

# TEAGASC TECHNOLOGY FORESIGHT PROJECT

## Scoping Document V4

### 1. Introduction

The Teagasc Technology Foresight Project aims to support the long-term development of a competitive, sustainable and profitable Irish Agri-Food and Bioeconomy (AFB) sector. The sector must continue to be innovative in seizing evolving market opportunities for food and non-food products and services. Its prosperity and competitiveness depends on its ability to adjust to a rapidly changing global environment. Consumers around the world are increasingly demanding new and more innovative products and the emerging bioeconomy is opening up new opportunities for food, non-food and non-feed products and ecosystem services.

Continuing advances in science, technology and innovation will be central drivers of the profitable and sustainable AFB. They will contribute to new ways of generating wealth, reducing input costs, and adding value while strengthening the sector's sustainability and resilience. Harnessing these advances requires a commitment to optimizing national science capacity, focusing on R&D collaboration across the supply chain and increasing the emphasis on technology transfer and commercialisation. The Teagasc Technology Foresight project is an important contribution to this process.

### 2. The Context

#### 2.1 *The Global Context*

Ireland's AFB and broader rural economy are being rapidly reshaped, driven predominantly by global trends and policy developments, combined with a range of non-monetary forces. These include food security/safety, food and health, environmental sustainability, biodiversity, biosafety, climate change, demographic changes, advances in science and technology, globalisation and increasing competition.

We have come to the end of the phase with a supply-driven market to one that is driven by new and wider market demands for competitively priced food products of proven quality, safety and sustainability. This challenge is compounded by a wider set of challenges arising from growing societal demands on land, water, air, soil, and biodiversity resources.

#### 2.2 *The Irish Agri-Food and Bioeconomy Sector*

The AFB sector continues to play an integral part in Ireland's economic recovery and is our largest indigenous industry, contributing €26 billion in turnover and generating 12.3% of merchandise exports. Food and beverage exports increased to a record value of almost €10.5 billion in 2014, representing an increase of 4% on the previous year and a 45% increase since 2009. The sector accounts for around 170,000 jobs, or 9% of total employment, and makes a particularly significant contribution to employment in rural areas.

The Department of Agriculture, Food and the Marine is currently preparing a new national strategy, Food Harvest 2025, for the sector. It will outline the key actions required to ensure that the sector (primary agriculture, the food and beverage industry, fisheries and fish processing, forestry and forestry processing) maximises its contribution to overall economic growth, job creation and environmental sustainability over the coming decade.

### **2.3 Response Required**

There is a clear need for research and innovation in order to respond to the emerging challenges facing the sector. Agricultural and food research is now being asked to address issues that are both multi- and inter-disciplinary. The application of new technologies (ICT, nanotechnologies, biotechnology, etc.) will play an increasingly important role in the sector. The Teagasc Technology Foresight project will explore these and identify those that have the greatest capacity to deliver within the sector.

## **3. The Foresight Project**

Teagasc undertook a major Foresight exercise over the period 2006-2008 ([http://www.teagasc.ie/publications/view\\_publication.aspx?PublicationID=285](http://www.teagasc.ie/publications/view_publication.aspx?PublicationID=285)). It resulted in the development of a new long-term RTDI strategy and recommendations for major structural and programme changes within the organisation. The Teagasc Board agreed in autumn 2014 to undertake a follow-up Foresight with a focus on new technologies. This Foresight project will focus specifically on the identification of the key technologies that have the potential over the next 15-20 years to underpin competitiveness, sustainability and growth in the AFB. It will be of major importance in assisting Teagasc to integrate a longer timeframe in the development of strategies, policies and roadmaps for its research and innovation programmes.

### **3.1 Project Objectives**

The overall objective of the project is to provide a comprehensive and well-researched source of evidence to enable Teagasc develop the long-term science and technology programmes needed to enable AFB meet, in a sustainable manner, the ambitious growth targets that will be set in Food Harvest 2025 and up to 2030.

The *specific objectives* of the study are to:

- Identify and analyse key drivers of change and the resulting challenges and opportunities arising for the AFB over the next 15 years.
- Develop a shared global vision for technology as a driver of AFB.
- Determine the science, technology and innovation needs resulting from the sector vision.
- Provide a detailed assessment of the new emerging generic and other technologies that could impact on the AFB up to 2030. The focus is to be on those likely to yield the greatest economic, environmental and social benefits. It will also include an assessment of barriers to uptake, likely costs, potential for impact, research needs and likely timescale to their introduction into the AFB.

- Make recommendations to the Teagasc Board and management on the new technologies to be prioritised in their future programmes.
- Secure the involvement and support of a wide spectrum of AFB stakeholders in the process.
- Build a mutual learning platform to enhance the strategic capability in Teagasc.

### ***3.2 Project Focus***

The focus of the exercise is on AFB including the production of food, feed, fuel, ecosystem services and other potential activities along the value chain. The project will focus on identifying the technologies which Ireland will need to exploit through research and knowledge transfer programmes in order to maximise opportunities for its land-based natural resources.

### ***3.3 Defining the Users***

The primary user of the Foresight will be Teagasc Board, management and staff in terms of defining long-term research agendas, programmes, objectives and strategies for the organisation. However, the results will also feed into wider policy making affecting the sector and possibly influence other actors in the national S&T arena.

### ***3.4 Setting the Time Horizon***

The project will focus on those technologies which could potentially find application in AFB by 2030.

## **4. Organisational Structure for the Project**

A **Steering Committee (SC)**, comprising national and international representatives from government institutions, industry and universities, is responsible for guiding the project. The SC will be assisted in its work by number of **Technology Cluster Working Groups (TCWG)**, which will responsible for undertaking the detailed technologies assessments. A **Foresight Expert Panel (EP)**, comprising the chairs and rapporteurs of the individual TC supported by external experts, will be responsible for developing the Foresight knowledge base and detailed guidelines for the work of the TC. The exercise will be supported by a **Project Working Group (WG)** drawn from within Teagasc, which will undertake the day-to-day management of the project. An external **Consultant (CO)** will provide the necessary expert foresight input.

## **5. Approach to the Study**

It is proposed that the following specific tasks will be implemented in delivering on the project objectives:

1. Prepare an initial technology scoping study which will identify at a relatively high level those technologies that could be of long-term relevance to AFB.

2. Establish TCWG and the EP and provide the members with the necessary training in Foresight methods.
3. Agree the design of the process, ensuring commitment and co-operation, putting the foundations / elements in place, preparing for the scoping, the foresight information, and the input needed.
4. Review, analyse and report on relevant existing and on-going Foresight studies and create a high quality knowledge base for the project. This should include the drivers of change, key trends, challenges, threats and opportunities. It will provide a basis for the development of the project vision for the sector.
5. Using different Foresight methods, conduct detailed analyses of the key new technologies to identify the critical technologies to be prioritised.
6. Develop a communications strategy to ensure that all relevant stakeholders are fully aware of the process and are provided with opportunities to contribute.
7. Develop agreed recommendations and priorities for presentation to the Teagasc Board.
8. Present the results in a report and at a national Foresight conference.

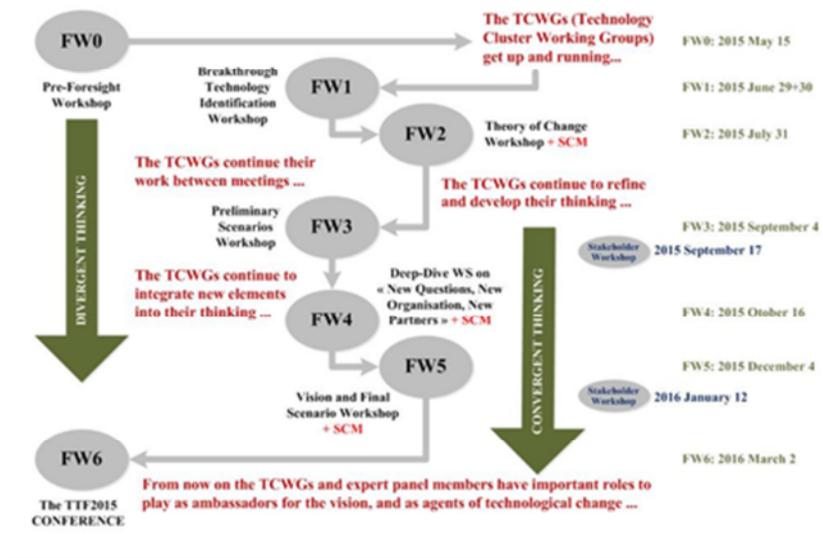
## **6. Project Structure**

An overview of the Technology Foresight Process is presented in Figure 1. This identifies and timetables a series of eight Foresight Workshops (FWs) that will take place between May 2015 and February 2016. More detail on the goals, chronology and outputs of the FWs are given in Table 1.

A Stakeholder Consultation process will run in parallel to the Foresight Workshops. The objectives are i) to inform AFB stakeholders of the project activities and outcomes; ii) to facilitate and promote their input and ownership of the project outcomes.

Two stakeholder meetings are planned. The first in autumn 2015 will provide a preliminary outline of the breakthrough technologies being considered and how these will help to realise high level goals outlined in key documents such as Food Harvest 2020 and 2025. The second in early spring 2016 will provide an opportunity to review project progress and to provide feedback that will be considered in the preparation of the final report.

# The Teagasc Technology Foresight Process



**Figure 1.** An overview of the Technology Foresight Process.

Knowledge dissemination will follow the completion of the Technology Foresight process. The objectives are i) to maintain all internal and external stakeholders fully informed of progress on an on-going basis; ii) to generate a high degree of interaction and learning among all those involved.

A communications plan will be agreed and implemented from the outset of the project. The objective will also be to disseminate the findings in various ways, including via the media, a dedicated website and a National Conference in March 2016.

Following the National Conference, an independent evaluation of the efficiency, effectiveness and preliminary impact of the project will be completed by the end-June 2016.

**Table 1.** An outline of the goals, chronology and outputs of the eight Workshops.

<b>May 15, 2015</b>	<b>FW0: Pre-Foresight Workshop</b>	The goal of this workshop is to discuss the overall goal and approach. Get the EP, TCWG member and everybody else on board. Assist the EP understand what is expected from them and help get the work of their TCWGs off the ground. Work out the practical issues until the end of the project.
<b>29-30 June 2015</b>	<b>FW1: Breakthrough Technology Identification Workshop</b>	The TCWGs have been working at identifying preliminary results of their work. Each TCWG presents the technologies that it has identified that could create real breakthroughs in terms of AFB performance. These are grouped in “ways that make sense”. Gaps will appear in terms of ancillary issues that need to be addressed to create the conditions for success.
<b>31 July 2015</b>	<b>FW2: Theory of Change</b> workshop to deepen our understanding of how these technologies will drive breakthroughs that will have a high impact on the bio-economy and society	Between workshops the TCWGs continue to work on and expand their lists of possible breakthrough technologies. They group and regroup them in terms of the sectors they will serve or in terms of the solutions they provide or the questions they will answer. They develop their thinking about how these new technologies will drive performance. This deeper understanding allows them to rank technologies in terms of impact, technology readiness and time to adoption.
<b>4 September 2015</b>	<b>FW3: Preliminary Scenarios Workshop</b>	The goal of this workshop is to express the opportunities provided by these technologies in terms of compelling scenarios that explain how these breakthrough technologies will help to realise high level goals outlined in key documents such as Food Harvest 2020 and 2025.
<b>16 October 2015</b>	<b>FW4: Deep Dive Workshops</b> to understand the new kinds of questions that emerging breakthrough technologies will allow scientists to ask. to understand new ways in which scientific activity is being organised, to address difficult, hard to solve problems and to shorten the path from discovery or creation to innovation.	Certain technology breakthroughs provide new “tools for thinking” and for “doing science”. These are changing the kind of questions that science and technology can reasonably ask. The goal of this workshop is to arrive at a much deeper understanding of these transformations and how they will impact the future work of research and technology development. In parallel the TCWGs continue their work of structuring the insights they have gathered on breakthrough technologies and refining their scenarios accordingly. This workshop also looks at important trends in research and innovation that could have an impact on how AFB is organised in the future. The goal of the workshop is to examine how the role of the scientist and the organisation of research activity is already being transformed and how this will develop in the coming years. In parallel the TCWGs continue their work to refine their scenarios and integrate these new elements into the overall picture.
<b>4 December 2015</b>	<b>FW6: Vision Building and Final Scenarios Workshop</b>	The goal of this workshop is to present the latest version of the scenarios developed by the TCWGs, and develop a shared global vision for technology as a driver of progress in the AFB.
<b>2 March 2016</b>	<b>International Foresight Conferenced</b>	The overall vision is presented, along with the scenarios that flesh out the vision in terms of major technology groups and sectors of the AFB. This is an opportunity for expert panel meetings to position themselves as agents of technological change in the sector.

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ng all those involved in the Foresight exercise, or in some way targeted by it, through various media over the lifecycle of the project, from start-up to implementation and diffusion.

The Strategy will aim to:

- Foster a process of learning amongst all participants and stakeholders in the project
- Encourage a participatory approach in the exercise and more generally in the policy- and decision-making cycles
- Target communications and interactions between stakeholders, specifically leading to consensus-building and commitment of stakeholders.

Three types or levels of communication are identified as being required in order to satisfy the needs of the different stakeholders:

- Communicate information on the broad aims of the project – “setting the scene” and securing a level of interest of stakeholders
- Communicate information on Foresight as a process, sets of approaches and tools, and as a mind-set
- Communicate information on the specific theme or issues being addressed – focussing on the core theme of the project.

#### **8. Defining the outcomes**

The tangible outcomes will include a range of reports and analyses, including working papers on selected thematic areas and analyses of new technologies. Intangible outcomes will include development of strategic capability in Teagasc, new relationships and networks, enhanced opportunities for profiling Teagasc and broader appreciation of the importance of S&T in AFB.