Groups.

Teagasc hosted Farming and Country Life 1916, the largest centenary celebration of rural Ireland. Visitors and exhibitors from the four corners of Ireland descended upon Athenry for this once in a lifetime, family event.

A 1916 town was created within the 100 acre site at Teagasc, Athenry, complete with a life sized replica of the GPO, shops, pub, traditional cottage and farm, and much more. Musicians, dancers and dramatic performances brought the 1916 town to life, with visitors invited to try an instrument, join in a dance or share a story. The event was packed with demonstrations, exhibitions, narrations, drama, dance and music covering topics from livestock and crops in 1916, to vintage machinery and horse carriages of the time.

I would like to thank all of my colleagues, in all roles and functions across Teagasc, for their commitment and hard work in 2016.

**Professor Gerry Boyle**  
Teagasc Director



# TEAGASC AUTHORITY 2016



## **Teagasc Authority**

Dr. Karina Pierce, Mr. Richard Kennedy, Mr. Joseph Larkin, Dr. Noel Cawley, Mr. Tommy Cooke, Professor Gerald Fitzgerald, Ms. Cliona Murphy, Mr. Pdraig Gibbons.



Mr. Alan Jagoe



Mr. Brendan Gleeson



Mr. Liam Woulfe



## Attendance at Authority Meetings 2016

	06-Jan	03-Feb	02-Mar	06-Apr	04-May	01-Jun	06-Jul	07-Sep	05-Oct	02-Nov	07-Dec
Cawley, Dr. Noel, Chairman	√	√	√	√	√	√	√	√	√	√	√
Cooke, Mr. Tommy	√	√	-	√	√	√	√	√	-	√	√
Fitzgerald, Prof. Gerald	√	√	√	√	√	√	-	√	√	-	√
Gibbons, Mr. Pdraig	√	√	√	√	√	√	√	√	√	√	√
Gleeson, Mr. Brendan	√	√	√	√	-	√	√	-	√	-	√
Jagoe, Mr. Alan	-	√	√	-	√	√	√	√	-	√	√
Kennedy, Mr. Richard**						-	-	√	√	√	√
Larkin, Mr. Joe	-	√	√	√	√	√	-	√	√	√	√
Murphy, Ms. Cliona	√	√	-	√	-	√	√	-	√	√	-
O'Leary, Mr. Tim*	-	√	√	√	√	√					
Pierce, Dr. Karina	√	√	√	√	√	-	√	√	√	√	√
Woulfe, Mr. Liam	-	√	√	√	√	-	√	√	√	√	√

\*Mr. O'Leary guest attendee at meeting of 01 June 2016

\*\*Mr. Kennedy was appointed to the Authority effective from 25 May 2016

This schedule of attendances at meetings is provided in accordance with paragraph 3.8 of the Code.

## Audit Committee

	25-Feb	06-Jul	05-Oct	22-Nov
Woulfe, Mr. Liam	√	√	√	√
Pierce, Dr. Karina*	-	√	√	
Gleeson, Mr. Brendan	√	√	√	√
O'Connell, Mr. Noel**				√
Gibbons, Mr. Pdraig	√	√	√	√

\*Dr. Pierce resigned from Committee effective from 02.11.16

\*\*Noel O'Connell (external Committee Member appointed 02.11.16)

## Research Committee

	03-Jun	18-Nov
Pierce, Dr. Karina (Chair)	√	√
Larkin, Mr. Joe	√	√
Jagoe, Mr. Alan	-	√
Fitzgerald, Prof. Ger	√	√
Kennedy, Mr. Richard*		√

\*Mr. Kennedy appointed to Committee on 02.11.16

## Advisory & Education Committee

	22-Feb	15-Jul	25-Nov
Jagoe, Mr. Alan (Chair)	√	√	√
O'Leary, Mr. Tim	√		
Gibbons, Mr. Pdraig	√	√	√
Larkin, Mr. Joe	√	√	√
Cooke, Mr. Tommy	√	√	√
Kennedy, Mr. Richard*			√
Pierce, Dr. Karina**			√

\*Mr. Kennedy appointed to Committee on 02.11.16

\*\*Dr. Pierce appointed to Committee on 02.11.16

## Operations Committee

	29-Feb	29-Aug	16-Dec
Cooke, Mr. Tommy (Chair)	√	√	√
Cawley, Dr. Noel	√	√	√
Larkin, Mr. Joe	√	√	√
Murphy, Ms. Cliona	-	-	√

## Nominations Committee

	06-April	26-Oct	06-Dec
Cawley, Dr. Noel (Chair)	√	√	√
Fitzgerald, Prof. Ger	√	√	√
Gibbons, Mr. Pdraig	√	√	√
Cooke, Mr. Tommy	√	√	√
Pierce, Dr. Karina	√	√	√

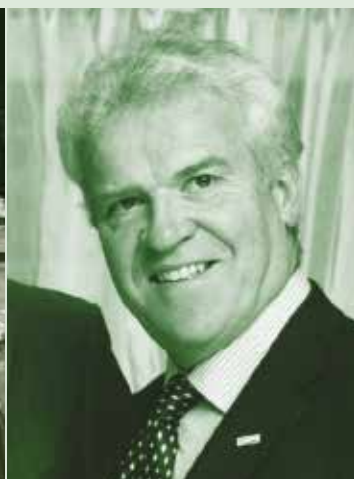
## SENIOR MANAGEMENT TEAM



Professor Gerry Boyle  
*Director*



Dr. Frank O'Mara  
*Director of Research*

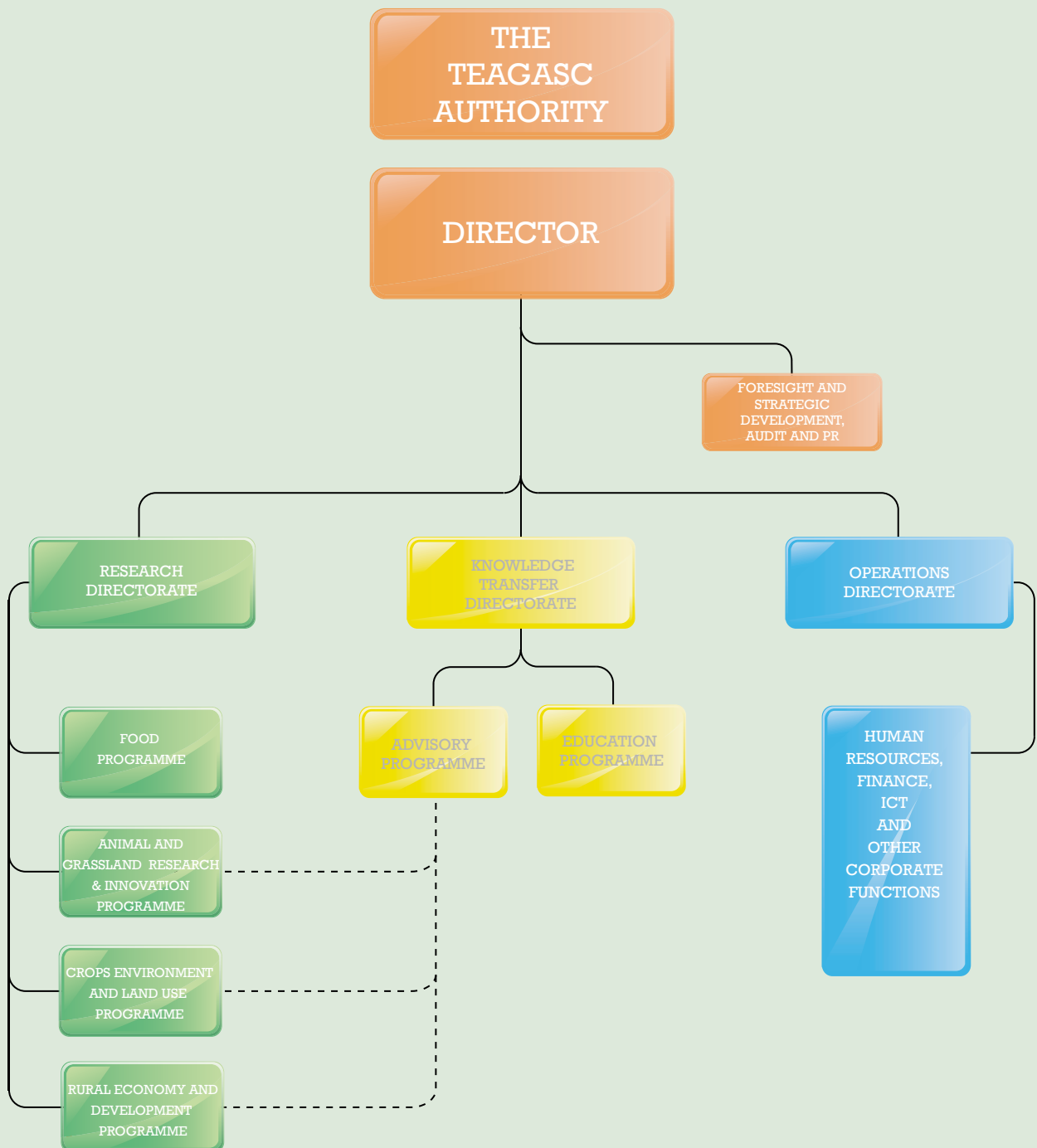


Mr. Tom Doherty  
*Chief Operating Officer*



Prof. Tom Kelly  
*Director of Knowledge Transfer*

# ORGANISATIONAL CHART





## JANUARY 2016





# GOAL 1

## IMPROVE THE COMPETITIVENESS OF AGRICULTURE, FOOD, AND THE WIDER BIO-ECONOMY

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## IMPROVE THE COMPETITIVENESS OF AGRICULTURE, FOOD, AND THE WIDER BIO-ECONOMY

### BEEF

#### BEEF 2016

Beef 2016, a major open day held at Teagasc Grange in July was opened by Michael Creed TD, Minister for Agriculture, Food and the Marine. Among the highlights at Beef 2016, was the grassland village which included a grass reseeding demonstration showing establishment methods for reseeding pastures and a grazing infrastructure demonstration showing examples of simple paddock systems with water, fencing and roadways.

Blueprints for dairy calf-to-beef systems were highlighted given the growing number of dairy calves available for beef production from the increase in the national dairy cow herd. Pearse Kelly, Head of the Teagasc Drystock Knowledge Transfer Department, said: "The most successful systems are those that optimise animal performance from grazed grass and achieve a high proportion of total life time gain from grazed grass. Profitability is vulnerable to increases in concentrate input costs and calf purchase price, as well as the selling price of beef."

#### Beef Data Genomics Programme

Following an open competitive tender process run by the Department of Agriculture, Food and the Marine the general Beef Data Genomics Programme (BDGP) training contract was awarded to Teagasc. The BDGP is part of Ireland's Rural Development Programme 2014-2020. It involves funding of €300 million and builds on the success of previous schemes including the €23 million Beef Genomics Scheme (BGS).



Minister for Agriculture, Food and the Marine Michael Creed, TD, with Teagasc staff at Beef 2016.

The Programme addresses weaknesses in the maternal genetics of the Irish suckler herd, thereby contributing to farmer profitability and reducing the greenhouse gas intensity of Ireland's beef production. A compulsory element of the BDGP was that all participants in the programme had to complete a four hour training course.

- Teagasc trained 171 tutors to deliver the BDGP training courses.
- Teagasc prepared, in conjunction with ICBF and

DAFM, all of the training material used in the BDGP training courses.

- Teagasc delivered 940 BDGP training courses across 90 locations with an average attendance of 26 farmers.
- 24,174 BDGP participants were trained in total on these courses (97.5% of the participants in the BDGP programme).
- Almost €4 million was paid out by the Department of Agriculture, Food and the Marine through Teagasc to the course participants.

**TABLE 1 - Number of applicants trained per Advisory Region within Teagasc**

Advisory Region	No. Trained by 31st October 2016	No. of Courses
Cork East	689	29
Kilkenny/Waterford	926	36
Tipperary	1032	43
Cork West	1046	39
Roscommon/Longford	1741	70
Laois/Kildare/Meath/Louth/Dublin	1760	66
Wicklow/Carlow/Wexford	1315	52
Kerry/Limerick	2084	81
Mayo	2248	86
Westmeath/Offaly/Cavan/Monaghan	3401	133
Donegal/Sligo/Leitrim	3226	122
Galway/Clare	4706	183
<b>Total</b>	<b>24174</b>	<b>940</b>



### **Newford Farm**

Hundreds of farmers gathered at Newford Suckler Demonstration Farm in Athenry, County Galway for an open day showcasing the achievements and learnings of the farm's first full year of operations. The 56 hectare farm was established by Dawn Meats and Teagasc in 2015, with support from McDonalds and the Irish Farmers Journal, to demonstrate best practice in sustainable suckler beef production.

Cow type at Newford differs from the norm, comprising mainly first-cross Aberdeen Angus cows. These are bred from the dairy herd, for their excellent milk yield potential off grass, minimizing the need for use of bought in concentrates.

### **Beef AI**

Approximately 20% of calves are sired through AI in Irish beef herds annually. Such low usage of this effective technology reflects the difficulty and labour requirements for heat detection, assembly of cows for insemination as well as land fragmentation on beef farms. As a consequence there has been increasing interest in the use of oestrous or heat synchronisation protocols which facilitate the use of timed AI (TAI) eliminating the need for heat detection.

In order to obtain accurate and robust information on the potential for TAI on Irish beef cow herds as well as to evaluate available protocols, Teagasc, together with UCD and the Agriculture and Biosciences Institute of Northern Ireland conducted a series of large scale on-farm synchronisation studies, funded by the Department of Agriculture, Food and the Marine. The work involved 74 herds



*Clare farmer and Teagasc client, Michael Baker, is a qualified AI technician who uses AI on his own suckler cows.*

located throughout the island of Ireland with 2,204 cows calved  $\geq 35$  days, enrolled in the studies. Three different synchronisation protocols were compared, all of which were based on the use of a progesterone pessary (PRID E, CEVA Animal Health), inserted for

a seven day period.

All cows were subjected to a single TAI at 72 hrs after PRID removal, regardless of whether signs of heat were observed or not. Herdowners were free to use the semen of their choice

## GOAL 1

### IMPROVE THE COMPETITIVENESS OF AGRICULTURE, FOOD, AND THE WIDER BIO-ECONOMY

(all herds used a commercial AI service), and thus semen from a large number of bulls were used across the studies. Despite this, pregnancy rates ranged from 50-70% in these trials, with a very acceptable overall average pregnancy rate of 55% achieved to a single timed insemination. These results were particularly encouraging given that ~50% of cows had not resumed normal postpartum ovarian cyclicity at the time of treatment.

Synchronisation had the effect of condensing the subsequent calving pattern on these herds. In a typical herd, almost 80% of all synchronised cows were pregnant within 23 days of the start of the breeding season (i.e. between cows conceiving to TAI plus those that conceived to a subsequent repeat breeding, three weeks later). While many herds elected to AI any cows that repeated to service, others turned out stock bulls approximately 10 days after the TAI.

This latter practice is very efficient from both a labour and stock bull use viewpoint and allows a herd to use maternal genetics through TAI and focus on terminal traits in their stock bull(s).



*Pearse Kelly, Teagasc Head of drystock Knowledge Transfer addressing some of the large attendance at Beef 2016 at Teagasc Grange.*





Dr. Noirín McHugh, Research Officer, Moorepark  
 Alan Bohan, Walsh Fellow, Teagasc Moorepark.  
 William Fitzgerald, Regional Veterinary Laboratory, Limerick  
 Professor Gerry Boyle, Director, Teagasc.  
 Ben Anthony, Sheep Farmer, Wales,  
 Professor Michael Diskin, Sheep Enterprise Leader, Athenry  
 Diana Fairclough, Sheep Farmer, Wales

## SHEEP

### Sheep Health

Compromised health in sheep not only reduces productivity while increasing costs and labour requirements but is also a growing welfare concern for sheep production internationally. To date, however, most sheep breeding goals internationally do not include health traits.

Teagasc, in conjunction with Sheep Ireland, has collated health data on over 20,000 animals across a plethora of health traits

including lameness, mastitis and dag score. Genetic analysis of the data showed that ample genetic variation existed across all the health traits investigated.

This, coupled with the calculation of the economic value of each health trait using the Teagasc Lamb Production Bio-economic model allows for the incorporation of health traits into the national sheep breeding goals, thereby providing Irish sheep producers with a selection tool to select healthier and more robust animals.

### Sheep Conferences

Teagasc National Sheep Conferences took place in Ballinasloe, County Galway, Gorey, County Wexford and a Teagasc Hill Sheep Conference was held in Ballybofey, County Donegal. Key themes included:

- Accelerating genetic improvement in the Irish sheep flock. The best genetics from New Zealand is currently being evaluated in Teagasc Athenry.
- The effect that stocking rate and prolificacy have on the overall profitability of lowland sheep enterprises.



# GOAL 1

## IMPROVE THE COMPETITIVENESS OF AGRICULTURE, FOOD, AND THE WIDER BIO-ECONOMY

- The importance of managing upland habitats.
- Sustainably controlling liver fluke in sheep on hill farms.
- Budgeting and setting targets for finishing hill lambs.

### **SheepNet: EU Network on Sheep Productivity**

SheepNet (Sharing Expertise and Experience towards sheep Productivity through NETworking) is a new EU-funded project led by idele (France) which aims to increase sheep productivity. The inaugural meeting was held at the Teagasc Sheep Research Centre at Athenry. SheepNet is about practice-driven innovation to improve sheep productivity. The six main sheep producing EU countries (Spain, United Kingdom, Romania, Italy, France, Ireland), and Turkey participate.



Michael Gottstein, Teagasc Head of sheep Knowledge Transfer, at a sheep farm walk in Ennis.

Danny and Margaret McCarthy who farm in the Derryfadda valley in west Cork work closely with their Teagasc advisor Michael Connolly.



## DAIRYING

### Dairy Joint Programmes

Teagasc has worked closely with dairy co-ops/PLCs including Carbery, Dairygold, Glanbia Kerry, Lakeland, Tipperary for many years. While objectives vary somewhat depending on geographical area, catchment scale etc. the Joint Programmes share the aim of promoting robust dairy systems which produce high quality milk competitively and sustainably in terms of farm families/businesses, the environment, animal welfare, and are capable of withstanding milk price volatility. While each joint programme is unique, in most cases a Teagasc advisor is assigned to a Joint Programme in return for a financial payment by the partner organisation.

Two of the more recently established joint programmes involve Arrabawn and Aurivo Co-ops. As with other Joint Programmes these Co-ops involve discussion groups, demonstration farms and targeted advisory programmes. In 2016 Arrabawn launched a new 'Milk for Profit' programme in conjunction with Teagasc. It was officially launched by Minister for Agriculture, Food and the Marine, Michael Creed TD on the farm of Seamus and Brian Molamphy, Portroe, Co. Tipperary, one of five development farms within the Joint Programme.

The five development farms have been selected to demonstrate the benefits of technology adoption and best practice in the areas of financial management and planning, compact calving, grass utilisation, breeding management, herd health and milk quality.

The Joint Programme between Teagasc and Aurivo encompasses 24 dairy discussion groups (345 farmers). The groups are located in Galway, Mayo, Sligo, Donegal, Roscommon and Westmeath. As well as the broader aims of financial and environmental sustainability current goals focus on heifer rearing and improving milk solids.

### National Dairy Conference

'Technologies for Success' was the theme for the Teagasc National Dairy Conference which took in Cork and Westmeath.

Irish and international speakers addressed the audiences at both venues. Dr. Pat Dillon, Head of the Teagasc Animal & Grassland Research and Innovation Programme presented a paper on Irish dairying and how it is well positioned for the upturn. He said:



Teagasc Director Prof Gerry Boyle, Brian Molamphy, Portroe, Co. Tipperary, and Arrabawn CEO Conor Ryan discuss the 'Milk for Profit' programme which aims to promote the development of robust dairy systems capable of withstanding milk price volatility.



# GOAL 1

## IMPROVE THE COMPETITIVENESS OF AGRICULTURE, FOOD, AND THE WIDER BIO-ECONOMY

“The best strategy for Irish dairy farmers to overcome volatile milk price is to develop low cost grass-based systems of milk production. In the future, comparisons should be made on a ‘per kg of milk solids’, rather than a ‘per litre’ basis; this better reflects the milk payment system, is more closely related to costs of production and can compare milk of different composition.”

He pointed out that based on the Teagasc National Farm Survey 2015, the top 20% of dairy farmers ranked on profit per hectare, had higher stocking rates, lower concentrate feed input per cow, longer grazing season, higher milk solids production per cow and a higher proportion of the farm in the grazing platform compared to the average dairy farm.

After hearing from platform speakers participants were able to choose between a range of highly interactive workshops where topics focusing challenges in dairy farming were addressed.



Farmer Michael Gowen with Dr. Tom O'Dwyer, Head of Dairy Knowledge Transfer, Teagasc.

### Calf Care Events

Teagasc and Animal Health Ireland, in conjunction with the dairy milk processors Aurivo, Dairygold, Glanbia and Lakeland Dairies, and supported by Volac, joined forces to organise a series of ten calf care events promoting best practice in rearing and looking after calves. Each of the events focussed on four topics: The 1,2,3 of colostrum management; Performance of calves on either milk replacer or whole milk; Controlling cryptosporidium and coccidiosis in calves; Streamlining the workload during the calving season.

Events took place in counties, Kildare, Wexford, Cork, Kilkenny, Waterford, Cavan, Limerick and Galway.

### Greenfield Dairy Open Day

‘Coping with low/volatile milk prices in 2016’ was the theme for an open day held in May. Teagasc advisors facilitated small groups of farmers to participate in cash flow workshops at the event. These workshops concentrated on the steps needed to generate cash on farms:

- Manage the breakeven milk price by increasing the value of milk produced or reducing costs. In 2015 the Greenfield

Attending the launch of the CalfCare spring farmer events on the farm of George Corrigan, Ballon, representatives from AHI, Teagasc and the dairy milk processors involved in the running of a series of 13 CalfCare events.





farm produced milk with a protein content of 3.87% and butterfat of 4.64% which is adding significant value to the milk over the base of 3.3% and 3.6%

- Avail of the fixed price milk schemes offered by the milk processor. Around 25% of the milk produced in 2016 on the farm was sold at a fixed price
- Create cash flow reserves. A cash reserve of €125,000 was set aside over previous years for low price periods like 2016

## GRASS

### Developing Better Grass Cultivars Faster Using DNA Based Selection.

Teagasc has been breeding perennial ryegrass for over 50 years at Oak Park, Carlow. Breeding new cultivars takes many years but new technologies are offering opportunities to speed the process up. DNA based strategies are now being employed by Teagasc to select plants for advancement in its grass breeding programme at Oak Park. The outcome is that many more cycles of selection can be completed in a much shorter time frame, meaning accelerated gains for important traits such as forage yield. Using this technology, Teagasc is now fast-tracking delivery of the next generation of grass cultivars to support Irish farmers.

### PasteurBase and AgriNet merge.

"The merger of PastureBase and AgriNet Grass is a strategic step forward for Irish farmers in grassland management," said Teagasc Director Professor Gerry Boyle. "It will place Teagasc at the forefront of Smart Agriculture and is an important step forward

Head of the Teagasc Crops, Environment and Land Use Programme, Paddy Browne with advisor Phelim McDonald.



for the organisation in this area. PastureBase Ireland will greatly aid the role out of KT groups and will be used in the completion of some of the grassland technologies such as the Teagasc spring rotation planner, grass wedge and autumn grass budget."

### Clover

Speaking at an open day on the Teagasc Clonakilty College research farm, Dr. Pat Dillon Head of the Teagasc Animal & Grassland, Research and Innovation programme said: "Clover has the potential to reduce nitrogen use, increase milk production per cow, and reduce nitrous oxide emissions. "Over three years, a grass clover system receiving 150 kilograms of Nitrogen per hectare produced similar grass dry matter production per hectare as a ryegrass only system receiving 250 kilograms of Nitrogen per hectare. Animal performance has been consistently high in grass clover systems at similar stocking rates."

## TILLAGE

### Teagasc National Tillage Crops Conference

Teagasc Crops Researcher, Dr. Joseph Lynch outlined yield formation in winter wheat and the need to focus on maximising final ear number and prolonging grain filling to achieve high yields in Irish conditions.

Dermot Forristal, Teagasc Crops Researcher spoke about the importance of crop rotation to maximise cereal yields, the profitability of the whole rotation and control costs. He also identified the most viable non-cereal break crops for Ireland based on the recent Department of Agriculture, Food and the Marine funded CROPQUEST project.

Dr. John Carroll, Teagasc Crops Researcher continued the theme of break crops, by outlining the work on optimising bean production in the Teagasc/IFA grain levy funded break crops programme.

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Teagasc Crops Researcher, Dr. Steven Kildea updated the attendance at the tillage conference on the results of the Septoria sensitivity monitoring and the discovery last autumn of resistance to the SDHI group of fungicides. He also gave advice for the coming season on how to slow the development of this resistance and stressed the importance of the whole industry complying with anti-resistance guidelines for future sustainability.

### Malting Barley

Teagasc continued its joint activities with the malting barley industry through 2016. At a malting barley seminar Teagasc Crop Researcher, Dr. Richie Hackett highlighted research work which indicated the need to either use lower rates of nitrogen or attain high yields to ensure low proteins to achieve Distilling specifications. Liz Glynn, Teagasc

Researcher, reported on fungicide research work which indicated the need for growers to apply fungicides early to achieve best returns.

### Potatoes

#### National Conference

Farmers and industry from across the country attended the National Potato Conference and Trade Show organised by IFA, Teagasc and Bord Bia.

Highlights included market research by Kantar Worldpanel which revealed positive value and volume growth for the first time in seven years as shoppers are returning to buy more often - making 34 trips in the year. However, the volumes they buy on each trip still haven't recovered to 2007-8 levels. In 2007, potato volume purchased by the average Irish household was 140kg per year, in 2015 that had fallen to 119kg.

During the conference Michael Hennessy, Head of Crops Knowledge Transfer in Teagasc, outlined the three year 'Salad Potatoes Initiative' aimed at increasing the production of salad potatoes grown in Ireland: "The industry has all the elements necessary to increase salad potato production as we have suitable soils, existing infrastructure and a market anxious to sell Irish produce."

Fiona Hutton, Teagasc, commented: "Virus in potatoes is a serious problem and can lead to yield losses of up to 50%". Fiona then outlined virus incidence across Ireland and the control measures necessary: "There isn't one main virus control technique, a combination of measures are needed including clean seed, rogueing and chemical control."

*Lorcan Bourke, Sector Manager for Potatoes at Bord Bia, nutritionist Aoife Hearne, Prof. Gerry Boyle and Dr. Marc Allison Cambridge University Farms, NIAB.*







Mark Plunkett, Jack Nolan, DAFM, Prof. Gerry Boyle, and Dr. David Wall.

### Potato Breeding

The Teagasc potato breeding programme demonstrated the potato lines that exhibit complete resistance to the potato cyst nematode species *Globodera pallida*. The resistance is based on “Pyramiding two partially effective loci conferring resistance to *Globodera pallida* Pa2/3 act consistently across multiple nematode field populations,” said Teagasc scientist Dr. Dan Milbourne.

### Teagasc Crops Better Farms

Teagasc Crops Better Farms held a number of meetings through 2016. The emphasis of the program is “How to achieve 90% of your field’s potential through Smart farming”. At the meetings in February Mark Plunkett, Soils Specialist, highlighted the potential for precise placement of inputs to improve overall

field performance. Mark, along with research colleagues, is developing a “Precision Tool Kit” which will bring together tools and techniques for all farmers to use to improve yield variability in fields.

### Soils

Teagasc provides a soil testing service to its clients with 10 soil testing suites available. The standard soil test (S1) is most widely used by Teagasc clients. S1 tests for soil pH, lime requirement, available soil P & K. Annually there are ca. 40,000 soil samples taken and tested by Teagasc. This information is stored in a large soils data base and provides a good indication of national soil fertility trends for all the major nutrients across the main farming enterprises.

Soil sample results analysed at Teagasc show that 90% of samples have sub optimal levels of the principle soil nutrients lime, phosphorus (P) and potassium (K). Mark Plunkett, Teagasc Soil and Plant Nutrition Specialist speaking at a Teagasc conference on soil fertility said: “The first principle in fertiliser planning is controlling soil acidity through liming soils on a regular basis.

“Soil test results indicate that approximately two thirds of our soils require lime on a regular basis to maintain optimum pH status for grass and grain production. Lime is a cost effective soil conditioner and in effect is a fertiliser as it is required to unlock major soil nutrients. Best practice guidelines for effective lime use on farms are presented in the Teagasc Lime & pH technical Bulletin No. 2.”



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### HORTICULTURE

#### Horticulture

The horticultural sector contributes circa €350m (Source: Department of Agriculture, Food and the Marine, 2015) to agricultural output at farm gate level and provides over 6,000 jobs in the production sector and a further 9,000 in the amenity services sector. The market challenges can be summarised as a general cost v price squeeze.

#### Mushroom Sector

The most significant sub-sector in edible horticulture production

is mushroom production. The Irish mushroom industry is valued at €140m farm-gate and exports approximately 86% of product to the UK. The industry has built a significant UK market share of over 50% since the 1990's. Exchange rate volatility, specifically a weak sterling has had significant impact on the sector in 2016 following the EU membership referendum. Teagasc has focused on assisting growers to become more efficient and maximise profitability through the joint industry programme with Commercial Mushroom Producers (CMP). 2016 has seen a renewed focus

on management practices on commercial mushroom farms in order to sustain and repair profit levels.

#### Mushroom Research

There is scope to expand and diversify the mushroom sector in Ireland through the development of new technology, new strains (more flavour) and new products (e.g. animal feeds, bioactive compounds, SMC as a fuel source). A particular niche exists to increase the sophistication and complexity of the mushroom product portfolio in the context of significant advances in mushroom science, particularly the genome sequencing of *Agaricus bisporus*.

#### Nursery Stock and Ornamentals

Following an advisory absence from this sector for four years, The Teagasc Authority approved the appointment of Dónall Flanagan, as Nursery Stock/ Ornamentals Specialised advisor, based at the Teagasc Horticulture Development Department at Ashtown.

The Hardy Nursery Stock/ Ornamental Industry in Ireland is in a good position to continue its development over the coming years albeit against the background of having undergone significant change and rationalisation since 2008 on the back of the economic crisis. Dónall commenced providing technical assistance to growers around specific management and production issues associated with propagation, IPM and sustainable production, and began the task of working with Bord Bia and other industry stakeholders to set a course for this sector towards 2025.

Marie Staunton, Garden Writer and Consultant. Dermot Callaghan, Head of Teagasc Horticultural Development Department. Dr. Michael Gaffney and Leo Finn, Teagasc.





### **Integrated Pest Management Research in Horticultural Crops**

IPM in high value intensive horticultural crops is critical for the continued development of horticulture production. Teagasc have a direct responsibility to facilitate Research and KT of IPM across the horticultural sectors. In 2016 Teagasc commenced development of an IPM toolbox at Teagasc Ashtown to advance IPM strategies for Horticulture crops in Ireland.

Teagasc confirmed the presence of the invasive insect pest *Drosophila suzukii* on ten of sixteen monitored fruit farms in Ireland in 2016.

## **FORESTRY**

### **Training**

The Teagasc Forestry Development Department provides training on all aspects of forestry where a demand is identified or if there is a specific request for training. In 2016 Teagasc was involved with 17 different forestry courses. These included courses on timber measurement, Introduction to forestry, shaping, seed courses and an environmental course.

### **Forestry One to One Clinics**

These were run in most Teagasc Offices throughout the country in January. In January alone there were 48 days of dedicated Forestry clinics held with 426 clients attending. In February 12 extra clinic days had to be added with 62 clients attending. Therefore the total that attended was 488 landowners over 60 clinic days. This year the one to one clinics focused primarily on afforestation as well as management issues.



*John Phelan, who farms in the foothills of the Slieve Bloom Mountains in county Laois has reduced his sheep flock and planted some of his 49ha with forestry. He consults regularly with Liam Kelly, his Teagasc Forestry Development Officer.*

### **Forest Management Walks**

A series of Management Walks were held nationwide in April. In total 20 events were held across the country by the FDU Advisory Team. These events focussed on the management issues of young forest plantations, including stocking levels, vegetation control, crop protection and formative shaping.

Teagasc Forest Advisors led each walk along with the local Forest Service Inspectors. Twenty events were held in total, with almost 400 forest owners attending. The majority of these events were held in the evening.

### **Talking Timber**

Minister Andrew Doyle TD, Minister of State at the Department of Agriculture, Food and the Marine, with responsibility for Forestry attended and opened the event in Ennis. In total over 500 attended the three Talking Timber events which were held in Kerry and Donegal as well as Clare.

### **Talking Hardwoods**

Talking Hardwoods, the inaugural Teagasc / Forest Service Hardwood Marketing event took place in Co. Laois in November. This event involved three main elements: Timber Product/Use display – with short presentations from industry players; presentations on the Hardwood Timber Resource, uses

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Tony Cotter, Irish Ambassador to Saudi Arabia, Kevin Lane, chief executive of Ornua, Saeed Bajwaber, chairman of Al Wazeen Trading, Aaron Forde, chairman of Ornua.

and its potential; a Networking section involving 25 trade stands.

A Talking Hardwoods event was formally opened by Minister of State Andrew Doyle TD. In total 250 attended the event.

#### **Invasive Species**

Chalara Disease (Ash Dieback) is a serious threat to our native Ash trees, which could in turn endanger the age-old craft of making hurleys. Teagasc forestry researcher Gerry Douglas explains: "The number of confirmed cases of Ash Dieback disease (Chalara) has increased despite major efforts to eradicate the fungus, which causes the death of shoots and, after several years, can kill trees. Ash dieback is spread by fungal spores that travel on the air from near and far.

"Species of ash from Asia are naturally resistant to dieback disease and Teagasc is attempting to cross them with Irish ash as a first step to transfer the resistance into our native ash. A very small proportion of trees in our native population of ash trees will prove resistant and we can use them for vegetative propagation and also as a basis for breeding and producing resistant seeds," said Gerry Douglas. Research in Teagasc aims to identify resistant trees and develop the most efficient means to make available resistant plant material for the future.

## FOOD

#### **Manufacturing Facility**

Ornua, Ireland's largest exporter of Irish dairy products, opened a new cheese manufacturing facility in Riyadh, Saudi Arabia. The €20 million state-of-the-art facility will manufacture white cheeses for the Saudi Arabian market, the fifth largest dairy importer in the world.

The new facility will use pioneering technology developed by Ornua and Teagasc to produce a range of bespoke fresh white cheeses for the increasingly sophisticated bakery sector, retail delis and foodservice customers. White cheeses are hugely popular in the Middle East North Africa region. The technology allows milk ingredients to be recombined for fresh white cheese production.



**International Union of Food Science and Technology Congress.**

Over 1,800 food scientists, engineers, food industry professionals, regulatory authorities and students from around the world came to Dublin for this major event hosted by the Institute of Food Science and Technology of Ireland. Teagasc Director Professor Gerry Boyle said: "Teagasc are delighted to partner IUFOST and IFSTI to organise this congress, which will help our researchers to develop international co-operation and information exchange. Bringing the best food scientists

from around the world here to Dublin facilitates the sharing of knowledge and education. It provides an important opportunity for international food companies to engage with the food science community for mutual benefit."

Declan Troy, President of the Institute of Food Science and Technology of Ireland (IFSTI) and Teagasc said: "With over 500 different organisations represented from over 65 countries, this truly embodies an unparalleled global collaboration of the brightest minds in food science, research and innovation."

**Novel Food Technologies**

Speaking at a Food Innovation Gateways event at the Teagasc Food Research Centre, Ashtown, Dublin, Declan Troy Director of Food Technology Transfer in Teagasc said: "The potential of novel food processing technologies has gained increased industrial interest as the food sector seeks to become more environmentally and economically sustainable. "Teagasc has significant expertise in technologies such as high pressure processing, ultrasound processing, novel thermal processing and separation technology. These technologies



*Minister for Agriculture, Food and the Marine Michael Creed, TD, addressing the IUFOST Conference.*

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can be used to manufacture innovative, safe, sustainable food products, of the highest-quality, shaping the future of the food sector in Ireland.”

The event showcased current novel processing technologies, capabilities, services and expertise and provided a unique forum for face-to-face interaction between key researchers and leading food industry representatives.

### **Upskilling the Irish Meat Sector**

It is now well accepted that good welfare practices are directly correlated with subsequent meat quality. Good welfare is also integral in national quality assurance schemes at farm and abattoir levels and is a key platform for trade of Irish meat produce both nationally and internationally.

In response to new animal welfare regulations and the requirement to improve the ultimate quality of meat Teagasc implemented a comprehensive training programme for abattoir operatives both in the area of welfare competencies and management and under the jurisdiction of the Department of Agriculture, Food and the Marine.

To date in excess of 3500 meat industry operatives including managerial staff have been upskilled through two certified training programmes and representing in excess of 150 meat processing companies ranging from large multinationals to small and medium enterprises (SMEs). The programme has also been accessed and validated by the EU Food and Veterinary Office.

### **Postgraduate Certificate in Dairy Technology and Innovation**

University College Cork, in association with Teagasc, has developed a highly innovative, industry-focused, part-time, blended-learning qualification which will support the further education and training needs of people at work in the dairy industry.

Modules include milk production and quality, dairy chemistry, trends and dynamics across dairy markets, dairy processing technology, dairy microbiology and business processes across the supply chain. The programme will be market-led and delivered via blended learning, i.e., a mix of online and in-class sessions, designed to facilitate people at work in industry.

### **International Dairy Federation Conference**

Dr. Noel Cawley, Chairman of the IDF National Committee of Ireland and Chairman of the Teagasc Authority greeted 600 dairy scientists, technologists, food formulators and process engineers, from academia and industry in 32 countries, who attended the three day event. Among the highlights at the conference were:

- Dr. Mark Fenelon showcased Teagasc Food Research Moorepark innovation in infant milk formula processing, and the adaptation of cow's milk to bring it even closer to that of human breast milk.

- Dr. Paul Cotter, Teagasc Food Research programme, Moorepark, outlined how the latest molecular diagnostic tools such as nucleic acid-based approaches are being used to investigate microbial-related cheese quality defects.

Dr. Noel Cawley, Chairman, IDF National Committee, Ireland, and Chairman Teagasc, with Kevin Lane, CEO of Ornua, at the IDF Dairy Science & Technology Symposia 2016 which welcomed over 600 international delegates.

### **Oat Beta Glucan, Promotes a Healthier Heart and Microbiome**

Scientists at the APC Microbiome Institute in Cork have confirmed that gut microbes are at the centre of heart health. And that we should all consume porridge regularly, to get the benefits of oat beta glucan for heart and gut health. The study, found that consumption of oat beta glucan not only lowered blood cholesterol in mice, but that it also helped keep body weight down and benefited the gut microbiota – the community of bacteria living in the intestines.

“The message is to take porridge regularly to reduce your risk of cardiovascular disease,” said, Prof. Catherine Stanton, leader of the research at the APC Microbiome Institute and Teagasc Food Research Centre, Moorepark, Co. Cork.

## FARM MANAGEMENT

### Cash flow

The 'Teagasc Farm Management' programme, including the 'Get Farm Financially Fit' campaign, aims to empower farmers to make good financial decisions on their farms resulting in increased farm income and improved long-term viability.

As part of 'Get Farm Financially Fit' the Teagasc Farm Management team developed '5 Minute Cash Flow' templates to assist farmers to manage cash flow in Dairy, Drystock and Tillage enterprises.

Low milk price, increased costs and the unfavourable weather conditions in spring 2016 severely affected plans on dairy farms in particular. This had major implications for cash flow.

The dairy template was distributed to all dairy farmers in the country via milk processors in conjunction with the DAFM Dairy Forum.

Recommendations within the template included:

- Act early, delay will cause the situation to deteriorate and result in extra stress.
- Be realistic and up front in developing your Cash Flow plan.
- Consult and draw up a plan with your Teagasc Advisor, Agricultural Consultant or accountant. They have the expertise and experience to help you to develop a Cash Flow plan for your business.
- Decide on a course of action using your Cash Flow plan to form the basis of negotiations with your suppliers and banks. Creditors will respond best to realistic

budgets and up-to-date cash flow projections.

### Partnerships

The Teagasc Farm Management Unit also has responsibility for the development and promotion of farm partnerships in Irish agriculture. A series of CPD training events by Teagasc brought together professionals who work with farmers to provide information broadening the collective knowledge required for the formation of a registered farm partnership.

### Modelling the Impact of Brexit on Irish Agriculture

Brexit could profoundly change the trade relationship between Ireland and the UK and affect the level of support provided by the Common Agricultural Policy. The UK continues to be the main export market for Irish agricultural and food exports.

Teagasc research has quantified the possible impact of Brexit on Irish agriculture, Irish agri-food exports and on Irish family farm incomes. Analysis highlighted the vulnerability of the sector both from higher trade barriers and the negative impact on the EU (and CAP) budget of Brexit.

The beef sector in Ireland is the most vulnerable agri-food sector due to current dependence on the UK market and reductions in direct payments that could arise as a result of BREXIT. This research has informed Government and industry understanding of the Brexit process and the threat it poses to the Irish agri-food and wider economy.

## PIGS

### New Research Facility

The highlight of 2016 was the completion of the Pig Research Facility at Teagasc Moorepark. This culminated with a "walk-through" of the new facility in late May, which saw almost 300 people attend over two days. Teagasc now has a state-of-the-art 200 sow integrated herd research facility, a growing number of research staff and student and a research programme driven by pig producer and industry input.

### International Links

Teagasc Pig Development Department staff were involved in organising, and presenting at, high profile international conferences throughout the year including the European Pig Producers Congress; International Pig Veterinary Science Congress; International Conference of Production Diseases; European Federation of Animal Science; International Livestock Manure Conference.

EU funding for the EUPIG Project project was granted in August. EU PIG is a Europe-wide network developed to improve the pig industry and is made up of a consortium of 19 organisations (including Teagasc) from across 13 member states in Europe. The network will coordinate, collaborate and share findings from existing pre-farm gate research, share best practice on technical production and exchange approaches to knowledge transfer with pig producers and associated advisors.

### Advice and Education

The Teagasc Pig Research, Advisory, Education and Training Programme 2016-2020 document



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*Ciaran Carroll (right) speaking with attendees at the Teagasc Pig Research Dissemination Day.*

was published and circulated. The strategy document was reviewed and agreed by the Teagasc Pig Stakeholders Group.

The second annual Research Dissemination Day series took place in April with researchers and students providing an update on their projects. There are now seven researchers and 16 postgraduate students working on various projects.

Farm visits continue to be a priority for disseminating information to pig farmers and for reviewing current performance on farm. Analysis of accurate records

is essential for this to succeed and 2016 has seen further progress, with 97,000 sows (65% of the national herd) now on the Teagasc ePM PigSys system. The ePM data provides the advisor with the information they need to be able to evaluate performance and target improvements and enables national and international benchmarking (via Teagasc involvement with the InterPig group).

Discussion Groups continue to give producers an opportunity to meet with other like-minded farmers to share their data and

ideas on how best to improve performance at farm level. Teagasc now facilitates seven groups (with over 70 farmers and 60,000 sows) involved.

Education: 2016 saw the completion of a Level 5 Course in Pig Production, the third of its kind since their inception in 2009. A new QQI Level 5 course in pig production began in August, with a total of over 40 students attending Teagasc Ballyhaise or Teagasc Moorepark/Clonakilty.

## EDUCATION

Overall college enrolments for Teagasc Level 5, Level 6, and Teagasc linked higher education courses in agriculture, horticulture, equine and forestry for the 2016/17 academic year stand at 1,873. While 5% lower than for 2015, overall enrolments remain at 2014 and 2013 levels.

Head of Education at Teagasc Tony Pettit said: "Provisional enrolment data for the entry Level 5 certificate in agriculture, indicate that 570 students commenced their studies, a decline of about 10% relative to the 2015/16 academic year. These are mostly school leavers going to the 4 Teagasc and 3 private colleges.

Tony Pettit said: "Despite fluctuations in enrolments across programmes total combined enrolments are broadly comparable with recent years. However the improving employment opportunities leading to an upsurge in enrolments in other sectors such as craft apprenticeship programmes indicate enrolments to agricultural colleges are beyond their exceptional peak of recent years."

The demand for adult Green Cert courses for the distance education and part time options remains exceptionally high, he said: "Teagasc expect to have accommodated nearly 4,400 enrollees to the adult Green Cert programme in the period from autumn 2014 to the end of 2016. A further 3,600 people who have formally logged their interest in the Teagasc Green Cert programme have yet to be accommodated."

### Knowledge Transfer Education Activities and Outputs

#### Activity Indicators for Agricultural and Horticultural Colleges relating to full-time awards

Sector		Planned Enrolments 2016	Actual Enrolments 2016
Higher Level	Agriculture Higher Level Programmes	400	401
	Prof Diploma Dairy Farm Mgt	45	27
	Horticulture/ Forestry/Food Sc.	40	73
<b>Total Higher (excl. forestry/ food sc.)</b>		<b>485</b>	<b>501</b>
Further Level (full- time)	Level 5 Cert in Agriculture	630	569
	College Green Cert (SPCFA)	390	382
	Level 6 Advanced Agric Courses	240	210
	Horticultural courses (Levels 5/6)	133	74
	Other (Equine/ Forestry L5 & L6)	100	99
<b>Total Further</b>		<b>1493</b>	<b>1334</b>
Performance Indicators	Student/staff ratio	19:1	18:1
	Cost per student	€7,000	€7,000
	Completion target for CIA Level 5	90%	90%

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### 4.2.8.2 Adult Green Cert\*

Performance Indicator	Planned Part-Time Enrolment 2016	Actual Part-Time Enrolment 2016	Planned Distance Education Enrolment 2016	Actual Distance Education Enrolment 2016	Planned Total Adult Green Cert	Actual Total Adult Green Cert
<b>Enrolments</b>	<b>500</b>	<b>415*</b>	<b>946</b>	<b>692*</b>	<b>1446</b>	<b>1107*</b>

\*Adult Green Cert enrolments are distorted due to the DAFM required emergency enrolment of applicants in late 2015.

#### Diploma in Dairy Farm Management

The next generation of dairy farm managers graduated from the Teagasc/UCD Professional Diploma in Dairy Farm Management course in December. The graduates were presented with their diplomas by Minister of State at the Department of Agriculture, Food and the Marine, Andrew Doyle TD, at an awards ceremony at the Teagasc Animal & Grassland, Research and Innovation Centre, Moorepark, County Cork.

The graduates came from a wide geographical spread, ranging from Donegal to Waterford. Past graduates have successfully found employment as farm managers in countries like Ireland, New Zealand and Saudi Arabia and some have returned to manage their home farm.

#### Horticulture Courses

The Teagasc College of Amenity Horticulture at the National Botanic Gardens in Dublin launched a series of new part-time / work-based courses for

the horticulture sector. Three new QQI Level 6 component awards will be offered in Ecology and the Environment, Garden centre operations and Tree and Shrub management. This will complement the existing awards in Sportsturf Science and Maintenance, Market Gardening, Nursery Stock Production and Landscape Design and Construction.



Graduates of the Teagasc Professional Diploma in Dairy Farm Management are pictured with Andrew Doyle, Minister of State for Food, Forestry & Horticulture, Professor Gerry Boyle, Director Teagasc, Dr. Marion Beecher, Teagasc Programme Coordinator & Dr. Karina Pierce, UCD in Moorepark.



## ADVISORY SERVICES

### Knowledge Transfer Advisory Activities and Outputs (2016)

Indicator	Total for 2016	B&T Dairy	B&T Drystock	B&T Tillage	Soils & Agri Env.
<b>Number of Advisors</b>	<b>228.17</b>	<b>81.3</b>	<b>105.17</b>	<b>14.20</b>	<b>27.5</b>
1 Clients	42,115	11,323	23,005	2,189	5,598
2 Visits	12,925	6,311	4,540	1,195	879
3 Consultations	77,257	25,442	37,295	4,642	9,878
4 Discussion /Project groups	771	304	426	41	
5 Number of farmers in groups	12,359	4,711	6,991	657	

#### Farm Planning Activities

6 BPS submitted	41,880	8,662	19,631	2,051	11,536
7 Teagasc eProfit Monitors	3,286	2,069	1,138	30	49
8 Your Farm Your Plan workbooks	275	105	170	0	0
9 Full Farm Business Plans	294	185	61	20	28

#### Environment / Regulation Activities

10 Simple Fertiliser Plans	6,312	2,335	2,663	663	951
11 New Derogations	465	424	25	2	14
12 Derogation renewals/ revisions	3,703	3,366	256	18	63
13 Cross Compliance support	2,386	659	1,018	279	430
14 TAMS	1,180	661	428		91
15 Greening consults	994		994		
17 GLAS T3 (outsourced)	3,021 accepted plans				
18 GLAS 1 NMP	3,787 (ongoing)				
19 Carbon Navigators	10,908				

#### Other

20 New advisory clients	4.4% (1,840)				
21 No. of BETTER/Monitor Farms	95	48	44	2	1
22 Total meetings/ seminars	475	150	247	34	44
23 Total farm walks/ demos/ other	375	252	68	39	16

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#### Successful Basic Farm Payment Scheme Campaign

Teagasc completed in excess of 40,000 Basic Payment Scheme applications on behalf of farmer clients this year and 39,000 of these were done on-line. Commenting on the Teagasc BPS campaign Dermot McCarthy, Head of Teagasc Advisory Services, said that: "After a slow start to this year's campaign, the on-line system worked well and all clients were processed within the DAFM deadline while Teagasc public events and discussion group programmes continued uninterrupted."

#### Road Maps

Teagasc has published a set of 2025 sectoral roadmaps. The nine road maps cover suckler beef, dairy, sheep, pigs, tillage, forestry, horticulture, environment and food. Each roadmap outlines the anticipated key market and policy issues likely to face the sector out to 2025, along with the expected size and shape of the individual sectors.

The environment and land use implications of anticipated changes are also explored and the critical technical performances required in different enterprises are published for farmers to benchmark the performance of their own farm.

*Teagasc advisor Liz Duffy and Cork dairy farmer Maurice Smiddy at the Teagasc office in Midleton.*





## GOAL 2

### SUPPORT SUSTAINABLE FARMING AND THE ENVIRONMENT



# GOAL 2

## SUPPORT SUSTAINABLE FARMING AND THE ENVIRONMENT

### SOILS

#### Green Book

A major responsibility of the research staff at Teagasc Johnstown Castle is the publication of booklets and manuals providing nutrient and trace element advice for grassland and crops. The 4th edition of the nutrient advice manual “Teagasc Green Book” published by Wall and Plunkett in 2016 provides comprehensive advice for all major farming systems.

The publication contains sufficient information to allow farm advisors and consultants to prescribe optimum levels of major and micro nutrients for the most important agricultural and field horticultural crops. New information and updates are included based on the latest scientific findings and in compliance with the latest European and Irish legislation concerning the management of nutrients in agriculture. Teagasc collaborators on the publication include the Fertiliser Association of Ireland and the University of Adelaide.

#### NMP Online

Nutrient management planning is a key tool for farmers in achieving increased productivity and efficiency while at the same time targeting improved environmental outcomes. With the introduction of the Nitrates and Water framework directives nutrient management planning became very complex and was mainly focused on meeting regulatory requirements. This has contributed to falling soil fertility and missed opportunities towards improved environmental outcomes.

NMP on-line has been developed for use by agricultural advisors and consultants and has been used to prepare nutrient management plans for close to 40,000 farmers to date. Almost 800 users have been trained and it has become the system required by DAFM for the submission of GLAS and Derogation nutrient management plans.

While the initial focus of nutrient management plans is scheme compliance, the key strength of the system is its capacity to deliver key messages to farmers in relation to soil fertility. The system was designed with input from farmers. In particular, farmers indicated that they preferred graphical and map based outputs as they are easier to understand and follow. NMP Online produces detailed maps which can be easily used by farmers in relation to each component of soil fertility management.

### GREENHOUSE GASSES

Irish agriculture accounts for over 30% of national greenhouse gas (GHG) emissions and the long lived nitrous oxide ( $N_2O$ ) from soil is a major contributor to Irish emissions. Based on IPCC default emission factors, nitrogen fertiliser and dung/urine returns by grazing animals account for 41 and 27% of Irish agricultural  $N_2O$  emissions.

Research conducted in Teagasc Johnstown Castle has published Ireland specific emissions factors from five sites over two years for fertiliser and dung/urine. The research has for the first time established fertiliser type

specific emission factors of 1.49% for calcium ammonium nitrate, 0.4% for protected urea and 0.25% for urea1 compared to the default value of 1%. The emission factors for dung and urine have decreased from 2% to 0.31 and 1.18%, respectively.

These country specific emission factors have resulted in a reduction in GHG emissions of c. 0.7 MT  $CO_2$ . There are now low cost fertiliser formulation options for farmers to reduce GHG emissions. The research has also resulted in partitioning of N source dramatically changing with fertiliser increasing from 27 to 38% and dung/urine reducing from 41 to 23% of  $N_2O$  emissions. This research has contributed to the development of the Irish National Mitigation Plan Under the Climate Action and Low Carbon Development Act 2015.

#### Balancing Greenhouse Gas and Agricultural Production Targets

Research undertaken by both Teagasc and the Agri-Food and Biosciences Institute (AFBI) has highlighted practical ways for agriculture to reduce greenhouse gas emissions, maintain production and save farmers money. In 2016 scientists from Teagasc and AFBI presented key results from a multi-site and multi-year experimental field trial that focussed on both grassland and spring barley. These trials evaluated the effects of fertiliser formulation and organic excreta on the potent greenhouse gas nitrous oxide ( $N_2O$ ) and on the air pollutant ammonia ( $NH_3$ ).

Results from these multi-site and multi-year Irish field trials show that:

- Fertiliser nitrogen is the main source of the potent greenhouse gas  $N_2O$  on Irish farms
- Averaged over all grassland sites, switching from CAN (Calcium Ammonium Nitrate) to NBPT (a Urease inhibitor) treated urea reduced direct emissions of the greenhouse gas  $N_2O$  by 73%
- CAN and NBPT treated urea consistently produced similar yields and N off-take in grassland and spring barley
- Untreated urea had lower fertiliser N recovery and therefore lower efficiency than both NBPT treated urea and CAN

- NBPT reduced  $NH_3$  volatilisation from urea fertiliser by 78.5%. As a result NBPT treated urea is approximately equivalent to CAN in terms of  $NH_3$  loss
- NBPT treated urea is generally less expensive than CAN

#### **NUI Galway and Teagasc Join Forces**

Cutting greenhouse gas emissions from milk and meat production is a major challenge for Ireland. To help address this and other related challenges, Teagasc and NUI Galway have established a Strategic Research and Training Alliance on Carbon-Neutral

Agriculture. The new partnership will accelerate an inter-disciplinary portfolio of training and research approaches and innovations.

## **ENERGY IN AGRICULTURE**

'Energy in Agriculture 2016' took place in Gurteen Agricultural College, County Tipperary, in August. It's the first event looking at various energy saving opportunities for farmers together with renewable energy deployment opportunities within

*Pictured at the signing of the agreement were (l-r): Professor Charles Spillane, Head of the Plant and AgriBiosciences Research Centre (PABC) in NUI Galway; President of NUI Galway Dr. Jim Browne; Minister Sean Kyne, TD Minister of State for Gaeltacht Affairs and Natural Resources representing the Minister for Communications, Climate Change and Natural Resources; Director of Teagasc Professor Gerry Boyle; and Dr. Cathal O'Donoghue, Teagasc.*





## GOAL 2

### SUPPORT SUSTAINABLE FARMING AND THE ENVIRONMENT



*'Energy in Agriculture' was opened by the Minister for Communications, Climate Action and Environment, Denis Naughten TD (second from left). Pictured also are: Mike Pearson, principal Gurteen College, Councillor Siobhan Ambrose, Chair of Tipperary County Council, Prof. Gerry Boyle and Paul Kenny, CEO Tipperary Energy Agency.*

the various sectors. The event was organised by Teagasc in combination with Tipperary County Council and Tipperary Energy Agency and supported by SEAI.

'Energy in Agriculture' was opened by the Minister for Communications, Climate Action and Environment, Denis Naughten TD. He talked about the need for Ireland to substantially decarbonise the energy system, wean ourselves off our dependence on imported fossil fuels and move to cleaner, greener energy sources. He referred to the

lead taken in agriculture where Ireland has the lowest carbon foot print in Europe for dairy production and the fifth lowest for beef production.

Professor Gerry Boyle, Director of Teagasc said: "Energy efficiency and the adoption of efficient technology, including renewable energy are just two of the ways in which a farm business can improve its competitiveness and lower its carbon footprint. An efficient farm is more likely to be a profitable farm, with lower carbon emissions per unit of output. For example - carbon

emissions per kilo of beef or litre of milk produced."

## WATER

### Managing Organic Fertilisers

Research from the Teagasc Agricultural Catchments Programme found that there was little evidence of livestock slurry in streams following the end of the 'closed period' for slurry spreading. This means that farmers either weren't spreading slurry at this time, or were spreading it on the parts of their farms where it was less likely to be washed off.

There were, however, some signals of livestock slurry in runoff at the start of the closed period, in some of the studied catchments. This occurred when early autumn storms quickly followed the last few days of the 'open period'. These signals were also found during the particularly wet summer of 2012 when soils were wet and storms coincided with normal summer slurry spreading. There was also evidence of other nutrient losses during the closed period and the analysis suggested these were from residual soil sources rather than recently spread livestock slurry. This shows the potential for nutrients that were spread in earlier years, or even decades, to be lost to water now, and into the future.

Dr. Mairead Shore, Hydrochemist with the Teagasc Agricultural Catchments Programme said: "This research finding is based on over four years of detailed data collected in the Agricultural Catchments during storms when surface runoff is expected, and shows, very precisely, the nutrient concentrations of water flowing out of the catchments. Less detailed sampling would likely be insufficient to pick up these patterns as surface runoff tends to be short-lived. The analysis specifically used the relationship between phosphorus and sediment in river outflows and also different forms of nitrogen."

### **Teagasc and Geological Survey of Ireland**

Teagasc and the Geological Survey of Ireland (GSI) are deepening their long standing working relationship through the signing of a Memorandum of Understanding (MOU). The agreement was signed by Professor Gerry Boyle, Teagasc Director and Dr. Koen Verbruggen, Director of GSI in October.

Speaking at the event, Professor Boyle said: "Looking ahead, the two organisations commit to working closely together on areas of common interest, including improved understanding of soil chemistry, using Tellus to better understand national soil variability and the implications

*Teagasc and the Geological Survey of Ireland (GSI) are deepening their long standing working relationship through the signing of a Memorandum of Understanding (MOU). The agreement was signed by Professor Gerry Boyle, Teagasc Director and Dr. Koen Verbruggen, Director of GSI at the Teagasc Ashtown Research Centre.*





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### SUPPORT SUSTAINABLE FARMING AND THE ENVIRONMENT

for farmers to reach Food Wise 2025 expansion targets.”

Koen Verbruggen said: “This agreement will facilitate further development of the Soil Information System for Ireland through improved data integration between Teagasc and the GSI and improved assessment

of the effect of agriculture on groundwater and surface water quality through the spatial identification of farms in high risk areas. We hope this will improve the understanding of areas where there is sufficient natural attenuation potential to protect our waters.”

## BIODIVERSITY

### Land of High Nature Value

High Nature Value farmland is a headline environmental indicator for agricultural policies, and is an important provider of biodiversity and ecosystem services. The IDEAL-HNV project developed a national-scale estimate of



*Pictured at Teagasc's ICT in Agriculture Seminar are (from left): Professor Gerry Boyle, Director of Teagasc with Dr. Richard Howell, Department of Agriculture, Food and the Marine, Dr. John Bell, European Commission and Director of Research, Teagasc, Dr. Frank O'Mara.*

the likely occurrence of HNV farmland. For the first time, these data can be used to incorporate impacts on HNV farmland of, for example, land use change and climate change in national-scale models or scenarios.

Comparisons of the spatial distribution of HNV areas and

the spatial distribution of agri-environmental payments can assess the degree to which payments are targeted toward HNV farming systems (an EU policy objective). The IDEAL-HNV project also investigated the socio-economic profile of farms, and developed a web-based tool to assess the HNV status of individual farms at <http://www.high-nature-value-farmland.ie>.

### ICT Agri

This Teagasc event brought together end users, industry, research performers and research funders, to identify the current state of the art technologies in use, address upcoming challenges and look to future opportunities.

In recent years, Teagasc has put in place a number of key building blocks which will provide a basis for future development of digital agriculture solutions in Ireland. These include the Teagasc National Farm Survey, PastureBase Ireland, Soils Information System and Teagasc NMP-online.

As well as developing the building blocks for future solutions, Teagasc has developed a series of partnerships with complementary groupings like the Irish Cattle Breeding Federation (ICBF), Tyndall National Institute, and the Waterford Institute of Technology's Telecommunication Software and Systems Group (TSSG).

Teagasc's membership of the ICT-AGRI Era-NET has been a major catalyst for the development of research lines in the area of digital agriculture. The grouping of research funders and leading research performers from across Europe has allowed Teagasc to tap into high level expertise and to

contribute to a European Strategic Research Agenda in this area.

### Green Pastures Deliver Superior Dairy Products

The vast majority of cows in the world are fed indoors. Ireland's dairy and meat herds are almost entirely pasture-based – an advantage clearly articulated in the “Origin Green” campaign marketed by Bord Bia. As a result, consumers generally perceive that milk and dairy products produced from cows maintained on outdoors grazing pastures are “healthier” than from cows fed typical indoor rations and concentrated feeding systems.

Now, scientists are providing the scientific evidence to show the benefits of milk and butter from pasture-fed cattle in terms of superior nutritional properties, appearance, flavour and colour. The research, led by Teagasc and UCC researchers and including APC Microbiome Institute's Prof. Catherine Stanton at Teagasc Moorepark Food Research Centre and Prof. Paul Ross in UCC, is published in two papers in the *Journal of Dairy Science*. This study is part of a large collaborative programme across Teagasc Moorepark Research Centre and the APC Microbiome Institute, entitled “Profiling Milk From Grass” which is funded by Teagasc, Science Foundation Ireland and the Dairy Research Trust.





## GOAL 2

### SUPPORT SUSTAINABLE FARMING AND THE ENVIRONMENT

#### NATIONAL FARM SURVEY

A preliminary estimate of the Teagasc National Farm Survey results show that family farm income decreased by 9% in 2016, bringing the average income figure for the farming sector to €24,060. This is the return for the farmer's labour and for the land and capital employed in the business.

Speaking at the launch of the results, Dr. Emma Dillon, Economist with the Teagasc National Farm Survey said; "Despite increased direct payments and a reduction in some of the key input items such as fertiliser, further falls in milk prices and poorer crop yields than in recent years, resulted in a 9 percent decline in average farm income in 2016".



The continued roll-out of GLAS and the Beef Data Genomics Programme (BDGP) saw direct payments on cattle farms increase by between 5 and 11% in 2016 relative to the previous year. This increase helped offset lower cattle prices and it meant that the average farm income on cattle farms increased by between 2% and 4% in 2016 depending on the production system. Despite this increase, average cattle farm incomes remain quite low, at just €12,908 for cattle rearing farms in 2016; "Cattle farmers are still very reliant on direct payments which comprise a large proportion of their income," said Brian Moran of the Teagasc National Farm Survey; "The BDGP and GLAS schemes are of particular importance on cattle and sheep farms" he added.

Milk price was down almost 10% in 2016 on the back of a 20% reduction in 2015, despite this, milk production continued to expand in 2016. This resulted in income on dairy farms falling by 17 percent to an average of €51,809. The Teagasc National Farm Survey results show that considerable efficiency gains continued to be achieved on dairy farms in 2016. Analysis of farms over the period since quota removal, shows that 4 out of every 5 dairy farms have increased production; "Increases in milk volume and production efficiency further reduced production costs in 2016, but lower milk price meant that dairy farmers were unable to maintain their incomes", said Teagasc Economist Dr. Trevor Donnellan.

Tillage farms were severely affected by a decline in crop yields in 2016. Coupled with a reduction in the price of cereals, this

resulted in a 10% fall in average tillage farm income to €30,816. Lamb prices decreased by 2% in 2016 and with direct payments receipts relatively unchanged the average sheep farm income remained stable at €16,011.

Almost €690 million was invested by farmers in their businesses in 2016, of which over €245 million was invested on dairy farms. As in previous years two-thirds of farms have no business related debt, with many choosing to fund new investment from working capital. On the remaining one-third of farms the average debt level is €63,764 or 1.8 times the income level.

Farming continues to remain highly reliant on direct payments. The average direct payment per farm was nearly €18,000 in 2016, comprising 75 percent of farm income on average and almost 100 percent of income on the average cattle and average sheep farm.

The farming population in Ireland includes a considerable number of part-time farms with almost one in three farmers working elsewhere off-farm. Just over half of all farm households have an off-farm income source from either the farm-holder or spouse.

In spite of the fall in income in 2016, average farm income has become less volatile over the last five years. Looking ahead to 2017, prospects for dairy are very positive, with a dramatic recovery in incomes forecast. Average incomes on drystock farms should remain relatively stable.



# Teagasc National Farm Survey 2016

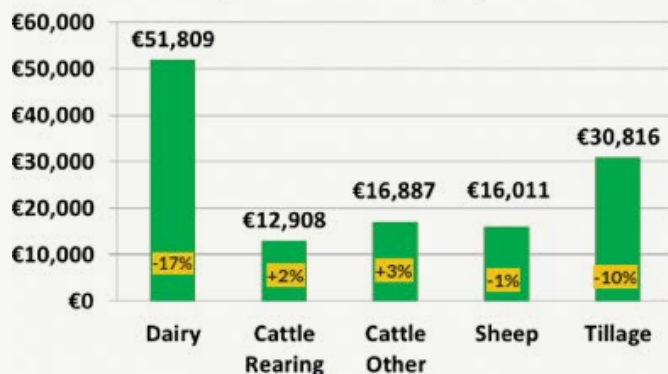
83,377 farms



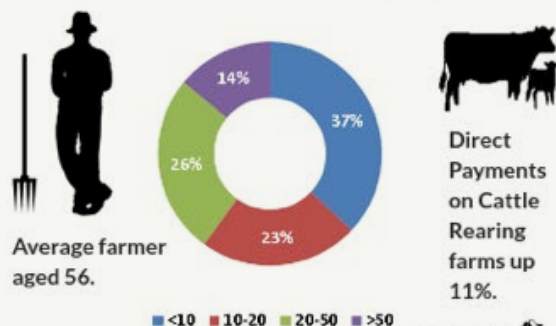
## Average Farm Income 2016



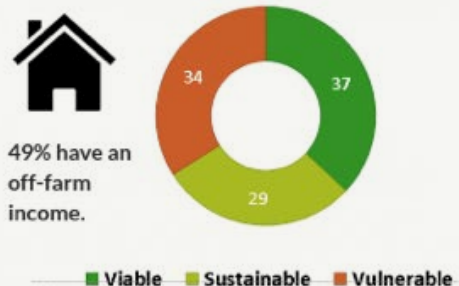
## Average Farm Income by System



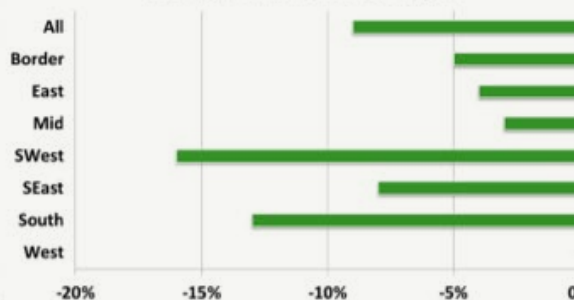
## Farm Income Distribution €('000)



## Viability of Farms (%)



## % Change in Farm Income across Regions



80% of dairy farms increased production since 2014.



€690m invested on-farm in 2016.

The Teagasc National Farm Survey has been in operation since 1972. It is a member of the EU FADN (Farm Accountancy Data Network). The 2016 preliminary results are based on a sample of 805 farms, representing 83,377 farms nationally.



## GOAL 2

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#### **Teagasc and International Food Security**

In recent years, Teagasc has emphasised the need to consider the challenges to Irish agriculture within the context of the global challenges in relation to food security and climate change. The organisation's Statement of Strategy now describes Global Food Security as one of the key-drivers of the national policy context. The organisation's new Statement of Strategy for the period 2017-2020 has, for the first time, included a number of actions relating to international food security and the organisation has developed a clear policy and strategy governing its development role.

As the national body responsible for agricultural research and knowledge transfer in Ireland, Teagasc has a responsibility to support the national effort aimed at strengthening agricultural development and reducing hunger and under nutrition in underdeveloped countries. The organisation has the knowledge, expertise and capacity to partner with Irish Aid in the delivery of its programmes. In addition, there is a clear and growing expectation at national policy level that Teagasc and other State agencies should use their resources in support of the national overseas development programme.

In line with this, the focus of the Teagasc development strategy is focused on development of local capacity in research and knowledge transfer. Typically, Teagasc's commitment aims to leverage its own expertise in agricultural research and knowledge transfer to maximum effectiveness by combining its expertise with

other complementary actors. It prioritises activities relating to institutional linkages and supports, policy development, institutional capacity building and structured knowledge transfer from Ireland. In this regard, we support the objective of emphasizing long-term capacity building support to national research and extension institutions themselves, as their weaknesses continue to hold back the potential of the agricultural sectors in many developing countries.

The organisation has established formal relationships with counterparts in many of the Irish Aid partner countries and in non-partner countries. It has built excellent relationships with a number of the CG Research Programmes and with other international bodies. Many developing countries view the Teagasc AKIS model as being the one to emulate for their own countries and the Teagasc Advisory Service, in particular, is viewed internationally as being unique and excellent in terms of its core activities and this expertise is increasingly being sought out.

In 2016, Teagasc took a lead role leading to the formation and launch of Irish Forum for International Agricultural Development (IFIAD) in October 2016. IFIAD is a voluntary, multi-disciplinary platform, bringing together actors from government departments, the universities, NGOs and the private sector to share knowledge and good practices for the benefit of agricultural development programming and policy in support of Ireland's development objectives.

The underlying premise for establishing IFIAD was the recognised need for a more effective multi-disciplinary engagement in the area of agricultural development and the identified opportunity to better leverage Irish expertise in this area for the benefit of development programmes overseas. Capitalising on Ireland's excellence in the agri-food sector, the Forum aims to bring together researchers, policymakers and practitioners with a view to strengthening the research-policy-practice interface and maximising the Irish contribution to agriculture-driven poverty reduction in developing countries.

Teagasc is now firmly committed, within its resource constraints and its mission of supporting Irish agri-food as its primary task, to building on the experience and involvement under the second Irish Aid MoU.

## STUDENT OF THE YEAR

The 2016 winner of the Teagasc/FBD Student of the Year award is Shane Fitzgerald from Kilmagemogue, Portlaw, Co Waterford. The awards were presented by the Minister for Agriculture, Food and the Marine, Michael Creed TD in Dublin. Shane Fitzgerald completed his Teagasc Green Cert programme at Kildalton Agricultural College.

Presenting the awards to the finalists, Minister Michael Creed said: "I would like to congratulate the prize winners and all the other students involved. In achieving such high standards, you are well placed to make a strong contribution to the development of the largest indigenous sector in the country. This expanding export orientated sector will benefit greatly from the skills, knowledge and enthusiasm that these young people will

bring. I would like to express my appreciation to Teagasc for their commitment to education and training in the agri-food sector and to FBD Insurance for their continuing sponsorship."

Director of Teagasc, Professor Gerry Boyle said: "I wish to congratulate all of the Teagasc Student of the Year finalists, all of whom are engaged in farming. I would also like to recognise the support for more than three

*Tony Pettit, Teagasc Head of Education, pictured at the Student of the Year awards.*





## GOAL 2

### SUPPORT SUSTAINABLE FARMING AND THE ENVIRONMENT

decades of FBD in sponsoring the Student of the Year and many other Teagasc initiatives aimed at improving farm efficiency and profitability. Today's finalists, like most Teagasc graduates are, or will become, the owners of a farm. Essentially Teagasc are educating future business owners. How we educate people for the role of business owner will be critically important. From a Teagasc perspective there will be a greater focus on developing the capability

of its learners to identify and pursue business opportunities, to look at the world in new ways and to have confidence to adapt to change and challenges. Teagasc education, like all education institutions, needs to reshape education approaches to meet 21st century needs."

*Pictured are Michael Creed TD, Minister for Agriculture, Food and the Marine, Shane Fitzgerald, Fiona Muldoon Chief Executive of FBD Insurance, and Prof. Gerry Boyle, Director of Teagasc.*







## GOAL 3

ENCOURAGE DIVERSIFICATION OF THE  
RURAL ECONOMY AND ENHANCE THE  
QUALITY OF RURAL LIFE

## GOAL 3

### ENCOURAGE DIVERSIFICATION OF THE RURAL ECONOMY AND ENHANCE THE QUALITY OF RURAL LIFE

#### HEALTH AND SAFETY

##### Men's Health

Teagasc is currently engaged in an on-going study of farmers' health in association with health professionals from the Waterford Institute of Technology (WIT), Centre for Men's Health, IT Carlow and the UCD Schools of Physiotherapy and Performance Science and Agriculture and Food Science.

Recent findings of the Farmers' Health study among a sample of 366 farmers (86% male) compares self-reported health behaviours with the overall general population, available from the national Survey on Lifestyle and Attitude to Nutrition (SLAN). The study found that 38% of farmers reported one or more health issues in the previous 12 months. Thirty-four percent reported a physical health complaint and 12% reported mental health issues.

A booklet '*Staying Fit for Farming – A Health Booklet for Farmers*' can be downloaded from the Teagasc Website at: [Staying Fit For Farming](#)

##### Mental Distress

A joint study among dairy farmers conducted by Teagasc, National University of Ireland Galway (NUIG) and University of Limerick (UL) indicated that on-going mental distress leads to anxiety and depression. Mental distress also leads to increased expectation of accidental injury. The study also found that mental distress from farming can arise from on-going work time pressure, bureaucracy, financial pressure, work unpredictability and the presence of farm hazards.

From a positive perspective, the study showed that social support has a positive influence on reducing mental distress. The study follows a Health and Safety Authority commissioned report in 2013 which indicated that a

higher percentage of the farming population suffered from poor wellbeing (16%) than the general Irish population (12%).

##### Code of Practice

The Teagasc Farm Safety Code of Practice Training Programme for 2016-2017 was launched at the National Ploughing Championships. Minister for Jobs, Enterprise and Innovation, Mary Mitchell O'Connor TD joined with Andrew Doyle TD Minister of State at the Department of Agriculture, Food and the Marine to perform the launch.

Teagasc Half-Day courses are available in all counties to assist farmers to comply with the requirement to complete, or revise, a farm Risk Assessment under the Farm Safety Code of Practice.

##### Tragic Event Service

Farm accidents have a sudden and traumatic effect on all members of a farm family. Farms by their nature are dangerous work places and as a result farms have a higher than overall percentage of accidents. In many cases the farmer himself is killed, or seriously injured. This leaves many difficult decisions for the spouse and other family members. These relate to immediate decisions on continuing the successful running of the farm, both technically and financially.

In 2016 Teagasc began providing a service to families affected by such tragedies to assist them cope in the immediate aftermath. The service is on a case-by-case basis and can be accessed by the family contacting their local Teagasc office. It is a free service and deals with technical, management and scheme assistance.

	Farmers	General population
Had consulted with GP about their health in the last year	59%	74%
Experience lower back pain	28%	16%
Overweight or obese	60%	50%
Report high levels of physical activity	54%	24%
Report smoking	18%	29%
Drink alcohol	85%	80%
Binge drinking (having 6 or more standard drinks on one occasion) at least once per week	19%	28%



### Animal Breeding

Genetic studies show that heritability of genetic factors controlling docility is in the 0.2-0.4 range, which allows considerable scope to breed for docility over a number of generations. Commenting on the rise in farm deaths caused by cow attacks, which have exceeded bull attacks in recent years, Teagasc geneticist Dr. Noirin McHugh points out that that cow aggression around, or after, calving is a genetic trait that can also be reduced through breeding.

She added that bovine maternal aggression has been viewed as a 'physiological condition' but this is not the case and has a genetic influence. Breeding from aggressive animals should be avoided and such animals should be culled from herds.

However, according to Dr. McHugh management of animals can also play a role and that cattle form lasting impressions of painful or frightening events which can result in future handling problems. Dealing with stock in a calm way results in less stress and higher performance in cattle.

### Diversification

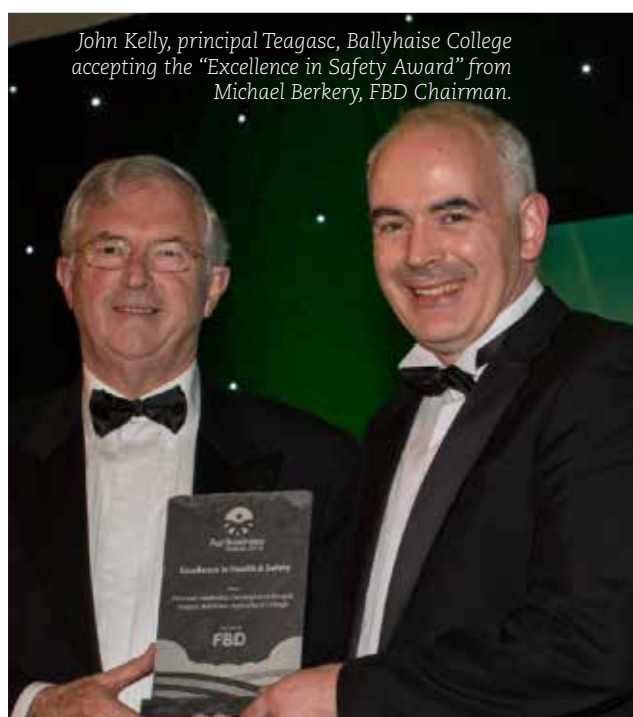
**Organic farming**  
In the European Union, the market for organic food is worth €24billion (2014), a doubling in size over the last 10 years. Demand for organic Irish beef is on the rise particularly in Europe. At farm level in Ireland, the organic sector has experienced a large influx of new farmers in recent years with 1,800 farmers now farming organically including approximately 600 who entered conversion in 2015.

About 70% of organic farmers in Ireland are cattle farmers. Irish organic food enjoys an



Pictured at the launch of the Teagasc Farm Safety Code of Practice Training Programme for 2016-2017 (left to right): John McNamara, Teagasc Farm Safety Specialist, Andrew Doyle TD Minister of State at the Department of Agriculture, Food and the Marine, Tom Kelly, Director of Knowledge Transfer, Teagasc, Mary Mitchell O'Connor TD, Minister for Jobs, Enterprise and Innovation, Pat Griffin, Health and Safety Authority.

John Kelly, principal Teagasc, Ballyhaise College accepting the "Excellence in Safety Award" from Michael Berkery, FBD Chairman.



## GOAL 3

### ENCOURAGE DIVERSIFICATION OF THE RURAL ECONOMY AND ENHANCE THE QUALITY OF RURAL LIFE

excellent reputation both at home and especially across Europe. Latest figures show the organic retail food market in Ireland is now worth over €136million annually (Source Bord Bia). A nationwide series of twelve organic demonstration farm walks organised by Teagasc, in conjunction with the Department of Agriculture, Food, and the Marine, showcased successful organic operations.

These farm walks offered conventional farmers the opportunity to learn first-hand about the practicalities of organic farming. At each of the farm walks, the host farmer, along with representatives from Teagasc, the Department of Agriculture, Food and Marine and the Organic Certification Bodies were on hand to answer questions. Teagasc incorporated specific themes into the farm walks such as grassland management and crop rotations.

#### **'Guidelines for Successful Organic Beef Production' publication**

In 2016 Teagasc launched a publication 'Guidelines for Successful Organic Beef Production'. This comprehensive technical booklet authored by Teagasc researchers, specialists and advisors, focuses on farm management practices that need to be part of a successful organic beef production system. Topics such as nutrient management on organic cattle farms, and red clover-agronomy and management, are covered in the publication.

Speaking at the launch of the publication, Dan Clavin, Organic Specialist with Teagasc said; "Making the most of the land while farming to organic

standards can be a challenge as there are few quick fix solutions in organic farming, but with the right skills and knowledge it is possible to be productive and increase profitability. This booklet is essential reading both for organic cattle farmers and for those taking a serious look at making the switch over to organic cattle production."

#### **Rural Tourism**

The Irish rural tourism sector generates €6bn every year and for some regions, it is a fundamental, and growing, part of the local economy. Teagasc Rural Development as part of the Commission for Economic Development in Rural Areas (CEDRA) published a *Rural Tourism* booklet to highlight opportunities for rural dwellers in creating on-farm diversification opportunities.

At the launch, Minister of State at the Department of Agriculture, Food and Marine Andrew Doyle said: "Rural Tourism is a perfect way to stimulate real impetus into encouraging footfall out of the towns and cities.

"There is such diversity in rural Ireland's visitor activities and attractions, as well as in our specialist farm food producers, all of which make a very compelling case to venture out of the city boundaries. Over the past few years, fantastic diversified farm and rural businesses have opened up to visitors. There is a genuine focus on providing a great experience and developing unique local features and skills. This publication provides important guidance which complements the resurgent interest in Irish food, heritage and holidays."

#### **Equine Husbandry**

The Irish Sport Horse industry makes a valuable economic contribution to the Irish economy, valued in excess of €700 million per annum. There are over 12,500 people employed in the Sports Horse Industry, with more than 47,000 people involved in the sector.

Opening the Teagasc National Equine Conference in November. Teagasc Director, Professor Gerry Boyle said: "Ireland is a horse loving nation with the highest density of horses per capita in Europe." The conference focussed on how the sector, collectively can achieve some of the goals outlined in the strategy report 'Reaching New Heights', which was developed by Teagasc, RDS and Horse Sport Ireland, and provides a road map for the sector to 2025.

Teagasc support for the equine industry, is through Knowledge Transfer specialists Wendy Conlon and Declan McArdle, who provide advice, information, and skills training, through various mediums. Short adult courses are provided on horsemanship skills; sport horse breeding; and digital marketing. The Teagasc equine team at Kildalton Agricultural and Horticultural College provide full time education through its Level 5 and Level 6 QQI certified equine horsemanship and breeding courses at Piltown, Co. Kilkenny.

#### **Farmhouse Cheeses**

In 2016 Teagasc and Bord Bia completed a pilot programme that seeks to enable the future development of the farmhouse cheese sector in Ireland. Cheese Institute Fundamentals is a development programme for the Irish farmhouse cheese sector.



Designed in partnership with industry and delivered by Bord Bia & Teagasc, the programme consists of a series of workshops delivered over 10 months to 12 farmhouse cheese companies.

Each workshop includes a number of subject matter specialists and addresses topics such as cheese production and ripening, controlling cheese yield, batch variability, food safety and hygiene, whey utilisation, in addition to marketing planning, pricing & negotiations, business planning, key account management, the consumer and market, digital content creation and management.

### **Goat Farming Conference**

This was the first conference of its kind since 2007 and provided an opportunity to the 130 people attending to hear from an impressive array of speakers from Ireland, the UK and the Netherlands. The topics covered included; goat health and nutrition, kid rearing and the goat industry both in Ireland and abroad.

### **Ash for Hurley Production**

The harvesting of hurley butts is part of the work of a collaborative project between members of the GAA Ash Society. The society comprises of a number of partners including the GAA, Teagasc, Forest Service (Department of Agriculture, Food

and the Marine (DAFM)), Coillte and the Irish Guild of Ash Hurley Makers (IGAHM). Its goals are to help ash growers to fully optimise their forests, to create a culture of forest management, to support the ash hurley-making industry and to develop initiatives aimed at addressing the challenges of pests and diseases such as ash dieback.

The Centenary Forest at Teagasc Johnstown Castle was planted in 1984 as part of the GAA centenary celebrations. Since then the forest has been used as a research trial and has generated valuable information in relation to many aspects of growing ash including spacing, nutrient management, weed control and thinning.

*Pictured at the harvesting of hurley butts in Teagasc, Johnstown Castle were (l to r) John Jordan, hurley maker; Prof. Gerry Boyle, Director Teagasc; Rioch Fox, Farm Manager Johnstown Centre Teagasc; Pat Daly, Games Development Director GAA; Noel Culleton, retired researcher; Ger Shortle, Head Johnstown Centre Teagasc; Seamus Dunne, Senior Inspector Forest Service (DAFM).*





## GOAL 3

### ENCOURAGE DIVERSIFICATION OF THE RURAL ECONOMY AND ENHANCE THE QUALITY OF RURAL LIFE

#### FARMING AND COUNTRY LIFE 1916

Teagasc welcomed over 60,000 people from across the country to Mellows Campus, Athenry for Farming and Country Life 1916 at the historic Mellows Campus, Athenry on 10th and 11th June. The event was officially launched by Minister Heather Humphreys who said “This event represents an authentic and accurate retelling of the story of local 1916 military events and Farming and Country Life of the era and it is very clear that a huge amount of work has been carried out by all involved to organise this event, and to transform the Mellows Campus into street and rural landscapes of 1916.”

A commemorative plaque was unveiled by Chairman of Teagasc, Dr. Noel Cawley as a tribute to

Liam Mellows and the volunteers who took refuge in Mellows Campus during the Easter Rising. The event was organised by Teagasc, in conjunction with Galway County Council as part of the 1916 commemorations.

With seven distinct villages, the event was packed with all the activity of a 1916 town, from music, dance and drama to livestock, machinery and history. This event included demonstrations on the working horse and its role for the Irish household, exhibition GAA games in 1916 attire, sports day with traditional children’s games and re-enactments of evictions, advisory scenes, schoolhouse and cottage.

The event reflected important aspects of life in Ireland at the beginning of the last century. It

provided high quality educational, authentic material and accurately retold the story of local 1916 military events and Farming and Country Life of the era. It showcased a significant number of interactive exhibits, dramatic re-enactments, lectures, and reconstructions.

A large number of farming, rural, community and voluntary, local and national organizations participated in the event including IFA, GAA, National Ploughing Association, UCD and the ICA, the Museum of Country Life, the Agricultural Museum in Johnstown Castle, The GAA Museum, the Department of Folklore in UCD and with many local heritage and historical societies.

*Pictured at the Teagasc Farming & Country Life event in Athenry, Co Galway are Eugene Costello, Loughrea with Professor Gerry Boyle, Director Teagasc and Heather Humphreys, Minister for Regional Development, Rural Affairs, Arts and the Gaeltacht.*









## GOAL 3

### ENCOURAGE DIVERSIFICATION OF THE RURAL ECONOMY AND ENHANCE THE QUALITY OF RURAL LIFE

#### TEAGASC AND FARM WOMEN

The aim of a study 'How Teagasc advisory services can improve engagement with and empowerment of farm women,' by Teagasc Walsh Fellow Aisling Molloy, was to establish the current level and nature of engagement of farm women in County Wexford with advisory services, to identify their knowledge needs and examine ways to increase their engagement in a way that supports and empowers their role within family farms.

While an estimated 74,000 women work on Irish farms (27% of the agricultural workforce), only 4,800 are registered clients with the main farm advisory service (Teagasc). Factors contributing to this low level of engagement

include traditional gender roles and relationships in farming but may also include structural or cultural barriers in the way that advisory services are provided.

Focusing on one county as representative of the national situation, the study profiled farm women in County Wexford, their roles on farms; their knowledge needs; the extent of their engagement with advisory services, the barriers to their engagement; and proposed a strategy to address these.

Women-only Discussion Groups, more events and information, including family members in correspondence, succession and inheritance planning and highlighting female farmers more in the media were the main suggestions offered to improve engagement.

#### FARM HAZARDOUS WASTE COLLECTIONS

Like many businesses, some hazardous waste is generated through the normal running of a farm, from engine oils & filters to the residues of pesticides, herbicides and out-of-date veterinary medicines. The removal of these potentially dangerous substances represents a major step in improving farm safety while reducing the serious pollution risks associated with accidental spillages.

A campaign was initiated in 2013, and led by the Environmental Protection Agency (EPA) working with a cross-government team that includes Teagasc; the Department of Agriculture, Food & Marine; the Department of Communications, Climate Action & Environment and local authorities.

Some 2,000 farmers participated in the 2016 campaign by clearing sheds of out-of-date chemicals and other hard-to-manage wastes. Safe disposal of these wastes is important for every farmer in keeping the farmyard safe for themselves and their family; in producing quality-assured products; and in maintaining Ireland's green and sustainable image.





Agriculture and  
Food Development  
Authority



## GOAL 4

### ENHANCE ORGANISATIONAL CAPABILITY AND DELIVER VALUE FOR MONEY

## GOAL 4

### ENHANCE ORGANISATIONAL CAPABILITY AND DELIVER VALUE FOR MONEY

#### Teagasc Foresight 2035

The final report of the Teagasc Technology Foresight 2035 Project was published at an international conference at the Aviva stadium conference centre in March 2016. As part of the Technology Foresight Project, over 200 experts and industry stakeholders were consulted to identify breakthrough technologies which will transform the Irish agri-food and bioeconomy sector by 2035.

Five technology themes were identified as being the priorities for Irish research and innovation in the coming years:

1. Plant and Animal Genomics and Related Technologies
2. Human, Animal and Soil Microbiota
3. Digital Technologies
4. New Technologies for Food Processing

5. Transformation in the Food Value Chain System

Teagasc Director, Professor Gerry Boyle, said: "The pace of new technology adoption is accelerating and progress is happening across a broad spectrum of technologies. New tools will enable the agricultural sector to better tackle the challenges of climate change, and wider sustainability concerns while promising enhanced living standards and quality of life for sectoral players."

Dr. Noel Cawley, Teagasc Chairman, said: "Farms and processing companies are becoming smarter places. Scientific understanding is ever increasing. Knowledge is growing. More data are emerging. These developments have propelled the agri-food sector over the last 20



years. This technology foresight report has identified the key technologies that will shape and influence the farms of 2035."

The Teagasc Technology Foresight 2035 report was presented to the European Commissioner for Agriculture and Rural Development, Phil Hogan, at a conference in Brussels, on Wednesday, 22 June.

*Pictured from (L to R) were: Professor Gerry Boyle, Director, Teagasc; Mr. Phil Hogan, European Commissioner for Agriculture and Rural Development; Dr. Noel Cawley, Teagasc, Chairman and Dr. Frank O'Mara, Teagasc Director of Research at the Teagasc Technology Foresight 2035 Report presented to the EU Commissioner at a conference in Brussels.*







*Pictured at the Teagasc 2035 Foresight event are (from left): Prof. Banning Garrett, founding Director of the Atlantic Council's Strategic Foresight Initiative; Aidan O'Driscoll, Secretary General of the Department of Agriculture, Food and the Marine; Janet Bainbridge OBE, CEO of Agriculture Technology for the UK Trade and Investment; Dr. Noel Cawley, Chairman, Teagasc; Dr. Frank O'Mara, Director of Research, Teagasc; and Dr. Lance O'Brien, Teagasc's Head of Foresight and Strategy.*

### **Statement of Strategy**

During 2016 Teagasc launched its sixth Statement of Strategy (SoS), which sets out goals, priorities and high-level strategic actions for the period 2017-2020. The Statement was prepared in consultation with staff and a range of external stakeholders and represents Teagasc's response to the opportunities and challenges facing the organisation and the agri-food sector.

In addition to supporting the industry to address on-going challenges of competitiveness and sustainability, it will help underpin the sector's response to the new challenge arising from the decision of the UK to exit the European Union (Brexit). While the short-term implications of this decision are already apparent in terms of the impact of changes in the value of Sterling against the Euro, the medium-to-long-term impact will only become clear as the exact terms of Brexit are agreed over the coming years. Teagasc's commitment over the

coming years to developing new tools and techniques will be essential in ensuring that the industry will continue to prosper under whatever new trading relationships the UK agrees into the future.

### **Teagasc Walsh Fellowships Seminar**

The winner of the best oral presentation and winner of RDS medal was Aideen Kennedy, who is based at the Teagasc Animal & Grassland Research and Innovation Centre, Moorepark and

*Aideen Kennedy, Winner of the RDS Medal at the Teagasc Walsh Fellowships Seminar pictured here being presented with her medal from (L to R): Declan Troy, Director of Food Technology Transfer, Teagasc and Tom Kirley, RDS.*



## GOAL 4

### ENHANCE ORGANISATIONAL CAPABILITY AND DELIVER VALUE FOR MONEY

at the Department of Biological Sciences, Cork Institute of Technology, Bishopstown. The title of her presentation was: *Epidemiological investigations into Johne's disease on Irish dairy farms*. Aideen was presented with her medal by Tom Kirley from the RDS.

The best food research presentation and winner of the Institute of Food Science and Technology Ireland (IFSTI) medal was Aoife Buggy. Aoife is based at

the Teagasc Food Research Centre, Moorepark and at the Department of Chemistry in the National University of Ireland, Maynooth. The title of her presentation was: *Effect of  $\alpha$ -lactalbumin concentration on the stability of infant milk formula under differing process condition*. Professor Alan Reilly, representing IFSTI, presented Aoife with the IFSTI medal.

The award for the best poster went to Jessica Coyne. Jessica is based at the Teagasc Animal

& Grassland Research and Innovation Centre in Moorepark and also works with the Biometrical Genetics Department at the Natural Resources Institute Finland (Luke), FI-31600 Jokioinen, Finland and at the Department of Agricultural Science in the University of Helsinki in Finland. The title of Jessica's presentation was: *Genetics of longitudinal growth and feed efficiency data*.

Thirteen PhD Walsh Fellow Students made oral presentations

*Pictured during a visit by the Dutch ambassador to Teagasc Oak Park:*

*L to R: Dr. Rogier Schulte (Head of Translational Research on sustainable Food Production), Dr. Denis Griffin (Potato Breeder), Paul Schellekens (Dutch Ambassador), Wemmechien Hofman (Dutch Senior Economic & Trade Officer), Prof. Gerry Boyle (Teagasc Director), Dr. Lance O'Brien (Head Strategy and Intl. Relations), Dr. Dan Milbourne (Molecular Geneticist), and Dr. Frank O'Mara (Director of Research).*





*Teagasc Director, Professor Gerry Boyle presents Jack O'Meara, St Joseph's College, Borrisoleigh, Co Tipperary, with the Teagasc Special Award at BTYSTE 2016.*

of their research findings at the seminar. In addition, 42 Walsh Fellows presented posters outlining their research.

### **Advisory Conference**

Agricultural advisory and education professionals from all over Europe were in Limerick in June for a conference themed 'Innovation Support for a Diverse Agriculture'. Teagasc hosted the 55th IALB and third EUFRAS conference at the University of Limerick campus.

Chairman of EUFRAS, Dr. Tom Kelly of Teagasc said: "This event brings together key agricultural professionals from advisory and education including arable, beef, milk, organics, energy and forestry from across Europe. The conference comes at a time when the role of rural advisors in innovation support is becoming much more valued and appreciated, both globally and at European level.

The International Academy of Rural Advisors (IALB) consists of over 500 private individual advisor memberships. It is primarily a German speaking organisation mostly from Austria, Switzerland, Poland and Germany. IALB was established over 54 years ago and while still retaining the IALB umbrella they are very active members of EUFRAS.

Ulrich Ryser, president of IALB, and head of the Swiss based Agridea advisory support organisation, stated that advisors have to look beyond the regional and organisational borders to learn and this will help them be more effective.

EUFRAS is the European Forum for Rural and Agricultural Advisory Services which was established in 2013 and has 30 member organisations in 20 countries. EUFRAS connects agricultural and rural advisory services, public and private, across Europe and promotes increased cooperation internationally and represents them at a European level.

### **BT Young Scientists 2016**

Jack O'Meara, from St Joseph's College, Borrisoleigh, Co Tipperary winner of the Teagasc special award at the BT Young Scientist & Technology Exhibition 2016 (BTYSTE 2016). Jack's project 'The Mastitis Meter', which was entered in the Chemical, Physical & Mathematical Sciences category, looked at the early detection of mastitis of milk in the parlour. He looked at the increased conductivity of infected



milk and proposed a device that would test samples of milk for increased conductivity before it enters the bulk tank.

Jack's award was sponsored by Teagasc for the project that best demonstrates a thorough understanding of the science of agricultural or food production, or the use of science to improve technologies available to agricultural or food production. Almost 1,200 students from across the island of Ireland covering 550 projects from 29 counties competed in the RDS at the event.



*Delegates at the Teagasc-hosted IALB/EUFRAS conference held at the University of Limerick.*

## GOAL 4

### ENHANCE ORGANISATIONAL CAPABILITY AND DELIVER VALUE FOR MONEY

#### CommBeBiz

The EC-funded project CommBeBiz – which supports bioeconomy researchers across Europe to speed up transfer of their knowledge to relevant stakeholders – launched the Bioeconomy Impact 2016 conference (Dublin, 11th-12th February 2016). This event provided opportunities for researchers to think critically about their work and consider how they can effectively utilise it to deliver greater impact.

Dr. Maeve Henchion, who leads Teagasc involvement in the CommBeBiz project, said: “This event highlighted that delivery of the bioeconomy will involve significant change management. The bioeconomy is different to what has gone before. It will require new ways of doing research, new ways of doing business, and new ways of creating policies in addition



*Billy Kelleher receiving his award from Teagasc Chairman Dr. Noel Cawley.*

to the obvious change required in production, consumption, processing and recovering of biological feedstocks.”

#### Gold Medal Winner

The 2016 winner of the Teagasc Gold Medal is Billy Kelleher. The Teagasc Gold Medal is awarded on an annual basis to someone who has made an exceptional contribution to Teagasc and to the agriculture and food sectors. Billy is the Teagasc Regional Advisory Manager for West Cork.

The award was presented to Billy Kelleher by the Teagasc Chairman, Dr. Noel Cawley at a meeting of the Teagasc Authority in Oak Park, Carlow. He said: “As an advisor Billy covered all enterprises and was highly technically competent in all enterprises and in particular dairy and tillage, where he served a large client base of farmers. He led the Teagasc Dairygold Joint Dairy Development Programme for 12 years from 2000 to 2012, before being appointed as regional manager of the advisory services in Cork West. Since this appointment the advisory service in Cork West, The Carbery Joint



*Pictured (L to R): Rhonda Smith (Minerva Communications UK Ltd.); Rob Peters (European Commission); Dirk Carrez (Biobased Industries Consortium); Maeve Henchion and Prof. Gerry Boyle (Teagasc).*



Programme and linkages with Clonakilty Agricultural college have all prospered.”

### New Offices/Extensions to Offices

On the Teagasc Ashtown campus, there is now an integrated facility, covering Food Research, Horticultural Development, Forestry Development, Horticultural Education and Food Industry training.

Opening the facility, Minister for Agriculture, Food and the Marine Michael Creed TD said: “In today’s rapidly changing geopolitical, economic and trade environment, it is more important than ever to explore the boundaries of science and technology when it comes to food. Innovation is the key to unlocking the value added in food raw materials, to improving competitiveness, and to providing a vital layer of insulation against the vagaries of highly volatile commodity markets. This is why this Teagasc development in Ashtown is so critically important, and I am delighted to be here at its launch.”



Michael Creed TD, Minister for Agriculture, Food and the Marine, (right) officially opened the Education, Research and Conference centre in Teagasc Ashtown with Dr. Noel Cawley, Teagasc Chairman and Prof Gerry Boyle, Teagasc Director.

### Breeder Honoured

Harry Kehoe, retired Potato Breeder from Teagasc, Oak Park, was conferred with an Honorary Degree of Doctor of Science, in recognition of his lifetime’s work as a Plant Breeder. The conferring took place in UCD.

Rooster was one of more than 35 potato varieties bred by Harry Kehoe and his team at Teagasc, Oak Park, Carlow. Since its launch in 1991 Rooster has become the dominant potato in the Irish

market accounting for 60% of the market.

Cara has been the most successful potato variety bred in Oak Park to date, and almost 40 years after its release is still being grown in markets as diverse as the United Kingdom, Egypt and the Canary Islands. Cara was notable as one of the first successful varieties with resistance to the *Globodera rostochiensis* strain of Potato Cyst Nematode.

Dr. Harry Kehoe, centre pictured with Professor Andrew J Deeks UCD President and Dr. Alex Evans of UCD



## GOAL 4

### ENHANCE ORGANISATIONAL CAPABILITY AND DELIVER VALUE FOR MONEY

#### SCIENCE WEEK

In 2016 the Science Week theme was 'Science Rising' – focusing on the progression of scientific technologies over the last 100 years in agriculture, food processing, nutrition, and food safety. Teagasc centres explained to students how traditional methods of the agri-food industry have developed over time, and showcased current technologies used in agri-food research.

##### Teagasc Grange

Teagasc Grange, Co Meath hosted two open days in the Animal & Grassland, Research and Innovation Centre. Students from the Trinity Access Programme and from local secondary schools were invited to visit the centre for a tour of the labs and farm for a **Your Food Starts Here** event.



##### Teagasc Moorepark

**Understanding the Irish Dairy Industry** at Teagasc, Moorepark, Co Cork gave local secondary students the opportunity to use microscopic tools in the Food Research centre, and see some of the key technologies that underpin dairy farming in the Animal & Grassland, Research and Innovation Centre,

including a tour of the research lab. Students learned about how microbiology and food safety have progressed, and saw food microstructure and how that relates to the food experience in the microscopy lab.

##### Teagasc Oak Park

Teagasc Crops, Environment and Land Use Research Centre in







Oak Park, Carlow, hosted **From Barley to Beer – The Science of the Perfect Pint**. Students from Pearse College Dublin and Carlow IT were given a demonstration of the malting process by a local maltster from Boortmalt, and a beer brewing demonstration and tasting by a senior brewer from O'Hara's, a local brewing company. They were able to observe the beer-making process from the grain to the glass. Oak Park researchers demonstrated precision farming in the field using driverless tractors and unmanned aerial vehicles.

#### **Teagasc Athenry**

Second level students in Galway visited the Teagasc Animal & Grassland, Research and Innovation Centre, Athenry, Co. Galway, for the **Animal Science @ Teagasc Athenry** event. They gained an insight into how science is being used to address reproduction and parasitism issues in sheep. Students viewed different sheep breeds and learned about their attributes and role in Irish farming.

#### **Teagasc Ashtown**

As part of Science Week Teagasc Food Research Centre in Ashtown, Dublin held **A Taste of Food Science**, a free evening event open to the general public. Teagasc researchers hosted a night of fun, entertainment and science.



## GOAL 4

### ENHANCE ORGANISATIONAL CAPABILITY AND DELIVER VALUE FOR MONEY

#### Annual Energy Usage Report 2016

Teagasc operate 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 2016, Teagasc consumed 26,631.0 MWh of energy consisting of:

- 11,431.7 MWh of electricity or 42.9% of total energy
- 8,755.4 MWh of fossil fuel for space heating or 32.9% of total energy
- 5,058.8 MWh of vehicle fuel (agricultural, commercial transport and car fleet) or 19.0% of total energy
- 1,385.1 MWh of renewable fuels or 5.2% of total energy

Teagasc has an on-going program in place to upgrade the building fabric of its facilities to reduce heat loss (double glazing, roof and wall insulation etc.). This program will continue in 2017. Renewable fuel sources accounted for 5.2% of total energy use in 2016. This figure does not take account of the portion of purchased electricity which is generated from renewable resources. A formal energy management system has been put in place with the aim to reduce energy usage in line with national targets.

#### ICT Investments

Teagasc launched a completely new public website in 2016, powered by a new Content Management System. It completed its migration from a traditional phone system to a fully integrated Voice Over IP telephony and collaboration system. It continued to invest in improving its computer networks and its High Performance Cluster for research computing. A new Nutrient Management Planning system went live and there was significant further investment in the Pasturebase Ireland system. Work continued on a new Education Management System and it is on track to go live in 2017.



*An MOU was signed between Teagasc and SANYUAN Foods Co., LTD, Beijing, P.R. China*

*Front row (L to R): Dr. Mark Fenelon – Head, Teagasc Food Programme*

*Dr. Chen Lijun – General Manager Beijing Sanyuan Foods Co., LTD*

*Back Row (L to R): Michael Cantwell – Director of the Food Division of Enterprise Ireland*

*Aidan O'Driscoll – Secretary General, Department of Agriculture, Food and the Marine, Ireland*

*Minister Michael Creed TD – Minister for Agriculture, Food and the Marine*

*The Ambassador of Ireland to China – H.E. Mr. Paul Kavanagh; Embassy of Ireland, Beijing, China.*

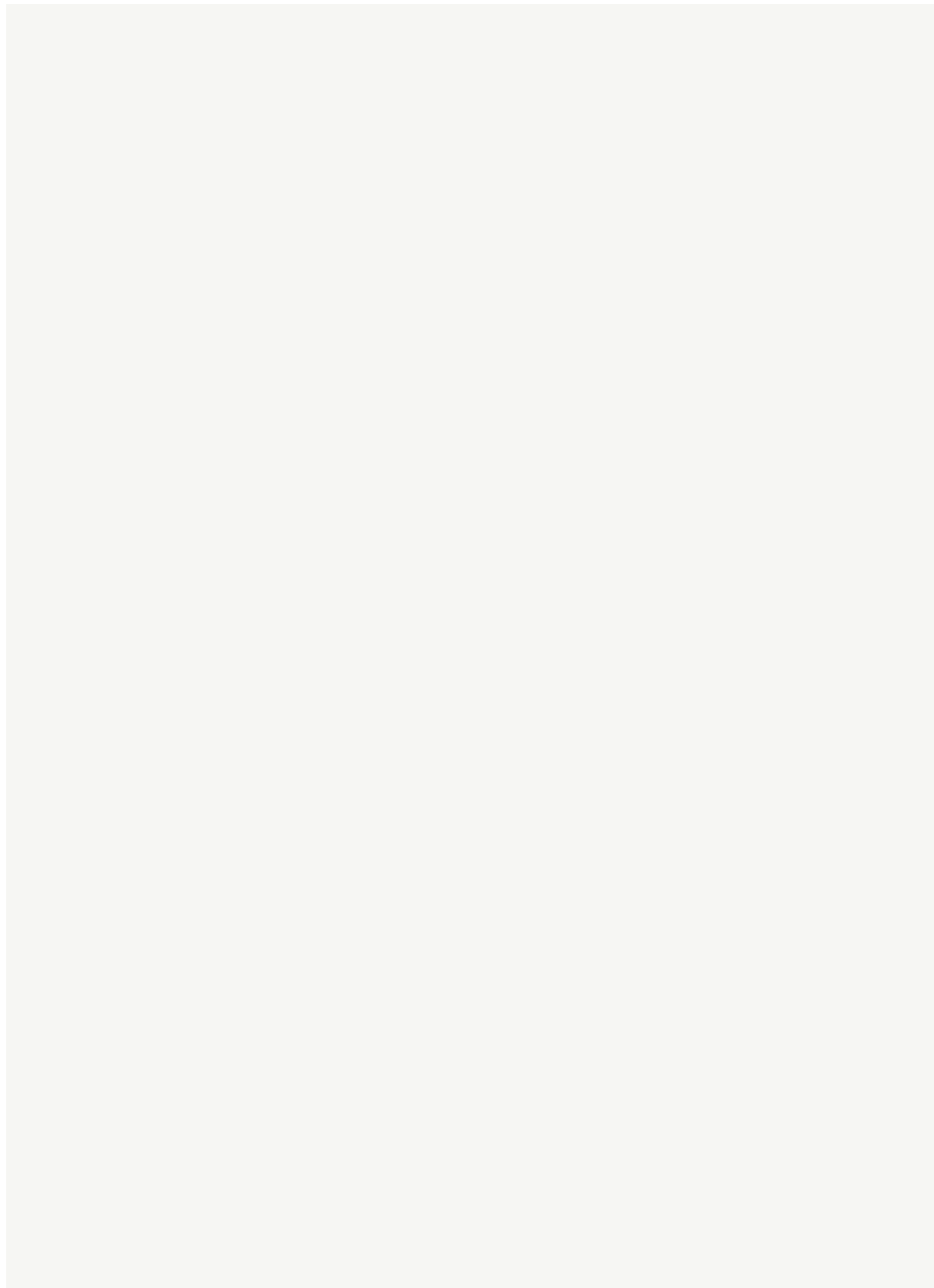


and Ireland



## GOAL 4

ENHANCE ORGANISATIONAL CAPABILITY  
AND DELIVER VALUE FOR MONEY







# Teagasc Consolidated Financial Statements

*Report of the Authority  
and Consolidated Financial Statements  
Year ended 31 December 2016*

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

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# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### REPORT OF THE COMPTROLLER AND AUDITOR GENERAL FOR PRESENTATION TO THE HOUSES OF THE OIREACHTAS

I have audited the financial statements of Teagasc for the year ended 31 December 2016 under the Agriculture (Research, Training and Advice) Act 1988. The financial statements comprise the consolidated statement of income and expenditure, the consolidated statement of comprehensive income, the statement of financial position of the group and of Teagasc, the consolidated statement of changes in capital and reserves, the statement of changes in capital and reserves of Teagasc, the consolidated statement of cash flows and the related notes. The financial statements have been prepared in the form prescribed under Section 12 of the Agriculture (Research, Training and Advice) Act 1988, and in accordance with generally accepted accounting practice.

#### Responsibilities of the Authority

The Authority is responsible for the preparation of the financial statements, for ensuring that they give a true and fair view and for ensuring the regularity of transactions.

#### Responsibilities of the Comptroller and Auditor General

My responsibility is to audit the financial statements and to 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 and to identify any information that is apparently materially incorrect based on, or materially inconsistent with, the knowledge acquired by me in the course of performing the audit. 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:

- give a true and fair view of the assets, liabilities and financial position of the group and the Authority as at 31 December 2016 and of its income and expenditure for 2016; and
- have been properly prepared in accordance with generally accepted accounting practice.

In my opinion, the accounting records of the Authority were sufficient to permit the financial statements to be readily and properly audited. The financial statements are in agreement with the accounting records.

#### 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 if I find

- 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 with the knowledge acquired by me in the course of performing the audit, 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
- there are other material matters relating to the manner in which public business has been conducted.

#### Non compliance with procurement rules

Audit testing identified non-competitive procurement of services in 2016 to the value of €725,000. The statement on internal financial control sets out the steps being taken by the Authority to address the matter.

Seamus McCarthy  
Comptroller and Auditor General  
27 June 2017

## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### 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 in Teagasc and its subsidiary.

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 2009 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 the Group;
- developing a culture of accountability across all levels of the organisation.

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

- identifying the nature, extent and financial implication of risks facing the Group including the extent and categories which it regards as acceptable;
- assessing the likelihood of identified risks occurring;
- assessing the Group'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.

The Group has an internal audit function, which operates in accordance with the requirements of the 2009 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 the Group is exposed and annual internal audit plans are based on this analysis. The internal audit plans are approved by the Audit Committee. In 2016 the Authority retained an external expert to advise the Audit Committee.

The audit of the 2016 financial statements identified six service transactions with a total value of €725,404 which were not competitively procured. While competitive processes had previously been undertaken in respect of these procurements, the contracts for these procurements had expired and were extended without going through a new competitive process. The reason in most cases for these contracts being extended was in anticipation of the Office of Government Procurement (OGP) putting contracts in places for these services. The OGP contracts for these procurements are in the process of being implemented.

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 the Group 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 respect of the year ended 31 December 2016.

Dr. Noel Cawley  
Chairman  
13 June 2017



## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### 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 adequate accounting records 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 accounting records 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  
13 June 2017

Joe Larkin  
Member of the Authority  
13 June 2017

## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### CONSOLIDATED STATEMENT OF INCOME AND EXPENDITURE YEAR ENDED 31 DECEMBER 2016

	Note	2016 €'000	2015 €'000
<b>Income</b>			
Oireachtas grants	4	146,583	137,124
EU funding	5	1,898	2,542
Sale of livestock		3,064	2,943
Operational income	6	29,399	27,158
Net deferred funding for pensions	10	2,562	9,960
Surplus on disposal of fixed assets	13	1,062	62
Other grants, donations and voluntary levies		3,779	3,486
Sale of goods		127	117
Research and technology services		1,182	972
<b>Total Income</b>		<b>189,656</b>	<b>184,364</b>
<b>Expenditure</b>	7	<b>(181,706)</b>	<b>(186,309)</b>
<b>Operating surplus/ (deficit)</b>		<b>7,950</b>	<b>(1,945)</b>
Interest receivable		4	111
<b>Surplus/ (deficit) before transfers and taxation</b>		<b>7,954</b>	<b>(1,834)</b>
Transfer (to)/ from Capital Account		(1,760)	964
<b>Surplus/ (deficit) for the financial year before taxation</b>		<b>6,194</b>	<b>(870)</b>
Taxation	11	(42)	(46)
<b>Surplus/ (deficit) for the financial year</b>		<b>6,152</b>	<b>(916)</b>
<b>Surplus/ (deficit) attributable to</b>			
Teagasc		6,041	(1,038)
Non-controlling interest		111	122
		<b>6,152</b>	<b>(916)</b>

The Statement of Cash Flow and Notes 1-36 form part of these financial statements.

Dr. Noel Cawley  
Chairman  
13 June 2017

Professor Gerry Boyle  
Director  
13 June 2017



## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

##### YEAR ENDED 31 DECEMBER 2016

	Note	2016 €'000	2015 €'000
<b>Surplus/ (deficit) for the financial year</b>		6,152	(916)
Actuarial (loss)/ gain on pension liabilities	10	(66,845)	174,088
Adjustment to deferred pension funding		<u>66,845</u>	<u>(174,088)</u>
<b>Total comprehensive income for the year</b>		<u>6,152</u>	<u>(916)</u>
Teagasc		6,041	(1,038)
Non-controlling interest		<u>111</u>	<u>122</u>
		<u>6,152</u>	<u>(916)</u>

The Statement of Cash Flow and Notes 1-36 form part of these financial statements.

Dr. Noel Cawley  
Chairman  
13 June 2017

Professor Gerry Boyle  
Director  
13 June 2017

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### STATEMENT OF FINANCIAL POSITION AS AT 31 DECEMBER 2016

		Group		Teagasc	
	Note	2016 €'000	2015 €'000	2016 €'000	2015 €'000
<b>Non-current assets</b>					
Property, plant and equipment	13	98,518	96,658	95,582	93,822
Investments	15	421	415	422	416
		<u>98,939</u>	<u>97,073</u>	<u>96,004</u>	<u>94,238</u>
<b>Current assets</b>					
Inventories	16	4,819	4,675	4,819	4,675
Receivables: amounts falling due within one year	18	23,642	20,253	23,290	20,021
Cash and cash equivalents	19	20,757	18,185	19,623	17,076
		<u>49,218</u>	<u>43,113</u>	<u>47,732</u>	<u>41,772</u>
<b>Payables: amounts falling due within one year</b>					
Payables and accruals	20	17,297	20,571	17,104	20,392
Deferred income	21	19,560	16,354	19,497	16,311
		<u>36,857</u>	<u>36,925</u>	<u>36,601</u>	<u>36,703</u>
<b>Net current assets</b>		<u>12,361</u>	<u>6,188</u>	<u>11,131</u>	<u>5,069</u>
<b>Total assets less current liabilities</b>		111,300	103,261	107,135	99,307
<b>Provisions for liabilities</b>					
Deferred Tax	23	101	100	-	-
<b>Payables: amounts falling due after one year</b>					
Deferred income	22	611	485	272	98
		<u>110,588</u>	<u>102,676</u>	<u>106,863</u>	<u>99,209</u>
Deferred pension funding	10	1,232,605	1,163,198	1,232,605	1,163,198
Pension liabilities	10	(1,232,605)	(1,163,198)	(1,232,605)	(1,163,198)
<b>Net assets</b>		<u>110,588</u>	<u>102,676</u>	<u>106,863</u>	<u>99,209</u>
<b>Capital and reserves</b>					
Capital account		95,582	93,822	95,582	93,822
Statement of income and expenditure account		12,346	6,194	11,281	5,387
Capital contribution		2,660	2,660	-	-
		<u>110,588</u>	<u>102,676</u>	<u>106,863</u>	<u>99,209</u>
Reserves attributable to Teagasc		107,467	99,666	106,863	99,209
Non-controlling interest		3,121	3,010	-	-
		<u>110,588</u>	<u>102,676</u>	<u>106,863</u>	<u>99,209</u>

The Statement of Cash Flow and Notes 1-36 form part of these financial statements.

Dr. Noel Cawley  
Chairman  
13 June 2017

Professor Gerry Boyle  
Director  
13 June 2017



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### CONSOLIDATED STATEMENT OF CHANGES IN CAPITAL AND RESERVES AS AT 31 DECEMBER 2016

#### GROUP

		Capital account	Revenue reserves	Capital contribution	Total	
			Group	Non- controlling interest	Non- controlling interest	
	Note	€'000	€'000	€'000	€'000	
<b>At 1 January 2015</b>		94,786	6,882	228	2,660	104,556
Deficit for the year		-	(1,038)	122	-	(916)
Actuarial gain on pension liabilities	10	-	174,088	-	-	174,088
Adjustment to deferred pension funding	10	-	(174,088)	-	-	(174,088)
<b>Total comprehensive income</b>		-	(1,038)	122	-	(916)
Amounts capitalised in respect of purchased assets	13	5,995	-	-	-	5,995
Net amount released on disposals	13	(7)	-	-	-	(7)
Less: amortised in line with asset depreciation	13	(6,952)	-	-	-	(6,952)
<b>At 31 December 2015</b>		<b>93,822</b>	<b>5,844</b>	<b>350</b>	<b>2,660</b>	<b>102,676</b>
Surplus for the year		-	6,041	111	-	6,152
Actuarial loss on pension liabilities	10	-	(66,845)	-	-	(66,845)
Adjustment to deferred pension funding	10	-	66,845	-	-	66,845
<b>Total comprehensive income</b>		-	6,041	111	-	6,152
Amounts capitalised in respect of purchased assets	13	8,871	-	-	-	8,871
Net amount released on disposals	13	(55)	-	-	-	(55)
Less: amortised in line with asset depreciation	13	(7,056)	-	-	-	(7,056)
<b>At 31 December 2016</b>		<b>95,582</b>	<b>11,885</b>	<b>461</b>	<b>2,660</b>	<b>110,588</b>
		107,467		3,121		110,588

The Statement of Cash Flow and Notes 1-36 form part of these financial statements.

## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### STATEMENT OF CHANGES IN CAPITAL AND RESERVES AS AT 31 DECEMBER 2016

##### TEAGASC

	Note	Capital account €'000	Revenue reserves €'000	Total €'000
<b>At 1 January 2015</b>		94,786	6,585	101,371
Deficit for the year		-	(1,198)	(1,198)
Actuarial gain on pension liabilities	10	-	174,088	174,088
Adjustment to deferred pension funding	10	-	(174,088)	(174,088)
<b>Total comprehensive income</b>		-	(1,198)	(1,198)
Amounts capitalised in respect of purchased assets	13	5,995	-	5,995
Net amount released on disposals	13	(7)	-	(7)
Amortised in line with asset depreciation	13	(6,952)	-	(6,952)
<b>At 31 December 2015</b>		<b>93,822</b>	<b>5,387</b>	<b>99,209</b>
Surplus for the year		-	5,894	5,894
Actuarial loss on pension liabilities	10	-	(66,845)	(66,845)
Adjustment to deferred pension funding	10	-	66,845	66,845
<b>Total comprehensive income</b>		-	5,894	5,894
Amounts capitalised in respect of purchased assets	13	8,871	-	8,871
Net amount released on disposals	13	(55)	-	(55)
Less: amortised in line with asset depreciation	13	(7,056)	-	(7,056)
<b>At 31 December 2016</b>		<b>95,582</b>	<b>11,281</b>	<b>106,863</b>

The Statement of Cash Flow and Notes 1-36 form part of these financial statements.



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### CONSOLIDATED STATEMENT OF CASH FLOW AS AT 31 DECEMBER 2016

#### GROUP

	Note	2016 €'000	2015 €'000
<b>Cash flow from operating activities</b>	28	10,817	1,296
Taxation paid		(41)	(28)
<b>Net cash flow from operating activities</b>		<u>10,776</u>	<u>1,268</u>
<b>Cash flow from investing activities</b>			
Payments to acquire tangible fixed assets		(9,298)	(6,344)
Receipts from sales of tangible fixed assets		1,117	69
Payments to acquire investments		(27)	(28)
Receipts from sales of investments		-	52
Interest received		4	111
<b>Net cash used in investing activities</b>		<u>(8,204)</u>	<u>(6,140)</u>
<b>Net increase/ (decrease) in cash and cash equivalents</b>		2,572	(4,872)
Cash and cash equivalents at 1 January		<u>18,185</u>	<u>23,057</u>
<b>Cash and cash equivalents at 31 December</b>		<u>20,757</u>	<u>18,185</u>
<b>Cash and cash equivalents consists of:</b>			
Cash at bank and in hand	19	20,757	9,185
Short term deposits	19	-	9,000
<b>Cash and cash equivalents at 31 December</b>		<u>20,757</u>	<u>18,185</u>

The Statement of Cash Flow and Notes 1-36 form part of these financial statements.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 1. General information

Teagasc (the Agriculture and Food Development Authority of Ireland) was established under the Agriculture (Research, Training and Advice) Act, 1988. The mission is to support science-based innovation in the agri-food sector and the broader bioeconomy that will underpin profitability, competitiveness and sustainability. Teagasc's principal and registered office is at Oak Park, Carlow. Teagasc owns a 57% share in Moorepark Technology Limited whose principal activity is the provision of services for Research and Development.

#### 2. Summary of significant accounting policies

The basis of accounting, and significant accounting policies adopted by Teagasc, are set out below. They have all been applied consistently throughout the year and for the preceding year.

##### 2.1 Statement of compliance

The financial statements of Teagasc for the year ended 31 December 2016 have been prepared in accordance with FRS 102, the financial reporting standard applicable in the UK and Ireland issued by the Financial Reporting Council (FRC).

##### 2.2 Basis of consolidation

For the purposes of these financial statements, the 'Teagasc Group' comprises: the parent entity Teagasc and its subsidiary Moorepark Technology Limited. The accounting policies and accounting period of the subsidiary are consistent with those of the Group. Inter-company transactions and balances and gains on transactions between group companies are eliminated. The investment in the subsidiary is accounted for at cost less impairment. Details of the subsidiary are provided in Note 15.

##### 2.3 Basis of preparation

The financial statements have been prepared under the historical cost convention, except for certain assets and liabilities that are measured at fair values as explained in the accounting policies below. The financial statements are in the form approved by the Minister for Agriculture, Food and the Marine with the concurrence of the Minister for Finance under Section 12 of the Agriculture (Research, Training and Advice) Act 1988. The following accounting policies have been applied consistently in dealing with items which are considered material in relation to Teagasc's financial statements.

##### 2.4 Revenue recognition

###### *Oireachtas grants*

Teagasc receives government grants in respect of research and other projects (revenue grants) and capital grants to fund capital investment. Revenue grants that do not include performance criteria are recognised as income on a cash receipts basis. Grants received which impose specific performance criteria are charged to deferred income and recorded as a creditor until the relevant performance criteria have been met and the grants are recognised as income. Capital grants are released to income over the expected useful life of the relevant asset purchased.

###### *Sale of goods*

Revenue from the sale of goods is recognised when the significant risks and rewards of ownership of the goods have passed to the buyer, usually on dispatch of the goods, the amount of revenue can be measured reliably, it is probable that the economic benefits associated with the transaction will flow to the entity and the costs incurred or to be incurred in respect of the transaction can be measured reliably.



## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### NOTES TO THE FINANCIAL STATEMENTS

##### *Advisory fees*

Teagasc receives income for annual advisory service contracts, annual discussion fee contracts and additional advisory services provided. Income from annual advisory service contracts is recognised in the accounting period when the relevant invoice has issued. Income in relation to discussion fee contracts and additional advisory services is recognised in the accounting period in which the service is rendered and the outcome of the contract can be estimated reliably.

##### *Accrued income*

Income earned on goods/services delivered, but unbilled, is recognised in accordance with contractual terms as accrued income on the Statement of Financial Position. Income earned on research projects, but unclaimed, is recognised as accrued income on the Statement of Financial Position, taking into account the individual rules of all funding bodies.

##### *Royalty income*

Royalty income is recognised on an accruals basis in accordance with the substance of the relevant agreements.

##### *Tuition fees*

Revenue is recognised over the period of instruction.

#### **2.5 Employee benefits**

The Group provides a range of benefits to employees, including paid holiday arrangements and defined benefit pension plans.

##### *Short term benefits*

Short term benefits, including holiday pay and other similar non-monetary benefits, are recognised as an expense in the period in which the service is received.

##### *Defined benefit pension plans*

The Group 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. Actuarial valuations are obtained at least triennially and are updated at each Statement of Financial Position date.

Teagasc also operates the Single Public Services Retirement Benefits Scheme (Single Scheme), which is the defined benefit scheme for pensionable public servants appointed on or after 1 January 2013. Single Scheme members' contributions are paid over to the Department of Public Expenditure and Reform.

Pension costs reflect pension benefits earned by employees in the period and are shown net of staff pension contributions which are retained by the Group. 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 Consolidated Statement of Comprehensive Income 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.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 2.6 Leases

At inception Teagasc assesses agreements that transfer the right to use assets. The assessment considers whether the arrangement is, or contains, a lease based on the substance of the arrangement.

##### *Operating leases*

Leases that do not transfer all the risks and rewards of ownership are classified as operating leases. Payments under operating leases are charged to the income statement on a straight-line basis over the period of the lease.

#### 2.7 Taxation

The taxation expense for the period comprises current and deferred tax recognised in the reporting period. Tax is recognised in the income statement. Current or deferred taxation assets and liabilities are not discounted.

##### *Current tax*

Current tax is the amount of income tax payable in respect of the taxable profit for the year or prior years. Tax is calculated on the basis of tax rates and laws that have been enacted or substantively enacted by the period end.

Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation. It establishes provisions where appropriate on the basis of amounts expected to be paid to the tax authorities.

##### *Deferred tax*

Deferred tax arises from timing differences that are differences between taxable profits and total comprehensive income as stated in the financial statements. These timing differences arise from the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in financial statements.

Deferred tax is recognised on all timing differences at the reporting date except for certain exceptions. Unrelieved tax losses and other deferred tax assets are only recognised when it is probable that they will be recovered against the reversal of deferred tax liabilities or other future taxable profits.

Deferred tax is measured using tax rates and laws that have been enacted or substantively enacted by the period end and that are expected to apply to the reversal of the timing difference.

#### 2.8 Research and development

Expenditure on research activities is recognised as an expense in the period in which it is incurred.

#### 2.9 Tangible assets

##### *Property, plant and equipment*

Property, plant and equipment are stated at cost less accumulated depreciation and accumulated impairment losses. Such costs include costs directly attributable to making the asset capable of operating as intended.

Land is not depreciated. Assets under construction are not depreciated. Depreciation is provided on all property, plant and equipment at rates calculated to write off the cost, less estimated residual value, of each asset on a systematic basis over its expected useful life as follows:



## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### NOTES TO THE FINANCIAL STATEMENTS

Farm buildings	20 years
Other buildings	50 years
Plant and vehicles	5 years
Computer equipment	3 years
Laboratory and office equipment	10 years

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

The carrying values of property, plant and equipment are reviewed for impairment when events or changes in circumstances indicate that the carrying value may not be recoverable.

The estimated useful lives, residual values and depreciation methods are reviewed, and adjusted as appropriate, at the end of each financial year.

The gain or loss, being the difference between the sales proceeds and the carrying amount of the asset, arising on disposal or retirement of an item of property, plant and equipment is recognised in profit or loss. Any amount in the revaluation reserve relating to that asset is transferred to retained earnings directly.

Fully depreciated plant and equipment is retained in the financial statements until it is no longer in use.

#### *Heritage assets*

Heritage assets are maintained principally for contribution of knowledge and culture. These include historical buildings and sites. Information on the cost or value of the heritage assets held by Teagasc cannot be obtained at a cost which is commensurate with the benefits to users of the financial statements, therefore the assets are not recognised in the Statement of Financial Position. A disclosure regarding heritage assets held is in Note 14.

#### *Assets for re-sale*

Tangible assets are classified as held for sale when the carrying amount is expected to be recovered principally through a sale transaction and a sale is highly probable. They are stated at the lower of carrying amount and fair value less cost to sell.

#### *Impairment of non-financial assets*

At each Statement of Financial Position date non-financial assets not carried at fair value are assessed to determine whether there is an indication that the asset (or asset's cash generating unit) may be impaired. If there is such an indication the recoverable amount of the asset (or asset's cash generating unit) is compared to the carrying amount of the asset (or asset's cash generating unit).

## 2.10 Financial assets

#### *Investment in subsidiary*

The investment in the subsidiary Moorepark Technology Limited is measured at cost less impairment. If there is objective evidence of impairment, an impairment loss is recognised in the Statement of Income and Expenditure in the year.

#### *Other investments*

Investments listed on a recognised stock exchange are measured at their fair value, and movements are recorded through the Statement of Income and Expenditure and Retained Revenue Reserves. Other financial assets comprising investments in unquoted shares and financial investments are measured at their fair value if this can be reliably determined; otherwise they are measured at the value attributed to them at the date of acquisition less impairment. If there is objective evidence of impairment, an impairment loss is recognised in the Statement of Income and Expenditure and Retained Revenue Reserves in the year.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 2.11 Inventory

##### *Biological assets*

Livestock and own farm produce are valued at the fair value model. Fair 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.

##### *Other inventory*

All other inventory is stated at the lower of cost and net realisable value.

#### 2.12 Receivables

Receivables are recognised at fair value, less a provision for impairments. The provision for impairments is a specific provision, and is established when there is objective evidence that Teagasc will not be able to collect all amounts owed to it. All movements in the provision for impairments are recognised in the Statement of Income and Expenditure.

#### 2.13 Payables

Payables, including trade and other payables and deferred income are initially recognised at transaction price, unless the arrangement constitutes a financing transaction, where the debt instrument is measured at the present value of the future receipts discounted at a market rate of interest.

#### 2.14 Provisions and contingencies

##### *Provisions*

Provisions are recognised when the Group has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation; and the amount of the obligation can be estimated reliably.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to passage of time is recognised as a finance cost.

##### *Contingencies*

Contingent liabilities, arising as a result of past events, are not recognised when (i) it is not probable that there will be an outflow of resources or that the amount cannot be reliably measured at the reporting date or (ii) when the existence will be confirmed by the occurrence or non-occurrence of uncertain future events not wholly within the Group's control. Contingent liabilities are disclosed in the financial statements unless the probability of an outflow of resources is remote.

Contingent assets are not recognised. Contingent assets are disclosed in the financial statements when an inflow of economic benefits is probable.

### 3. Critical accounting estimates and judgements

The preparation of the financial statements requires management to make judgements, estimates and assumptions that affect the amounts reported for assets and liabilities as at the Statement of Financial Position date and the amounts reported for revenues and expenses during the year. However, the nature of estimation means that actual outcomes could differ from those estimates. The following judgements have had the most significant effect on amounts recognised in the financial statements:

## TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

### FINANCIAL YEAR ENDED 31 DECEMBER 2016

#### NOTES TO THE FINANCIAL STATEMENTS

##### *Useful economic lives of property, plant and equipment*

The Group depreciates the tangible fixed assets over their estimated useful lives after taking into account their estimated residual values. The estimated useful life reflects management's estimate of the period that the Group intends to derive future economic benefits from the use of the Group's tangible fixed assets. The residual value reflects management's estimated amount that the Group would currently obtain from the disposal of the asset, after deducting the estimated costs of disposal, as if the asset were already of the age and in the condition expected at the end of its useful life. Changes in the expected level of usage and technological developments could affect the economics, useful lives and the residual values of these assets which could then consequentially impact future depreciation charges. See Note 13 for the carrying amount of tangible fixed assets.

##### *Valuation of investments*

At the end of each financial year, an assessment is made on whether there are indicators that Teagasc's investment in the subsidiary is impaired. Where necessary, Teagasc's assessments are based on the estimation of the value-in-use of the assets by forecasting the expected future cash flows for a period of up to 5 years, using a suitable discount rate in order to calculate the present value of those cash flows. See Note 15 for the carrying amount of investments.

##### *Impairment of receivables*

Teagasc assesses receivables on a continuous basis for any objective evidence of impairment by considering factors, including the ageing profile, the creditworthiness and the past collection history of each debtor. If the financial conditions of these debtors were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances may be required. See Note 18 for the carrying amount of trade and other receivables.

##### *Retirement benefit obligation*

Teagasc has an obligation to pay pension benefits to certain employees. The cost of these benefits and the present value of the obligation depend on a number of factors, including; life expectancy, salary increases, asset valuations and the discount rate on corporate bonds. Management estimates these factors in determining the net pension obligation in the Statement of Financial Position. The assumptions reflect historical experience and current trends. See Note 10 for the disclosures relating to the defined benefit pension scheme.

##### *Provisions*

The Group makes provisions for legal and constructive obligations, which it knows to be outstanding at the year-end date. These provisions are generally made based on historical or other pertinent information, adjusted for recent trends where relevant. However, they are estimates of the financial costs of events that may not occur for some years. As a result of this and the level of uncertainty attaching to the financial outcomes, the actual outcome may differ significantly from that estimated.



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 4. Oireachtas Grants

		2016	2015
	Subhead	€'000	€'000
Vote 30: Agriculture, Food and the Marine Grant-in-aid for general expenses <sup>1</sup>	A.5	116,534	110,983
Grant for human resource purposes	A.3.4	10,500	10,500
Food research and agriculture research	A.3.1	4,310	5,146
Stimulus collaborative research programme	A.3.2	5,319	5,496
GLAS scheme	B.3.3	3,375	4,319
Beef genomics scheme	B.6	2,315	-
Knowledge transfer programme	B.7	1,822	-
Carbon navigator	C.10.10	1,745	-
Grant for forestry publicity and awareness and training	C.6.4	600	650
Grant for forestry education	C.6.4	63	30
		<u>146,583</u>	<u>137,124</u>

<sup>1</sup>Single Pension Scheme members' contributions of €323,442 and €203,124 in the prior year were netted against Grant-in-aid for general expenses.

A grant receivable without any performance criteria is recognised in income when the grant proceeds are receivable. Oireachtas grants received which impose specified future performance conditions are recognised in income when those conditions have been met. Oireachtas grants, received before income recognition is satisfied, are recorded as separate liabilities in the Statement of Financial Position. At year end, Teagasc had unfilled conditions included in the Statement of Financial Position as liabilities with respect to the following:

	Note	2016	2015
		€'000	€'000
Food research and agriculture research	21	2,719	3,187
Stimulus collaborative research programme	21	<u>3,181</u>	<u>5,230</u>
		<u>5,900</u>	<u>8,417</u>

#### 5. EU Funding

	2016	2015
	€'000	€'000
Farm Survey Income	144	144
INTERREG	5	68
Framework Programme VI	4	123
Framework Programme VII	738	1,891
Horizon 2020	761	156
Other EU income	<u>246</u>	<u>160</u>
	<u>1,898</u>	<u>2,542</u>

Framework Programmes have been the main financial tools through which the European Union supports research and development activities covering almost all scientific disciplines. Horizon 2020 started in 2015 and runs to the end of 2020.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 5. EU Funding (continued)

A grant receivable without any performance criteria is recognised in income when the grant proceeds are receivable. EU grants received which impose specified future performance conditions are recognised in income when those conditions have been met. EU grants received before income recognition is satisfied are recorded as separate liabilities in the Statement of Financial Position. At year end, Teagasc had unfilled conditions included in the Statement of Financial Position as liabilities with respect to the following:

	Note	2016 €'000	2015 €'000
Framework Programme VII		1,429	1,273
Horizon 2020		1,690	816
Other EU income		372	240
	21	<u>3,491</u>	<u>2,329</u>

#### 6. Operational income

	Operations €'000	Knowledge transfer €'000	Research €'000	2016 €'000	2015 €'000
Advisory service fees	-	9,516	213	9,729	9,426
Course fee income	38	4,934	267	5,239	4,131
Other fees <sup>1</sup>	8	1,374	10,267	11,649	9,960
Other farming operations	-	731	1,627	2,358	2,591
Publications and miscellaneous	15	109	300	424	1,050
	<u>61</u>	<u>16,664</u>	<u>12,674</u>	<u>29,399</u>	<u>27,158</u>

<sup>1</sup> Included in Other fees are state grants receivable from Science Foundation Ireland of €3.181m and Enterprise Ireland of €1.541m.

A grant receivable without any performance criteria is recognised in income when the grant proceeds are receivable. State agency grants received which impose specified future performance conditions are recognised in income when those conditions have been met. State agency grants received before income recognition is satisfied are recorded as separate liabilities in the Statement of Financial Position. At year end, Teagasc had unfilled conditions included in the Statement of Financial Position as liabilities with respect to the following:

	Note	2016 €'000	2015 €'000
Science Foundation Ireland	21	3,170	1,701
Enterprise Ireland	21	<u>1,801</u>	<u>431</u>
		<u>4,971</u>	<u>2,132</u>

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 7. Expenditure

	Operations	Knowledge transfer	Research	2016	2015
	€'000	€'000	€'000	€'000	€'000
Pay (Note 9)	5,575	30,614	34,600	70,789	69,652
Travelling and subsistence	410	2,205	2,384	4,999	4,768
Staff training	494	-	145	639	612
General operating expenses (Note 8)	7,952	14,726	19,706	42,384	42,171
Financial charges	76	18	1	95	113
Depreciation (Note 13)	193	1,283	5,904	7,380	7,248
Grants to private colleges (Note 29)	-	3,037	-	3,037	2,988
Cost of livestock sales	-	(51)	867	816	753
Cost of research and development services	-	-	136	136	224
Other grants	87	1,365	5,819	7,271	7,097
	14,787	53,197	69,562	137,546	135,626
Pensions (Note 10)				44,160	50,683
				181,706	186,309

Total pay includes:

	2016	2015
	€'000	€'000
Overtime	1,070	1,101
Allowances	1,938	2,094
Redundancy	-	-
	3,008	3,195

In 2016 160 (2015: 166) staff received overtime payments. The highest aggregate amount paid to an individual was €22,967 (2015: €25,554).

#### Travelling and subsistence

	Domestic	Foreign	2016	2015
	€'000	€'000	€'000	€'000
Subsistence	1,685	423	2,108	1,952
Motor travel	2,601	-	2,601	2,448
Airline and ferries	-	302	302	368
	4,286	725	5,011	4,768



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 8. Analysis of general operating expenses

	Operations	Knowledge transfer	Research	2016	2015
	€'000	€'000	€'000	€'000	€'000
Farming supplies/ services	-	813	2,648	3,461	4,275
Maintenance/ repairs	247	2,903	5,306	8,456	8,554
Rents/ rates/ insurances	1,032	326	1,030	2,388	2,042
Postage/ telephones	755	926	317	1,998	2,085
Power/ fuel/ petrol	141	685	1,369	2,195	2,452
Laboratory supplies	-	(9)	3,332	3,323	4,617
Printing/ stationery/ publicity	1,104	1,065	842	3,011	2,664
Seminar/ classroom/ library supplies	126	1,249	1,061	2,436	2,398
Services of external agencies	-	1,113	1,427	2,540	1,961
Student and staff canteen supplies	88	309	353	750	740
Audit fee	52	-	-	52	52
ICT supplies/ services	2,814	66	588	3,468	2,987
Legal/ professional fees*	1,588	5,127	785	7,500	6,360
Miscellaneous programme costs	10	147	623	780	957
Special events and miscellaneous	(5)	6	25	26	27
	<u>7,952</u>	<u>14,726</u>	<u>19,706</u>	<u>42,384</u>	<u>42,171</u>

\*Included in Legal/ professional fees is GLAS scheme expenditure of €3.020m and Beef Data Genomics Programme expenditure of €0.726m. These are part of the Rural Development Programme 2015-2020 and commenced in 2015.

It was deemed more appropriate to reclassify expenditure related to the GLAS scheme from 'Services of external agencies' to 'Legal/ professional fees'. The 2015 comparatives have been adjusted accordingly.

#### 9. Staff

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

	2016	2015
Professional	707	676
Technical	150	165
Administrative/ clerical	203	195
Farm/ domestic	138	142
	<u>1,198</u>	<u>1,178</u>

The Director's remuneration was as follows:

	2016	2015
	€'000	€'000
Basic pay	139	139
Benefit in kind (Car)	13	13
	<u>152</u>	<u>152</u>

The Director's pension entitlements do not extend beyond the model public sector defined benefit superannuation scheme.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 9. Staff (continued)

##### Key management compensation

Key management includes the Director, the Authority members and three divisional directors reporting to the Director. The compensation paid to key management for employee services is shown below:

	2016 €'000	2015 €'000
Salaries and other short term benefits:		
Key management remuneration	665	661
	<u>665</u>	<u>661</u>

Pension related deductions of €3,264,994 (2015: €4,182,310) were deducted from salaries and paid to the Department of Agriculture, Food and the Marine.

The following outlines the employee benefits greater than €60,000 in 2016:

Employee benefits	Group Number of employees
€60,000 to €70,000	234
€71,000 to €80,000	96
€81,000 to €90,000	24
€91,000 to €100,000	37
€101,000 to €110,000	17
€111,000 to €120,000	1
€121,000 to €130,000	-
€131,000 to €140,000	-
€141,000 to €150,000	3
€151,000 to €160,000	1

In accordance with their employment/ placement agreements some staff and students are entitled to meals in college canteens. The cost of provision of these meals in 2016 was €39,514.

Management and staff related hospitality expenses for the year were €4,875.

Teagasc have a 10 year premium seat sponsorship agreement with Croke Park at an annual cost of €4,800 for staff incentive and stakeholder entertainment. The costs attributable to staff incentives in 2016 was €4,363.

#### 10. Defined benefit pension plans

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 CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 10. Defined benefit pension plans (continued)

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

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

The average number of monthly pensions paid during the year was 1,713 (2015: 1,686).

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

	2016	2015
	€'000	€'000
Current service cost	21,303	28,775
Interest on scheme liabilities	26,275	25,002
Past service cost	-	367
Staff contributions	(3,418)	(3,461)
	<u>44,160</u>	<u>50,683</u>

##### ii. Movement in net pension liability during the financial year

	2016	2015
	€'000	€'000
Net pension liability at 1 January	1,163,198	1,327,326
Current service cost	21,303	28,775
Past service cost	-	367
Benefits paid	(45,016)	(44,184)
Interest on scheme liabilities	26,275	25,002
Actuarial loss/ (gain)	66,845	(174,088)
Net pension liability at 31 December	<u>1,232,605</u>	<u>1,163,198</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.



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 10. Defined benefit pension plans (continued)

Net deferred funding for pensions in the year

	2016	2015
	€'000	€'000
Funding recoverable in respect of current years pensions	47,578	54,144
Resources applied to pay pensions	(45,016)	(44,184)
	<u>2,562</u>	<u>9,960</u>

The deferred funding asset for pensions as at 31 December 2016 was €1,233m (2015: €1,163m).

#### iv. History of defined benefit obligations

	2016	2015	2014	2013
	€'000	€'000	€'000	€'000
Experience gain/ (loss)	(13,272)	55,428	129,274	26,988
Percentage of present value of scheme liabilities	1.1%	4.7%	9.7%	2.1%
Changes in assumptions	(53,573)	118,660	(152,973)	-
Percentage of present value of scheme liabilities	4.4%	10.2%	11.5%	0%
Actuarial (loss)/ gain recognised in other comprehensive income	(66,845)	174,088	(23,699)	26,988

The cumulative actuarial loss recognised in the Statement of Comprehensive Income amounts to €100.844m (2015: €33.999m).

#### 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) normally increase in line with general public sector salary inflation.

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 disclosures has been based on an actuarial valuation by a qualified independent actuary on 16 January 2017 in order to assess the scheme liabilities at 31 December 2016.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 10. Defined benefit pension plans (continued)

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

	2016 % per annum	2015 % per annum
Inflation rate increase	1.75	1.75
Salary rate increase	3.25	3.25
Pension rate increase – Main Scheme	2.50	2.50
Pension rate increase – Single Scheme	1.75	1.75
Scheme liabilities discount rate	1.80	2.30

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 2016 and 2040.

	2016	2041
Year of attaining 65		
Life expectancy - males	87.3	90.3
Life expectancy - females	88.8	91.2

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

	2016 €'000	2015 €'000
Total accrued pension liability	<u>1,232,605</u>	<u>1,163,198</u>

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 11. Tax on profit on ordinary activities

	2016 €'000	2015 €'000
Based on results for the year:		
Current tax charge	41	28
Under provision in prior years	-	-
Deferred tax (Note 23)	1	18
	<u>42</u>	<u>46</u>

The tax charge for the year is lower than the charge that would result from applying the standard rate of Irish corporation tax to the profit on ordinary activities. The differences are explained as follows:

	2016 €'000	2015 €'000
Profit/ (loss) on ordinary activities before taxation	6,194	(870)
Profit on ordinary activities multiplied by Standard rate of corporation tax in Ireland -12.5%	774	(109)
<b>Effects of:</b>		
Excess of capital allowances over depreciation	(2)	(11)
Higher tax rate on profits	5	6
Parent profit on ordinary activities multiplied by 12.5%	(736)	149
Utilisation of tax losses	-	(7)
Current tax charge for the year	<u>41</u>	<u>28</u>

#### 12. Authority members' fees and emoluments

	2016 €'000	2015 €'000
Cawley, Dr. Noel, Chairman	21	21
Pierce, Dr. Karina	-	-
Kennedy, Mr. Richard	7	-
Jagoe, Mr. Alan	12	12
Fitzgerald, Prof. Gerald	-	-
Gleeson, Mr. Brendan	-	-
Cooke, Mr. Tommy	12	12
Gibbons, Mr. Pdraig	12	12
O'Leary, Mr. Tim	5	12
Larkin, Mr. Joseph	-	-
Woulfe, Mr. Liam	12	8
Murphy, Ms. Cliona	-	-
	<u>81</u>	<u>77</u>
<b>Total expenses paid to Authority members</b>	<b>39</b>	<b>44</b>

Department of Public Expenditure and Reform guidelines on One Person One Salary were implemented in 2016. Ms. Cliona Murphy, who was entitled to a fee in 2015 and 2016, waived her right to the entitlement.



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 13. Property, plant and equipment

##### GROUP

	Land €'000	Buildings €'000	Assets under construction €'000	Plant and equipment €'000	Total €'000
<b>Cost or valuation</b>					
At 1 January 2015	6,381	125,634	614	80,006	212,635
Additions	-	1,149	2,051	3,144	6,344
Buildings completed	-	-	-	-	-
Disposals	-	-	-	(285)	(285)
At 31 December 2015	6,381	126,783	2,665	82,865	218,694
Additions	-	4,103	975	4,220	9,298
Buildings completed	-	2,608	(2,608)	-	-
Disposals	-	-	-	(972)	(972)
At 31 December 2016	6,381	133,494	1,032	86,113	227,020
<b>Accumulated depreciation and impairment losses</b>					
At 1 January 2015	446	49,604	-	65,016	115,066
Charge for year	-	3,240	-	4,008	7,248
Impairment losses	-	-	-	-	-
Disposals	-	-	-	(278)	(278)
At 31 December 2015	446	52,844	-	68,746	122,036
Charge for year	-	3,369	-	4,012	7,381
Impairment losses	-	-	-	-	-
Disposals	-	-	-	(917)	(917)
At 31 December 2016	446	56,213	-	71,841	128,500
<b>Carrying value</b>					
At 31 December 2016	5,935	77,280	1,032	14,271	98,518
At 31 December 2015	5,935	73,939	2,665	14,119	96,658

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 13. Property, plant and equipment (continued)

TEAGASC	Land €'000	Buildings €'000	Assets under construction €'000	Plant and equipment €'000	Total €'000
<b>Cost or valuation</b>					
At 1 January 2015	6,381	121,126	614	75,176	203,297
Additions	-	1,024	2,050	2,921	5,995
Buildings completed	-	-	-	-	-
Disposals	-	-	-	(285)	(285)
At 31 December 2015	6,381	122,150	2,664	77,812	209,007
Additions	-	4,073	975	3,823	8,871
Buildings completed	-	2,608	(2,608)	-	-
Disposals	-	-	-	(963)	(963)
At 31 December 2016	6,381	128,831	1,031	80,672	216,915
<b>Accumulated depreciation and impairment losses</b>					
At 1 January 2015	446	47,170	-	60,895	108,511
Charge for year	-	3,086	-	3,866	6,952
Impairment losses	-	-	-	-	-
Disposals	-	-	-	(278)	(278)
At 31 December 2015	446	50,256	-	64,483	115,185
Charge for year	-	3,215	-	3,841	7,056
Impairment losses	-	-	-	-	-
Disposals	-	-	-	(908)	(908)
At 31 December 2016	446	53,471	-	67,416	121,333
<b>Carrying value</b>					
At 31 December 2016	5,935	75,360	1,031	13,256	95,582
At 31 December 2015	5,935	71,894	2,664	13,329	93,822

Included in the opening balances is land totaling 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.

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. Two of the rental agreements expire within three years, two between five and ten years and the remaining agreement is a long term lease with the end date yet to be finalised.

A 2.5 acre site was sold during 2016 which was part of the block of land that was transferred to Teagasc on its establishment in 1988, the cost of which could not be separately identified and consequently this disposal is not reflected in the note.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 13. Property, plant and equipment (continued)

##### Disposal of Fixed Assets

	Proceeds/ costs 2016 €'000	Proceeds/ costs 2015 €'000
Proceeds from sale of property:		
Property sales during year	1,093	-
Cost of sales	(20)	-
	<u>1,073</u>	<u>-</u>
Proceeds from sale of other assets	44	69
	<u>1,117</u>	<u>69</u>
Net book value of fixed assets disposed:		
Property assets	-	-
Other assets	(55)	(7)
	<u>(55)</u>	<u>(7)</u>
Surplus on disposal of fixed assets	<u>1,062</u>	<u>62</u>

There was no transfer to the Exchequer of asset sales proceeds in 2016.

#### 14. Heritage Assets

##### Group and Teagasc

Period houses in Kildalton College, Ballyhaise College and Oak Park Research Centre are part of the working infrastructure of Teagasc, and are as such capitalised on the Statement of Financial Position at original cost. Certain heritage assets pertaining to Johnstown Castle, including the Castle, Agricultural Museum and Walled-In Garden were not recognised in the Statement of Financial Position as information on the cost or value of these heritage assets cannot be obtained at a cost which is commensurate with the benefits to users of the financial statements. There is currently no comparable assets which Teagasc can utilise to help in assessing the value of these heritage assets.

#### 15. Investments

	Group		Teagasc	
	2016 €'000	2015 €'000	2016 €'000	2015 €'000
Investment in quoted shares	264	285	264	285
Investment in unquoted shares	<u>157</u>	<u>130</u>	<u>158</u>	<u>131</u>
	421	415	422	416

	Group		Teagasc	
	2016 €'000	2015 €'000	2016 €'000	2015 €'000
Fair value at 1 January	285	144	285	144
Additions	-	70	-	70
(Loss)/ gain on fair value movement in the year	<u>(21)</u>	<u>71</u>	<u>(21)</u>	<u>71</u>
Fair value at 31 December	<u>264</u>	<u>285</u>	<u>264</u>	<u>285</u>



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 15. Investments (continued)

##### Investments in unquoted shares

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
<b>Value at acquisition date</b>				
At 1 January	130	140	131	141
Additions	27	41	27	41
Adjustment	-	-	-	-
Disposals	-	(51)	-	(51)
At 31 December	157	130	158	131

##### Provision for diminution in value

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
<b>Value at acquisition date</b>				
At 1 January	-	-	-	-
Increase/ (decrease) in provision	-	-	-	-
At 31 December	-	-	-	-

##### Net book value

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
At 1 January	130	140	131	141
Movement in unquoted shares	27	(10)	27	(10)
At 31 December	157	130	158	131

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 15. Investments (continued)

Analysed as:

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Glanbia plc	229	246	229	246
Kerry Group plc	35	39	35	39
Moorepark Technology Ltd	-	-	1	1
Wexford Milk Producers Ltd	25	25	25	25
Lakeland Dairies	5	5	5	5
Aurivo	2	2	2	2
Glanbia Co-Operative Ltd	14	14	14	14
Kerry Co-Operative Creameries Ltd	1	1	1	1
Carbery Creameries Ltd	43	16	43	16
Barryroe Creameries Ltd	1	1	1	1
Dairygold Co-Operative Society Ltd	36	36	36	36
Dairygold Co-Operative Society Ltd (Revolving fund)	30	30	30	30
	<u>421</u>	<u>415</u>	<u>422</u>	<u>416</u>

Details of investments:

Company name	Country of incorporation	Registered number	Number of shares	Nominal value per share at 31.12.2016	Dividend received	Nature of business of company
Glanbia plc	Ireland	129933	14,510	€15.78	2016 - €1,225 2015 - €1,662	Global nutrition company
Kerry Group plc	Ireland	111471	522	€67.90	2016 - €216 2015 - €243	Provider of taste and nutrition technologies
Moorepark Technology Ltd	Ireland	168270	5,100	€0.127	2016 - €nil 2015 - €nil	Provision of services for R&D
Wexford Milk Producers Ltd	Ireland	2640R	24,536	€1.00	2016 - €nil 2015 - €nil	Milk production and supply
Lakeland Dairies Co-Operative Society Ltd	Ireland	4622R	104,371	€0.05	2016 - €52 2015 - €52	Milk production and supply
Aurivo Co-Operative Society Ltd	Ireland	5113R	1,715	€1.00	2016 - €34 2015 - €34	Milk production and supply
Glanbia Co-Operative Ltd	Ireland	4928R	14,371	€1.00	2016 - €3,874 2015 - €1,526	Milk production and supply
Kerry Co-Operative Ltd	Ireland	3618R	87	€1.25	2016 - €218 2015 - €174	Milk production and supply
Carbery Creameries Ltd	Ireland	2899R	7,371	€2.21	2016 - €nil 2015 - €nil	Milk production and supply
Barryroe Co-Operative Ltd	Ireland	1736R	1,000	€1.00	2016 - €nil 2015 - €nil	Milk production and supply
Dairygold Co-Operative Society Ltd	Ireland	4621R	35,733	€1.01	2015 - €nil 2014 - €nil	Milk production and supply

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 15. Investments (continued)

Teagasc has invested €650 in Moorepark Technology Limited and has a 57% holding in the paid up share capital of the company.

The percentage shareholding in all of the other organisations listed is negligible and does not give Teagasc a controlling interest.

#### 16. Inventories

	2016 €'000	2015 €'000
Livestock	4,097	3,985
Farm produce, fertilisers and feeding stocks	544	491
General supplies	178	199
	<u>4,819</u>	<u>4,675</u>

Stocks are stated after provision for impairment of €nil (2015: €nil).

Reconciliation of movements in livestock:

	2016 €'000	2015 €'000
Balance at start of year	3,985	3,916
Purchases	928	820
Sales	(2,489)	(2,399)
Births	832	720
Deaths	(128)	(150)
Fair value adjustments	969	1,078
Balance at end of year	<u>4,097</u>	<u>3,985</u>

#### 17. Assets held for sale

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

	Carrying amount at 31 December 2016 €'000	Carrying amount at 31 December 2015 €'000
Site at Raheen, Co. Limerick	125	125
Site at Athenry, Co. Galway	-	-
Site at Ballyhaise, Co. Cavan	-	-
	<u>125</u>	<u>125</u>



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 18. Receivables

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Trade receivables	9,680	6,590	9,393	6,397
Other receivables	161	135	141	108
Accrued operational income	4,950	4,303	4,950	4,303
Accrued Oireachtas grant income	7,375	6,553	7,375	6,553
Prepayments	1,446	2,662	1,431	2,650
VAT and other taxes	30	10	-	10
	<u>23,642</u>	<u>20,253</u>	<u>23,290</u>	<u>20,021</u>

All amounts included above fall due within one year.

Trade receivables are stated after provision for impairment of €91,650 (2015: €110,849).

#### 19. Cash and cash equivalents

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Cash at bank and in hand	20,757	9,185	19,623	8,076
Short-term deposits	-	9,000	-	9,000
	<u>20,757</u>	<u>18,185</u>	<u>19,623</u>	<u>17,076</u>

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 20. Payables – amounts falling due within one year

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Trade payables	729	2,746	729	2,725
Other payables and accruals	11,938	12,544	11,772	12,427
Legal provisions	196	220	196	220
PAYE/ PRSI	2,225	2,250	2,211	2,250
Value added tax	823	969	823	953
Corporation tax	13	25	-	-
Withholding tax	228	367	228	367
Research advances	-	-	-	-
Other payroll deductions	1,068	942	1,068	942
Refundable deposits	77	508	77	508
	<u>17,297</u>	<u>20,571</u>	<u>17,104</u>	<u>20,392</u>
Payables for taxation and social welfare included above	<u>3,310</u>	<u>3,620</u>	<u>3,281</u>	<u>3,584</u>

Included in the other payables and accruals of €11.94m are: wages and salaries and other employee costs €2.86m (including an annual leave accrual of €1.92m), professional fees including legal and analytical services €2.29m, repairs and maintenance €1.53m, student grants €1.30m, equipment and capital items €1.13m, ICT costs €0.71m, general operating costs including utilities €0.69m, other accruals €0.40m, farm running costs €0.39m, public relations and advertising €0.23m and travel and subsistence €0.23m.

The repayment of trade payables vary between on demand and thirty days. No interest is payable on trade payables.

PAYE/PRSI, Value added tax and withholding tax are subject to terms of relevant legislation. Interest accrues on late payment of taxes in line with the terms of relevant legislation. No interest was due at the end of the financial year.

Other amounts included with payables not covered by specific note disclosures are unsecured, interest free and repayable on demand.

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 21. Deferred income due within one year

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:

	Note	Group		Teagasc	
		2016 €'000	2015 €'000	2016 €'000	2015 €'000
Department of Agriculture, Food and the Marine - advance for FIRM projects	4	2,719	3,187	2,719	3,187
Department of Agriculture, Food and the Marine - advance for Stimulus projects	4	3,181	5,230	3,181	5,230
Enterprise Ireland	6	1,801	431	1,801	431
Environmental Protection Agency		214	260	214	260
Science Foundation Ireland	6	3,170	1,701	3,170	1,701
European Union	5	3,491	2,329	3,491	2,329
Other research related deferrals		1,424	448	1,361	405
Course fee deferrals		2,446	1,654	2,446	1,654
Amounts received in advance for work associated with the completion of sale of land at Athenry		1,114	1,114	1,114	1,114
		<u>19,560</u>	<u>16,354</u>	<u>19,497</u>	<u>16,311</u>

#### 22. Deferred income due after more than one year

	Group		Teagasc	
	2016 €'000	2015 €'000	2016 €'000	2015 €'000
At beginning of year	485	434	98	-
Grants received	-	-	-	-
Released to income and expenditure account	(146)	(47)	(98)	-
Course fee deferrals	<u>272</u>	<u>98</u>	<u>272</u>	<u>98</u>
At end of year	<u>611</u>	<u>485</u>	<u>272</u>	<u>98</u>

Grants totalling €3,167,987 were received to date by MTL from FEOGA, Enterprise Ireland, Irish Dairy Board and Teagasc. Under certain circumstances set out in those agreements, some or all of these grants may become repayable to these agencies.



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 23. Provision for liabilities

Deferred tax	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
At beginning of year	100	81	-	-
Charged to profit or loss account	1	19	-	-
Charged to other comprehensive income	-	-	-	-
Utilised during the year	-	-	-	-
At end of year	101	100	-	-

Components of deferred taxation	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Accelerated capital allowance	1	19	-	-
Others	-	-	-	-
	1	19	-	-

#### 24. Capital Account

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

#### 25. Income and expenditure account

The income and expenditure account represents cumulative comprehensive income recognised as at reporting date.

#### 26. Non-controlling interest

The non-controlling interest comprises shares in Moorepark Technology Limited.

#### 27. Leases

##### Operating leases

At 31 December Teagasc had future minimum lease payments under non-cancellable operating leases as follows:

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Leases which expire:				
Within one year	477	462	477	434
Between two and five years	1,338	1,187	1,338	1,187
After five years	1,283	1,508	1,283	1,508
	3,098	3,157	3,098	3,129

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 28. Reconciliation of profit to cash flow from operating activities

	2016	2015
	€'000	€'000
Surplus/ (deficit) for the year	6,194	(870)
Depreciation expense	7,381	7,248
Impairment losses on tangible fixed assets	-	-
Fair value adjustments on biological assets	(969)	(1,078)
Fair value adjustments on investments	21	(71)
Adjustments to opening value of investments	-	(84)
Gain on disposal of tangible fixed assets	(1,062)	(62)
Interest income	(4)	(111)
Transfer to/ (from) capital account	1,760	(964)
Total operating cash flows before movements in working capital	13,321	4,008
Decrease in inventory	825	1,092
(Increase) in receivables	(3,388)	(3,258)
Increase/ (decrease) in payables	59	(546)
Cash flow from operating activities	10,817	1,296

#### 29. Private colleges

Teagasc provides support to three private agricultural colleges as follows:

	2016	2015
	€'000	€'000
Grants to private colleges	3,037	2,988
Salary costs of staff seconded to private colleges (included in the total pay expenditure in Note 7 above)	1,092	862
External service provider costs for teaching services provided to private colleges (included in the general operating expenditure in Note 8 above)	101	96
	4,230	3,946

In addition to grants outlined above Teagasc provided workbooks to private colleges to the value of €84,950 (2015: €92,300).

#### 30. Commitments

##### Capital commitments

Teagasc had capital commitments outstanding at 31 December 2016 amounting to €1.922m which relate to construction of buildings and facilities at Ashtown €1.350m and Grange €0.572m (2015: €4.371m).

##### Grant commitments

Teagasc had grant commitments outstanding at 31 December 2016 amounting to €10.076m which relate to Walsh Fellows €5.636m, Private College Grants €3.072m and Other Grants €1.368m (2015: €10.384m).

# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 31. Authority members – disclosure of transactions

The Authority has adopted procedures in accordance with the guidelines issued in 2009 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 were involved.

#### 32. Contingent liabilities

The Authority has made provision in the financial statements reflecting its best estimate of the liability arising. The Authority is of the view that there are no contingent liabilities.

#### 33. Related party transactions

The following transactions were carried out with related parties:

Sales of goods and services:

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Subsidiary	-	-	30	31
	-	-	30	31

Purchases of goods and services:

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Subsidiary	-	-	711	716
	-	-	711	716

Payable to related parties:

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
Subsidiary	37	45	37	45
	37	45	37	45

The receivable and payables arise mainly from sales and purchase transactions, respectively. The receivables and payables are unsecured in nature and bear no interest. No provisions are held against receivables from related parties during the year (2015: €nil).

Under the terms of the Moorepark Technology Promoter's Agreement, Teagasc has undertaken to provide from its own resources specified staff requirements to include the Manager, the Company Secretary and one technician. Teagasc also provides the remuneration of the Managing Director from its resources.



# TEAGASC CONSOLIDATED FINANCIAL STATEMENTS

## FINANCIAL YEAR ENDED 31 DECEMBER 2016

### NOTES TO THE FINANCIAL STATEMENTS

#### 34. Financial instruments

The Group and Teagasc have the following financial instruments:

	Group		Teagasc	
	2016	2015	2016	2015
	€'000	€'000	€'000	€'000
<b>Financial assets that are equity instruments measured at fair value through consolidated statement of income and expenditure</b>				
Listed fixed asset investments	264	285	264	285
Unlisted fixed asset investments	157	130	158	131
<b>Financial assets</b>				
Trade receivables	9,680	6,590	9,393	6,397
Other receivables	161	135	141	108
Cash at bank and in hand (including short-term deposits)	20,757	18,185	19,623	17,076
<b>Financial liabilities measured at amortised cost</b>				
Trade payables	729	2,746	729	2,725
Other payables	11,938	12,544	11,772	12,427

#### 35. Events after the reporting period

There have been no significant events, outside the ordinary course of business, affecting the Group since 31 December 2016.

#### 36. Approval of the financial statements

The Authority approved the financial statements on 01 March 2017.







