

RESEARCH AND INNOVATION  
TOWARDS A MORE  
SUSTAINABLE AND CIRCULAR  
EUROPEAN AGRICULTURE

## HOW TO RE-IMPLEMENT CROP-LIVESTOCK SYNERGIES?

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**Welcome to an interactive webinar  
using Mentimeter!**

**We will start at 14:00**

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# Instructions



The webinar will be interactive using Mentimeter

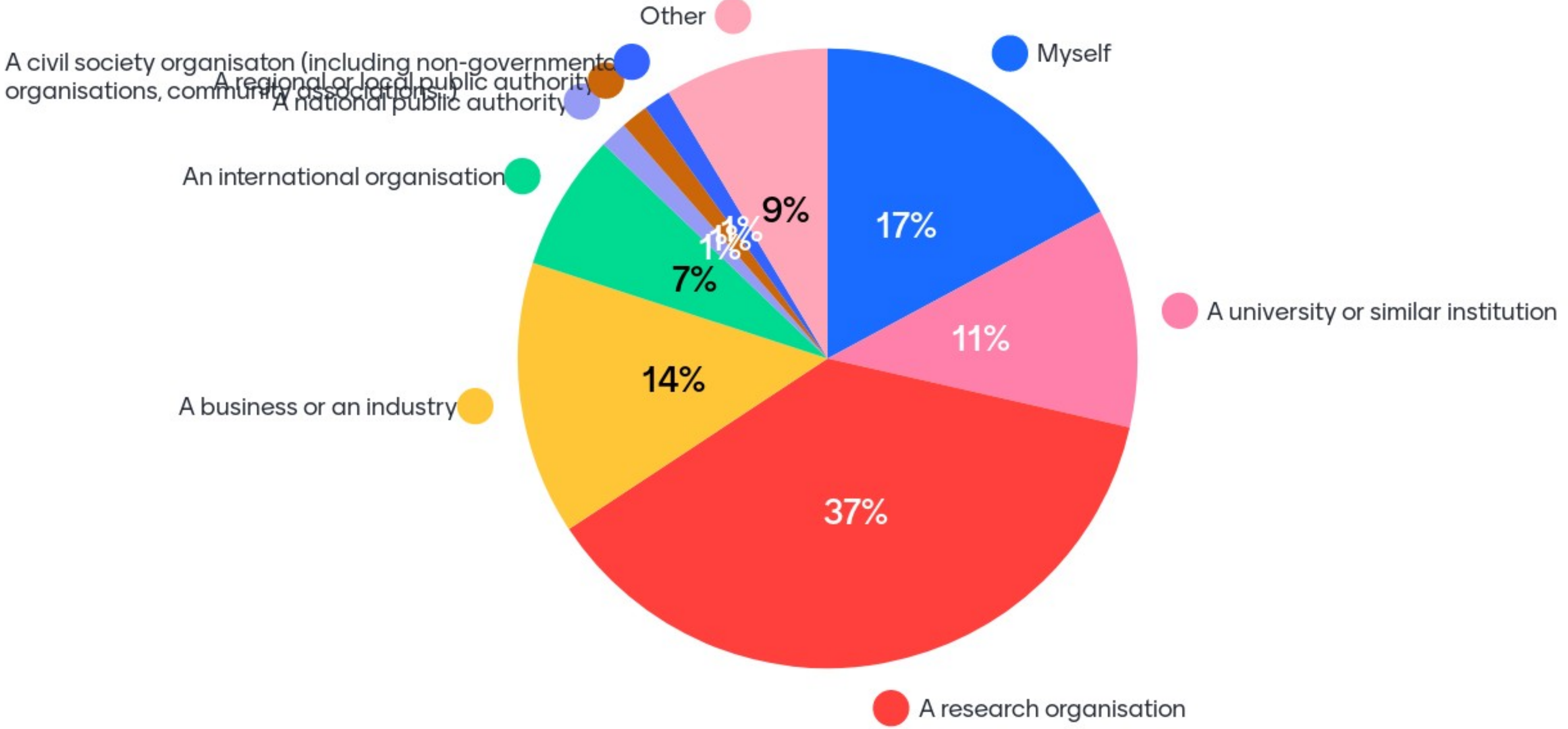
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Answer our questions



# What type of organisation do you represent?



# Webinar agenda



- 14:00 – 14:05 Welcome and instructions  
**Frank O'Mara (ATF)**
- 14:05 – 14:10 Introduction  
**Lukas Visek (Cabinet Frans Timmermans)**
- 14:10 – 14:50 How to re-implement Crop-Livestock Synergies?  
**Jean-Louis Peyraud (ATF) and Marc Cornelissen (Plant ETP)**
- 14:50 – 15:10 Discussion with panellists  
**Arnaud Bouxin (FEFAC) and Max Schulman (COPA-COGECA)**
- 15:10 – 15:50 Interactive Q&A
- 15:50 – 15:55 Closing remarks  
**Roberto Berutti (Cabinet Janusz Wojciechowski)**
- 15:55 – 16:00 Closing  
**Frank O'Mara (ATF)**



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# What main benefit do you see for reconnecting livestock and crop production?









# Introduction



Lukas Visek

Cabinet Frans Timmermans,

Commissioner / Green Deal and Climate Change

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# Aim of the webinar



## HOW TO RE-IMPLEMENT CROP-LIVESTOCK SYNERGIES?

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# Main contributors

## ETP “Plants for the Future”

- Marc Cornelissen, President, BASF
- Aleksandra Malyska, Amrit Nanda, Executive Manager

## Animal Task Force

- Jean-Louis Peyraud, President, INRAE
- Vivi H. Nielsen, Vice President, Aarhus University
- Florence Macherez, Secretary General, Idele
- Just Jensen, Aarhus University
- Michael Lee, Rothamsted University



# Challenges and hypothesis



**A society calling out for agriculture to change**

**A pressing need to rejuvenate agri-food systems at farm level and beyond farms**



**Relayed by a political agenda**

- **Farm to fork strategy**
- **Biodiversity strategy**
- **Protein plan for Europe**

**Changing the interplay between livestock and crop sector is a major lever for change**





# Aim and Purpose of the policy brief

## Aim

- To identify **research goals and policy recommendations** that aim at improving sustainable food production at the interplay of the plant and livestock sectors

## Purpose

- Align societal expectations and public policies which impose changes in agricultural systems
- Provide inspiration towards Horizon Europe for a rejuvenated sustainable agriculture based on synergies between livestock and crop sectors

# Methodology



Document published in April 2020

## Methodology

- Collection of multi-actors' inputs during two workshops:
  - Sept. 2017, May 2018 in Brussels
  - 28 actors: research, private sector, TPs, Copa-Cogeca
- Publication of a Position Paper (September 2019)
- Incorporation of feedbacks from representatives of DG AGRI, DG RTD (October 2019)
- Feedbacks from EC DGs during a webinar on Oct. 6<sup>th</sup>, 2020



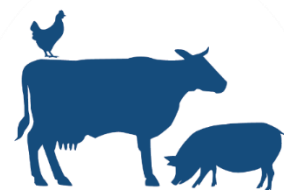
# The landscape



## A Green Revolution to improve productivity...

Systems have become more intensive  
more specialized, spatially separated

Monocultures  
Mineral N fertilizer  
Pesticides



Livestock systems

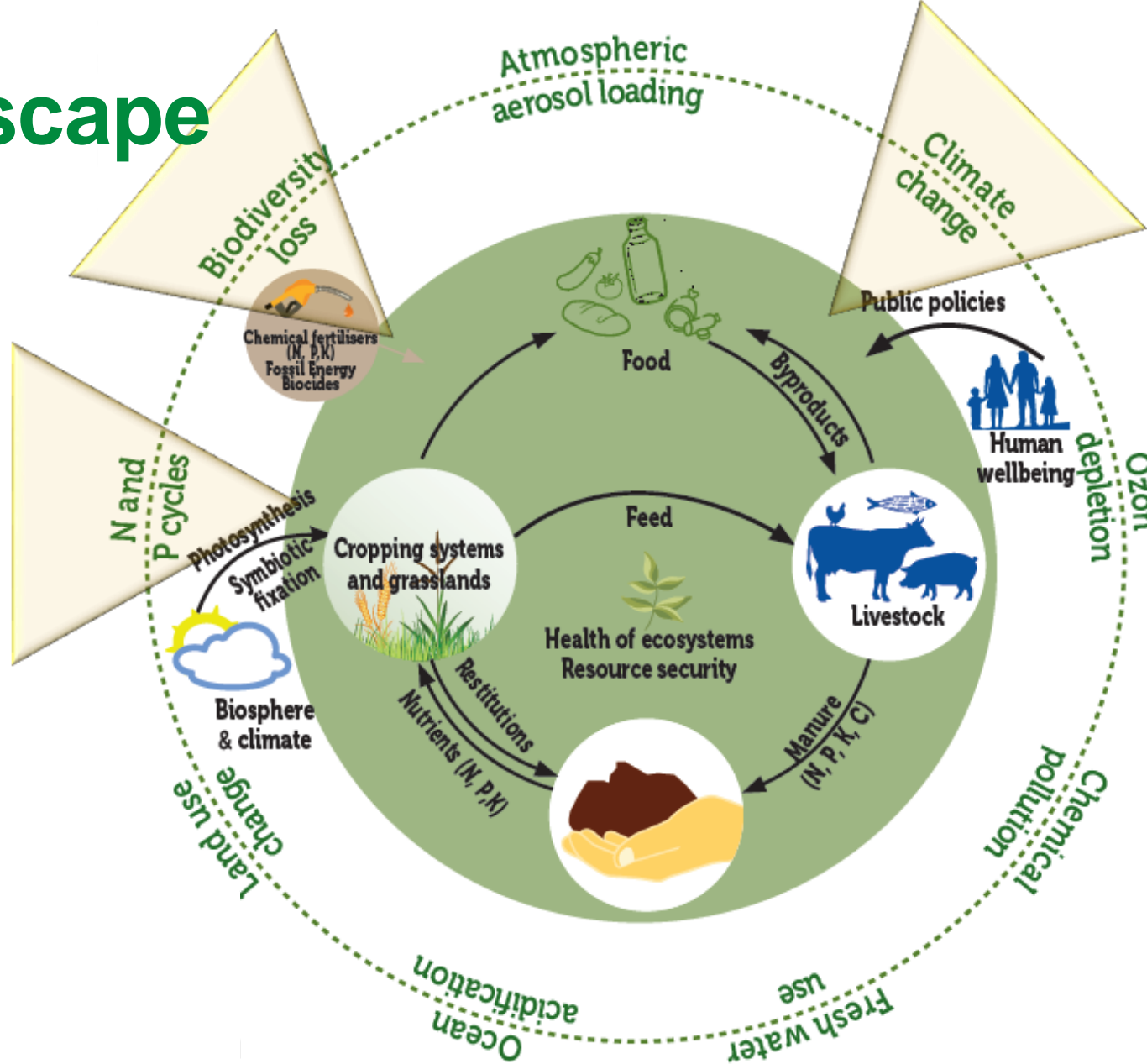
High levels of N outputs  
GHG  
Welfare issues  
Antimicrobials

... is causing negative effects

Loss of soil fertility, loss of biodiversity, degradation of ecosystems...

**Tackling the undesired effects by changing the interplay between sectors**

# The landscape



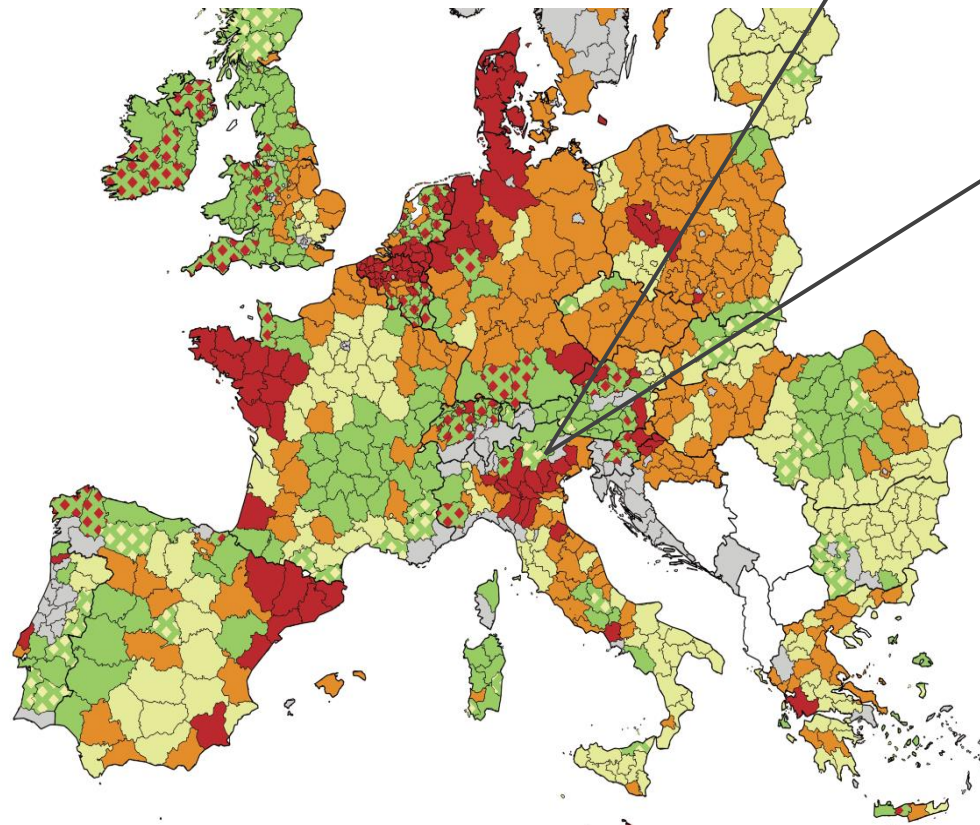
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# The landscape: a diversity of situations towards a diversity of solutions

- Low proportion of grassland in agricultural area, high animal density
- High proportion of grassland in agricultural area, high animal density
- High proportion of grassland in agricultural area, medium animal density
- High proportion of grassland in agricultural area, low animal density
- Low proportion of grassland in agricultural area, corps and animals
- Low proportion of grassland in agricultural area, low animal density
- Less than 20% of agricultural area in total area

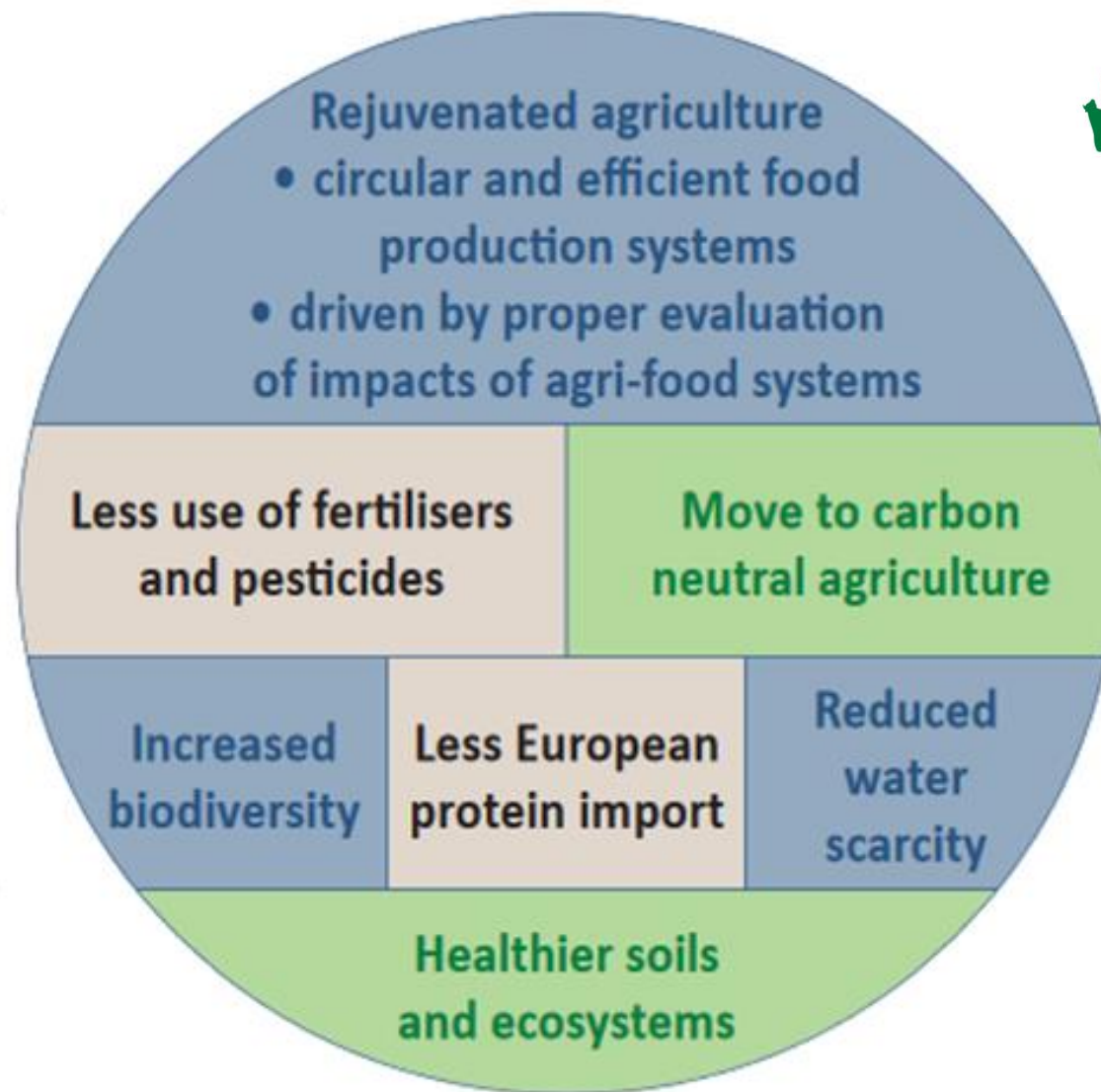


- Solutions are to be based on science
- Solutions are to be found according to the political choices and the territorial contexts
- There is no « one size fits all » optimal solution

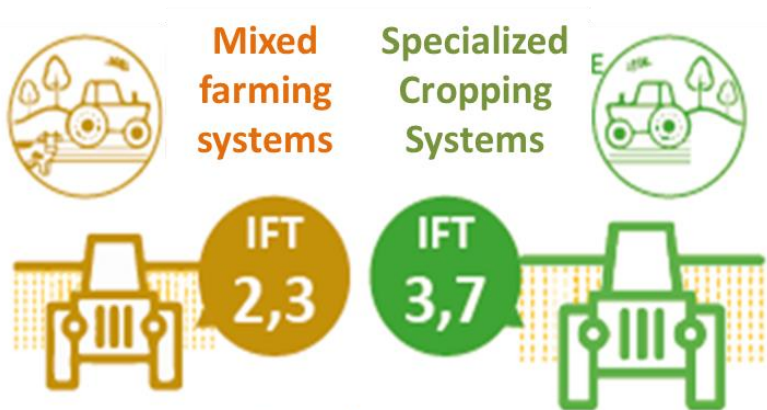
# Expected impacts

The goal is to arrive at a climate change mitigating, circular, resource efficient agri-food system

with closed nutrient cycles, healthy soils and ecosystems, restored biodiversity and an attractive landscape



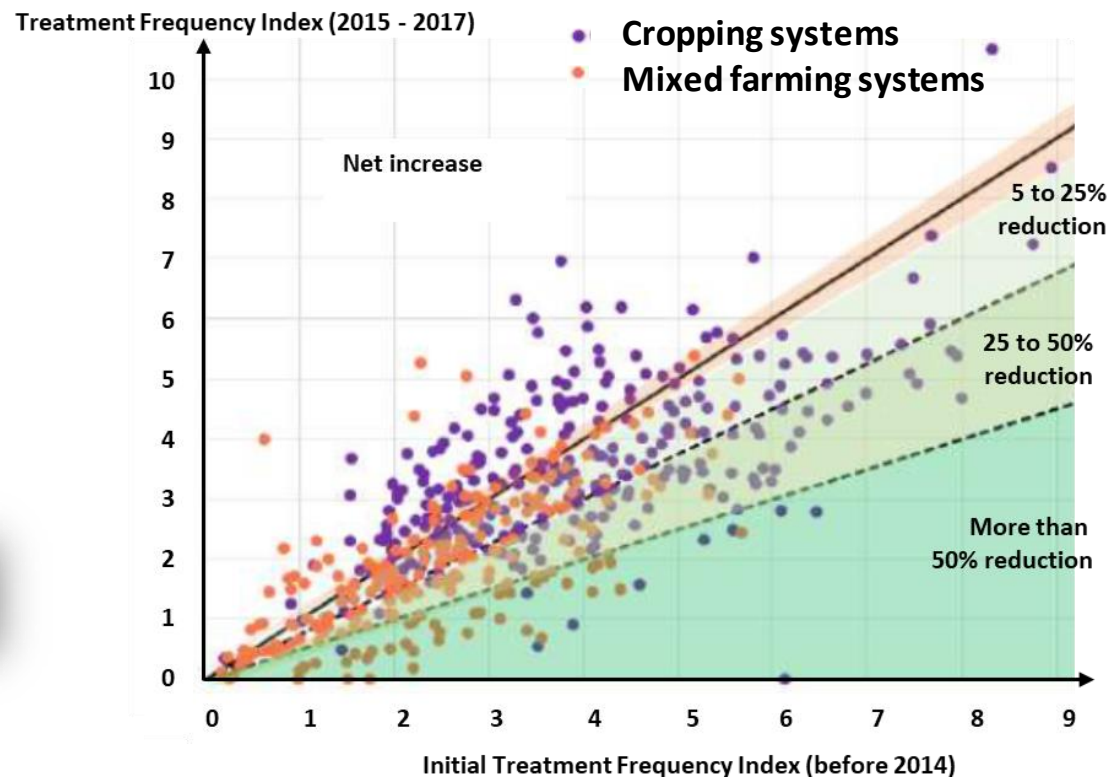
# E.g: Mixed farming systems and pesticide use



Index of Treatment Frequency



- More diverse species in rotation allow
  - Breaking of pest cycles
  - Crops receiving fewer pesticides



- High variability between farms showing margins of progress



# RECOMMENDATIONS

## Topics for Research and Innovation



### RECOMMENDATION 1 An LCA upgrade to track progress towards more sustainable farming

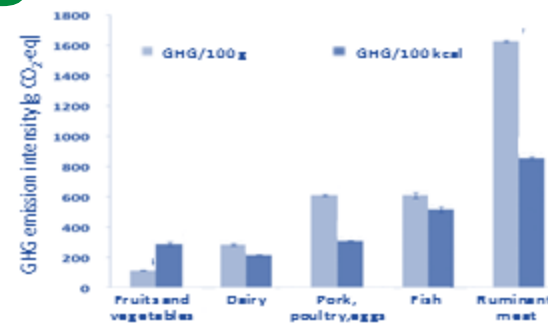
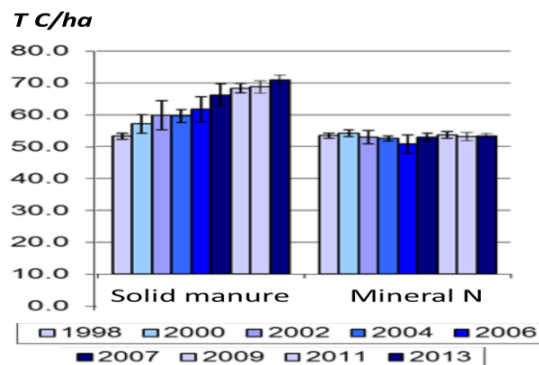
- We need more accurate models to assess the multi-functionality and complexity of agriculture
- Evaluation of sustainability on a long term basis
- Capturing a variety of performances (biodiversity, soil fertility, employment, etc.)
- Capturing interactions between crop and livestock sectors in a circular economy

# E.g.: Flaws in LCA methodologies



- **Focus on reduced impact per unit of product**
  - Favours intensive systems
  - Results affected by the choice of the functional unit

- **Struggles to comprehensively assess aspects that are critical for long-term sustainability:** soil fertility, soil erosion, biodiversity...



*Vieux et al., 2013*

- **Does not capture properties emerging at landscape level:** buffer zones, preservation of habitats maintained by herbivores



- **Partly biased vision of land use by livestock:** absence of distinction between non-arable and arable land



**Food from marginal lands?  
Livestock can do!!!**

# RECOMMENDATIONS

## Topics for Research and Innovation



### RECOMMENDATION 2 Optimise synergy in circular livestock- cropping systems

- Development of a master plan for a balanced protein production:
  - Integrated & circular approaches needed
  - Combinations of crops and livestock / local level



### RECOMMENDATION 2A Identification and development of innovative cropping systems

- Identification-development of a panel of crops, rotations: resource efficient crops, diversity in cultivation requirements, multi-purpose crops, agroforestry, etc.
- Development of innovative feed-livestock value chains: use of diverse feed resources, management of safety
- Development of manure as commercial bio-fertilizer



# E.g.: New interplays will benefit biodiversity



- Higher species diversity cultivated in rotation (including honey plants with different flowering dates)



## Mitigating the feed vs food competition

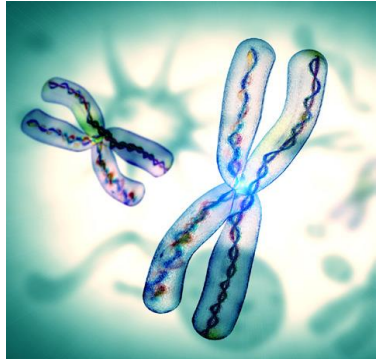


- Diversification of soil use, landscape and maintenance of open habitats



# RECOMMENDATIONS

## Topics for Research and Innovation



**RECOMMENDATION 2B**  
**Genetic improvement of plants and animals to maximise resource use efficiency**

- Development of a virtual knowledge platform
- Development of precompetitive research
- Plant improvement (protein production, amino-acids composition, antinutrients)
- More robust animals able to use feed of lower nutritional quality



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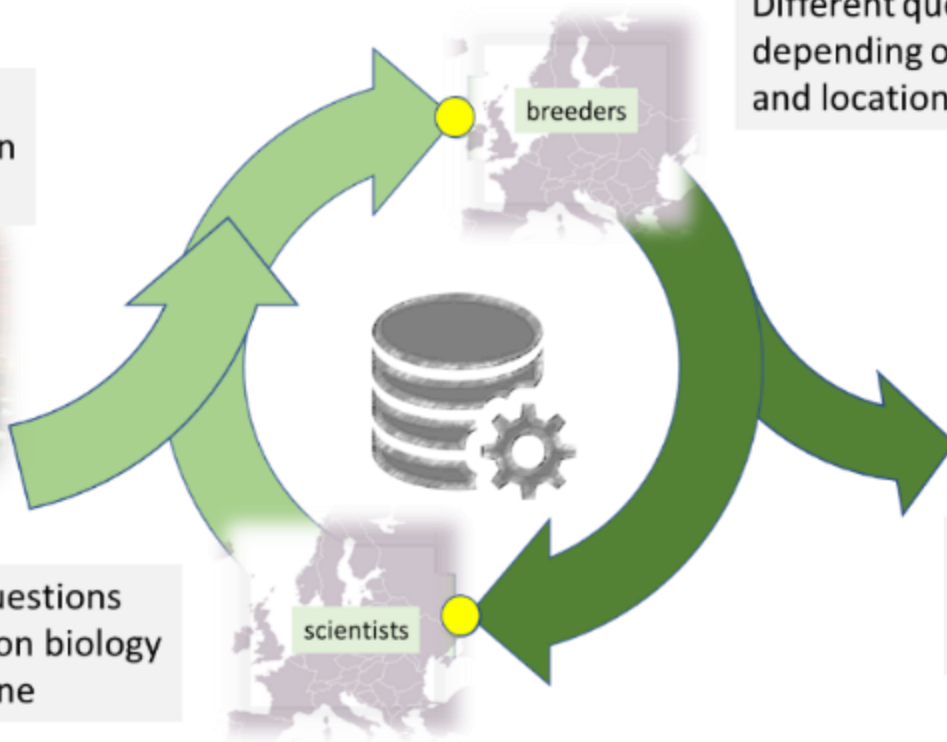
# E.g.: Promoting knowledge transfer: example of a crop improvement platform



Harmonisation and curation of vast collection of published work



Different questions depending on biology and discipline



Different questions depending on crop and location



Progressive sustainability standards in variety testing will offer breeders focus and global competitiveness

## Virtual predictive breeding workflow

Source: TIBS Opinion paper (Cornelissen et al., 2020)



# RECOMMENDATIONS

## Topics for Research and Innovation



### RECOMMENDATION 2C Development of biorefineries to maximise European self-sufficiency

- Up-scaling of bio-refinery methods for protein extraction from forages and oil seed
- Reducing ruminal degradation of proteins
- Development of innovative processing of manure

# E.g.: Turning a problem into a commodity

- Reduction of the use of mineral fertilizers

- 11.2 Mt mineral N
- 7.1 Mt manure N



- Avenues for improvement

- Avoiding losses between animal and effective supply to the soil
- Bio-refinery of manures using cascading approach:

high value ingredients – Minerals – Energy



# RECOMMENDATIONS

## Topics for Research and Innovation



### RECOMMENDATION 3 Governance, roles of stakeholders and public policies to promote changes over time

- Actors coordination to change the socio-technical system: explore and demo business models, analysis of collective strategies and case examples
- Design of public policies to guide and support transitions





# RECOMMENDATIONS

Inspiration  
for Joint Exploration

**Innovative Food systems**

**Environmental services**

**Food Sovereignty**

**Protein Autonomy**

**Circularity & waste**

**Business models**



**Pesticide & mineral fertilizer use**

**Soil fertility**

**Ecosystems health**

**Biodiversity**

**Climate**

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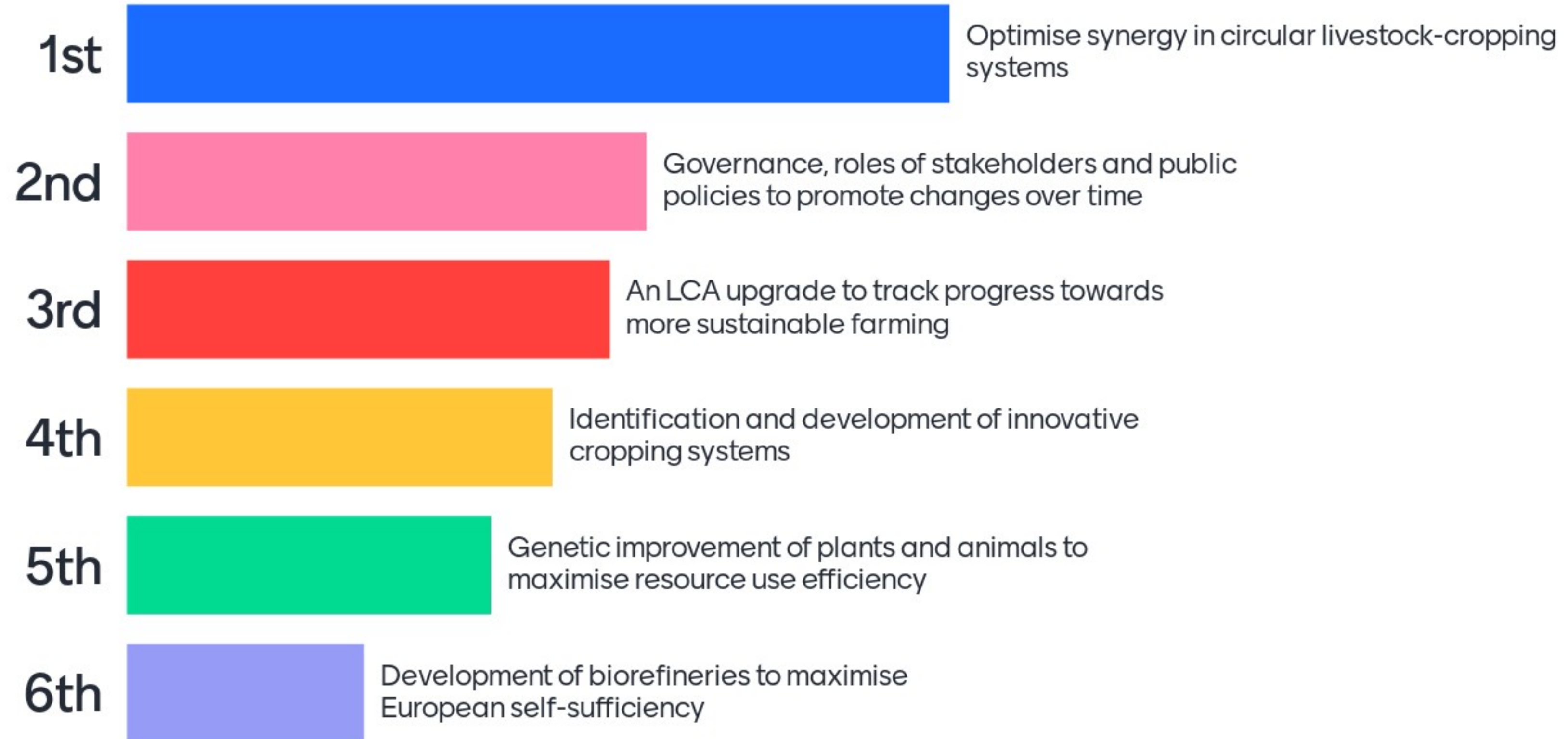
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# Please rank the recommendations in order of priority for you







# Conclusive remarks

Roberto Berutti,  
Cabinet Wojciechowski,  
Commissioner Agriculture





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**Thank you for your participation!**

