



An Roinn Talmhaíochta,  
Bia agus Mara  
Department of Agriculture,  
Food and the Marine

# Creating & Shaping the development of Ireland's Bioeconomy

Patrick Barrett

November 2020





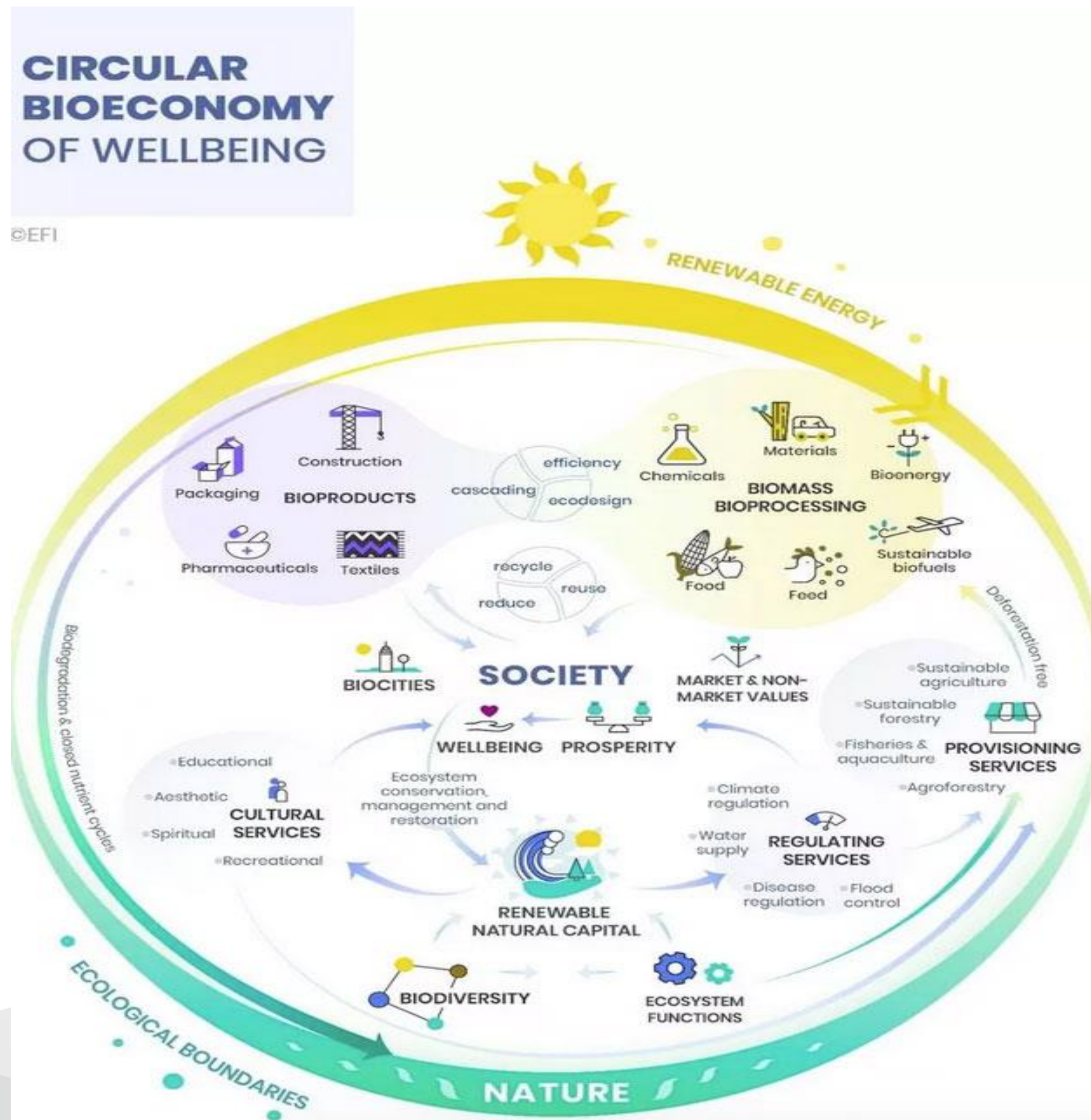
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Food and the Marine

## What is the bioeconomy?

Catalyst for change for producing & consuming **biological resources** and the use of **fossil & mineral resources**

Supports primary production & industries to become **innovative, sustainable** and **circular**.

Protects **nature**, develops **carbon neutrality** and **decarbonisation** and builds **rural and regional prosperity**.





# What is the EU doing?

## The Bioeconomy is embedded in the EU Green Deal

### 2018 European Bioeconomy Strategy



#### Aim:

Link the **sustainable use of renewable biological resources** with the protection and restoration of **biodiversity, ecosystems and natural capital** across land and water






With **social, environmental and economic SUSTAINABILITY and CIRCULARITY** at its core

Developed jointly across **different DGs** (RTD, AGRI, ENV, MARE, GROW, JRC, CLIMA)



1

#### STRENGTHEN AND SCALE-UP THE BIO-BASED SECTORS, UNLOCK INVESTMENTS AND MARKETS

-  Mobilise stakeholders in development and deployment of sustainable bio-based solutions
-  Launch the EUR 100 million Circular Bioeconomy Thematic Investment Platform
-  Analyse enablers and bottlenecks for the deployment of bio-based innovations
-  Promote and develop standards, labels and market uptake of bio-based products
-  Facilitate the development of new sustainable biorefineries
-  Develop substitutes to fossil based materials that are bio-based, recyclable and marine biodegradable





2

#### DEPLOY LOCAL BIOECONOMIES RAPIDLY ACROSS EUROPE

-  Launch a Strategic Deployment Agenda for sustainable food and farming systems, forestry and bio-based products
-  Launch pilot actions for the development of bioeconomies in rural, coastal and urban areas
-  Support regions and Member States to develop Bioeconomy Strategies
-  Promote education, training and skills across the bioeconomy

3

#### UNDERSTAND THE ECOLOGICAL BOUNDARIES OF THE BIOECONOMY

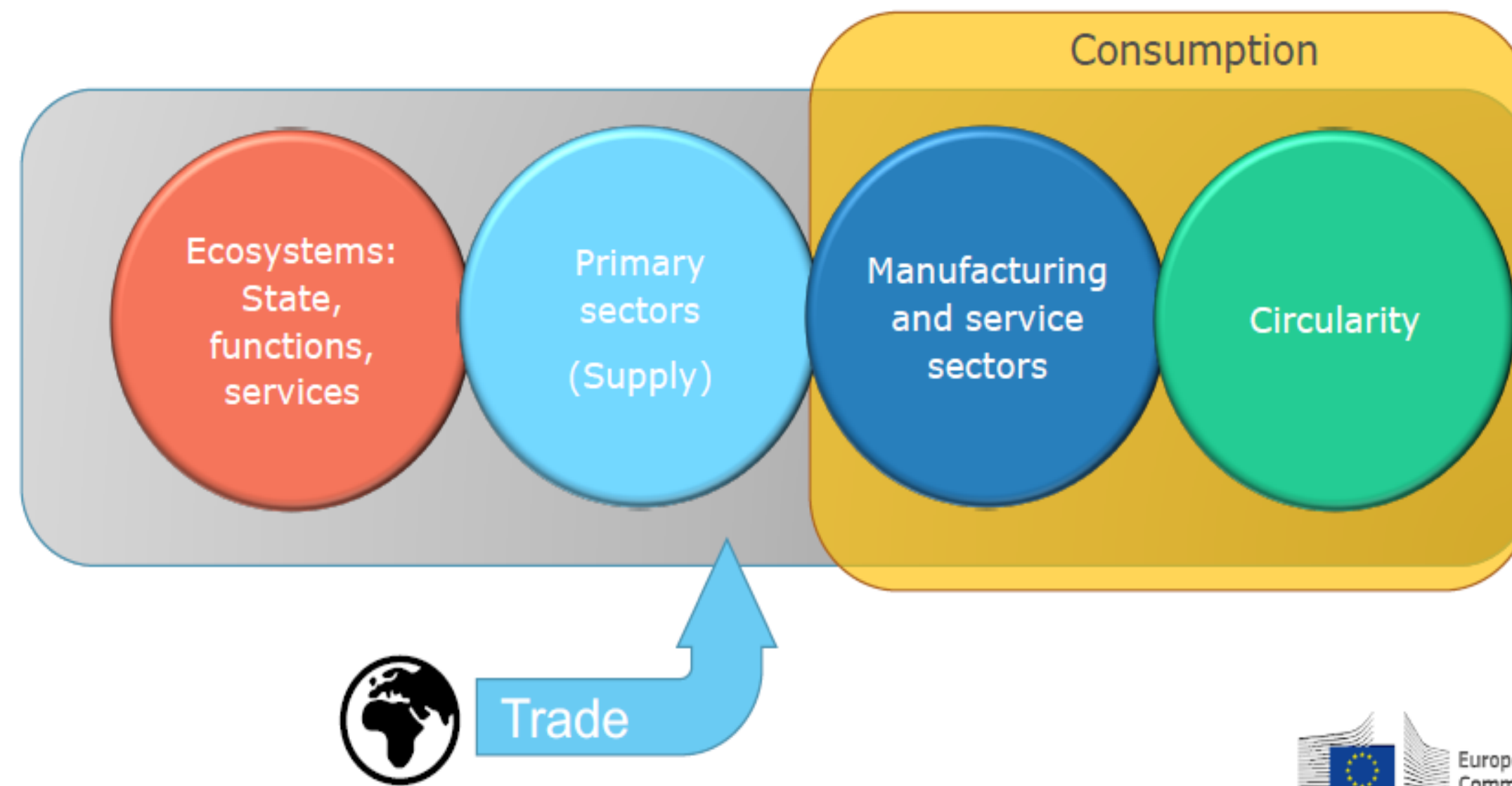
-  Enhance knowledge on biodiversity and ecosystems
-  Monitor progress towards a sustainable bioeconomy
-  Promote good practices to operate the bioeconomy within safe ecological limits
-  Enhance the benefits of biodiversity in primary production

# Why should Ireland further develop the bioeconomy?



## Context: what does the EU Bioeconomy encompass?

All sectors that PRODUCE | USE | PROCESS | RELY ON  
**biological resources**



## The characteristics of biological resources:

1. The unique and remarkable features of biological resources :
  - Renewability
  - CO2 friendly or even carbon neutral
  - Cascading use
  - New & better functions e.g. less toxic, less water, more stable,
2. New knowledge & technology e.g. biorefining, microbiome combining to optimally use biological resources
3. Digitalisation aiding soil, land and food & biomass management, mobilisation, logistics etc.
4. The more we protect and enhance nature the more **diversity & functionality** will be present in our biological resources and the more **resilient, climate friendly** and **valuable & healthy** our soils, farms, land and food systems will be.

# Kick-Starting Irelands Sustainable & Circular Bioeconomy



## Strategy - FoodWise 2025 (2015)

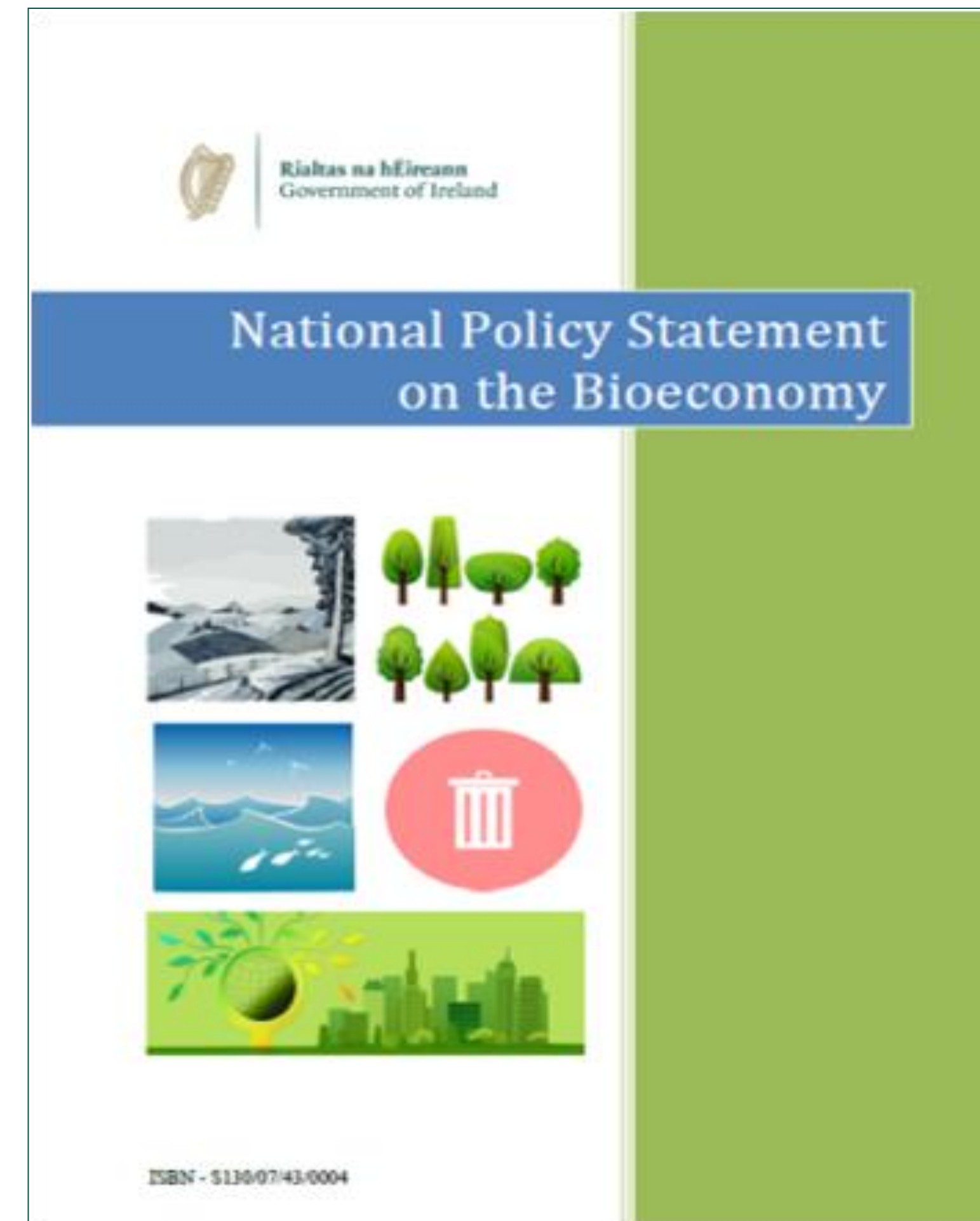
Provide scientific advice for policy decisions on bioeconomy

## Research - BioEire (Teagasc 2016-2018)

- Identify bioeconomy priorities for Ireland
- Knowledge base for national strategic development

## Action Plan - Rural Development / Jobs (2017)

- Baseline assessment of Bioeconomy activity and opportunities
- Public consultation & consultative workshop with key stakeholders
- Publication of High Level Policy Statement on the Bioeconomy.





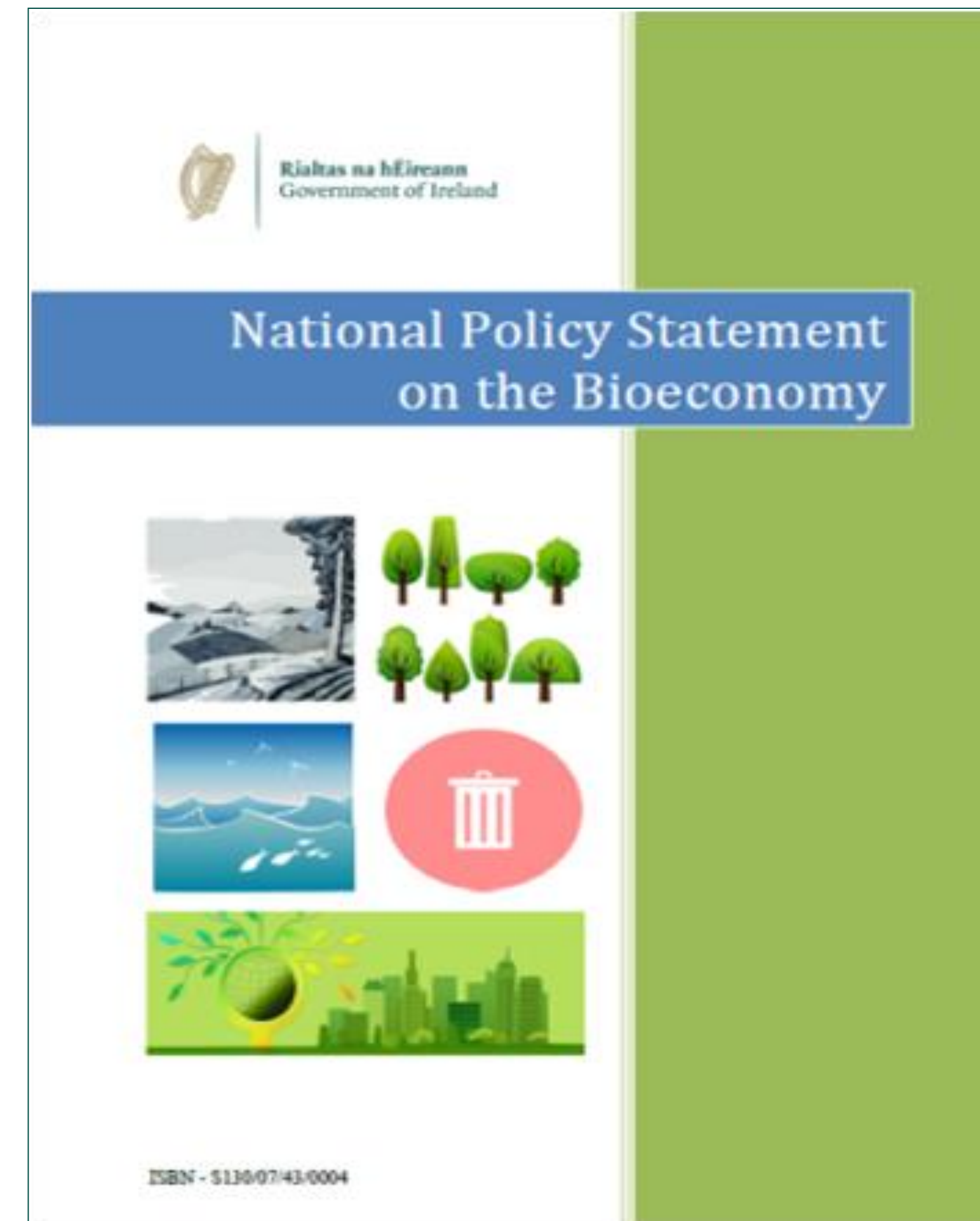
# Step 1: Vision for a future sustainable system addressing the key environmental, economic & social challenges



Capitalise on the potential of the bioeconomy to address **sustainable development & circularity**.

Address **guiding principles & strategic objectives**

Address specific actions & key challenges to improve the **commercial success** and **social development** of the Bioeconomy.

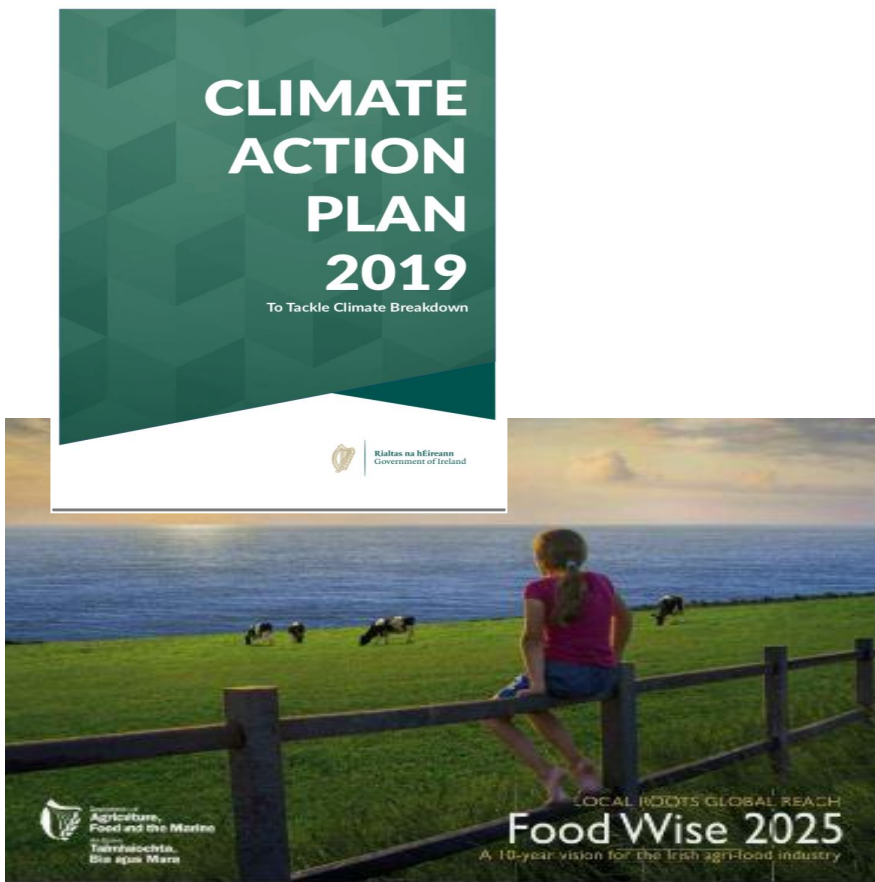




# Step 2: Bioeconomy Implementation Group - coordinating across government departments and across different levels of government.



1) Ensure Policy Coherence



4) Consider how primary producer, public and consumer awareness of the bioeconomy and its products can be raised.



2) Establish a Network of Stakeholders



3) Translate research to real applications



6) Review the Definition of Waste.



5) Risk Assessment and Management Protocols.

7) Progress the leading value chain propositions identified in the Bio-Eire project.





# How is bioeconomy integrating with wider Government Policy?



Rialtas na hÉireann  
Government of Ireland

Project Ireland 2040

**Building Ireland's  
Future**



**FUTURE JOBS  
IRELAND 2019**  
Preparing Now for Tomorrow's Economy



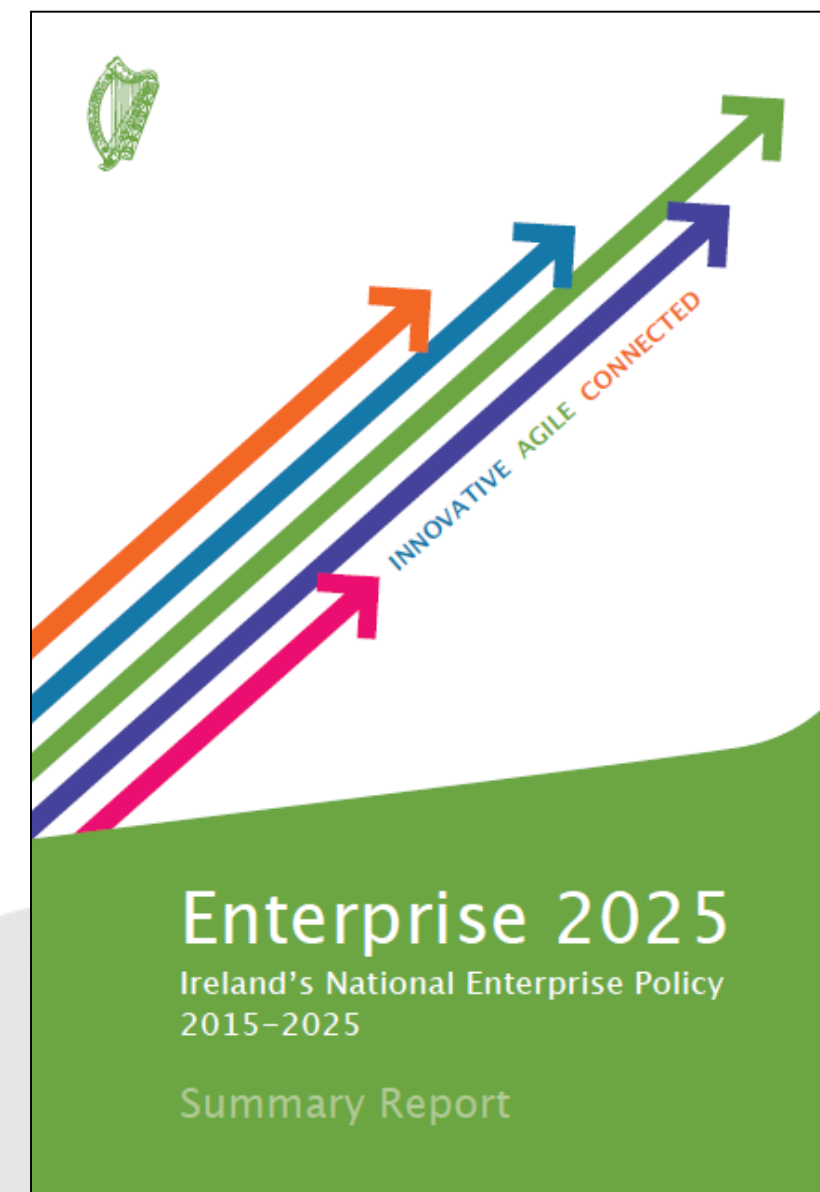
**Ireland's  
Agri-Food  
Strategy to  
2030 - An  
Open Policy  
Debate**

WEDNESDAY 16 OCTOBER  
2019, 9:00AM PRESIDENTS  
SUITE, AVIVA STADIUM,  
DUBLIN

**CLIMATE  
ACTION  
PLAN  
2019**  
To Tackle Climate Breakdown



Rialtas na hÉireann  
Government of Ireland



**Public Consultation  
Waste Action Plan for a  
Circular Economy  
2019**



# Step 3: Creating spaces for building system level awareness.



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[www.irishbioeconomy.ie](http://www.irishbioeconomy.ie)

[#irishbioeconomy](#)

## YOUR QUESTIONS ABOUT THE BIOECONOMY ANSWERED



### What is the bioeconomy?

Our definition of the bioeconomy and what it means for the future Ireland.

[FIND OUT MORE](#)



### Who supports it?

How the Irish government is backing the development of our bioeconomy.

[FIND OUT MORE](#)

Press release

## Launch of the National Bioeconomy Forum

From [Department of the Environment, Climate and Communications](#)  
Published on 19 October 2020  
Last updated on 19 October 2020

Minister for the Environment, Climate and Communications, Eamon Ryan TD, along with Minister of State in the Department of Agriculture, Food and the Marine (DAFM), Martin Heydon TD, today announced the launch of the National Bioeconomy Forum to promote, support and advocate for the sustainable development of the bioeconomy in Ireland.

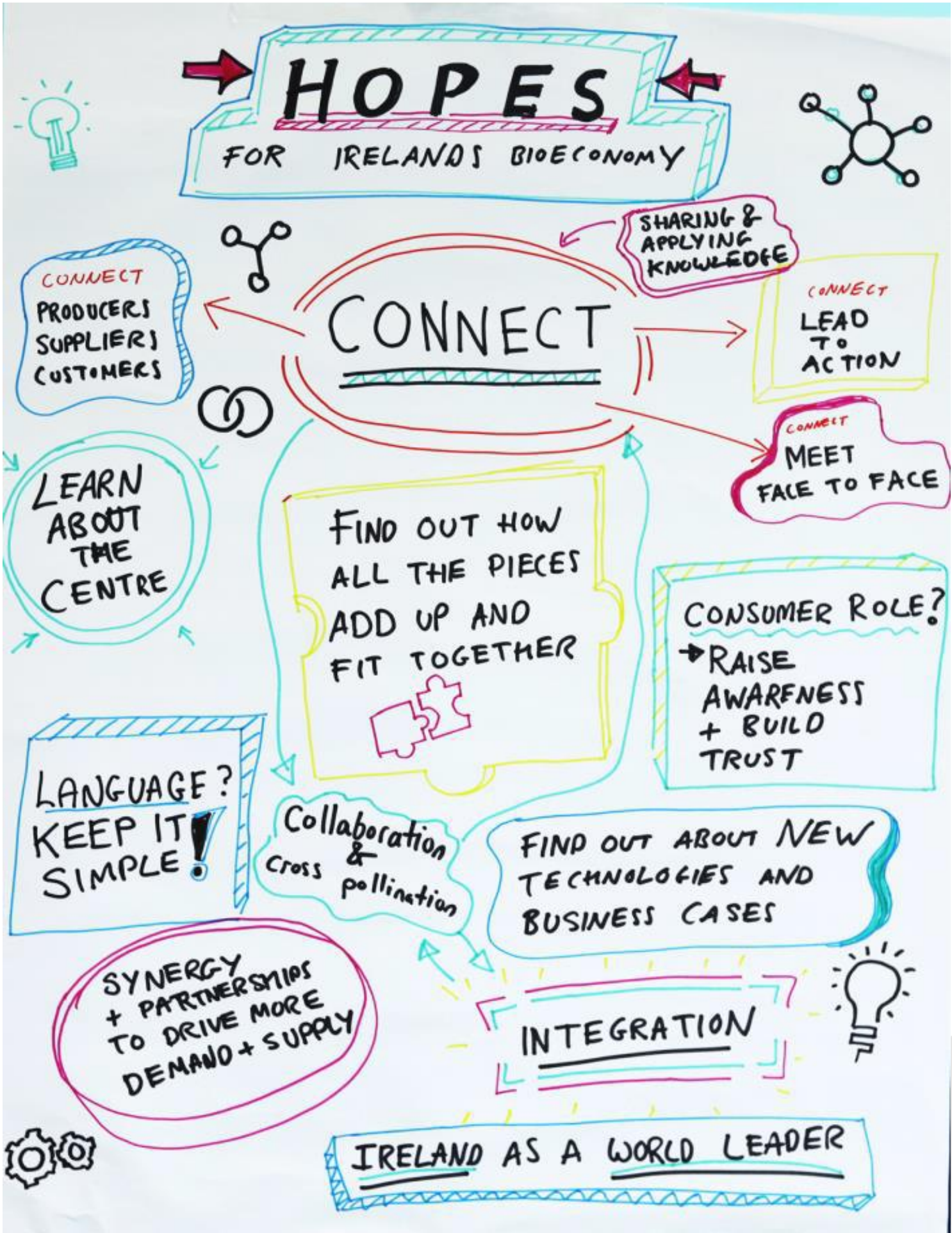
The National Bioeconomy Forum will provide a voice for a broad range of stakeholders, including industry, community groups, NGOs and relevant state bodies.

The bioeconomy uses renewable, biological resources sourced sustainably from land and sea such as crops, forestry, fisheries, aquaculture, micro-organisms and animals and converts these resources into value-added bio-based products including proteins, feeds, fertilizers, plastics and energy. The bioeconomy has the potential to create new, sustainable opportunities for farmers and high-quality, green jobs in rural and coastal areas. The Government recognises the important role that Ireland’s bioeconomy can play in meeting our climate change targets, and outlined a range of commitments in the Programme for Government to develop and grow the sector.



# CONNECTING IRELAND'S BIOECONOMY

# Networking & Awareness Raising





## Step 4: Lengthening planning and investment horizons to timescales commensurate with the transition.



### Project Ireland 2040, the National Planning Framework & the National Development Plan

While rural and coastal areas have the potential for, and will develop, many types of economic activities, those activities associated with the **bioeconomy** such as development of new **biorefining technologies** represent a **competitive advantage**.

The transition to a more **circular economy and bioeconomy**, where the value of bio-based products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised, will provide an **essential contribution** to our national goal of developing a **sustainable, low-carbon, resource efficient and competitive economy**.

**National Policy Objective 23:** Facilitate the development of the rural economy through supporting a **sustainable and economically efficient agricultural and food sector**, together with **forestry, fishing and aquaculture, energy** and extractive industries, **the bioeconomy** and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and **protecting the natural landscape** and built heritage which are vital to rural tourism.



Rialtas na hÉireann  
Government of Ireland

Project Ireland 2040

**Building Ireland's  
Future**





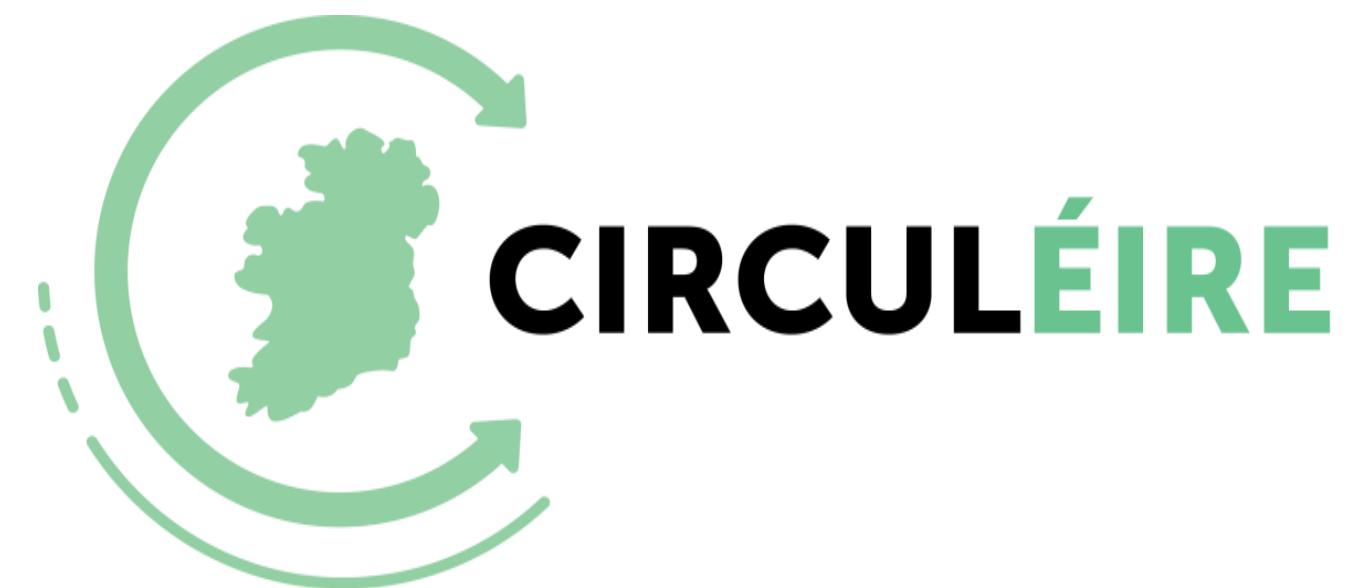
# Step 5: Establishing and maintaining long-term collaborative partnerships and networks.



The bioeconomy by its very nature is highly-collaborative and activities require participation, expertise and investment on the part of multiple actors including government, the private sector, and civil society.

A key factor for success is achieving effective cooperation among these multiple, diverse participants.

Bringing together multiple actors to make complementary investments raises particular challenges.





# Resilient, Carbon Neutral Farms



A world first for agriculture, BiOrbic, Carbery and their collaborators have undertaken an interdisciplinary programme of work, targeting numerous areas.



## RENEWABLE ENERGY

Sourcing energy through renewable means where possible to reduce the farm's reliance on carbon emitting fossil fuels.



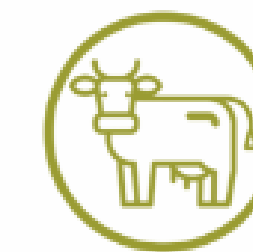
## SOIL AND GRASSLAND

Capturing carbon within the soil by planting multi-species swards. This allows for reduced use of fertiliser.



## BIODIVERSITY

Maintaining biodiversity on the farm, taking advantage of ecosystem services for less reliance on pesticides and fertiliser.



## ANIMAL DIET AND BREEDING

Trialling different types of diet that change animal digestion, reducing the amount of greenhouse gas emitted through belching.



## LIFE-CYCLE ANALYSIS

Thorough analysis of plant and animal life-cycles on the farm to understand overall carbon emissions.



# Transforming Industry

Scale up resource-efficient, circular and carbon neutral solutions based on both renewable energy and sustainable biological resources



AgriChemWhey



AgriChemWhey aims to establish a first-of-a-kind, industrial-scale biorefinery to valorise dairy waste to several high added value bio-based products for growing global markets by:

1. Optimising and scaling-up the innovative fermentation process
2. Proving the techno-economic viability of the biorefinery
3. Integrating symbiotic industrial and agricultural value chains

<https://youtu.be/wVhP-KVyl0s>



Biological resources are usually owned and managed by many more people, and distributed across wider parts of the territory.

The circular bioeconomy, if co-developed with the participation of local communities, has great potential to generate an equitable distribution of prosperity across a wider geography.



**Funguschain Project**

Extracting value from the agricultural offcuts of commercial mushroom farming

SEE THE VIDEO

Did you know that each week more than 60.000 tons of mushroom byproducts are generated in Europe?

A video introduction slide for the Funguschain Project. The background is a close-up, slightly blurred image of white mushroom spawn growing on dark substrate. The text is overlaid in white and orange. At the bottom right, there are two small orange squares.



# Strengthening the commercial prospects of the Irish Bioeconomy





# Step 6: Access to and cost of capital will be critical to the success of the bioeconomy.



## Joint action for bio-based industries: EIB, European Commission and ECBF Management GmbH launch circular bioeconomy fund with a target size of €250 million

1 October 2020 . [Twitter](#) [Facebook](#) [LinkedIn](#) [Email](#) [Print](#)



©Liana Mikah/Unsplash

- ▶ Launch of the European Circular Bioeconomy Fund (ECBF), the first equity fund exclusively dedicated to the bioeconomy and the circular bioeconomy in the EU and the Horizon 2020 Associated Countries.
- ▶ The ECBF reached its first closing with €82

Access to finance and risk-taking capacity are key to bring the circular bioeconomy from niche to norm. This is because it integrates a multitude of economic actors along complex value chains: everything from the protection and management of natural ecosystems, the production of biomass and food, to the deployment of new and sustainable high-tech solutions with high capital needs.

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### Related pages

- ▶ The EIB in the circular economy
- ▶ InnovFin – EU Finance for innovators

### Related tags

Ambroise FAYOLLE, 



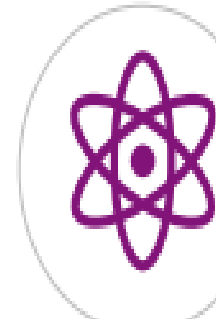
## Potential role for ISIF in the circular economy



Bioeconomy is closely aligned with ISIFs Food and Agriculture Strategy delivering on three priority themes, Climate, Regional, Indigenous with potentially transformative and additional projects to assist in the delivery to net carbon zero agriculture.

ISIF is currently assessing the role it can play funding projects in the Bioeconomy sector in the following areas;

- Develop tailored platform solutions;
- fund investments; and
- direct investments into companies (debt/equity) to support commercial investment opportunities.



Examples of opportunities include use of waste from livestock to generate energy (gas or electricity) through use of anaerobic digestion, biorefining, soil management and energy crops, use of waste / byproducts from production processes to create value added products.



# Step 7: State owned companies will play a very important role.

While encouraging new entrants and rural and technological entrepreneurship remains an important aim of bioeconomy development, it is also the case that the private sector might not step in precisely because there is only an emerging or under developed market yet for biobased products.



Hear about 3 of our GREEN ENTERPRISE bioeconomy projects

Symbiobeer  
Hexafly  
CyberColloids

A Webinar Series for Green Enterprise: Innovation for a Circular Economy

Thursday 22nd October  
10-11am

Register Now  
at [nwpp@epa.ie](mailto:nwpp@epa.ie)

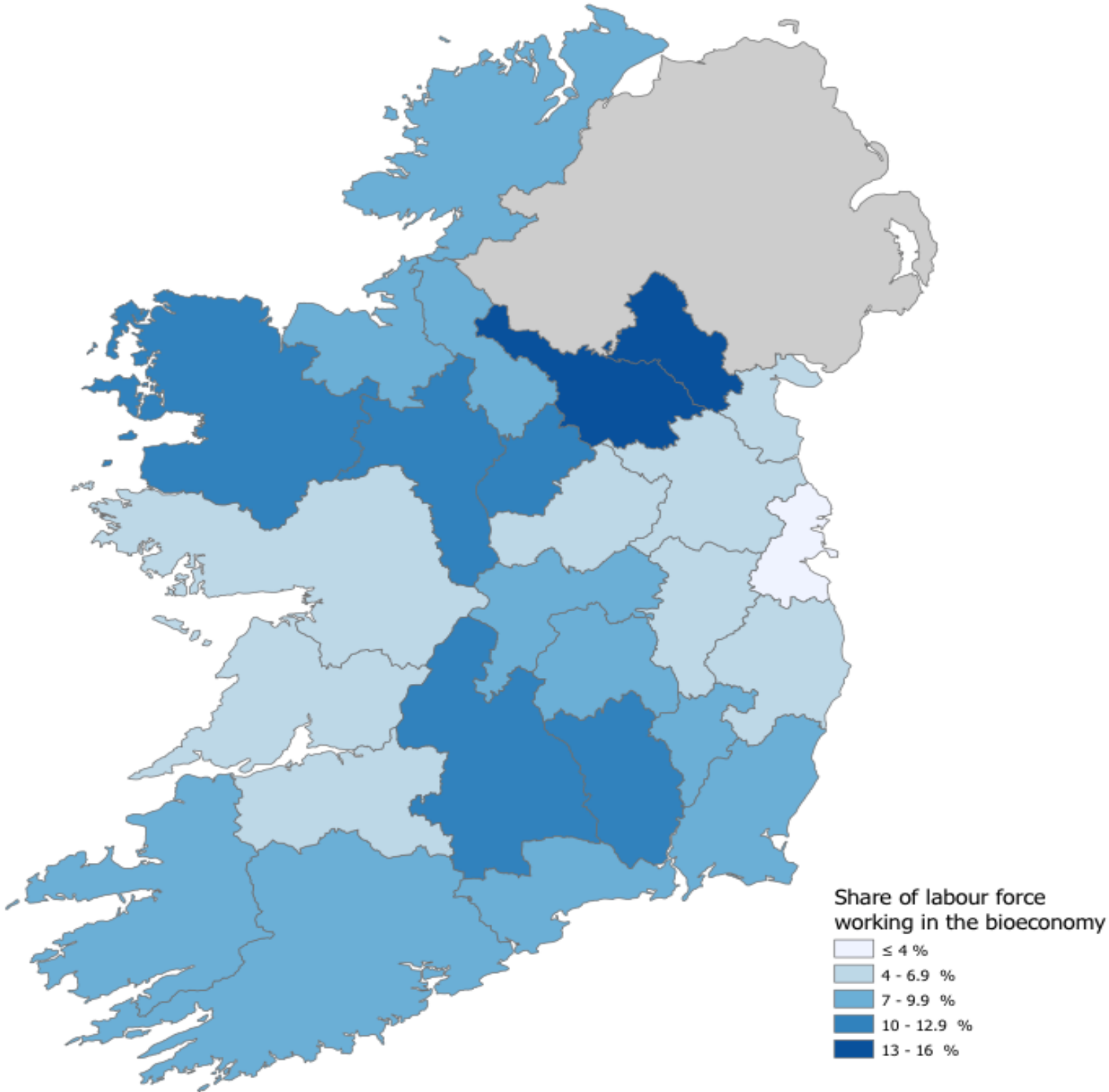
BIOECONOMY IRELAND WEEK

#greenenterprise  
#irishbioeconomy  
#BuildBackBetter

Rialtas na hÉireann  
Government of Ireland

## The importance of the bioeconomy in Ireland

### Share of the workforce employed in the bioeconomy



The bioeconomy is a multifaceted sector with many occupations falling under the general umbrella term. As such it is not surprising that it already provides livelihoods to many people in Ireland. On this map we show the share of people working in sectors considered fully embedded in the bioeconomy. The data was taken from the CSO, the the relevant sectors identified from the EU JRC report "Getting (some) numbers right – derived economic indicators for the bioeconomy". Sectors that are fully embedded in the bioeconomy include but are not limited to agriculture, forestry, and fisheries, food and beverage manufacturing, as well as bioenergy. The map shows a high share of bioeconomy related jobs in the north of the Republic with Cavan having the highest share (15.1 %), as well as in the south and the midlands. Dublin and its commuter counties shows the lowest share of bioeconomy related jobs.

Source: Central Statistics Office

BIOECONOMY IRELAND WEEK

OCTOBER 19-23 2020

Dr Stuart Green and Dr Jesko Zimmermann

Department of Agrifood Business and Spatial Analysis

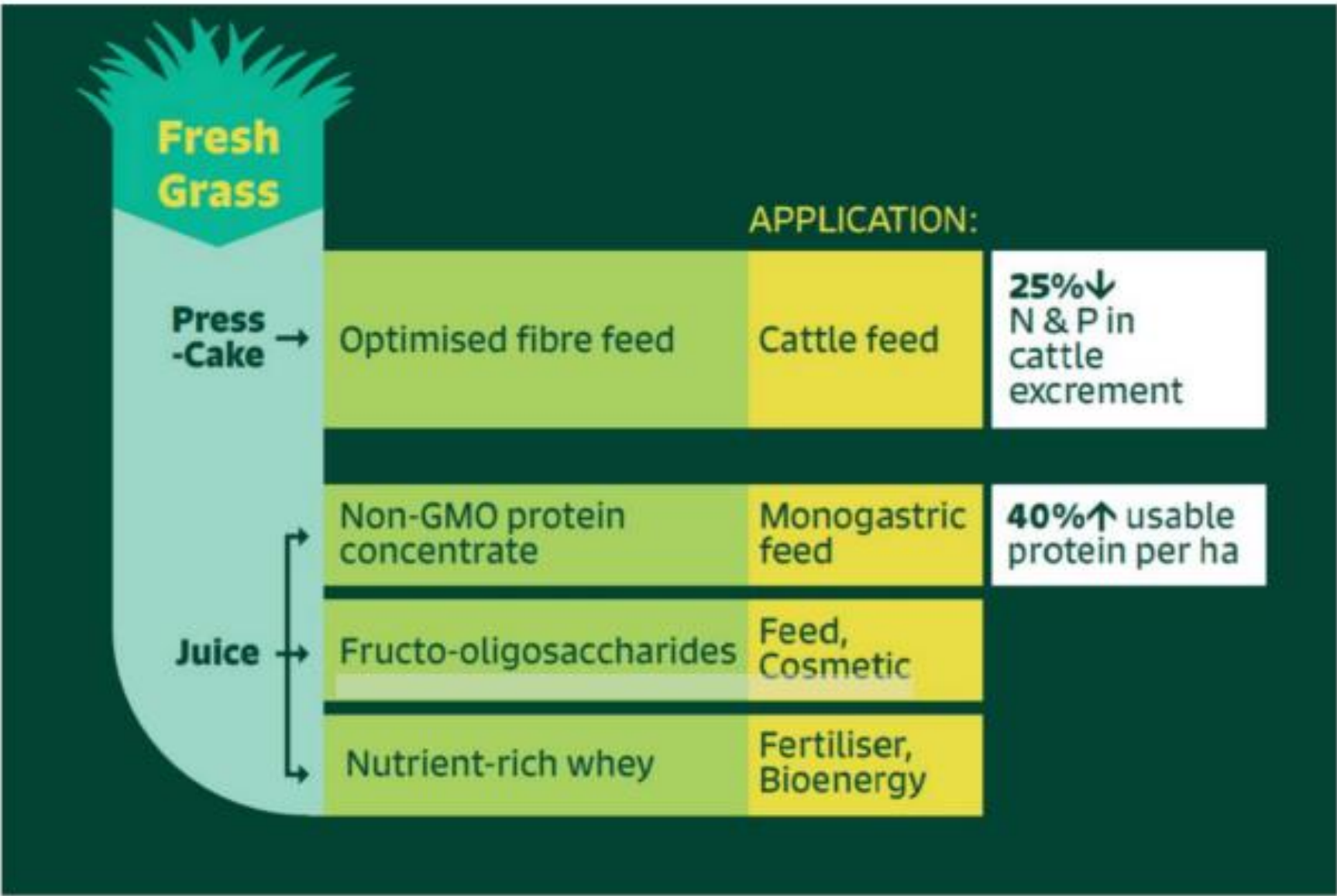
Teagasc Ashtown Research Centre



# Step 8: Technological innovation is necessary but not sufficient.



## Drivers and Approach



Relevant technologies are often available and diffusion, rather than invention, of technology is the more important issue.

[https://cbio.au.dk/fileadmin/DJF/CBIO/James\\_Gaffey.pdf](https://cbio.au.dk/fileadmin/DJF/CBIO/James_Gaffey.pdf)



**Circular bioeconomy education, research and development needs to be transdisciplinary, combining technology and engineering with complex systems thinking.**



## **Post-Graduate Diploma in Bioeconomy with Business**

**flexible, one year part-time, blended  
distance-learning programme**

**designed to enable upskilling**

### **MODULES**

**Bioeconomy Model for the Transition to a Low Carbon Economy**  
**Bioeconomy Feedstocks**  
**Life Cycle Assessment**  
**Conventional Valorisation Technologies**  
**Biorefinery Processes and Technologies**  
**Biobased Value Chains, Products, Processes and Markets**  
**Green Technologies Project**  
**Policy and Social Aspects of the Bioeconomy**  
**Knowledge, Innovation and Industry**  
**Work-based Learning: Bioeconomy Improvement Opportunity**





# Step 9: Managing and overcoming resistance is a key role of policy

Bioeconomy development will e.g. require the replacement of both technologies and the fuel & mineral sources in the agri-food system.

Such fundamental change may meet with resistance on the part of incumbent industries and workers whose jobs may be at risk or may change.

Bioeconomy will also require changes in behaviour on the part of individuals and society.

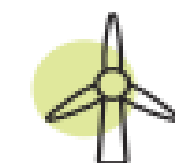
Managing and overcoming such resistance is a key.

## EXAMPLES OF HOW THE BIOECONOMY CONTRIBUTES TO THE EUROPEAN GREEN DEAL:



### CLIMATE PACT AND CLIMATE LAW

Carbon sequestration in soil, blue carbon and forests and its storage in harvested wood products, together with material substitution of fossil-based products (plastics, energy, textiles), can **generate significant carbon savings** and make us fit for -55% by 2030.



### PROMOTING CLEAN ENERGY

Unavoidable **biowaste can be converted into energy** including biofuels for sectors in which electrification will remain challenging (aviation, maritime).



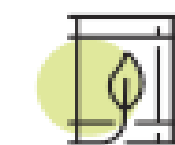
### INVESTING IN SMARTER, MORE SUSTAINABLE TRANSPORT

Use of cellulosic ethanol made from agricultural residues, such as wheat straw, in the transport sector can achieve **up to 95% emission savings** compared to fossil fuels<sup>2</sup>.



### STRIVING FOR GREENER INDUSTRY

Circular use of biomass **promotes resource efficiency and stimulates the production of high added-value products from side and waste streams**. Bark residues, e.g. can be used for extraction of protective compounds used for non-toxic treatment of wood-based construction materials<sup>4</sup>.



### ELIMINATING POLLUTION

**Circular bioeconomy maximises the use of side and residual streams** from agriculture, food-processing and forest-based industries, **thus reducing the amount of landfilled waste**.

Moreover, the use of bio-fertilisers, bio-pesticides and bio-based pest control can contribute towards **achieving the Farm to Fork and Biodiversity Strategy's objectives of reducing fertiliser and pesticide use and risk**.



### ENSURING JUST TRANSITION FOR ALL

The bioeconomy can **create 400 000 new green jobs by 2035<sup>3</sup> in particular in rural and coastal areas** if supported and deployed by regional and national strategies. Many bioeconomy opportunities also exist in urban and peri-urban areas.



### FINANCING GREEN PROJECTS

The **European Circular Bioeconomy Fund with a volume of up to €250 million will invest in innovative circular bioeconomy projects**, in the areas of agriculture, aquaculture and fisheries, the forest-based sectors, biochemicals and biomaterials and biomaterials.



### MAKING HOMES ENERGY EFFICIENT, RENOVATE

The use of biobased insulation materials such as cellulose fibre and sheep's wool can **effectively insulate buildings in a way that also minimises their embodied greenhouse gas emissions**.



### FROM FARM TO FORK

Algae farming can be a new source of renewable biomass for food and green products. Sustainable algae production has the advantage of achieving potentially high yields with minimum or no land and fertiliser requirements while enhancing biodiversity.

Moreover, the circular bioeconomy helps **to fight food waste by valorising it into a range of added-value products<sup>6</sup>**.



### PROTECTING NATURE

Developing sustainable bioeconomies can contribute to the **enhancement of biodiversity while improving the provision of ecosystem services**.



### LEADING THE GREEN CHANGE GLOBALLY

The **European Commission leads global bioeconomy initiatives**, such as the International Bioeconomy Forum and promotes the role of research and innovation as a key enabler in the global green transition.

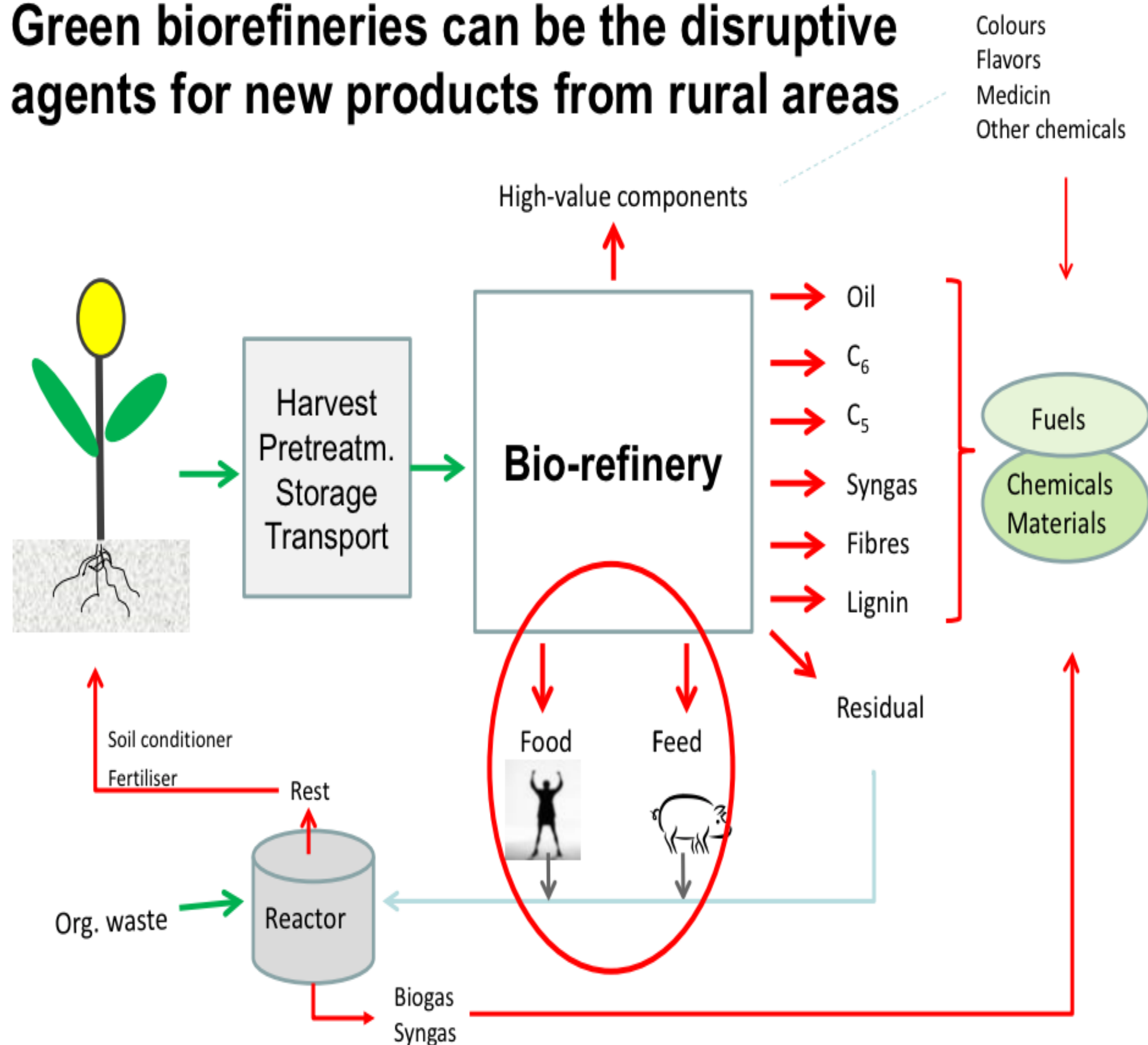
For more information visit  
<https://ec.europa.eu/research/bioeconomy/index.cfm>



# Step 10: International collaboration is essential.



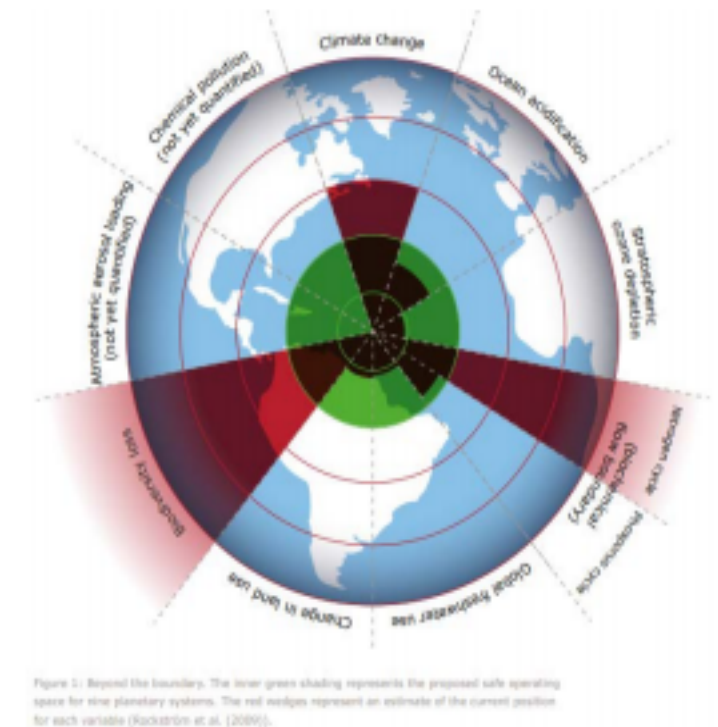
## Green biorefineries can be the disruptive agents for new products from rural areas



[https://cbio.au.dk/fileadmin/DJF/CBIO/Uffe\\_Joergensen.pdf](https://cbio.au.dk/fileadmin/DJF/CBIO/Uffe_Joergensen.pdf)

## Conclusions

- Biorefining of grass will increase animal protein production per ha by 50%;
- From the Irish GLAS project we conclude: milk quantity and quality stays equal, Rumen methane emission reduced by 15% when 2/3 of traditional silage is substituted by our product
- Biorefinery improves NUE threefold if combined with legumes and ammonia stripping offering conditions to stay within our Planetary boundaries
- Biorefinery of leaves will substitute all soy and undesired mineral imports into EU
- Biorefinery will lead to increased rural employability and increased agricultural incomes



Johan Sanders - [johan@grassa.nl](mailto:johan@grassa.nl) - [www.grassa.nl](http://www.grassa.nl)



# Step 10: International collaboration is essential.



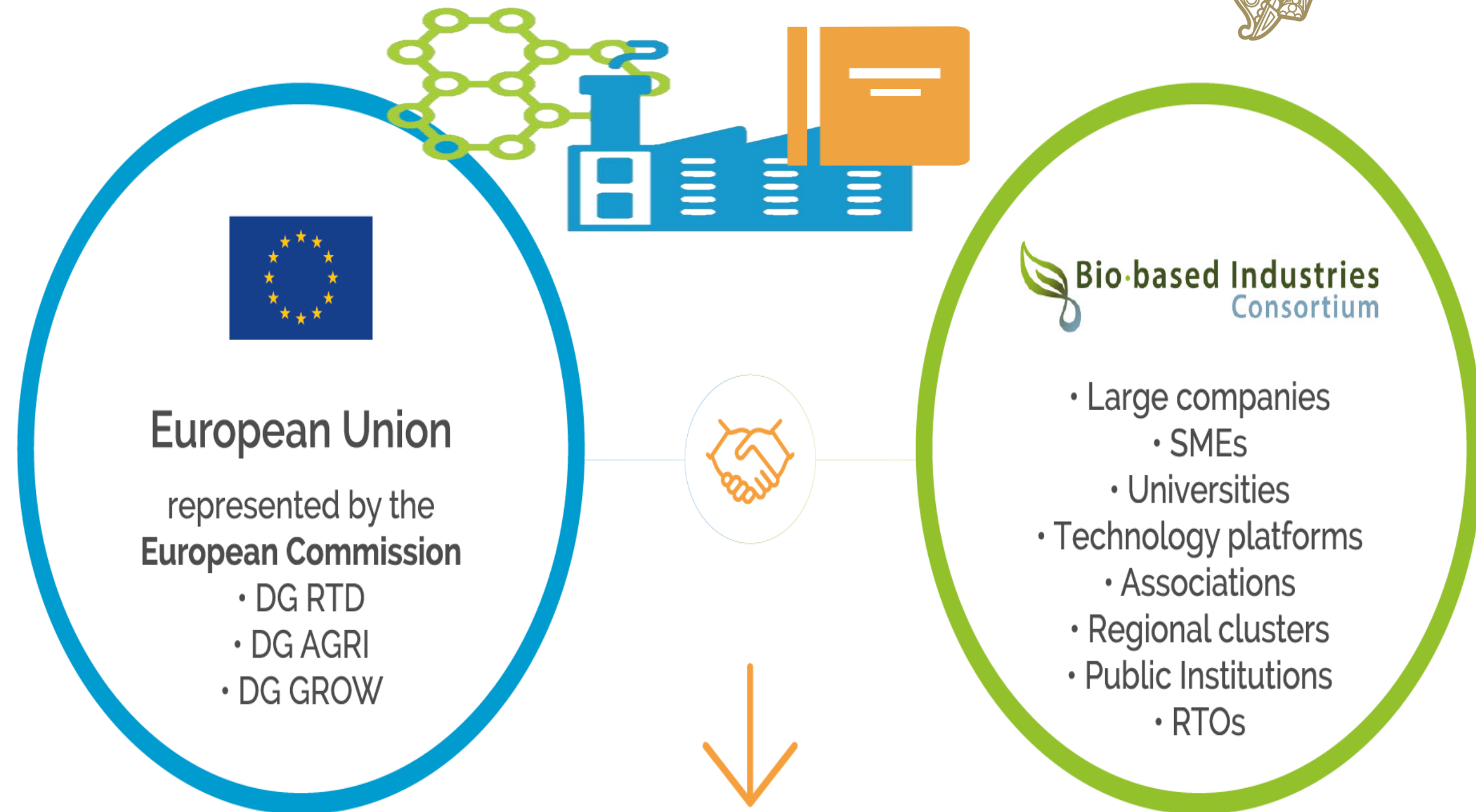
**Public-Private Partnership (PPP) between European Commission & Bio-based Industries Consortium (BIC)**

**Funding bioeconomy projects from technology development to full scale**

**Creating a structuring and mobilizing effect (fragmented sector), critical mass, leveraging effect, technology toolbox**

**Increase our focus on harnessing not only local but also global developments.**

**The mantra in innovation for bioeconomy is “Be flexible, Be adaptive!”**







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Thank you for your attention

Patrick Barrett  
November 2020