
Teagasc Crops, Environment and Land Use Programme (CELUP) Peer Assessment 2021

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High Level Findings & Recommendations

Recommendations are listed in order of priority for action below. In the main body of the report the recommendations follow the structure of the report

Programme level (€16.7m expenditure in 2020)	
1	Develop a forward-looking staff recruitment and development plan to better manage the risk of personnel turnover. Teagasc Senior Management should work with the CELUP Head of Programme, in concert with Heads of Department, to develop for each Department within CELUP, a forward-looking staff recruitment and development plan with a five-to-ten-year horizon (see section 2.1).
2	To strengthen the impact coherence of CELUP and specifically to support the navigation of trade-offs between profitability, competitiveness and environmental sustainability outcomes, an overarching strategy for CELUP should be developed showing how Department strategies and outcome trajectories, as well as synergies across Departments will together contribute to the “Teagasc Together” and “Food Vision 2030” strategies. By including stakeholders in its development, the strategy process will also firmly connect key stakeholders in the Agri-Food-Environment area and the farming community to the recently promoted Teagasc strategy and, thereby, the work of Teagasc Departments in CELUP, particularly ESLU (see section 7.1.3).
3	Develop a Programme-level “theory of change” as a contribution to “Teagasc Together”. The CELUP Head of Programme should work with Heads of Department and supported by the Evaluation Unit to map Department-level impact strategies onto a Programme-level “theory of change” that makes explicit the assumptions, inputs, activities, outputs, outcomes and impact underpinning how CELUP is contributing to the “Teagasc Together” and “Food Vision 2030” strategies (see section 7.1.3).
4	Implement learning and reflection events to focus on “impact pathways”. Regular learning events should be held between Departments and the Evaluation Unit. These would build further momentum around the use of the “theory of change” model as an internal learning tool to help focus the multiple roles that Teagasc staff can play in advancing further technology development and adoption, capacity development and policy influencing pathways to change (see section 7.1.2).
5	Monitor diversity data and pro-actively address diversity imbalances. Teagasc Senior Management should implement the routine annual reporting of diversity data including analysis of pay gaps throughout the organisation and, simultaneously, adopt a set of positive and pro-active actions that could help to address diversity imbalances (see section 2.6).
6	Ensure additional support to advisory services so as to ensure the full value of work from CELUP is not unnecessarily eroded. Teagasc management should explore options to ensure that farmers, at certain key times of the year, not only have support from Teagasc to submit important scheme applications but also to receive the necessary “technical” advisory contact required at that same critical time of year (see section 4.2).

Department level	
Environment, Soils & Land Use Research & KT Departments (€6.3m expenditure in 2020)	
1	Integration of production and environment-oriented research. The Head of Programme should take actions that encourage closer integration of the environment-oriented research of ESLU with the Animal & Grassland Research and Innovation Programme's (AGRIP's) production-oriented research (see section 3.3).
2	Strategic review of staff profile. The Head of Department should consider from a strategic standpoint the staff profile of the Department. The low ratio of (permanent) senior research and KT staff to (period-contracted) junior research and KT staff represents a reputational risk to Teagasc. The gender balance across the ESLU Department (and CELUP <i>in toto</i>) also needs to be addressed. Access to periods of sabbatical leave should be given consideration alongside a reappraisal of Teagasc policies towards staff and student supervision and the dominant deployment of period appointments (see section 3.4).
3	Ensure there are monitoring, evaluation and learning components in the SignPost Programme. The Head of Department should ensure the Signpost Programme focuses not just on the environmental outcomes achieved but also provides opportunity for evaluation research on how behaviour change is achieved (see section 7.1.2).
Crops Research and KT Departments (€4.3m expenditure in 2020)	
1	Specify Crops Research and KT Department's contributions to "Farm to Fork". The Head of Programme, together with his two Heads of Department, should specify, among the "actions" identified in response to the "Farm to Fork" statements, those that will be "owned by" and "belong to" Teagasc (see section 4.1)
2	Assemble a "horizon-scanning" group to advise on priorities. The Head of Programme, together with his two Heads of Department, should assemble a small "horizon-scanning" group (including informed individuals from outside the organisation) to provide advice on priorities for potential investment in the new skills and capacity from which Teagasc and its stakeholders are likely to derive greatest benefit (see section 4.4).
Forestry Development Department (€1.6m expenditure in 2020)	
1	Review forestry partnerships. In response to the new Irish Forestry Strategy, Teagasc should review its tactical and strategic partnerships with others in the forestry sector to leverage skills, resources, and expertise. This should include working with DAFM to implement the recommendations of the " <i>Coford Long Term Forest Research Report</i> " to ensure there are no critical sector-wide duplications or gaps (see section 5.4).
2	Strengthen engagement with "Project Woodland". Teagasc must continue to engage pro-actively and effectively with "Project Woodland" (alongside others) to ensure a strong, long-term trajectory for Ireland-specific forest science (see section 5.1).
Horticulture Development Department (€1.1m expenditure in 2020)	
1	Include human health and nutrition in analysis of options. In addition to import substitution, issues of human health and nutrition should feature in the analysis of strategic options and priorities for broadening the scope of the Horticulture Department (see section 6.1)

OVERVIEW OF ASSESSMENT OF QUALITY, IMPACT AND VIABILITY

Overall Programme Level

Criteria	Outstanding	Strong	Competent	Needs Improvement	Unacceptable
Quality					
Impact					
Viability		(Alignment with Teagasc Strategy)		(Management of risk relating to human resources)	

Department Level: Environment, Soils and Land Use Research & KT Departments

Criteria	Outstanding	Strong	Competent	Needs Improvement	Unacceptable
Quality	(National context)	(International context)			
Impact		(National policy)	(Agricultural Practice)		
Viability		(Alignment with national strategies/missions)		(Management of human resources)	

Department Level: Crops Research & KT Departments

Criteria	Outstanding	Strong	Competent	Needs Improvement	Unacceptable
Quality					
Impact					
Viability					

Department Level: Forestry Development Department

Criteria	Outstanding	Strong	Competent	Needs Improvement	Unacceptable
Quality		(KT)	(Research)		
Impact					
Viability				(Given anticipated growth & change in the sector)	

Department Level: Horticulture Development Department

Criteria	Outstanding	Strong	Competent	Needs Improvement	Unacceptable
Quality					
Impact					
Viability					

Key	Outstanding	Strong	Competent	Needs Improvement	Unacceptable
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OVERVIEW OF OUTCOME EVALUATION

- Six outcome case studies included in the evaluation were chosen to represent the different ways CELUP works to achieve outcomes and impact, not as a representative sample, but rather to be informative.
- The outcomes range from the development of new technologies that could have significant impacts on productivity and resilience (breeding of Buster and Java multi-disease resistant varieties of potatoes); to developing new commercial sectors (cut foliage sector); strengthening value chains (conifer thinning/forest sector); and supporting environmental policy implementation (water quality protection and MAC curves).
- The outcomes achieved as presented in the case studies were highly significant and result from high quality, relevant research and active engagement with “actors” in the agri-food sector.
- In all of the cases, the activities of the CELUP team were found to be a necessary contributory factor. In other words, the outcomes would not have been possible without CELUP.
- All of the described outcomes illustrate the combined effect of multiple projects in collaboration with many actors across research and KT activities over time.
- The evidence provided in the cases confirms that the outcome trajectories approach is of value in enabling a full appreciation of how Teagasc is contributing to the desired shift in the Irish agri-food sector.

Executive Summary

The PAP assessed CELUP and its component Departments against three criteria, i.e. quality, impact and viability using qualitative assessment (text) and quantitative assessment (the five assigned categories below). See also Appendix 1 for more detail on assessment categories.

Categories				
Outstanding	Strong	Competent	Needs Improvement	Unacceptable

I. Programme Quality, impact and viability

Programme Quality

The PAP considers that the Quality of the overall CELU Programme is **Strong**

The breadth, scope, and diversity of the CELU programme is impressive and this is more of a strength than it is a weakness. The scientific knowledge and technical capability that resides within the constituent CELU Departments is coupled with a high level of practical knowledge relating to tillage and grassland-based dairy and beef farming, horticulture, and forestry enterprises, as well as to minimizing the environmental impacts of these enterprises and to enhancing biodiversity and landscape maintenance. In addition, the Programme derives added value for Teagasc and Irish agriculture by its substantial international scientific collaborations as well as active engagement with policy makers and commercial suppliers of products to the agri-food sector (seeds, fertilisers, machinery etc.).

All Departments within the Programme have consistently contributed a body of well-cited papers to the international scientific literature. The contribution of the Programme to training a substantial body of Walsh Scholars over the assessment period is also worthy of note.

Programme Impact

The PAP assessed the Impact of the overall CELU Programme to be **Strong**

There are several ways in which the CELU Programme and its constituent Departments are successfully contributing to Teagasc's mission to support science-based innovation in the agri-food sector and wider bioeconomy. The outcomes achieved include for example: mutually beneficial collaborations with plant breeders; technical support to horticultural enterprises; adoption of improved soil-management practices; and the range of innovative approaches being adopted to ensure effective communication with a diversity of potential end-users.

The PAP found that overall, the outcomes achieved and as presented in the case studies are highly significant and the result of high quality and relevant research combined with excellent engagement with actors in the agri-food sector. In all cases, the activities of the CELUP team were found to be a necessary contributory factor. In other words, the outcomes would not have been possible without CELUP. The integrated approach to research feeding into KT and the advisory services is found to be a cornerstone of the Teagasc model. The PAP was impressed by the collaborative and solutions-oriented culture shared by staff, which is linked to the strong relationship of trust with the main system actors, in particular with the farming community. The unique position of Teagasc as the trusted provider of evidence informed

advice to farmers across the entire country, as well as direct engagement with policy makers and industry is perhaps the greatest asset for supporting ongoing impact. This could be further maximised through a more systematic reflection and learning about the theory of change, and through looking across Departments to strategically navigate trade-offs between profitability, competitiveness and environmental sustainability outcomes.

Building on the learning that has been generated, through this first use of the theory of change model, there is now an opportunity to build a more coherent Programme level view of its contribution to the newly formulated Teagasc Together strategy. This should include the identification of synergies and opportunities for deepening collaboration across Departments.

Programme Viability

The PAP considered that CELU Programme Viability was generally Strong but, regarding the management of risk relating to human resources, it also Needs Improvement

There are several components to an assessment of viability including: alignment with external policy drivers and end-user priorities; sufficiency of facilities and resources (financial and human) to deliver against expectations; and a clear, realistic strategy that specifies priorities, opportunities, and timelines as well as risks and their management. The Programme's priorities are closely aligned to the Teagasc strategy that encompasses the dual policy drivers of improved sustainability and increased productivity by widespread adoption of innovative practices and processes in all sectors of the agri-food industry. The PAP considered that the greatest threat to viability of the Programme is failure to secure, grow and retain the specialist knowledge and technical skills required to maintain competitiveness and deliver necessary outputs.

II. Department Quality, impact and viability

Environment Soil and Land Use Research & KT Departments

- The PAP considered that the Quality of the ESLU Department's activities was Outstanding in the national context and Strong when judged in an international context
- The PAP considered that the Impact of the ESLU Department's activities was Strong/Outstanding in relation to national policy and Competent with regards to agricultural practice.
- The PAP considered that the Viability of the ESLU Department was Strong with regard to alignment with national strategies and mission statements but Needs improvement with regard to management of human resources.

Crops Research & KT Departments

- The PAP judged that the Quality of both Departments could, with confidence, be rated as Strong.
- The PAP judged that the Impact of both Departments could, with confidence, be rated as Strong.
- The PAP judged the Viability of the Crops Departments to be Competent while recognising that institutional constraints were the primary contributory factors for this assessment, as distinct from failures in governance or leadership at Department level.

Forestry Development Department

- The PAP assessed the research element of the Department as Competent. This assessment necessarily reflects the scale of the research being undertaken and the available resources relative to the projected growth of the sector.
- The PAP considers the quality of the KT work in Forestry to be Strong
- The PAP considers the impact of the Forestry Development Department to be Outstanding.
- The PAP considers the viability of the Forestry Development Department to be Strong. However, given the context of growth and change to be anticipated in Irish farm forestry over the next 5-10 years it is appropriate to also state that it Needs Improvement.

Horticulture Development Department

- The PAP rates the Horticulture Department as Competent with regard to quality.
- The PAP rates the Horticulture Development Department as Strong with regard to impact.
- The PAP viewed the viability of the Horticulture Department as Strong

III. CELUP Outcome Evaluation

The purpose of the outcome evaluation component of this review is to assess how the CELUP Programme is working towards achieving outcomes. An outcome is a sustained change in behaviour (practices, relationships) or state (e.g., policy change, establishment of farmer association) in the Irish agri-food sector. Six outcome case studies were included in the self-assessment document and formed the basis of the outcome evaluation. A purpose of the case studies is to better understand the outcome trajectory of each case, i.e. the sustained and evolving pattern of interactions between actors, knowledge, technology, policy and institutions out of which outcomes emerge, and Teagasc's role in that trajectory. The cases were chosen to represent the different ways CELUP works to achieve outcomes and impact, not as a representative sample, but rather to be informative.

The PAP found that, overall, the outcomes achieved and as presented in the case studies were highly significant and result from high quality, relevant research and active engagement with "actors" in the agri-food sector. The outcomes presented cover a range of proximate and intermediate changes within the broader agri-food system. They range from: the development of new technologies that could have significant impacts on productivity and resilience (breeding of Buster and Java multi-disease resistant varieties of potatoes); to developing new commercial sectors (cut foliage sector); strengthening value chains (conifer thinning/forest sector); and supporting environmental policy implementation (water quality protection and MAC curves).

In all of the cases, the activities of the CELUP team were found to be a necessary contributory factor. In other words, the outcomes would not have been possible without CELUP. All of the described outcomes illustrate the combined effect of multiple projects in collaboration with many actors across research and KT activities over time. Some activities span 20 years or more (water quality and cut foliage) with most starting at least 14 years ago. The evidence provided in the cases confirms that the outcome trajectories approach is of value in enabling a full appreciation of how Teagasc is contributing to the desired shift in the Irish agri-food sector.

1. Introduction

1.1 Background

Teagasc is committed to undertake external independent peer assessments of its research and knowledge transfer programmes on a 5-year cycle. The Crops, Environment and Land Use Programme (CELUP) was previously reviewed in 2015. Since that review, Teagasc has developed a revised protocol that reflects the inclusion of a new evaluation component.

The new protocol provides guidance on:

- Purpose and methodology
- Scope
- Assessment criteria
- Composition, selection, duties, and terms of reference of the Peer Assessment Panel (PAP)
- Contents of documentation to be provided to the Assessment Panel
- Timetable for preparation and reporting

The evaluation component of the protocol includes the deployment of a theory of change that has been adopted over recent years by the Teagasc Evaluation Unit. This describes a systematic approach to identification of the different pathways through which Teagasc's combined research, advisory and educational programmes lead to science-based innovation in Ireland's agri-food sector and the wider bioeconomy. In preparation for the evaluation, the CELUP leadership team developed six outcome case studies using this theory of change to learn about how their work is supporting achievement of outcomes. These were provided to the PAP to facilitate their understanding of how the Programme is achieving its goals and as an evidence base for the evaluation component.

1.2 Objectives

The purpose of the Peer Assessment is:

- I. To answer the evaluation question: *"How, and to what extent, has CELUP contributed to Teagasc's mission to support science-based innovation in the agri-food sector and wider bioeconomy so as to underpin profitability, competitiveness and sustainability?"*
- II. To assess if an effective and balanced scientific programme is being delivered which fulfils the mission of the programme and meets the needs of its stakeholders.
- III. To determine the quality, relevance, and impact of the knowledge transfer programme.
- IV. To identify how the research and knowledge transfer programme could be improved to make best use of resources and contribute to outcomes and impact.
- V. To provide accountability for public funds expended.

To meet these objectives, the Peer Assessment Panel (PAP) is required to assess the *quality, impact* and *viability* of the overall CELU Programme and its component Departments

The Programme assessment also includes three further aspects: the *Walsh Scholarships Postgraduate Programme*; *Research Integrity*; and *Employee Diversity*

1.3 Peer Assessment Panel Membership

The membership of the Peer Assessment Panel (PAP) and their affiliations were:

Professor Ian Crute (Chair; unaffiliated UK)

Dr Bill Parker (AHDB, UK)

Dr Oene Oenema (Wageningen University, The Netherlands)
Dr Eimear Cotter (Environmental Protection Agency, Ireland)
Ms Jo O'Hara (Independent Forestry Consultant, UK)
Mr Michael Hoey (Country Crest & Ballymaguire Foods, Ireland)
Dr Marina Apgar (Institute of Development Studies, University of Sussex, UK)

1.4 Methodology

Before a two-day site visit to Teagasc HQ at Oak Park, Carlow the PAP participated in two on-line briefing sessions that provided them with information about the context of the Programme and the assessment process including the three criteria to be appraised (Quality, Impact and Viability) and the evaluation question to be addressed. The Panel was provided with, and reviewed, a detailed **Programme Description and Self-Assessment Report** prepared by the Head of Programme (with input from each Head of Department). This report included details of:

- Management structure, staffing and finances
- Past and future targets
- Strategy and interactions with industry
- Publications and bibliometric analysis
- Six outcome case studies involving each Department selected to demonstrate how CELUP is achieving outcomes and impact along three outcome trajectories. The six case studies were:
 1. Integrated strategies to support Septoria management in winter wheat
 2. Development, validation and routine deployment of marker assisted selection (MAS) driven rapid cycle breeding in the Teagasc/IPM potato breeding programme to develop sustainable multi-disease resistant commercial potato varieties.
 3. Changes in water quality policy and agricultural policy in Ireland to which Teagasc science contributed
 4. Teagasc's Gaseous Emissions research and Contribution to National Policy and Practice in Ireland
 5. The development of the outdoor cut foliage industry - a new sub-sector of commercial ornamental horticulture in Ireland. 2019-2021
 6. Teagasc's contribution to optimising the impact of appropriate conifer thinning to help meet the needs of the Irish forest sector

In addition to the above report, the Panel were also directed to several recent EC, Irish Government and Teagasc publications. These provided the Panel with awareness of, and insights into, the policy environment and strategy statements that were of direct relevance to the CELU Programme. These documents included:

- *Food Wise 2025*
- *Food Vision 2030*
- *Teagasc Together – Statements of Strategy 2021-2024*
- *Agri-food Strategy to 2030 (Environmental Report)*
- *EC Farm to Fork Strategy 2020*
- *Crops 2030*

The programme for the two-day on-site visit (14-16 November 2021) included eight discussion sessions with relevant Teagasc staff as follows:

- Director of Teagasc (Professor Frank O'Mara) and the Acting Director of Research (Mr Declan Troy)
- Teagasc Evaluation Officer (Dr Kevin Heanue)

- Head of CELUP (Dr John Spink)
- Members of the Crops Research and Knowledge Transfer Departments including HoD's.
- Members of the Horticulture Development Department including HoD.
- Members of the Forestry Development Department. The HoD was unfortunately unavailable.
- Members of the Environment, Soils and Land Use Research and Knowledge Transfer Departments including HoD's.
- A group of Teagasc stakeholders representing both industry and policy end-users
- A group of Postgraduate Walsh Fellows undertaking PhD research in the CELU Programme

The PAP was also provided with the opportunity to view some of the Oak Park research facilities for work on field crops, forestry, horticultural crops and for malting and fermentation research.

This report presents the findings of the PAP following its site visit. Expertise in research, knowledge transfer and policy issues relating to tillage and horticultural crops, soils, environmental sustainability, horticulture, and forestry were all represented among the membership of the Panel. Knowledge of end-user priorities and relevance as well as expertise in evaluating outcomes and impact of agricultural research were also represented.

2. Assessment of Programme Resources, Diversity and Walsh Scholars

2.1 Human Resources

At the time of the assessment, the CELU Programme had a staff of 264 FTEs (full-time equivalents) which represented a 16% increase in resource over the six-year period since the previous review. This reflects a relaxation in the recruitment embargo that was previously in place as well as the Programme's significant level of success in securing sources of external income. Approximately 8% (21 FTEs) of posts were administrative. Given the administrative tasks involved in managing the Programme's multi-site location, diversity of funding sources and turn-over of staff on period appointments (including PhD students) this relatively high proportion is not considered excessive.

The ratio of permanent staff (administrators, researchers, KT specialists and technologists) to contract staff on period appointments (excluding 70 Walsh Scholars) is approximately 1.5:1 Personnel turn-over therefore represents a significant risk and management challenge given the need to ensure the continual development and maintenance of both technical knowledge and practical skills within a diverse programme as well as maintaining strong and trusted relationships with key stakeholders (end-users, policy makers etc.). This issue was being addressed by the professional development of contract staff and successful acquisition of external project funding. However, the PAP considered that a more structured approach to the management of this risk would be beneficial.

Programme Level Recommendation (Priority 1)

The PAP recommends that Teagasc Senior Management works with the Head of Programme, in concert with Heads of Department, to develop for each Department within CELUP, a forward-looking staff recruitment and development plan with a five-to-ten-year horizon. The content of such a plan should ideally take account of:

- issues of succession and de-risking the loss of essential expertise;
- the continuing professional development of established and newly appointed staff at all levels;
- the future availability of required skills in the potential recruitment pool;
- expanding the technical knowledge base and access to innovative technologies;
- the continuing requirement for effective communication skills and engagement with a diversity of stakeholders including policymakers.

2.2 Physical resources

The work of the Programme is undertaken at three primary locations: Oak Park Research Centre (Tillage Crops and Forestry), Johnstown Castle Research Centre (Environment and Soils) and Ashtown Research Centre (Horticulture and Forestry). However, some forest research areas are also located on Coillte or privately-owned sites. During their site visit, the PAP was able to view the extensive experimental field, glasshouse, controlled environment, and crop processing facilities at Oak Park. The Panel also received information about the levels of capital investment that had, during the period under review, resulted in the provision of significantly upgraded facilities at Ashtown Research Centre. Significant expansion and upgrading of facilities at Johnstown Castle Research Centre had also recently been announced. The Environmental Research at Johnstown Castle Research Centre is, in part, a collaborative effort with the Dairy Research Programme at Moorpark Research Centre and the PAP identified opportunities for further integration of work conducted at these two centres.

Although there was little opportunity to examine the issue in depth, the PAP gained a clear impression that researchers and those involved in knowledge transfer were not constrained in their activities by lack of availability or access to the necessary field, laboratory, and other specialist facilities they required.

The 2015 Peer Assessment drew attention, in one of its recommendations, to the need for Teagasc to allocate resources to data management (“*storage, curation, annotation, access, analysis, synthesis and presentation*”). The Panel were pleased to learn that Teagasc had, since that review, invested in High Performance Computing capability (accessible to all researchers) and a Research Data Management Policy had been introduced including the implementation of training.

2.3 Walsh Scholarships

The value to the CELU Programme of the cadre of approximately 70 Walsh Scholars cannot be overstated. These postgraduate students invigorate research teams and enable research questions to be pursued that would otherwise not be possible. They make a significant contribution to the research output of all Departments as well as providing beneficial connectivity between Teagasc and several Irish and international universities.

The PAP had the opportunity for a discussion with a small group of students working in different areas of the Programme and at different stages in progress towards completion of their PhD studies. The enthusiasm for the opportunity to be part of relevant and academically exciting research was evident. Recognising that the recent disruptions during the covid-19 pandemic have affected the experience of the Walsh Scholars in different ways, some concerns about general integration across Teagasc and the students’ academic institutions were raised. The PAP gained the impression that supervision of the PhD students they met was somewhat *ad hoc* and idiosyncratic. The PAP acknowledge that this might not be reflective of the wider Walsh Scholarship

Programme and, although the outcomes were not yet readily available, they were aware that a formal evaluation of the Walsh Scholarship Programme has recently been completed. The PAP therefore encourages those responsible for Walsh Scholarship Programme management to ensure that procedures and processes for the review of scholar's performance and progress, contact with academic supervisors, attendance at training courses, and mentoring are in line with best practice.

2.4 “End-user” perspectives

In addition to receiving presentations and having discussions with Teagasc staff, the PAP met for an informal discussion with a diverse group of external “end-users” of the knowledge generated from the CELU Programme. This group included tillage farmers and horticultural crop growers, policy makers, a forestry business and those supplying products and services to the land-based industries. This group was unequivocal about the importance and value they attributed to the research and KT activities of the CELU Programme. They pointed out that Teagasc was usually the first point of contact for technical information and assistance. They identified Teagasc as a champion for the agri-food industries and a catalyst for establishing collaborations. In the context of environmental sustainability, they identified Teagasc as being in a unique position to drive the necessary change but pointed out that the resources to do this may not be sufficient. Concern was expressed about representation of the crops, forestry and land use sectors at Teagasc Board level as well as the adequacy of resources provided to CELU research and knowledge transfer in comparison with the livestock sectors.

2.5 Research Integrity

Teagasc in general, and the CELU Programme in particular, recognise the vital importance of integrity in research and knowledge transfer activities. The Panel were informed that Dr John Finn (ESLU Department) represents Teagasc in the National Forum on Research Integrity. Teagasc has also appointed a Research Integrity Officer who receives any written allegations of research misconduct and oversees an Investigation Procedure. Training of research staff at all levels under the **Epigean** scheme is mandatory for senior staff, permanent researchers and those contracted for more than 12 months. The training availability and its widespread uptake are to be applauded as is also the recent decision to make it available to Walsh Scholars.

The PAP was not made aware of any incident within the CELU Programme that required investigation. The PAP commends Teagasc management for the steps that the organisation has taken to elevate the importance of peer scrutiny and integrity. This is in the best interests of the agriculture and food industries that Teagasc serves as well as its own institutional reputation.

2.6 Diversity

The PAP received data that indicated significant gender imbalance in favour of males at all grades (even “Junior Research”), and in all but one role within the Programme. Predictably, this one exception was “Administration”. The Panel was informed that no data was collected routinely or was available in relation to: race, religion, nationality, ethnicity, disability, or sexual orientation. The Panel was also informed that the Programme endeavoured to ensure equal gender representation on all interview boards. However, monitoring the gender of applicants and appointments were only carried out routinely for senior positions. It appears that no monitoring of other diversity data informs recruitment processes. The PAP was concerned that there was such a pronounced gender imbalance at almost all levels within the CELU Programme and considers that positive action to redress the imbalance is necessary.

Programme Level Recommendation (Priority 5)

The Panel recommends that Teagasc senior management implements the routine annual reporting of diversity data including analysis of pay gaps throughout the organisation and, simultaneously, adopts a set of positive and pro-active actions that could help to address diversity imbalances.

[The PAP was pleased to note that, since the completion of their assessment, the Teagasc Director has taken the initiative to launch an inclusive activity among staff that is designed to identify aspects of diversity and inclusion that need more focus as well as assisting in the creation of an inclusive and well-connected culture.]

3. Assessment of Environment, Soils and Land Use Research and Knowledge Transfer Departments

3.1 Overview

The Environment, Soils and Land Use (ESLU) Department is housed at the Johnstown Castle estate, which comprises 250 ha of farmland and 150 ha of forestry, parkland, and lakes. There are three research farms (dairy, bull beef and a research farm for field experimentation). In addition, there are offices and state-of-the-art laboratory facilities. The ESLU Department conducts research in four areas:

- Soils
- Biodiversity
- Water quality
- Greenhouse gas emissions and climate change.

These are all broad and strategically important areas of research that are highlighted in Food Vision 2030. The future environmental sustainability of Irish agriculture is underpinned by the ESLU research and KT activities. The increase in staff numbers in ESLU over the assessment period reflects the priority being given by Teagasc to issues of environmental sustainability. The ESLU Department is the largest within CELUP with 110.5 FTE staff (42% of CELUP staff) an increase of 26% (23.3 FTE) since the previous review. As anticipated, given the scale of its resources, the ESLU Department has delivered the highest proportion of scientific publications (55%) within CELUP and generated the highest proportion of external funding (57%).

The current staffing structure of the ESLU Department is: 72 research, 10 KT and 29.5 “support”. Of the research staff, just 13 (including the HoD) have permanent contracts. The remainder are on period appointments (18) or are PhD students (40). Six out of the 10 KT staff have period appointments as do 17 of the support staff. By its nature, much of the work of ESLU necessarily involves long-term studies. These cannot be easy to sustain when less than one third of the CELU staff are permanently contracted and this raises questions about long-term viability.

3.2 Department Quality

The ESLU Department addresses research areas of high strategic relevance in terms of policy, industry viability and public concern: soil and water quality, biodiversity, greenhouse gas emissions and climate change. Resources allocated to each of these areas was difficult to determine from the data provided (staff, budgets, and publications) but the balance appears appropriate.

The **Research Strategy** is addressed to: “The development, testing and implementation of innovative technologies to facilitate farmers to combine economic and environmental sustainability, and to provide practical integrated solutions for farmers and other stakeholders to improve soil health, restore and protect biodiversity, improve water quality, reduce emissions of greenhouse gases and ammonia and enhance soil carbon sequestration”.

The **KT strategy** is: “To support farmers to improve the environmental sustainability of their production systems in order to meet national objectives relating to gaseous emissions, water quality, biodiversity and soil health, by delivering targeted advisory programmes”.

The ESLU Department fully embraces the overarching Teagasc strategic goal of: **“making sustainability front and centre of all Teagasc activities”** cf. “Teagasc Together”. Mission 1 (a climate smart, environmentally sustainable agri-food sector) and at least five out of the seven associated goals of **Food Vision 2030** emphasize the strategic importance of the Department. The future targets of the ESLU Department are firmly aligned with Teagasc and national policy priorities.

Over the last 6 years, the ESLU Department has delivered a steady output of publications. This can be summarised as: an average of 6 publications per FTE permanent researcher per annum or 10 to 15 publications per 1 million euros of expenditure. The average citation rating of the journals in which the publications have appeared is 5.6 and Department publications have, on average, been cited 6 times per year. The publications cover all four research areas. The number of times particular topics featured in the titles of publications were as follows: soils (26) nitrogen (38), nitrates (7), phosphates (47), ammonia (11), water (49), biodiversity (10) and greenhouse gases (18). The Department’s active international collaborations are indicated by the significant proportion of publications that included authors from other countries.

The ESLU Department has been very successful at attracting research funds from external sources. Total external funding was € 4.2 million in 2020 representing 74% of the Department’s total expenditure and 48% of the total external funding obtained by CELUP. The Department has excellent research facilities for conducting field measurements. Indeed, most of the research deals with ‘real-world conditions’; publications are primarily founded on measurements made “in the field”, including catchments and landscapes. This is the primary strength of the Department. In contrast, only a small number of reviews (6/7), no meta-analyses, two explorative studies, and only one modelling study have been published by members of the ESLU Department. This emphasises that the research expertise of the Department resides primarily in quantifying and mitigating emissions in current agricultural practices as distinct from investigations of potential routes towards adaptation and creation of resilience for agricultural enterprises in a changing climate.

The PAP considered that the Quality of the ESLU Department’s activities was Outstanding in the national context and Strong when judged in an international context

3.3 Department Impact

The ESLU Department has been instrumental in identifying and quantifying emissions of air and water pollutants and their sources as well as identifying and quantifying mitigation measures. These research and KT activities have greatly influenced, and supported policy developments related to water quality protection and marginal abatement cost curves (MACC). This is also very clearly indicated by the two outcome case studies: *“Changes in water quality policy and agricultural policy in Ireland to which Teagasc science contributed”* and *“Teagasc’s Gaseous Emissions research and Contribution to National Policy and*

Practice in Ireland". In addition, the soil quality and biodiversity research with associated KT activities have contributed greatly to developing management plans for preserving/enhancing soil health and biodiversity. The Signpost Farms are a positive development towards demonstrating the environmental changes required at the farm scale and also have the potential to be used in forestry KT. This programme also embraces behavioural change which is necessary to inform future research that is by design, impact oriented. However, it still seems to be early days in the uptake and application in practice on farms of all these measures, plans and actions. The evidence is that national water quality is still deteriorating, and agricultural greenhouse gas and ammonia emissions are not significantly reducing. As indicated by the EPA national environmental assessment reports, these research and KT efforts have yet to impact significantly in practice. However, this lack of impact is certainly not attributable to the KT efforts of the ESLU Department. The issue is that production-related incentives significantly exceed those relating to efforts directed to emission reduction (see below). There are significant opportunities for the Department to further strengthen the transfer of knowledge to stimulate implementation at farm scale and the Signpost Farms are a positive development in this regard.

Agriculture is responsible for 99.4% of the ammonia emissions and 37% of the greenhouse gas emissions in Ireland. Agricultural greenhouse gas emissions increased by 12% over the last 10 years while ammonia emission ceilings under the National Emission Ceiling Directive have been non-compliant for 7 out of the last 9 years, driven by growth of the agriculture sector. Also, water quality and biodiversity are deteriorating. The increased emissions from agriculture to the wider environment have been attributed to the increased domestic agricultural production, notably dairy production, which indicates that the mitigation policy measures have not been successful in reversing emission trends and environmental impacts. It suggests that the incentives for farmers to decrease emissions and to improve the environmental performance of production have not yet been sufficiently effective.

There is abundant evidence that the ESLU Department has had a substantial impact on national policy development as well as on representatives of agricultural organisations. However, influence on farmers and on-farm actions has been much less apparent. The impact on agri-food stakeholders is well reflected in *Food Vision 2030* which is an outcome from this assemblage of interested parties. The ESLU Department is going to be important in the delivery of *Mission 1* of *Food Vision 2030*. It is noteworthy that the number of KT staff in ESLU has recently doubled (from a meagre 5 to 10). The key question that only time will answer is: 'will the research and KT strategies of ESLU be sufficiently effective to impact on farmers' practice and thereby on achieving *Mission 1* of *Food Vision 2030*'

The PAP considered that the Impact of the ESLU Department's activities was Strong/Outstanding in relation to national policy and Competent with regards to agricultural practice.

ESLU Department Recommendation (Priority 1)

The PAP recommends that Teagasc considers initiatives that will result in closer integration of the environment-oriented research of ESLU with the Animal & Grassland Research and Innovation Programme's (AGRIP's) production-oriented research. There is already cooperation between ESLU and the Dairy Research Programme in Moorepark regarding emissions mitigation research. However, this is not to the extent recommended by the previous PAP. This integration of production-oriented and environment-oriented research is of crucial importance for developing sound pathways towards the achievement of *Mission 1 of Food Vision 2030*.

3.4 Department Viability

The research and KT activities of the ESLU Department are more embedded in *Food Vision 2030* than they are in the "*Teagasc Together*" (i.e. the Teagasc Statement of Strategy 2021 – 2024). The latter reflects recent changes towards a far greater emphasis on environmental sustainability than hitherto. The demands and expectations of Agri-Food-Environment stakeholders for research and KT activities from the ESLU Department that deliver practical outcomes will only increase and this will require careful management.

The future research and KT targets of the ESLU Department are closely aligned with the goals of *Mission 1 of Food Vision 2030*. The Department is effectively and dynamically led in its execution of a large research and KT portfolio. The Department has been highly successful in securing external funds, in attracting a substantial number of PhD Walsh Scholars and in publishing a large and steady flow of well-cited papers and reports. Senior staff are also increasingly involved in discussions with agri-environmental policy makers and in developing policy initiatives. The above is all positive but the current success of the ESLU Department also carries with it some risks. Senior staff can become overstretched by the demands placed on them to supervise PhD students and temporary contract staff as well as responding to research calls to generate external income. Time for reflection, review and "stock-taking" of future research priorities (aligned with the overarching Teagasc strategy and Food Vision 2030) is absolutely necessary.

The gender balance across the ESLU Department (and CELUP *in toto*) needs to be addressed as does the "tread-mill" of high staff turn-over associated with short-term contracts. There is need for a more strategic approach to ensuring a return on the investment of senior staff time in building the knowledge and skills of staff on period appointments and students. The gender imbalance and the ratio of permanent to temporary staff represents a risk to the sustainability and longer-term viability of the Department.

The PAP considered that the Viability of the ESLU Department was Strong with regard to alignment with national strategies and mission statements but Needs improvement with regard to management of human resources.

ESLU Department Recommendation (Priority 2)

The PAP recommends that Teagasc reconsiders from a strategic standpoint the staff profile of the ESLU Department. The PAP considers that the ratio (16:64) of (permanent) senior research and KT staff to (period-contracted) junior research and KT staff represents a reputational risk to Teagasc. The former have increasingly important roles in the

translation of the research findings to effective policy and practice briefs and ongoing engagement with multiple stakeholders. There is, in addition, an increasing requirement for senior staff to review and reflect on international literature, trends and practices both in Ireland and internationally if they are to contribute to the development and testing of incentives for changes in practice. However, junior research and KT staff also must receive training and close supervision. Risk management considerations indicate that these two pressures must be reconciled. The gender balance across the ESLU Department (and CELUP *in toto*) also needs to be addressed. Access to periods of sabbatical leave should be given consideration alongside a reappraisal of Teagasc policies towards staff and student supervision and the dominant deployment of period appointments.

4. Assessment of Crops Research and Knowledge Transfer Departments

4.1 Strategy and future directions

The activities of the Crops Research and Knowledge Transfer Departments are distinct in their activities but, of necessity, they are intimately connected in their strategic aims and objectives. Their shared focus is on achieving widespread uptake of well-proven, innovative practices on Irish tillage farms that result in increased crop yield, quality and farm profitability while minimising adverse environmental impacts (including on biodiversity and through emissions to air and water). Such outcomes emanate from close, continual and two way dialogue with a diversity of “end-users” to ensure research is appropriately directed towards the uptake of well-founded and optimised management decisions relating to: varietal selection, crop nutrition, cultivation practices, weed management and crop protection (i.e., durable control of pests and diseases). The crops of primary interest are cereals, potatoes, oilseed rape, and protein crops. The Crops Research Department also undertakes work on genetic improvement of forage grasses.

In August 2020, the Teagasc Tillage Crop Stakeholder Consultative Group delivered its forward strategy (“Crops 2030”) which specified 32 “actions” under 8 headings. Twenty-two of these actions anticipated the participation of Teagasc. Prior to the publication of “Crops 2030”, the two Crop Departments had specified 20 actions required to achieve their specified ambition to: **“Develop sustainable cropping systems in response to present/future challenges and aligned with EU Farm-to-Fork goals while supporting the development of high-value opportunities for future exploitation”**. There is a substantial degree of consistency, but also marked differences of emphasis, between these two contemporary statements of strategy. However, neither statements address priorities among the actions, nor do they address the availability of resources required to address the issues identified. The PAP consider that this is an important next step to be addressed by the Head of Programme in concert with the two Heads of Department and, importantly, the continuing involvement of the Teagasc Tillage Crop Stakeholder Consultative Group

Crops Research and KT Department Recommendation (Priority 1)

In the specific context of tillage crops research and knowledge transfer, the PAP recommends that the Head of Programme, together with his two Heads of Department, should specify, among the “actions” identified in response to the “Farm to Fork” statements, those that will be “owned by” and “belong to” the Teagasc CELU Programme. A prioritisation exercise, including a realistic analysis of available physical, financial, and human resources should follow. The latter should also take account of available technical expertise and possible requirements for future recruitment and capital investment. The proposed rationalised list of “headline actions” that will be addressed actively within the Programme over the coming six years should be communicated to and openly discussed with potential external partners (academic and industrial) as well as the Teagasc Tillage Crop Stakeholder Consultative Group and policy makers.

4.2 Knowledge Transfer Initiatives and Issues

The role of the relatively small Knowledge Transfer Department is to ensure that the large body of Farm Advisers who interact with tillage farmers in the regions are equipped with up-to-date information and relevant, timely messages to encourage and enable sound actions and decision-making by farming businesses. This involves synthesising research findings and translating these into the practical messages that are likely to result in uptake of beneficial practices on farm. The PAP was impressed by the diversity and scale of the delivery methods deployed by the KT Department and their evident outreach. The close day-to-day contact and familiarity of the small Crops Knowledge Transfer Department with the larger Crops Research Department activities on which they draw is a real strength to be nurtured.

The PAP was however concerned to learn that the “technical” advisory contact time that Teagasc farm advisers were able to have with farmers was being significantly eroded at certain critical times of the year. This was because advisers were helping farmer clients, as part of the farmer’s contract with Teagasc, to submit applications for various environmental, funding or grant schemes, typically against short deadlines. The PAP considered that this situation was highly likely to dilute and detract from the receipt of, and response to, important technical advice messages carefully crafted by specialists in the Crops Knowledge Transfer Department for delivery by Teagasc farm advisers. Although derived within a discussion of the Crops Research & KT Departments the associated recommendation has wider applicability and therefore is made at Programme level.

Programme Level Recommendation (Priority 6)

With the objective of ensuring that full value from the work of the Crops Knowledge Transfer Department (and other CELUP Departments) is not unnecessarily eroded, the PAP recommends that Teagasc management explores options to ensure that farmers, at certain key times of the year, not only have support from Teagasc to submit important scheme applications but also to receive the necessary “technical” advisory contact required at that same critical time of year.

4.3 Department Quality

The PAP considered the assessment of the two Crops Departments (Research and Knowledge Transfer) as a single unit. The strategic alignment, motivation and closely shared objectives of these two Department as well as their disparate sizes (8 staff in Knowledge Transfer compared to 55 in Research) made this a sensible and pragmatic approach.

The PAP judged that the Quality of both Departments could, with confidence, be rated as Strong. The high national and international profiles of the Departments are evident from their actively sought involvement in collaborative projects with both academic and industrial partners. Both Departments have been, over the assessment period, the steady source of good quality publications directed to both academic and industry audiences. Senior staff clearly recognise the importance of ensuring that research results are made available to peers (and end-user communities) by timely publication. The citations to Teagasc research provide good evidence of international visibility.

4.4 Department Impact

The impact of the Departments is best appraised by the degree of influence that their activities and outputs have on actions and investments made by a diversity of different “players” within the Irish tillage farming sector. In addition to those in the front-line (i.e., farmers growing tillage crops) and policymakers in government, these players include: independent farm advisers; plant breeding companies; and companies that supply seeds, fertilisers, crop protection products and machinery (and their representatives).

By way of illustrating different routes to achieving impact, two contrasting “case studies” from the Departments were elaborated in their self-assessment document:

- “Integrated strategies to support *Septoria* management in winter wheat”
- “Development, validation and routine deployment of marker assisted selection (MAS) driven rapid cycle breeding in the Teagasc/IPM potato breeding programme to develop sustainable multi-disease resistant commercial potato varieties”.

The first case study provided an impressive example of how it was possible to implement a dynamic approach to the successful control of a serious crop disease through the directed coordination of a diversity of different interested parties (including the commercial sector) backed by a body of technical expertise and well-informed advisers.

The second case study was a genuinely impressive “*tour de force*”. The potato breeding team had adopted, adapted, and applied several novel laboratory technologies. Aided by the public availability of the potato genome sequence they were able convincingly to demonstrate the feasibility of accelerating significantly the “stacking” of several important pest and disease resistance genes in genotypes with commercial potential. In this case, the impact on breeding efficiency and resource requirements was very significant. However, the conservative nature of the market for new potato varieties means that the new varieties produced have yet successfully to penetrate the market.

The PAP judged that the Impact of both Departments could, with confidence, be rated as Strong. This rating takes account of the broad body of evidence that the Panel had access to, and not simply the two case studies. However, were Teagasc-bred pest and disease resistant varieties of potatoes to become widely adopted in commercial production, nationally and internationally, this would undoubtedly be an “Outstanding” impact.

Crops Research and KT Department Recommendation (Priority 2)

Looking forward, a raft of new technologies and associated innovations will become increasingly pervasive in crop-based agriculture. Crop improvement founded on genome editing, automation (including robotics) and remote sensing (to name just a few examples) are already in train. Teagasc in general, and the Crop Departments in particular, will need to be alert to where such innovations may bring particular benefit to Irish agriculture. Scale and pace of uptake, and thereby derivation of benefit, will be influenced by policy drivers but are also substantially dependent on specific local factors such as: scale of operation, climate, markets, investment capacity and the knowledge/skills base of tillage farmers. The PAP recommends that, *in parallel with Recommendation 1 above*, the Head of Programme, together with his two Heads of Department, should assemble a small “horizon-scanning” group (including informed individuals from outside the organisation) to provide advice on priorities for potential investment in the new skills and capacity from which Teagasc and its stakeholders are likely to derive greatest benefit.

4.5 Department Viability

Viability is all about having in place clear and well-conceived future-proofed plans that enable forthcoming opportunities to be grasped while also having contingencies in place to deal with future risks (known and unknown). The priorities for the Crop Departments going forward have been clearly enunciated (although **Recommendations 1 and 2** above indicate the need for some further refinement) and the physical facilities required to deliver against these priorities do not appear to be limiting. However, given the level of dependency on contract staff as well as the important research contributions made by the cadre of Walsh Scholars, the PAP considered that potential losses of key contract staff expertise at critical times do pose risks that are difficult to mitigate. Given the number of projects that some research group leaders were already managing, there also appeared to be little “slack” available to respond to new opportunities (e.g., associated with external sources of funding such as ESG finance) or even “emergencies” that will likely occur. As referred to in **Recommendation 2** above, there is a need to ensure a secure fit between the highest research and knowledge transfer priorities to be delivered over the next 5 years and the human resources (scale and expertise) necessary to ensure deliver.

The PAP judged the Viability of the Crops Departments to be Competent while recognising that institutional constraints were the primary contributory factors for this assessment, as distinct from failures in governance or leadership at Department level.

5. Assessment of Forestry Development Department

5.1 Background and strategy

The Forestry Development Department provides science-based innovation to support the forest sector, appropriate forest expansion, sustainable forest management, and timber mobilisation. The focus of extension activity is on developing private forestry (roughly 50% of the forest resource and a lower, but increasing proportion of wood production). By contrast, Teagasc forestry research activity supports all sectors of Irish forestry.

The Forestry Development Department model of combining research and KT functions appears to work well and results in advisers being well respected by farmers. KT events are well-attended and often over-subscribed. This close association between researchers and advisers ensures that the whole team effort is seen to be fully aligned with a consistent overall direction and purpose. The team is well-informed about the whole forestry sector and projects a positive, solutions-oriented approach to sector development.

Forestry in Ireland is going through a period of significant change with private sector production expanding rapidly as trees planted 20-30 years ago start to mature, and as the increasing risk of tree pests and diseases, new to Ireland, is being realised. In addition, the economic, environmental, and recreational significance of the sector is also increasing, particularly in the context of climate change. “Project Woodland” was initiated by the Forestry Minister in 2020 to address difficulties with the current licensing system *and* to respond to the changing context referred to above. As part of this project, a shared national narrative for forestry policy in Ireland has developed through a new national vision and strategy. This dynamism in both the policy environment and resources presents a significant challenge for research programme management in the medium to long-term. It is a real credit to the Teagasc forestry team that they demonstrate both awareness and responsiveness to these strategic shifts. This was brought out particularly clearly in the case-study relating to conifer thinning.

The Forestry Development Department is committed to supporting the realisation of the “*Coford Long Term Forest Research Report*” recommendations that has proposed structures for meeting the needs and opportunities of Ireland’s forest sector through longer term research and innovation. The model for forest research commissioning and direction is continuing to evolve as the policy environment matures further through Project Woodland and the active involvement of the Department in this regard is to be applauded.

Overall, the PAP was impressed at the scope and impact of the team and felt that its profile within Teagasc did not adequately reflect its significance or impact.

Forestry Development Department Recommendation (Priority 2)

Teagasc must continue to engage pro-actively and effectively with Project Woodland (alongside others) to ensure a strong, long-term trajectory for Ireland-specific forest science. Teagasc needs to ensure that the case for continuing investment in forestry science is articulated clearly in the new national strategy, ensuring an alignment between farm forestry and the wider needs of the sector. This is also important in the context of the discussions regarding the future arrangements suggested by the “*Coford Long Term Forest Research Report*”. The latter appears to the PAP to be an excellent model for ensuring coherence across commercial, research and policy interests.

5.2 Department Quality

Research work within the forestry team is clearly constrained by its size (3 permanent researchers & 7 Walsh Scholars) but is of a high standard. Good evidence was provided of collaborative working with other researchers (e.g., NUIG, UCD, Coillte) to leverage Teagasc capability and deliver quality outputs. Given the scale of the research team, and the nature of Irish forestry, the work presented to the PAP is not likely to be of great significance internationally due to its regional and highly applied context. This latter statement should not be inferred as criticism but is merely an observation. The use of research techniques to assess and improve KT activities through the DAFM-funded FOROWN project as well as the long-term follow-up was particularly interesting. The PAP was encouraged to see social science being incorporated into the overall programme. The case study demonstrated an integrated approach with the range of projects well aligned to the desired outcome of improved forest management practices. **Taking all the evidence into account, the PAP assessed the research element of the Department as Competent. This assessment necessarily reflects the scale of the research being undertaken and the available resources relative to the projected growth of the sector.** There are 10 KT staff (of which one is on contract). The quality of the KT work carried out by the Department is very well-regarded and is an important part of Ireland's forestry support ecosystem. The close relationship with the Coford Council is particularly notable as a good model for interaction between stakeholders, researchers, and policymakers. Teagasc forestry advisers are in an important and unique position to bridge between forestry and agriculture. **There was good evidence of adaptive working, with the department flexing its approach to deal with the constraints of the small team and the developing operating environment. The PAP considers the quality of the KT work in forestry to be Strong.**

5.3 Departmental impact

The case-study provided very clear evidence not only of the impact of the Department, but also about how seriously the question of impact is taken by the team. The detailed quantitative analysis of the attendance, uptake and consequent behaviour change was compelling and will be valuable to policymakers and regulators in the current licensing discussions. This was backed up by conversations during the field visit and by the feedback from stakeholders. Other evidence in the case-study related to Teagasc's role in the development of forest owners' groups and certification processes. To have achieved this with so few staff is testament to the influence, capacity and capability of the forestry team.

The case study documentation also demonstrated good use of a range of engagement techniques (especially with the onset of COVID restrictions). It will be valuable to learn further from this work and gain an even greater understanding of the impact of different techniques on farmer behaviour. This could also have wider applicability. For example, linkages between woodland management and the environmental impact of farming operations have relevance to the work of the Environment, Soils and Land Use Department.

Teagasc is playing a central role in the ongoing development of farm-based forestry in Ireland. Research outputs are of key importance for regulatory and policy work. In this context, the PAP considers the impact of the Forestry Development Department to be Outstanding.

5.4 Department Viability

Given both the projected growth and the policy dynamism surrounding Ireland's farm forestry sector the strategic direction for the Teagasc forestry team will need to respond to the wider operating environment. All strategic drivers point to a large-scale increase in farm forestry activity (harvesting and new planting). The Department demonstrated clear awareness of the links from policy through to action. The Department's activities appear to be focused appropriately on key priorities although it was surprising not to hear more about forest resilience or the application of technology to drive efficiency and environmental performance. This possibly reflects both the limited time available for presentation at the site visit as well as the size of the Department relative to the scale and rate of change of the farm forestry sector.

All evidence during the assessment suggested a well-led and resilient Department that is adaptable, innovative and able to identify strategic priorities. The main concern of the PAP was the Department's ability to address the anticipated increase in scale and complexity of issues confronting Ireland's farm-based forestry sector in coming years. Many research and KT subjects will be shared across the forestry sector (not just related to farm-forestry) and the PAP would have liked to have seen more evidence of actions to establish tactical and strategic partnerships beyond the farming sector to address this challenge. This may mean increasing the research capacity of the department to interact and could include further collaborations with *inter alia* Coillte, investors, forestry contractors and forest nurseries **In the context of current targets and activity, the PAP considers the viability of the Forestry Development Department to be Strong. However, given the context of growth and change to be anticipated in Irish farm forestry over the next 5-10 years it is appropriate to also state that it will Need Improvement.**

Forestry Development Department Recommendation (Priority 1)

The PAP recommends that, in response to the new Irish Forestry Strategy, Teagasc reviews its tactical and strategic partnerships with others in the forestry sector to leverage skills, resources, and expertise. This should include working with DAFM to implement the recommendations of the "*Coford Long Term Forest Research Report*" to ensure there are no critical sector-wide duplications or gaps.

6. Assessment of Horticulture Development Department

6.1 Overview and future directions

As a relatively small Development Department, the staff confront a difficult task of conducting research and implementing knowledge transfer activities that will strategically advance the Irish horticultural industry while at the same time dealing with the many, and sometimes complex, immediate technical issues that inevitably arise in the industry. Striking the balance between the two is a significant challenge with the limited staff resources. Staff inevitably tend to get pulled into 'fire-fighting' issues as a priority. This means that less time is available for strategic development than is probably necessary. Staff time is likely to remain a limiting resource, so prioritisation of effort is clearly essential; the 'sharing' of relevant staff expertise (e.g., in entomology) with the Crops Department is a good development and to be encouraged and expanded whenever possible (e.g. with

forestry). Despite the resource constraints, the evidence provided suggests that the Horticulture Development Department is fully engaged with, and enjoys the confidence of, the industry. The PAP recognised that the Department certainly had the ambition and drive to chart a strategic course forward for the industry. The PAP recognised however that strategic change, particularly where it requires significant investment by the industry, is difficult. This is particularly so against a commercial market background of very low margins that limits the opportunity to invest. This is a fundamental issue beyond the control of Teagasc horticultural staff.

Horticulture Development Department Recommendation (Priority 1)

The Department is actively considering strategic options and priorities for broadening the scope of the Department's activities. In this context, the PAP recommends that, in addition to import substitution, issues of human health and nutrition should feature in the analysis. Horticultural crops primarily contribute essential micronutrients (vitamins and minerals) to the human diet. Requirements for micronutrients is dependent on age, gender, and ethnicity. Using data on the demography of the Irish population, including future projections, it should be possible to assemble data on the present and future demand for micronutrients in the national diet from a health perspective (as well as the scale of likely current deficiencies). This analysis (which could be conducted in partnership with growers and retailers) could be coupled with available knowledge of the nutrient content of a range of fruits and vegetables that could readily be produced in Ireland. From these analyses it should then be possible to make projections for optimum supplies of local, seasonal production of a range of home-grown horticultural products (as well as out-of-season importation) necessary to meet the optimum dietary demand of the Irish population. This exercise would assist in providing a persuasive rational argument for making investments in the scale-up of local supplies of specific horticultural crops, coupled with the resources for supporting research, development, and technical advice.

6.2 Department Quality

The volume of published research from the Horticulture Department is rather limited and this is clearly a reflection of its small size. Most of the published work originates from scientific collaborations, and this is to be applauded. However, it does make it difficult to determine the scale and scope of the Teagasc contribution (in the context of quality). The number of publications per FTE that have been produced by the Department over the assessment period bears favourable comparison with the other larger CELU Departments which suggests an equivalence in productivity as well as indicating that work undertaken in the Horticulture Department is of a quality that warrants publication at a broadly similar level to that of larger Departments in the CELUP programme. The below average citation rate for the Department's work simply reflects the scale of horticultural research internationally and cannot be considered as an indicator of quality. It is evident that the Horticulture Department collaborates widely, both with industry stakeholders and other researchers, including those overseas. This ability to link with other organisations and to access, synthesise and utilise information generated outside of Teagasc for the benefit of the Irish horticultural industry is an essential strand of the work of the Department given the limited staff resource to generate in-house information. This will be increasingly important as initiatives outside of Teagasc mean that there will be an acceleration in the integration of data acquisition, automation, and robotics in production systems. With the burgeoning ability to collect data, it will also be important to ensure that the industry can

link data and analytical insight to ensure that better management decisions are indeed being made in practice.

Taking account of all relevant aspects, the PAP rates the Horticulture Department as Competent with regard to quality.

6.3 Department Impact

The horticultural outcome case study (and the cross-case comparison) focuses on the development of the cut foliage industry in Ireland from 1993 onwards. The case study itself clearly demonstrates how a combination of research, development and industry investment in capacity and facilities can result in the development of a successful and growing industry. From the case study and the cross-comparison discussion, the PAP concluded that the primary impact route of this work has been mainly *via* the ‘technology development and adoption’ pathway (in the theory of change model), with some associated impact *via* the ‘capacity development’ pathway. Impact *via* the ‘policy influence’ pathway appears to be primarily limited to government recognition that cut foliage is a specific sub-sector of the industry.

There is some evidence that, in developing the cut foliage industry, Teagasc work has reacted to market signals and adapted production protocols accordingly (e.g. those prompted by the move from bunched to graded product specifications). It is less clear to what extent the choice of planting material and the production protocols have been influenced by feedback directly from growers. Regular stakeholder engagement appears to be good and on-going. Although it does not yet seem to have arisen, the question of the extent to which the cut foliage industry is environmentally sustainable and able to contribute to broader net zero targets will need addressing in the next few years (particularly if customers start to demand this information). This will apply equally to other horticultural crops sectors. While efficient production systems may be considered sustainable the evidence base to support this does need to be developed alongside work aimed at improving production techniques.

The approach taken in developing the cut foliage industry has been successful and if it can be replicated in other sectors of Irish horticulture the impact of the Horticulture Development Department will be strengthened. From the point of view of the Horticulture Development Department’s contribution to the Teagasc mission “*to support science-based innovation in the agri-food sector and wider bioeconomy so as to underpin profitability, competitiveness and sustainability*”, it has done this by:

- taking a science-led approach to development of the under-pinning technology and thereby facilitating development of a new industry;
- working closely with growers and marketing organisations to increase the value of the export market.
- ensuring that the fundamentals remain in place to enable further development of the cut foliage market, including the potential to generate new skills and new jobs.

Taking account of all relevant aspects, the PAP rates the Horticulture Development Department as Strong with regard to impact.

6.4 Department Viability

In terms of strategic direction, horticulture has a low profile in the 'Teagasc Together' statement of strategy. The main references to horticulture relate to farm diversification opportunities, principally in promoting the production of fruits to replace imports (apples are identified as a pilot initiative). The focus on new import substitution/export opportunities does align with both past and present strategic aims set out for the Horticulture Department. The timescale that may be involved in realising any new opportunities is demonstrated by the case study example of developing the cut foliage industry. This has taken 18 years to reach a point where the sector is recognised as a significant exporter with potential for further development. To bring new opportunities to fruition, the fundamental challenges to all horticultural production are labour cost and availability; the diminishing armoury of plant protection products; and peat replacement (particularly for mushroom casing). These all need to be addressed. It is unclear what will be prioritised and how work in these areas will be addressed over the next 5 years.

The challenge of identifying and implementing new investment opportunities also highlights the need to be creative and radical. There will be a need to identify what novel opportunities there may be for Irish horticulture at the same time as ensuring that the market 'pull' is there to underpin the necessary return on investment. Dessert apples have been suggested as an initial pilot. However, this does appear to be a relatively high-risk strategy given the likely high disease pressure in the Irish climate and the long-term commitment to orchard crops from both growers and the market. Drawing on the experience of what is happening elsewhere particularly in the UK, there is an opportunity to seek (for example) private equity funding for 'low carbon' glasshouse production models¹; to introduce closed production systems² or other forms of LED-based vertical farming systems³; or to develop green roof/green wall technologies⁴. These may merit further investigation in Ireland. These, or similar new technologies, might well benefit from the development of Teagasc demonstration facilities like the investment already made in malting/brewing technology in the Crops Department.

Fundamentally, the current Horticulture Development Department is viable, but with expertise at best one deep in most areas. It is therefore vulnerable to loss of key staff that may not be easy to replace. Some thought on succession planning is therefore vital (cf. Programme Recommendation 1). At the same time, the need to develop or recruit expertise in areas that are under development (we recognise the recruitment of an apple breeder) or that could be needed in future should be thought through carefully.

Overall, the PAP viewed the viability of the Horticulture Department as Strong

¹ For example [World-first low carbon greenhouses in boost for UK agriculture – Greencoat Capital \(greencoat-capital.com\)](https://www.greencoat-capital.com/)

² For example [DROP & GROW Aeroponic Container Farm System | LettUs Grow](https://lettusgrow.com/)

³ For example [What we do — Shockingly Fresh](https://www.shockinglyfresh.com/)

⁴ For example [About Vistafolia UK | Vistafolia® | Artificial Green Walls](https://www.vistafolia.com/)

7. CELUP Outcome Evaluation

7.1 Addressing the Evaluation Question

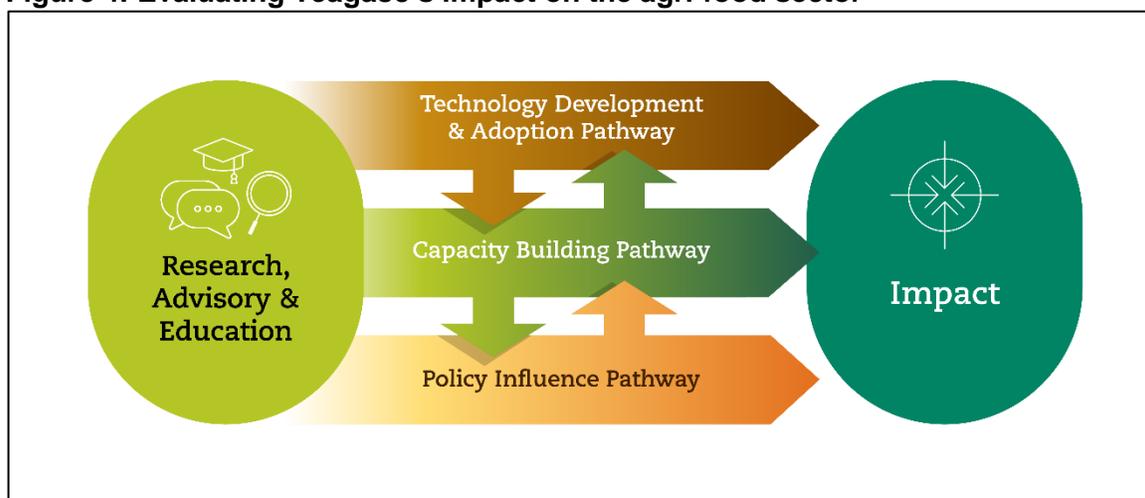
The evaluation component of this review is the first of its kind for Teagasc and was operationalised by the PAP through the following evaluation question:

How and to what extent, has the Crops, Environment and Land Use Programme (CELUP) contributed to Teagasc’s mission to support science-based innovation in the agri-food sector and wider bioeconomy so as to underpin profitability, competitiveness and sustainability?

The purpose of the evaluation is to assess how the CELU Programme is working towards achieving outcomes in the Irish agri-food sector. An outcome is defined as “*a sustained change in behaviour (practices, relationships) or state (e.g., policy change, establishment of farmer association) to which Teagasc has contributed*” (Annex 7; page 2 peer assessment protocol). The PAP recognises that Teagasc produces research and engages in KT and advisory activities (some of which sit beyond the programme being evaluated) in collaboration with and alongside other actors in the Irish agri-food sector. This includes farmers, the private sector, public agencies, NGOs and civil society, as well as other research, education and advisory services. The evaluation is, therefore, not measuring the attribution to outcomes solely of CELUP activities and recognises that research and KT activities interact with systemic dynamics to bring about change.

Teagasc Together strategy outlines a long term and systemic view of change. It assumes that outcomes from Teagasc research and KT (which are achieved through activities of the crops, horticulture, forestry, land-use and environment departments) will, over time, and through ongoing interaction with others, bring about a transition in Ireland’s agri-food sector to a more sustainable, competitive, resilient and diversified system. Teagasc uses a published framework (see Figure 4 page 59 of ‘Teagasc Together’) which shows how Teagasc activities contribute to impact in the agri-food sector through three interconnected impact pathways (technology development and adoption; capacity development; and policy influencing). These are interlinked with self reinforcing feedback loops around the capacity development pathway, which builds the capacity of the agri-food sector to innovate and transform. The framework is an aid to clarifying how the contributions made to specific outcomes can be understood as *plausible contributions* to the overarching goal.

Figure 4: Evaluating Teagasc’s impact on the agri-food sector



Source: Figure 4 page 59 'Teagasc Together'

The six outcome case studies included in the self-assessment document and developed by the CELU Programme team reflect upon and document the ways in which their activities are supporting the achievement of outcomes. This is the first application of the model internally and produced the starting material for the PAP to consider in this evaluation. A purpose of the case studies is to better understand the outcome trajectory of each case, i.e. the sustained and evolving pattern of interactions between actors, knowledge, technology, policy and institutions out of which outcomes emerge, and Teagasc’s role in that trajectory. The cases were chosen to represent the different ways CELUP works to achieve outcomes and impact, not as a representative sample, but rather to be informative. Consequently, the PAP has engaged with the evaluation question through a more limited evidence base than a full external outcome evaluation would normally require. In such a case, additional data collection would enable a substantiation of the outcome evidence provided. Nonetheless, the PAP found the six outcome case studies to be detailed and convincing accounts of the Programme’s outcome pathways. Together with the synthesis document (produced by the Evaluation Unit) this provided a rich evidence base to explore the ways in which outcomes are being achieved and could support future impact. Further discussions with staff and the authors of the case studies (the ‘champions’ of the processes of change described) during the site visit enabled probing and verification. During the preparatory meetings, the PAP agreed to deepen the evaluation through devising several sub-questions. Taking a retrospective view, these focussed on the ways in which the contribution to impact had emerged and, from this experience, to ascertain the potential for further impact in the future.

7.1.1 How significant was CELUP’s contribution to the outcomes identified in the case studies?

The PAP found that, overall, the outcomes achieved and as presented in the case studies were highly significant and result from high quality, relevant research and active engagement with “actors” in the agri-food sector. The outcomes presented cover a range of proximate and intermediate changes within the broader agri-food system. They range from: the development of new technologies that could have significant impacts on productivity and resilience (breeding of Buster and Java multi-disease resistant varieties

of potatoes); to developing new commercial sectors (cut foliage sector); strengthening value chains (conifer thinning/forest sector); and supporting environmental policy implementation (water quality protection and MAC curves).

In all of the cases, the activities of the CELUP team were found to be a necessary contributory factor. In other words, the outcomes would not have been possible without CELUP. All of the described outcomes illustrate the combined effect of multiple projects in collaboration with many actors across research and KT activities over time. Some activities span 20 years or more (water quality and cut foliage) with most starting at least 14 years ago. The evidence provided in the cases confirms that the outcome trajectories approach is of value in enabling a full appreciation of how Teagasc is contributing to the desired shift in the Irish agri-food sector. This fuller picture of engagement in the system necessarily meant that the PAP had at times to inquire into the ways in which CELUP worked with other parts of Teagasc and, in particular, the advisory services which were not formally part of this evaluation.

7.1.2 How do we understand CELUP to be pursuing the three interconnected pathways described in the theory of change?

Technology development and adoption pathway

Each outcome was analysed in terms of its contribution to the three pathways. The technology development and adoption pathway is well described in all of the case studies, reflecting the research emphasis of the CELU Programme. The PAP found that the research is mostly demand driven, evidenced clearly, for example, by the responsiveness of the Crops Research Department to the serious and persistent threat of *Septoria* to Irish and European wheat production. Further, the ability to respond to shifts within the sector was impressive, as demonstrated by the Forestry Department's response to the rapid development of new private forests. Responsiveness was a contributing factor to the ability to take advantage of opportunities presented to a setback in the cut foliage industry in 2009/10.

A real strength in supporting this pathway was the collaborative approach taken to research. For example, involvement with the Potato Genome Sequencing Consortium led to publication of the draft genome sequence in *Nature*, illustrating research excellence that was subsequently significant in driving the future of the technology in the potato breeding programme.

The Walsh Scholars programme also contributes in important ways to the technology development pathway. The central role that PhD students played was shown through specific examples, such as biological control of *Eucalyptus* pests in cut foliage and the large cohort of PhD students researching nutrient loss to water and thereby influencing water policy.

The PAP found less evidence of how technologies to support achievement of improved environmental outcomes are contributing to behaviour change (adoption) at the farm level; e.g. the reduction of gaseous emissions from agriculture. The PAP recognised that behaviour change is a systemic and complex process and that multiple actors in the system are required to align capabilities, opportunities and motivations (incentives) to

result in a change of on-farm practices⁵. Supporting changes in practice when research and industry goals align (e.g. agricultural technologies that enhance farm competitiveness) is clearly a strength of Teagasc and part of its technology adoption pathway. However, the current priority to reduce adverse environmental impacts will require a better understanding of how KT and research can contribute and provide opportunities and motivations to underpin the desired shift in behaviours.

The PAP was encouraged to hear about the Signpost Programme which is a multi-annual and multi-stakeholder collaboration to support directly the transition to more sustainable farming systems, and specifically to reduce GHG and ammonia emissions. The combination of on-farm demonstrations of science-based technologies, peer to peer learning, and an advisory campaign to engage in climate action is a robust approach to finding out how “hard-to-shift” behaviours might best be influenced. The fact that the Signpost programme is led by KT specialists within the Department is an opportunity to emphasise the importance of the “adoption and behaviour change” component of the adoption pathway. Leading with the desired change in practice and consequent environmental impact as distinct from science alone will be instructive.

ESLU Department Recommendation (Priority 3)

The PAP recommends the inclusion of a monitoring, evaluation and learning component in the Signpost Programme to focus not just on the environmental outcomes achieved but also to provide opportunity for evaluation research on how behaviour change is achieved. The learning from this Programme should be used to develop further the “behaviour change model” within the technology adoption pathway as well as to seek further opportunity to implement KT-led initiatives (where uptake is not straight-forward). The PAP considers that the new emphasis of Teagasc on contributing to the environmental sustainability of the Irish agri-food sector will call for a greater emphasis in this area of research. This will require evaluation studies in both the research and advisory components of Teagasc.

Capacity development pathway

In all of the case studies, and as discussed in relation to each of the Departments, the integrated approach of research feeding into KT and the advisory services is the cornerstone of the Teagasc model. Teagasc is uniquely *the* trusted provider of evidence and informed advice to farmers across the entire country. In addition, the organisation had direct and positive engagement with policy makers and other components of the agri-food industry. This came through clearly in all interactions during the assessment. The PAP sees this as a great asset that has yet to be fully maximised. In particular, there is greater

⁵ Evaluation of behaviour change is a large field with expertise that Teagasc could consider engaging with. One example is the use of the COM-B model in evaluation, – see:

https://www.researchgate.net/profile/John-Mayne-2/publication/301701597_The_Capabilities_Opportunities_and_Motivation_Behaviour-Based_Theory_of_Change_Model/links/577afc8708ae213761c9c50a/The-Capabilities-Opportunities-and-Motivation-Behaviour-Based-Theory-of-Change-Model.pdf

potential in the way that *the capacity development pathway* is understood and deployed to maximise its contribution to the alignment of the Irish agri-food sector with the **Teagasc Together** strategic goals.

The capacity development pathway places emphasis on the processes through which, over time, research and engagement with system “actors” builds the innovation capacity of the whole sector. The way this pathway is pursued within the CELU Programme is most evident in the outcomes sought by the smaller and more integrated Departments (Horticulture and Forestry). The conifer thinning case describes how the Forestry Department engages with a network of Forest Owners Groups, forestry companies, forestry professionals and how, over time, the collective capacity is increasing in order to respond to the shared goal of building a stronger timber supply chain. The cut foliage example illustrates how the Horticulture Department is working with and through a national foliage steering group that includes DAFM, Bord Bia, Enterprise Ireland and industry members. Consequently, the sector has grown to have an annual turnover of 7.5million Euro.

In these examples, and others shared during the site visit, the role that Teagasc researchers and KT specialists played in supporting collaborative engagement across actors ranged from: (i) provider of new knowledge and science-based advice, to (ii) system agitator pushing for innovation and challenging existing practice, to (iii) convenor and facilitator, through brokering relationships across different actors in the system. It was clear during discussions with the teams that the CELU Programme staff comfortably navigate these different roles at different times. The PAP was impressed by the collaborative and solutions-oriented culture shared by staff. This is linked to the strong relationships of trust they have with the main system actors and, in particular, with the farming community. However, this culture did not translate clearly into the case studies in which capacity was largely interpreted as the building of technical skills and tools. This suggests that further discussion may be needed on how to embrace the “softer” facilitative roles that a team requires. The building of systems with “capacity to innovate” as an explicit goal might be beneficial within all Departments.

Policy influencing pathway

The ways in which the CELU Programme supports the *policy influence pathway* was most evident in the two case studies relating to the work of the ESLU Department. ESLU has successfully undertaken policy-targeted research. For example, research within the Agricultural Catchments Programme which led to refined and specific advice to inform the Nitrates Action Plan. In the gaseous emissions case study, over time, ongoing policy-targeted and influencing research, such as the Agricultural Greenhouse Gas Research Initiative was used to develop the influential first Teagasc MACC. This then led to subsequent iterations of both GHG and Ammonia MACC which have informed current policy (such as the 2019 & 2021 Climate Action Plan and DAFMs AgClimatise strategy). Influencing policy in these examples is not solely the result of good quality, relevant and timely science, but also through combining excellent science with excellent engagement of ESLU and Teagasc across the science-policy interface in Ireland. Some of this engagement happens formally through expert advice on committees, such as the national nitrates review committee or the Oireachtas committee. Other examples are provision of analysis to the Citizen Assembly and engagement in international policy spheres such as contributing to IPCC reports and participation in the EU nitrates discussions. The

positioning of Teagasc within the “policy ecosystem” that has been cultivated over time together with the bonding ties established with many individuals and institutions sits behind the formal ‘moments’ of policy influencing. As discussed for the capacity development pathways, the policy influencing potential of all CELU Programme Departments is likely to be enhanced if there was a more evident appreciation of the facilitative role that Teagasc staff are able to play as brokers at the interface between science and policy.

Programme Wide Recommendation (Priority 4)

Regular learning events between the Department and the Evaluation Unit should be held to build further momentum towards use of the theory of change model as an internal learning tool. This will also broaden perspectives on the multiple roles played by Teagasc staff and further develop their capacity to exploit policy-influencing pathway by which positive science-based outcomes are achieved.

7.1.3 How well do the outcome trajectories map onto CELU Programme future direction?

Across our analysis of the three pathways presented above, what emerges as a real strength of Teagasc and the CELU Programme is the combination of high quality and relevant research and a facilitating approach to engagement with many actors in the agri-food sector. The outcome trajectories identified and the evidence provided illustrate how, over time, this combination is working to build momentum and support the capacity of the whole system to innovate, withstand shocks and respond to new demands and opportunities. In previous sections the PAP has commented on Departmental-level impact and has considered the specific outcome trajectories presented through the case studies within their assessment and recommendations.

What is less easy to determine is the overall impact coherence of the CELU Programme and how it responds to both the “Teagasc Together” and “Food Vision 2030” strategies. The PAP acknowledges that this is in part because Teagasc has entered a new strategy period. Notwithstanding this context, the PAP suggests there is opportunity to strengthen impact coherence and, specifically to support the navigation of trade-offs between profitability, competitiveness and environmental sustainability outcomes. Both the “Teagasc Together” and “Food Vision 2030” strategies call for this. Navigating these trade-offs will require greater collaboration across sectors of the industry than hitherto and, by design, between Teagasc’s research and KT programmes across agriculture, food and environment.

An explicit overarching CELU Programme-level strategy, showing how Department strategies and outcome trajectories, as well as synergies across Departments will together contribute to the “Teagasc Together” and “Food Vision 2030” strategies will help build greater impact coherence across CELUP than is currently evident.

The development of such an explicit CELUP strategy, together with the strong relationships of trust that exists between Teagasc and “actors” in the agri-food-environment sector, would provide opportunities to connect key stakeholders to the “Teagasc Together” strategy. This, in turn, will maximise synergies to navigate the future “trade-offs” that are going to be required. The latter will be particularly critical for the ESLU

Department and its ability to work towards the environmental outcomes that are central to the new Teagasc strategy. Moreover, *Food Vision 2030* provides an opportunity and requirement to rebalance the contribution and positioning of environmental research within Teagasc. There is a need to better inform and provide farmers with the evidence and tools they require to meet environmental targets. This is a delicate task which Teagasc is well positioned to deliver. The organisation is trusted by, and has the ear of, the farming community. However, this task will only be achieved with effective incentives and support from the Agri-Food-Environment stakeholders (involved in writing and launching Food Vision 2030).

As part of the process of delivering Teagasc strategy, the PAP make two linked recommendations.

Programme Level Recommendation (Priority 2)

An overarching strategy for CELUP is required to show how Department strategies and outcome trajectories, as well as synergies across Departments, will together contribute to delivery of the “Teagasc Together” and “Food Vision 2030” strategies. By including stakeholders in its development, the strategy process will also firmly connect key stakeholders in the Agri-Food-Environment area and the farming community to the recently promoted Teagasc strategy and, thereby, the work of Teagasc Departments in CELUP (particularly ESLU).

Programme Wide Recommendation (Priority 3)

The PAP recommends that the Head of the CELU Programme should work with the Heads of Departments, supported by the Evaluation Unit, to map existing Department level impact strategies onto a programme-level “theory-of-change” that makes explicit the assumptions, inputs, activities, outputs, outcomes and impact underpinning how CELUP is contributing to the “Teagasc Together” and “Food Vision 2030” strategies.

Appendix 1: Profile of Peer Assessment Panel members

Professor Ian Crute was formerly Non-Executive Director (2014-18) and Chief Scientist (2009-14) of AHDB in UK with strategic oversight of research priorities, innovation and knowledge exchange. He joined AHDB after 36 years in research at HRI Wellesbourne and East Malling (1973-1999) and as Director/CEO of Rothamsted Research (1999-2009). Crop pathology/genetics are his specialisms (ca. 170 publications) in addition to a particular interest in the sustainability of agricultural systems. The latter is reflected in co-authorship of several policy-focussed reports including: “Reaping the Benefits” (Royal Society); “Global Future of Food and Farming” (UK Foresight); “Strategy for Agricultural Technologies” (UK Government); “Preparing for Climate Change” (UK CCC)

Dr Bill Parker is Head of Technical Programmes at AHDB. His previous roles in AHDB have included Director of Horticulture (2009-2015, responsible for horticultural research and knowledge exchange) and Director of Research (2015-2019, overseeing AHDB’s entire crops and livestock research portfolio). He joined AHDB after 25 years working for ADAS, specialising in pest management but also leading research and knowledge exchange in crop protection and horticulture from 2001 to 2009. He has been an independent member of the UK government Advisory Committee on Pesticides (now the Expert Committee on Pesticides); chair of the UK Insecticide Action Group (IRAG-UK) and currently sits on the Strategic Advisory Board for the UK’s Global Food Security Programme.

Dr Oene Oenema is an agronomist/ soil scientist from Wageningen University and Research, the Netherlands. He is professor in soil fertility and nutrient management, with research interests in nutrient cycling, greenhouse gas emissions and agriculture-environment interactions. He is chair of the scientific committee of the nutrient management policy in the Netherlands, which advises the ministry of Agriculture, Nature and Food quality. He is visiting professor at the China Academy of Sciences in Shijiazhuang and distinguished professor at the China Agricultural University in Beijing, China (<https://research.wur.nl/en/persons/oene-oenema/publications/>).

Dr Eimear Cotter is a Director in the Environmental Protection Agency (EPA) with responsibility for the Office of Evidence and Assessment which includes leading EPA’s environmental research programme and the scientific assessment under the Water Framework Directive in Ireland. Previously she was Director of Environmental Sustainability in the EPA and worked in Sustainable Energy Authority of Ireland. Eimear has a wide range of experience in environmental protection, climate change, sustainable energy and sustainability. She is Board member on the National Statistics Board which guides the strategic direction of the Central Statistics Office.

Jo O’Hara MICFor is a chartered professional forester, a freelance consultant and accredited coach, and an experienced non-executive Director. She was previously a Forestry Commissioner and Scotland’s first Chief Forester. She is a trustee and member of Council for the Institute of Chartered Foresters and is Vice-Chair of the low carbon charity Changeworks. Jo has deep and extensive knowledge and experience of the opportunities and challenges of managing land for multiple purposes, including 30 years of experience in practical forestry and policy roles. She is currently working on several international forest and land management projects with public, private and research organisations. For more info see www.futureark.com

Mr Michael Hoey is a Director of Country Crest, a north County Dublin fourth-generation family agri-business led by Michael and his brother Gabriel. It employs over 400 people. Country Crest are involved in arable and livestock farming, fresh produce, prepared meals and a farm shop. The company supplies potatoes, onions and sweet potatoes to all Tesco stores in the Republic of Ireland and its Ballymaguire Foods Brand has grown substantially within the prepared foods sector in recent years. Michael is currently president of the Irish Potato Federation and was previously a member of the Teagasc Oakpark Stakeholder Group

Dr Marina Apgar is an Evaluation Research expert currently based at the Institute of Development Studies, at the University of Sussex. She is a core member of the Centre for Development Impact and has spent 20 years working in the research-evaluation divide supporting learning and evaluating how change happens in complex systems. Her methodological expertise lies in theory based and participatory evaluation including contribution analysis. As well as conducting impact evaluations she accompanies research and development partners in the design and implementation of monitoring, evaluation and learning systems for research for development programmes (Aquatic Agricultural Systems programme of the CGIAR; ESRC Social Technical and Environmental Pathways to Sustainability research centre; and programmes funded through the Global Challenges Research Fund). She is a member of the ODA-MEL Technical Expert Advisory Group of the UK Department for Business, Energy & Industrial Strategy.

Dr. Kevin Heanue is Teagasc's Evaluation Officer and has three main responsibilities. First, to develop, co-ordinate and conduct evaluations of Teagasc's research, advisory and education programmes. Second, to lead, guide and manage the strengthening of the evaluation role within Teagasc and the organisation's evaluation strategy, capabilities, policies, methods, practices and instruments. Third, to develop and lead a research programme on evaluation capacity building, evaluation frameworks, tools and methods. He provides a secretariat to the CELUP Peer Assessment panel.

Appendix 2: Schedule for site visit

The following is the schedule of activities for the duration of the CELUP Peer Assessment from 14th – 16th November 2021. Each session in the schedule is based on a maximum 10 minute, 3 slide presentation followed by a discussion.

Sunday, 14th November 2021

Time	Action	Key Topics
18:30	Welcome and briefing on requirements of the Peer Assessment by Prof. Frank O'Mara, Director of Teagasc or Mr. Declan Troy, Acting Director of Research	Welcome and briefing on requirements, Teagasc strategy, goals and organization structure.
19:00	Dinner (Seven Oaks Hotel, Carlow)	Attended by Director, Declan Troy, John Spink and HOD's.

Monday, 15th November 2021: Connie Conway Room, Crop Research Building, Teagasc Oak Park

Time	Action	Key Topics
08:30	Transportation from accommodation to Teagasc Oak Park	
08.45	Introduction and approach to Peer Assessment Kevin Heanue, Evaluation Officer	Confirmation of approach to peer assessment, who will be in each session, lead panel discussant and the structure and format of end report.
09:00	Overview of Programme Dr. John Spink, Head of CELUP	Overview of programme, research strategy, structure, funding, policy, publications and support mechanisms, technology transfer and strategy, outcome case studies.
09:45	Panel Deliberations	Report and assessment criteria (programme quality, impact and viability) and evaluation question.
10.15	Tea/Coffee	
10:30	Crops Research & KT	Discussion of Crop Science & KT Depts' structure, objectives, outputs, impacts, strategy and Septoria Control & Potato Breeding Outcome Case Studies
11:45	Panel Deliberations	Report and assessment criteria (quality, impact and viability) and evaluation question.
12.15	Lunch	
13.00	Horticulture	Discussion of Horticulture Development Dept's structure, objectives, outputs, impacts, strategy and Outdoor Cut Foliage outcome case study
14.00	Panel Deliberations	Report and assessment criteria (quality, impact and viability) and evaluation question.
14:30	Forestry	Discussion of Forestry Development Dept's structure, objectives, outputs, impacts, strategy and Conifer Thinning outcome case study.
15:30	Panel Deliberations	Report and assessment criteria (quality, impact and viability) and evaluation question.

16:30 – 17.00	Meeting with selection of Walsh Scholars	
19:00	Dinner in Teach Dolman, Carlow	Panel only

Tuesday, 16th November 2021: Connie Conway Room, Crop Research Building, Teagasc Oak Park

Time	Action	Key Topics
07. 45	Transportation from hotel to Oak Park	
08.00	Environment, Soils and Land Use	Discussion of ESLU Research & KT Depts' structure, objectives, outputs, impacts, strategy and Water Quality and Gaseous Emissions (MACC) outcome case studies Discussion of cross Teagasc environment-focused WGs?
09:30	Options: Panel opportunity to visit crops facilities or new hedging (biodiversity research) new malting facility; apple research, forestry work	Walsh Fellows/Post Docs/CRO's available if possible. With HOD's
11:00	Panel Deliberations with Tea/Coffee available	Report and assessment criteria (quality, impact and viability) and evaluation question.
11.30	Meeting with stakeholder representatives	Current experiences with Teagasc Views on future needs and capacity of Teagasc to meet these needs
13:00	Lunch	
14:00	Panel draft report and prepare exit presentation	
16:30	Panel meets with Prof. Frank O'Mara, Declan Troy, Dr. John Spink, Heads of Department and presenters	Panel present overview of emerging findings and recommendations from review
17:30	Finish	

Appendix 3: Assessment Criteria and Categories from Evaluation Protocol

Assessment criteria

The PAP assesses the research and KT programme and sub-programmes on the basis of the three criteria outlined below, i.e. quality, impact and viability, using qualitative assessment (text) and quantitative assessment (five assigned categories) (see Table 1).

1. Quality

The panel assesses the quality of the unit's⁶ research and the contribution that the research makes to the body of scientific knowledge. The panel also assesses the scale and productivity of the unit's research results (e.g. scientific publications, instruments and infrastructure developed, and other contributions to science) and the unit's scientific reputation. Bibliometric analysis together with information on other science-based outputs, activities (e.g. collaborations, joint programmes) and inputs (e.g. funding) are key inputs to this criteria's assessment.

The panel assesses the quality of the KT unit's activities and methods and the contribution those activities and methods make to the transfer of scientific knowledge. The panel also assesses the scale and productivity of the unit's activities (events, publications, stakeholder involvement, training, education provision and other contributions to knowledge transfer).

2. Impact

The panel uses the Synthesis Report of the Outcome Case Studies and the case studies themselves in order to answer the impact evaluation question, "How and to what extent, has the [name] Research Programme contributed to Teagasc's mission to support science-based innovation in the agri-food sector and wider bioeconomy so as to underpin profitability, competitiveness and sustainability?" In doing so, the panel will also comment on the main pathways through which the programme has achieved impact and the implications for Teagasc's overarching Theory of Change outlined in its Statement of Strategy.

3. Viability

Incorporating information from 1) and 2) above, in particular the extent to which the programme is building and maintaining its capacity to adaptively manage and respond, and considering the programme's SWOT analysis, the panel assesses the strategy that the research and KT units intend to pursue in the years ahead. In addition, the extent to which they are capable of meeting their research, knowledge transfer and impact targets during this period and if those targets are correct. It also considers the governance and leadership skills of the units' management.

Walsh Scholarships Postgraduate Programme, research integrity and diversity

Each programme assessment will also include assessment of three further aspects: the Walsh Scholarships Postgraduate Programme; research integrity; and diversity.

1. The Walsh Scholarships Postgraduate Programme (WSP)

The assessment committee considers the supervision and instruction of PhD candidates. The relevant subjects include the institutional context of the PhD programmes, the selection procedures, the programme content and structure, supervision and the effectiveness of the

⁶ Programme or Department, whatever is the relevant focus

programme plans and supervision plans, quality assurance, guidance of PhD candidates to the job market, duration, success rate, exit numbers, and career prospects. The research unit undergoing assessment responds to a number of questions in the self-assessment, described in the format provided in Appendix 4. The unit should use these questions to reflect on its own PhD programmes and on how it supervises PhD candidates. The assessment committee discusses this during the site visit, comments on this in its report, and, where appropriate, makes recommendations for improvement.

2. Research integrity

The assessment committee considers the research unit's policy on research integrity and the way in which violations of such integrity are prevented. It is interested in how the unit deals with research data, data management and integrity, and in the extent to which an independent and critical pursuit of science is made possible within the unit.

The assessment committee bases its assessment on how the research unit itself describes its internal research culture. The research unit undergoing assessment responds to a number of questions in the self-assessment, described in the format provided in Appendix 4. The unit should use these questions to reflect on its own data management practices, the level of internal research integrity, and the transparency of its research culture. The assessment committee discusses these points during the site visit, comments on this in its report, and, where appropriate, makes recommendations for improvement.

3. Diversity

The assessment committee considers the diversity of the research unit. Diversity can act as a powerful incentive for creativity and talent development in a research unit. Diversity is not an end in itself in that regard but a tool for bringing together different perspectives and opinions. The assessment committee bases its assessment on how the research unit itself describes its internal diversity. This refers to such topics as gender, age, and ethnic background. The research unit undergoing assessment responds to a number of questions in the self-assessment, described in the format provided in Appendix 4. The intention is for the research unit to use the answers to reflect on its own diversity. The assessment committee discusses these points during the site visit, comments on this in its report and, where appropriate, makes recommendations for improvement.

Table 1: Explanation of assessment categories

Qualitative Assessment			
Category	Programme Quality	Programme Impact	Programme Viability
Outstanding	<p>Research is world leading with researchers working at the forefront of their field internationally.</p> <p>KT has some international visibility and very high national visibility. Acknowledged leader in KT methods, programmes or results. Comprehensive evidence of adaptive management</p>	The programme makes an outstanding and substantial impact	Outstanding governance and leadership; capable of meeting its targets for innovation and technology adoption, capacity building and informing policy; has a clear strategy.
Strong	<p>Strong research unit which is one of the few most influential research groups in the world in its particular field.</p> <p>Strong KT Department with very high national visibility employing the most up to date methods. Comprehensive evidence of adaptive management</p>	The programme makes an important and strong impact	Strong governance and leadership; capable of meeting its targets for innovation and technology adoption, capacity building and informing policy; has a clear strategy.
Competent	<p>Competent research unit conducting very good, internationally recognised research.</p> <p>The KT Department has high national visibility and employs the most up-to-date methods. Good evidence of adaptive management</p>	The programme makes a very good impact	Competent governance and leadership; likely to meet its targets for innovation and technology adoption, capacity building and informing policy; strategy needs some strengthening.
Needs Improvement	<p>The research unit conducts good national level research.</p> <p>The KT Department has national visibility and employs a range of methods. Selected evidence of adaptive management.</p>	The programme makes a good impact	Governance and leadership needs improvement in order to be capable of meeting its targets for innovation and technology adoption, capacity building and informing policy.; strategy needs improvement.
Unacceptable	<p>The research unit does not achieve satisfactory results in its field.</p> <p>The KT Department has low or no national visibility and employs a limited range of methods. Little or no evidence of adaptive management</p>	The programme does not make a satisfactory impact	Governance and leadership not satisfactory; unlikely to meet its targets for innovation and technology adoption, capacity building and informing policy; strategy not clear.

Appendix 4: Action Plan for Implementation of Recommendations

Peer Assessment of Crops, Environment and Land Use Programme (CELUP) 2021

Action Plan for Implementation of Recommendations

Date: 12 April 2022

Submit to: Prof. Pat Dillon, Director of Research

This action plan outlines the recommendations from the peer assessment report on CELUP 2021. To complete this action plan please specify the actions to be taken, if any, to implement the recommendations outlined, allocate responsibility for these actions and set a target date by which the recommendation is to be implemented.

No.	Programme Level Recommendations	Actions to be taken	Person (s) responsible	Date for completion
1	<p>Develop a forward-looking staff recruitment and development plan to better manage the risk of personnel turnover. Teagasc Senior Management should work with the CELUP Head of Programme, in concert with Heads of Department, to develop for each Department within CELUP, a forward-looking staff recruitment and development plan with a five-to-ten-year horizon.</p>	<p>A staffing plan is currently being developed for the coming years in particular to deal with the increasing importance of climate change mitigation (including diversification) and biodiversity</p>	<p>John Spink HODs Pat Dillon</p>	<p>Q3 2022</p>
2	<p>To strengthen the impact coherence of CELUP and specifically to support the navigation of trade-offs between profitability, competitiveness and environmental sustainability outcomes, an overarching strategy for CELUP should be developed showing how Department strategies and outcome trajectories, as well as synergies across Departments will together contribute to the “Teagasc Together” and “Food Vision 2030” strategies. By including stakeholders in its development, the strategy process will also firmly connect key stakeholders in the Agri-Food-Environment area and the farming community to the recently promoted Teagasc strategy and, thereby, the work of Teagasc Departments in CELUP, particularly ESLU.</p>	<p>Departments within CELUP have largely separate groups of stakeholders be they industry or at the policy level, who are included in the development of individual departmental strategies. These are somewhat informally, brought together into a programme strategy, which has in recent years resulted in greater integration and exploitation of physical and human resources across departments. It is timely however, particularly in the light of the Climate action plan 2021, to update departmental strategies and bring them together formally into an overall Programme strategy</p>	<p>HODs John Spink</p>	<p>Q4 2022</p>
3	<p>Develop a Programme-level “theory of change” as a contribution to “Teagasc Together”. The CELUP Head of Programme should work with Heads of Department and supported by the Evaluation Unit to map Department-level impact strategies onto a Programme-level “theory of change” that makes explicit the assumptions, inputs, activities, outputs, outcomes and impact underpinning how CELUP is contributing to the “Teagasc Together” and “Food Vision 2030” strategies.</p>	<p>It would be constructive to have a planned approach to delivering the objectives identified above. However, there is already a significant business planning process in addition to the annual programme of activities exercise. The inclusion of this approach as a replacement for some or all of the current business planning process will be discussed with the business planning unit with a view to it being piloted in CELUP for the 2023 business plan</p>	<p>Evaluation Unit, Business planning unit, Pat Dillon, John Spink</p>	<p>Q4 2022</p>

4	<p>Implement learning and reflection events to focus on “impact pathways”. Regular learning events should be held between Departments and the Evaluation Unit. These would build further momentum around the use of the “theory of change” model as an internal learning tool to help focus the multiple roles that Teagasc staff can play in advancing further technology development and adoption, capacity development and policy influencing pathways to change.</p>	<p>This could be incorporated into the mid- and end of- year reviews of the business plans if designed around impact pathways</p>	<p>Evaluation Unit, Business planning unit, Pat Dillon, John Spink</p>	<p>Q4 2022</p>
5	<p>Monitor diversity data and pro-actively address diversity imbalances. Teagasc Senior Management should implement the routine annual reporting of diversity data including analysis of pay gaps throughout the organisation and, simultaneously, adopt a set of positive and pro-active actions that could help to address diversity imbalances.</p>	<p>Following discussion with the HR department, it has been agreed that Teagasc will report gender, diversity and employment status data by research programme level with HOP’s bi-annually. This data will form the basis of discussions around impact of on-going D & I initiatives and programme specific challenges. One-two D & I initiatives will be championed each year by the HOP and progress measured.</p>	<p>HR department, John Spink</p>	<p>Q3 2022</p>
6	<p>Ensure additional support to advisory services so as to ensure the full value of work from CELUP is not unnecessarily eroded. Teagasc management should explore options to ensure that farmers, at certain key times of the year, not only have support from Teagasc to submit important scheme applications but also to receive the necessary “technical” advisory contact required at that same critical time of year.</p>	<p>The role of regional advisors in supporting scheme work, which is often seasonal in nature with high peak workloads coinciding with periods of high opportunities and demands to give technical advice, is acknowledged as a feature of the current advisory service offering by advisors to farmers.</p> <p>A number of initiatives are currently in operation to try to minimise the impact of scheme work on the technical advisory programme, including ongoing background support to advisors on scheme implementation and administration to help streamline scheme work. There are also a number of programmes (e.g. the industry joint programmes) that provide additional specialist support resources to support advisors in the design and delivery of technical advice and programmes.</p> <p>The Teagasc Climate Action Strategy proposal currently being developed will further address this challenge, as the Signpost Advisory Programme component of the strategy is aiming to establish a cohort of advisors in each Teagasc Region that will be specifically allocated to promoting climate action and sustainability practice adoption with farmers. The advisors within</p>	<p>KT Director</p>	<p>Q3 2022</p>

		this programme will not be providing contracted advisory services (incl. Schemes) to clients, and hence will not be restricted by seasonal demands for supporting scheme work.		
No.	Department Level Recommendations	Actions to be taken	Person(s) responsible	Date for completion
Environment, Soils & Land Use Research & KT Departments				
1	Integration of production and environment-oriented research. The Head of Programme should take actions that encourage closer integration of the environment-oriented research of ESLU with the Animal & Grassland Research and Innovation Programme's (AGRIP's) production-oriented research.	There has been significant effort over recent years to more closely integrate CELUP and AGRIP activities. The formation of the new cross programme Climate change centre will accelerate this process	CELUP & AGRIP HOPs Pat Dillon	Q4 2022
2	Strategic review of staff profile. The Head of Department should consider from a strategic standpoint the staff profile of the Department. The low ratio of (permanent) senior research and KT staff to (period-contracted) junior research and KT staff represents a reputational risk to Teagasc. The gender balance across the ESLU Department (and CELUP <i>in toto</i>) also needs to be addressed. Access to periods of sabbatical leave should be given consideration alongside a reappraisal of Teagasc policies towards staff and student supervision and the dominant deployment of period appointments.	There has been significant effort over recent months to develop a staffing plan and 7 new permanent posts in the department are soon to be advertised as part of Teagasc's response to the Climate Action plan. This will go some way to addressing the permanent to contract staff ratio. The permanent to contract ratio in ESLU is somewhat distorted by the ACP which is externally funded and has a large cohort of contract staff, but the underlying ratio of the core department will be compared to other departments in CELUP and other programmes. The issue of gender will be addressed as per programme recommendation 5.	HOD, HOP, Director of Research and Director	Q2 2022
3	Ensure there are monitoring, evaluation and learning components in the SignPost Programme. The Head of Department should ensure the Signpost Programme focuses not just on the environmental outcomes achieved but	The Signpost Programme Manager has already been in contact with Kevin Heanue, Teagasc Evaluation Officer, and are targeting the development of a Monitoring, Evaluation and Learning (MEL) Framework for the Signpost Programme by end of Q2 2022, in line with this recommendation. Additional	Tom O'Dwyer and Kevin Heanue	MEL Framework by end of Q3 2022 and ongoing

	also provides opportunity for evaluation research on how behaviour change is achieved.	resourcing requirement may be identified through this exercise, including funding for research on behaviour change,		
Crops Research and KT Departments				
1	Specify Crops Research and KT Department's contributions to "Farm to Fork". The Head of Programme, together with his two Heads of Department, should specify, among the "actions" identified in response to the "Farm to Fork" statements, those that will be "owned by" and "belong to" Teagasc.	HOP and HODs will review the current strategic objectives of crops programme compiled in 2020 (https://www.teagasc.ie/crops/crops/research/research-strategy/) to ensure alignment with F2F statements,. This will facilitate the identification of specific F2F actions as per reviewer's request	Ewen Mullins	End of Q3 2022
2	Assemble a "horizon-scanning" group to advise on priorities. The Head of Programme, together with his two Heads of Department, should assemble a small "horizon-scanning" group (including informed individuals from outside the organisation) to provide advice on priorities for potential investment in the new skills and capacity from which Teagasc and its stakeholders are likely to derive greatest benefit.	Action on this has already commenced through the Tillage Industry Stakeholder Group which met in March. Further work will continue with focussed discussion among HOP and HODs and a specific item on the agenda of the next stakeholder meeting.	Michael Hennessy	End of Q4 2022
Forestry Development Department				
1	Review forestry partnerships. In response to the new Irish Forestry Strategy, Teagasc should review its tactical and strategic partnerships with others in the forestry sector to leverage skills, resources, and expertise. This should include working with DAFM to implement the recommendations of the " <i>Coford Long Term Forest Research Report</i> " to ensure there are no critical sector-wide duplications or gaps.	<p>Teagasc is collaborating with DAFM, along with other stakeholders, in the development of a new Irish Forestry Strategy. Teagasc's role and contribution in relation to forestry is to be reviewed as an element of Project Woodland.</p> <p>Teagasc will review current tactical and strategic partnerships and how these can be enhanced and potential new partnerships developed in response to the new Irish Forestry Strategy (once finalised). This will necessitate additional resources to develop further.</p> <p>The potential for strategic partnership will continue to be a focus area in ongoing stakeholder engagements e.g. with forest owner groups and industry representatives in terms of adding value to</p>	HoD, HoP, SMG	<p>Following the finalisation of new Forestry Strategy.</p> <p>Ongoing and dependent on DAFM/Teagasc</p>

		<p>research and advisory outcomes while maintaining objectivity with regard to knowledge generation and transfer.</p> <p>In relation to the Coford Long Term Forest Research Report, Teagasc has recently met with DAFM personnel to initiate some possible actions, including the enhancement of Teagasc involvement and capacity in longer-term forestry research.</p>		agreement and timeframes
2	Strengthen engagement with “Project Woodland”. Teagasc must continue to engage pro-actively and effectively with “Project Woodland” (alongside others) to ensure a strong, long-term trajectory for Ireland-specific forest science.	<p>Teagasc is already pro-actively engaging with Project Woodland, and will continue to actively engage with relevant stakeholders.</p> <p>This includes contributing to the DAFM Forest Policy group and Project Woodland Working Group 3. Teagasc is taking a lead on training needs analysis for the sector and collaborating on communication strategy development. Teagasc management also recently held a bilateral meeting with DAFM as part of the process. Teagasc will play a central role in subsequent implementation of the strategy, implementation of the next Forestry Programme and will contribute robustly to future forest science outputs and knowledge transfer.</p>	HoD, Forestry Specialist	Conclusion of Project Woodland and dependent on role in implementation of actions and resources.
Horticulture Development Department				
1	Include human health and nutrition in analysis of options. In addition to import substitution, issues of human health and nutrition should feature in the analysis of strategic options and priorities for broadening the scope of the Horticulture Department.	The benefits of fruit and vegetables in the diet is increasingly used in the promotion of the horticultural industry and by HDD in promoting its work. Whilst human health and diet falls outside the remit of Teagasc we will investigate the opportunities with colleagues in the food programme and other external bodies	HOD, HOP	Q4 2023

End