

# Optimising genetic potential for resilient and diverse production systems

How to ensure critical mass investment in  
breeding to enable the green transition

23<sup>rd</sup> October 2023

# Introduction

- 39 ETPs recognized by the EU since 2002
- Membership funded
- Multi Stakeholder
- SRIA & Recommendations



**Think Tank**  
European Parliament

# Supporting the green transition

The EU Green Deal aims to become carbon neutral by 2050  
Without innovation, production losses are inevitable

How to balance sustainability goals with food security?

The three pillars of sustainability – environmental, social, economic – must go hand in hand to be successful

The genetics of the primary material (seeds, breeds, etc) is a limiting factor for improving the resilience and sustainability of our food system



# Workshop Agenda

- 13:00 Welcome and introduction to workshop *by Ana Granados, FABRE TP*
- 13:10 Keynote - perspectives from the farm *by Max Schulman, Finnish Farmer*
- 13:30 Breeding is the pillar of our food systems and the future of a circular bioeconomy  
*by Amrit Nanda, Plant ETP*
- 14:00 Introduction to breakout sessions *by David Bassett, EATIP*
- 14:10 **Breakout session 1: The role of breeding in the green transition**
- 15:00 Coffee/tea break
- 15:30 **Breakout session 2: How to enable strategic long-term investment in breeding**
- 16:15 Plenary reporting and discussions
- 17:00 Next steps and close

# Keynote

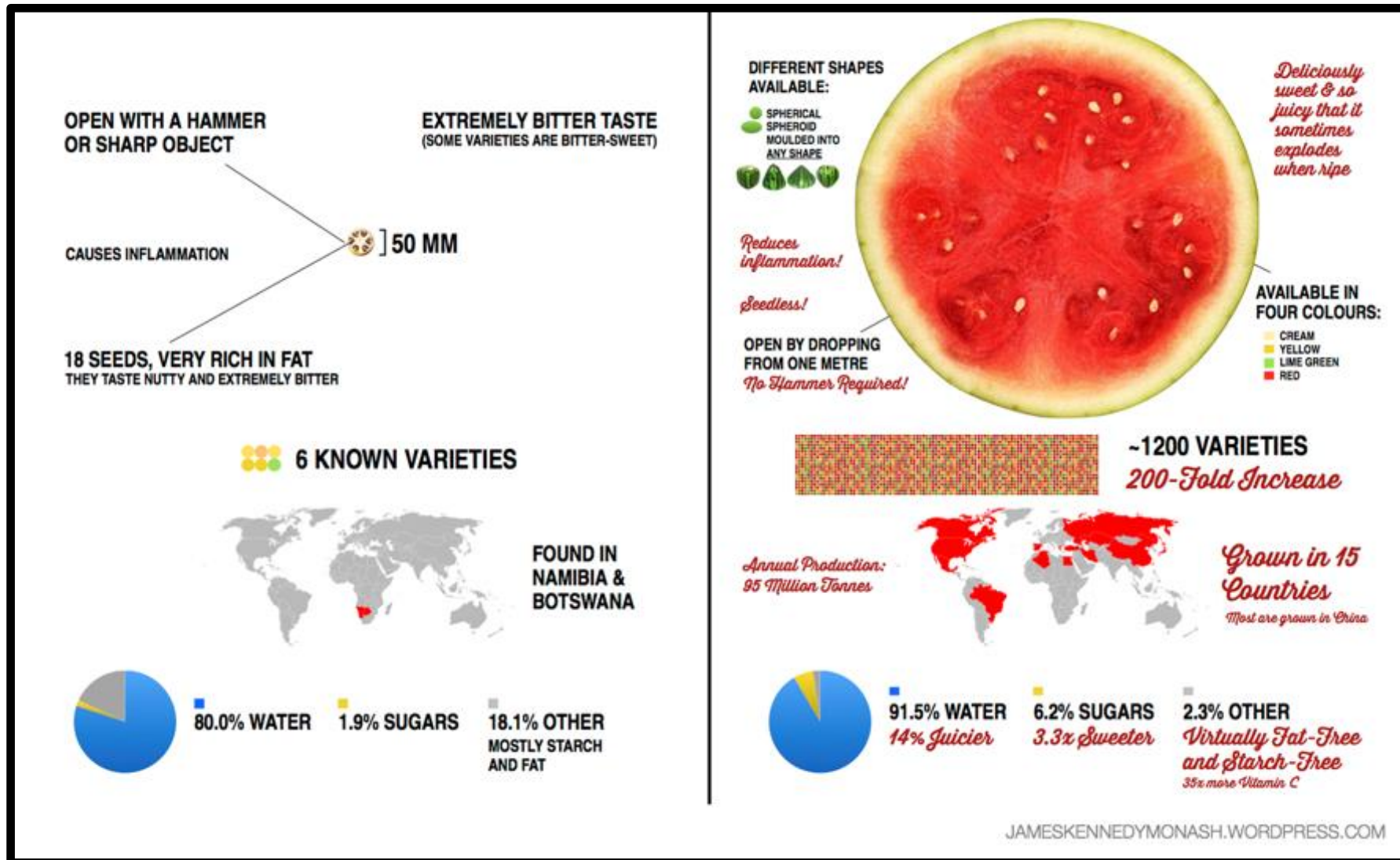
Max Schulman, Finnish farmer,  
MTK and COPA-COGECA



Breeding is the pillar of our food systems and  
the future of a circular bioeconomy  
*Amrit Nanda, Plant ETP*

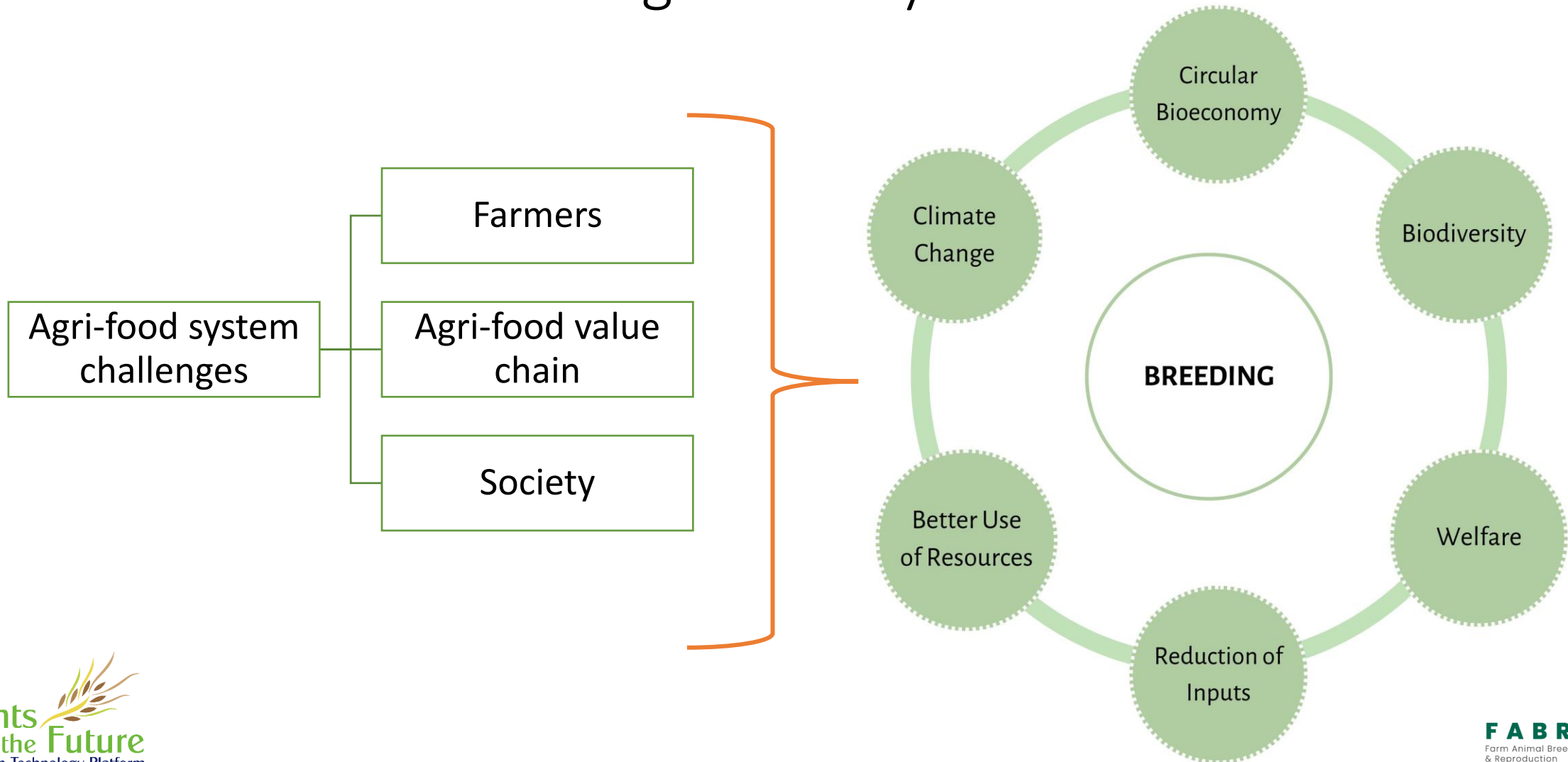
# What is the role of breeding?

**WATERMELON**  
3000 BC



**MODERN DAY**  
**WATERMELON**

# Breeding contributes to all aspects of agri-food systems





# Breeding complements current EU R&I strategies



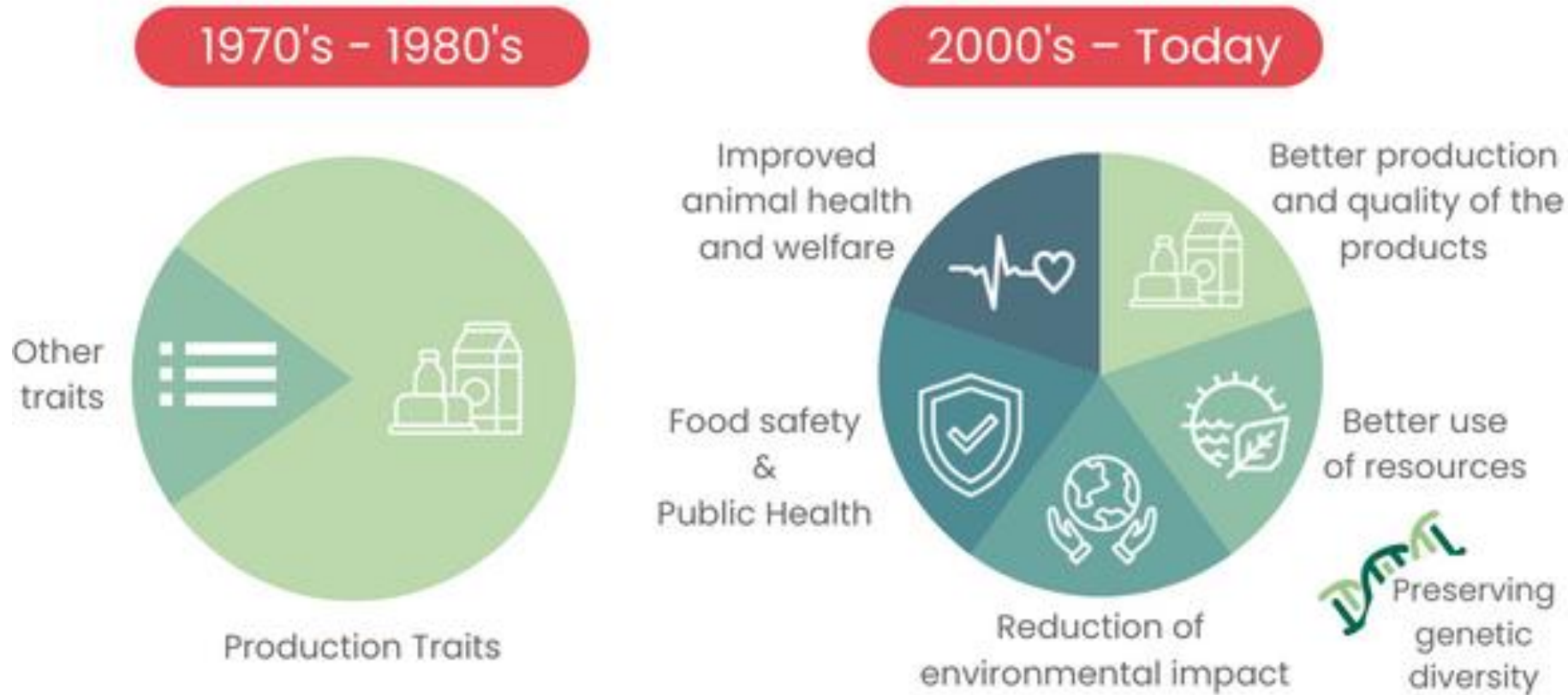
# Breeding complements current EU R&I strategies



# Breeding - the crucial stepping stone



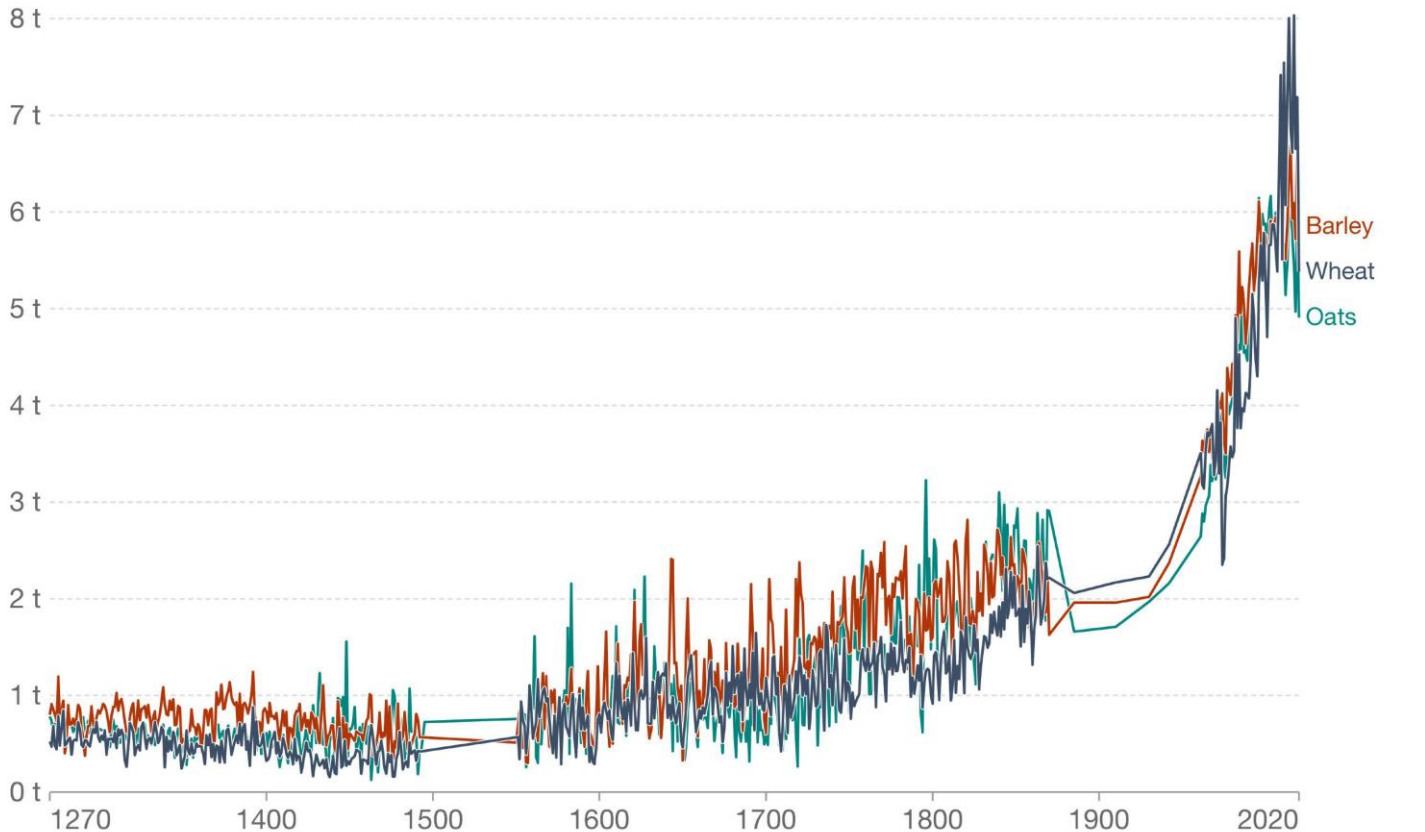
# In the past decades, breeding goals have diversified



# Breeding has increased productivity massively

## Cereal yields in the United Kingdom

Crop yields are measured in tonnes per hectare.



Although cereal crops were domesticated 5,000-10,000 years ago, they barely improved over several millennia of human agriculture

Source: Broadberry et al. (2015) and Food and Agriculture Organization of the United Nations

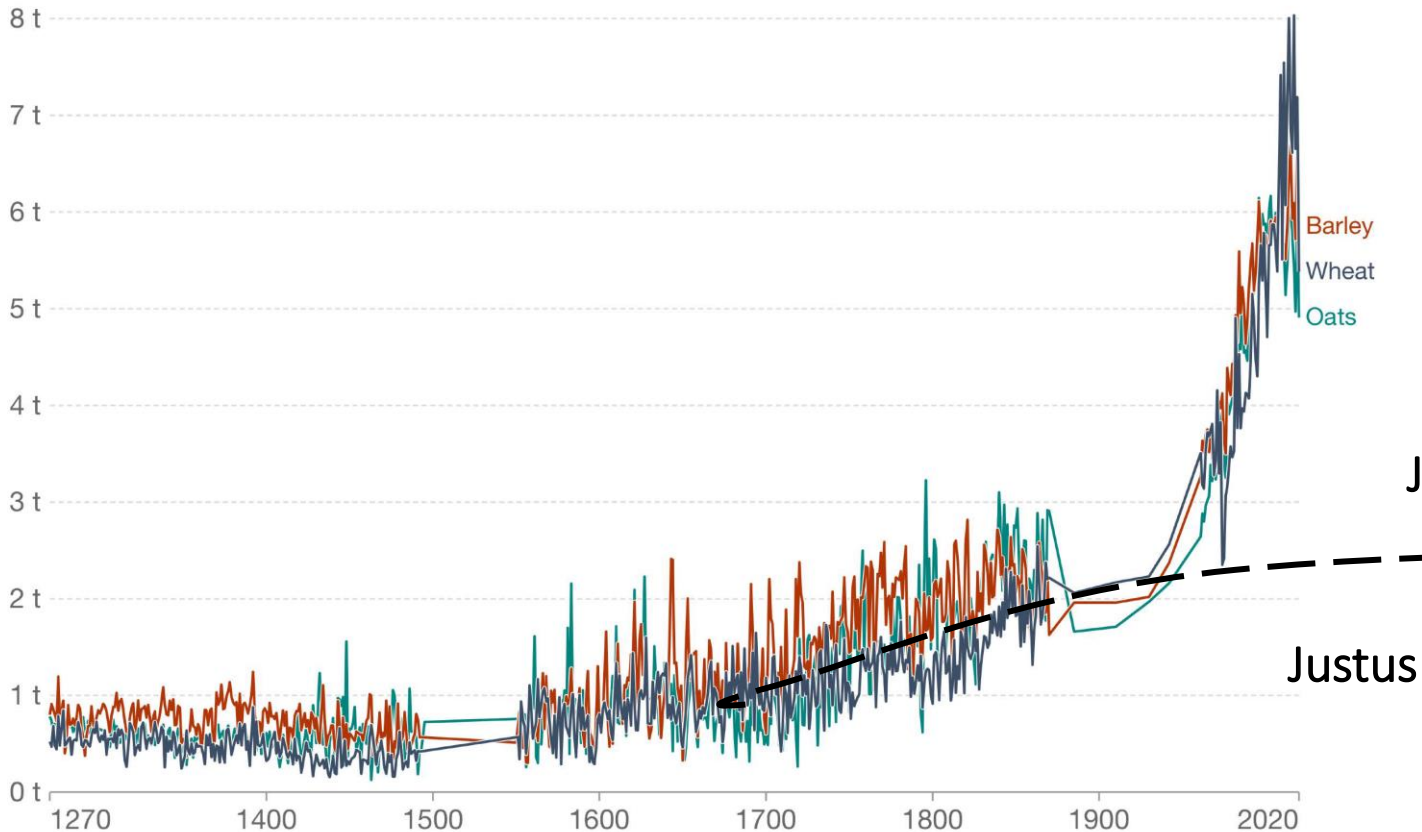
OurWorldInData.org/crop-yields • CC BY

Graph: Broadberry et al. (2015) British Economic Growth (Cambridge University Press) and United Nations Food & Agriculture Organisation

# Breeding has increased productivity massively

## Cereal yields in the United Kingdom

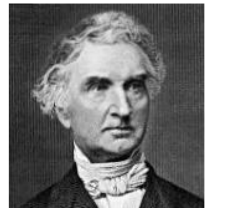
Crop yields are measured in tonnes per hectare.



Modern agronomy  
and crop protection  
**Julius Kühn (1825-1910)**



Mineral fertilisers  
**Justus von Liebig (1803-1873)**



Source: Broadberry et al. (2015) and Food and Agriculture Organization of the United Nations

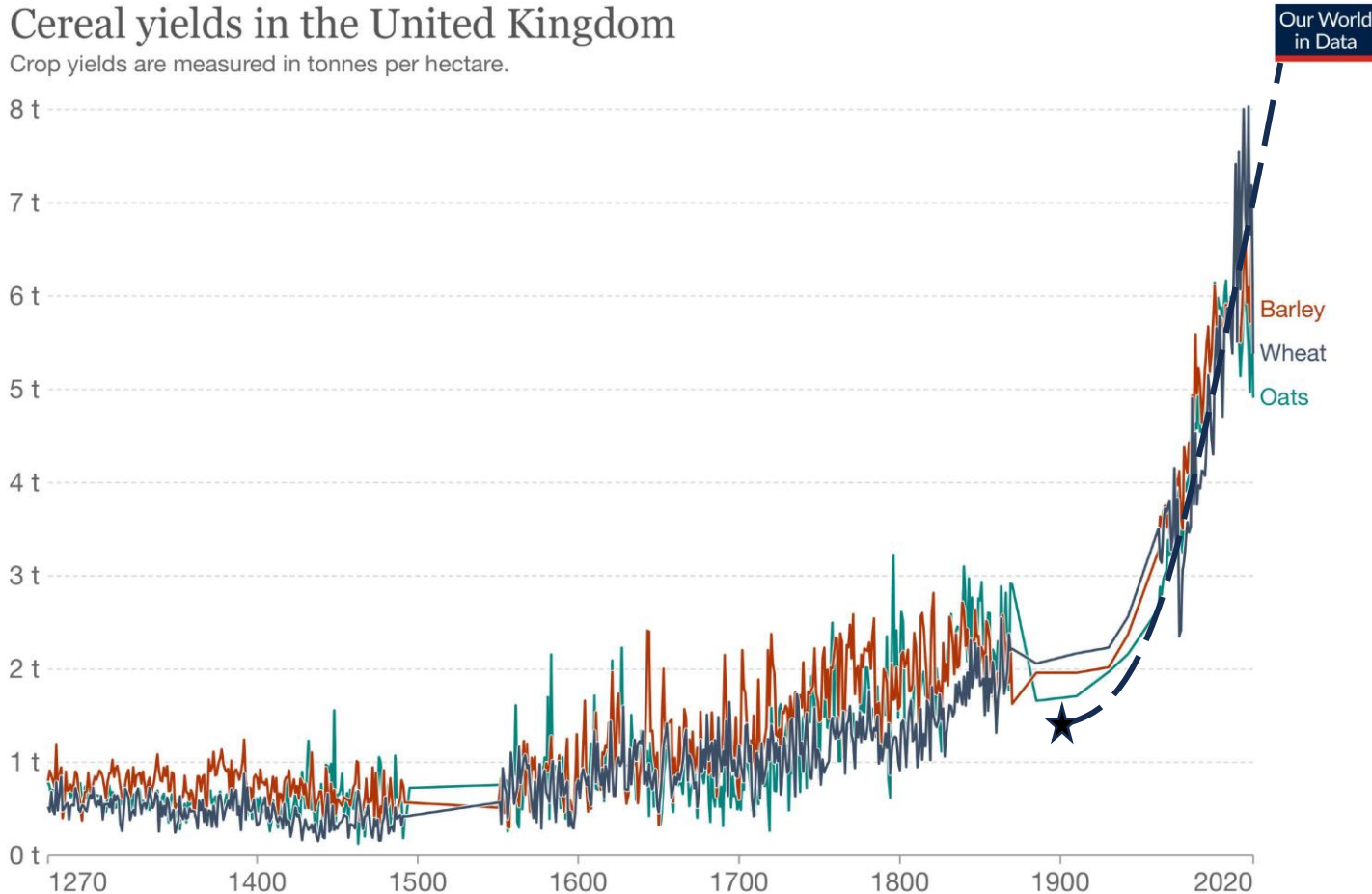
OurWorldInData.org/crop-yields • CC BY

Graph: Broadberry et al. (2015) British Economic Growth (Cambridge University Press) and United Nations Food & Agriculture Organisation

# Breeding has increased productivity massively

## Cereal yields in the United Kingdom

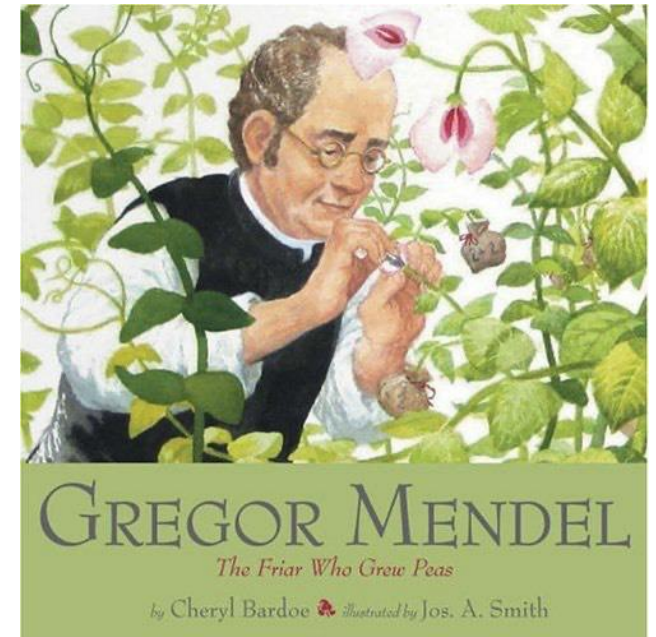
Crop yields are measured in tonnes per hectare.



Source: Broadberry et al. (2015) and Food and Agriculture Organization of the United Nations

OurWorldInData.org/crop-yields • CC BY

★ Rediscovery of Mendel's findings in 1900 (from 1865)  
Breeding becomes a science

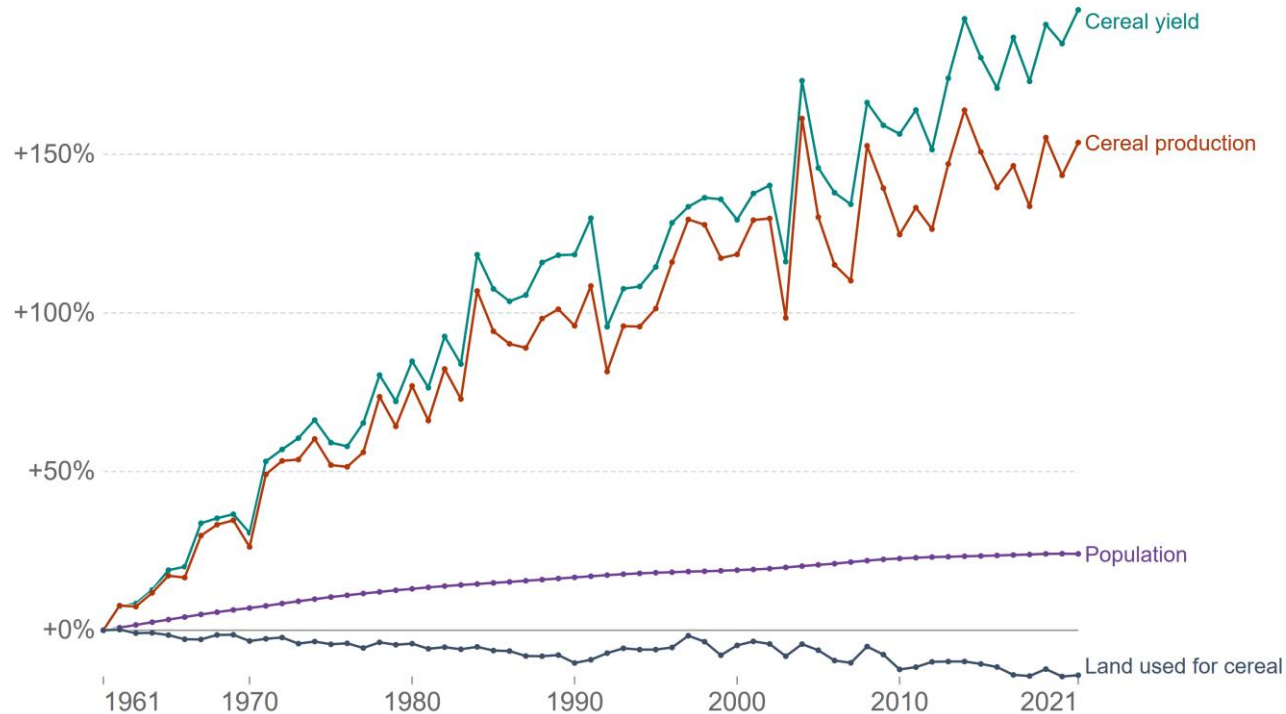


# Breeding enables us to produce more with less land

Change in cereal production, yield, land use and population, European Union (27)

Our World in Data

All figures are indexed to the start year of the timeline. This means the first year of the time-series is given the value zero.



Source: Our World in Data based on World Bank; Food and Agriculture Organization of the United Nations  
OurWorldInData.org/crop-yields • CC BY

In the past two decades, plant breeding alone has contributed to

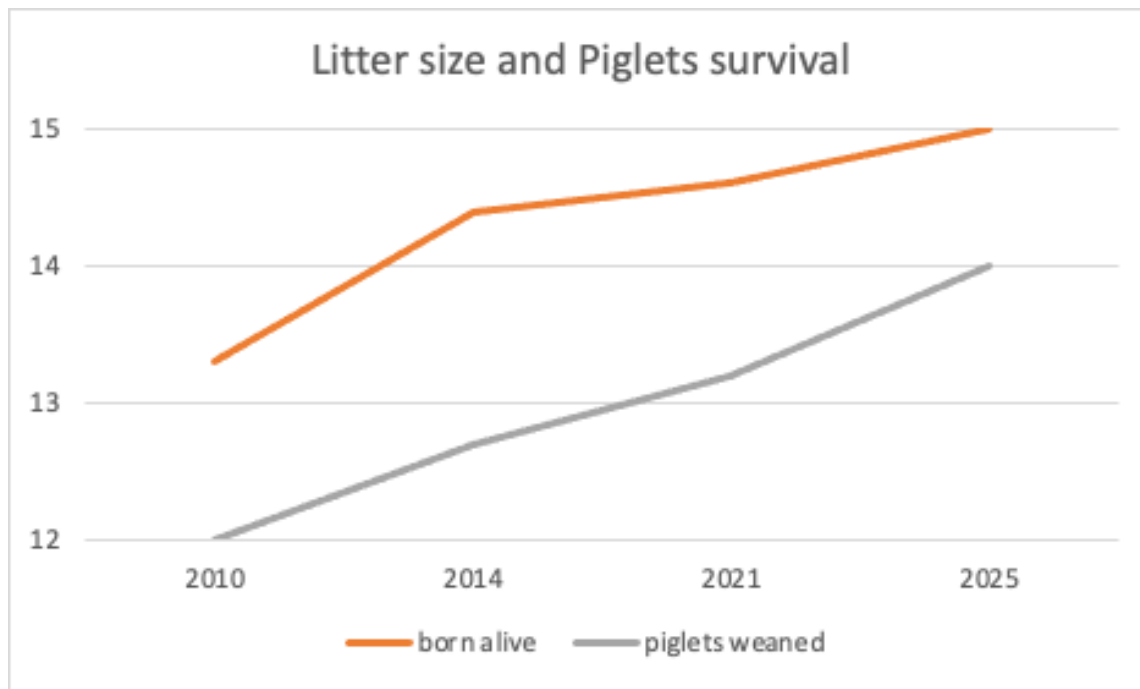
**~67% increase of crop production**

in the EU\*, ensuring a stable supply of food and feed for the EU and beyond, while reducing the need for agricultural land

\*Noleppa and Carlsburg (2021)



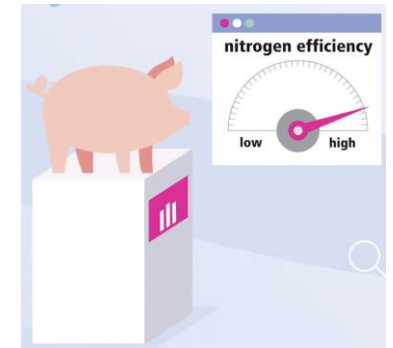
# Breeding improves animal health



- **Fewer use of feed** :  $\frac{1}{4}$  kg less feed is needed per kg of meat every 5 years



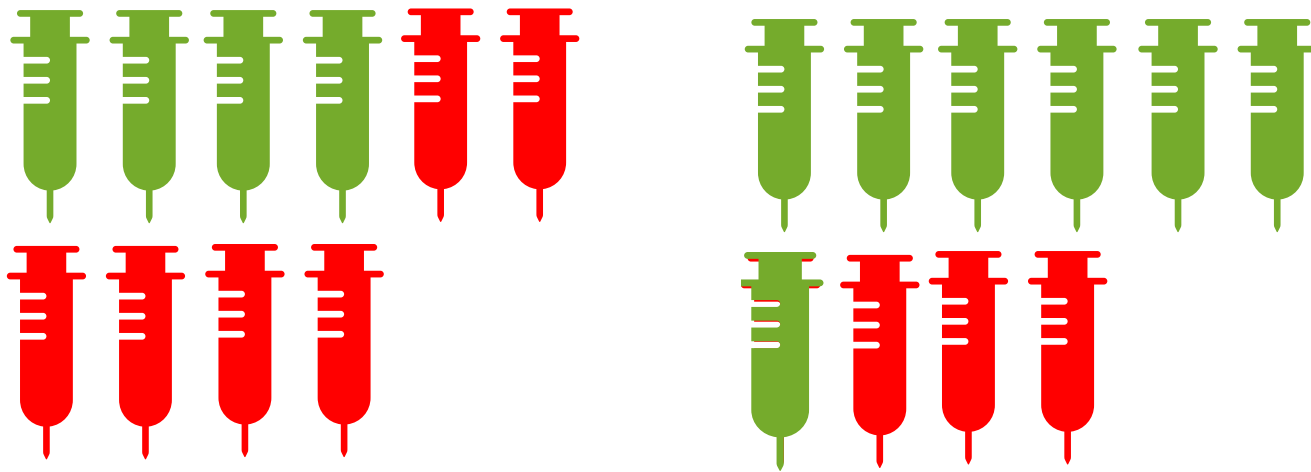
- **High Nitrogen efficiency** : in 5 years 3,5% reduction of emissions



# Breeding improves animal health and welfare while reducing food loss

## A concrete example: decrease of mastitis treatments between 2008 and 2018

% of treatments per 100 cows



3<sup>rd</sup> lactation in 2008

3<sup>rd</sup> lactation in 2018

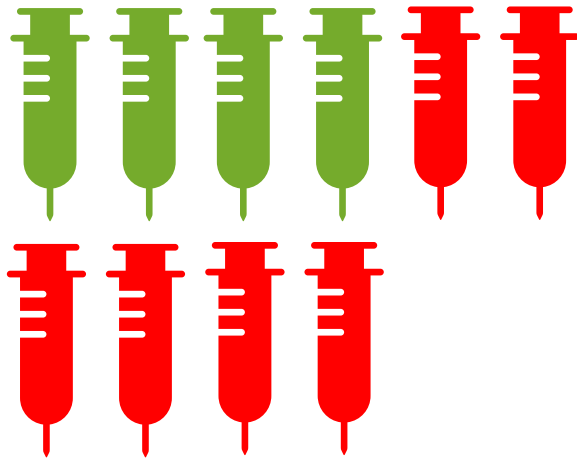
Difference between 2008 and 2018

- **↘ 4,270 kg** antibiotics used
- **↘ 17.2 mill. kg** discarded milk
- **↘ 54.9 mill. kg** permanent milk loss

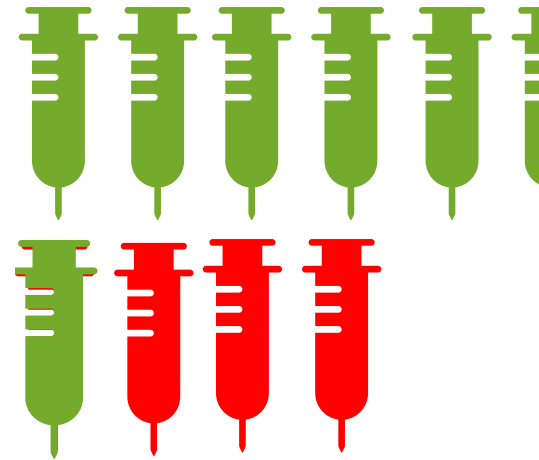
# Breeding improves animal health and welfare while reducing food loss

## A concrete example: decrease of mastitis treatments

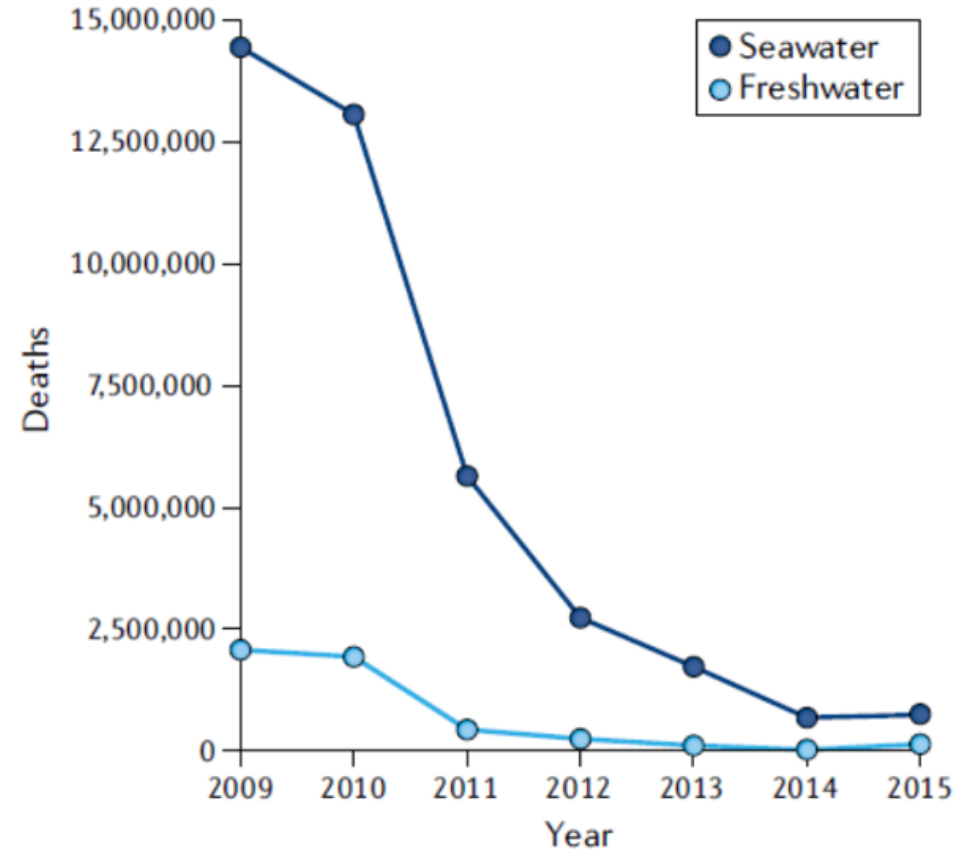
% of treatments per 100 cows



3<sup>rd</sup> lactation in 2008



3<sup>rd</sup> lactation in 2018



# Breeding is a long and resource-intensive process

chicken



shrimp



5-10 YEARS

sheep



tialpia



cow



salmon



10-20 YEARS

tuna



faba bean



potato



pig



grapes



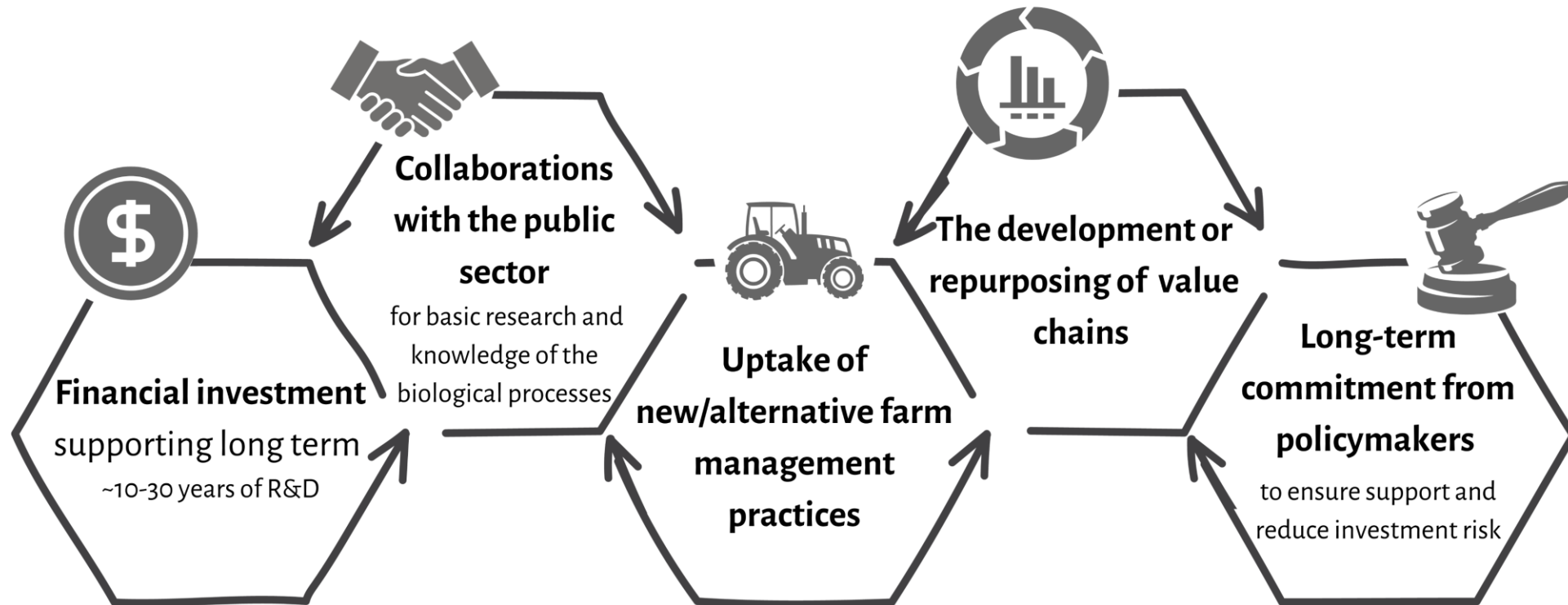
20-25 YEARS

apple

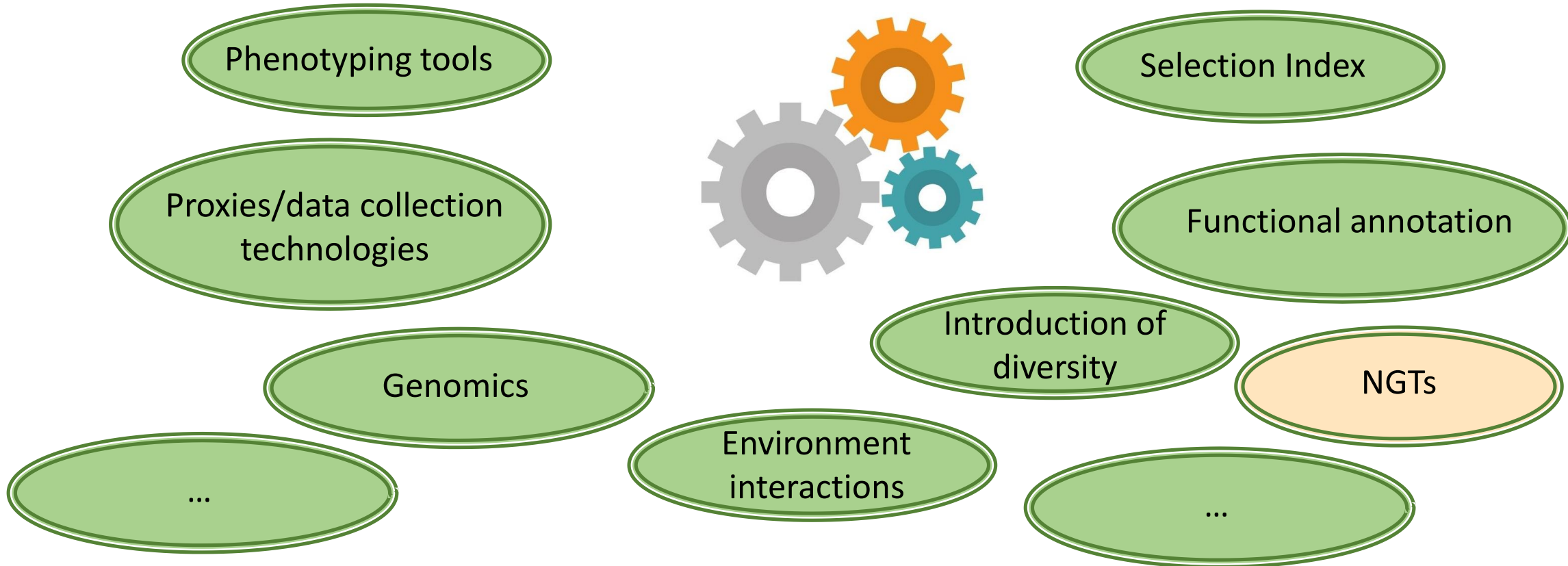


# Breeding is a long and resource-intensive process

Breeding a broad range of species, breeds and varieties for diverse production systems, requires:

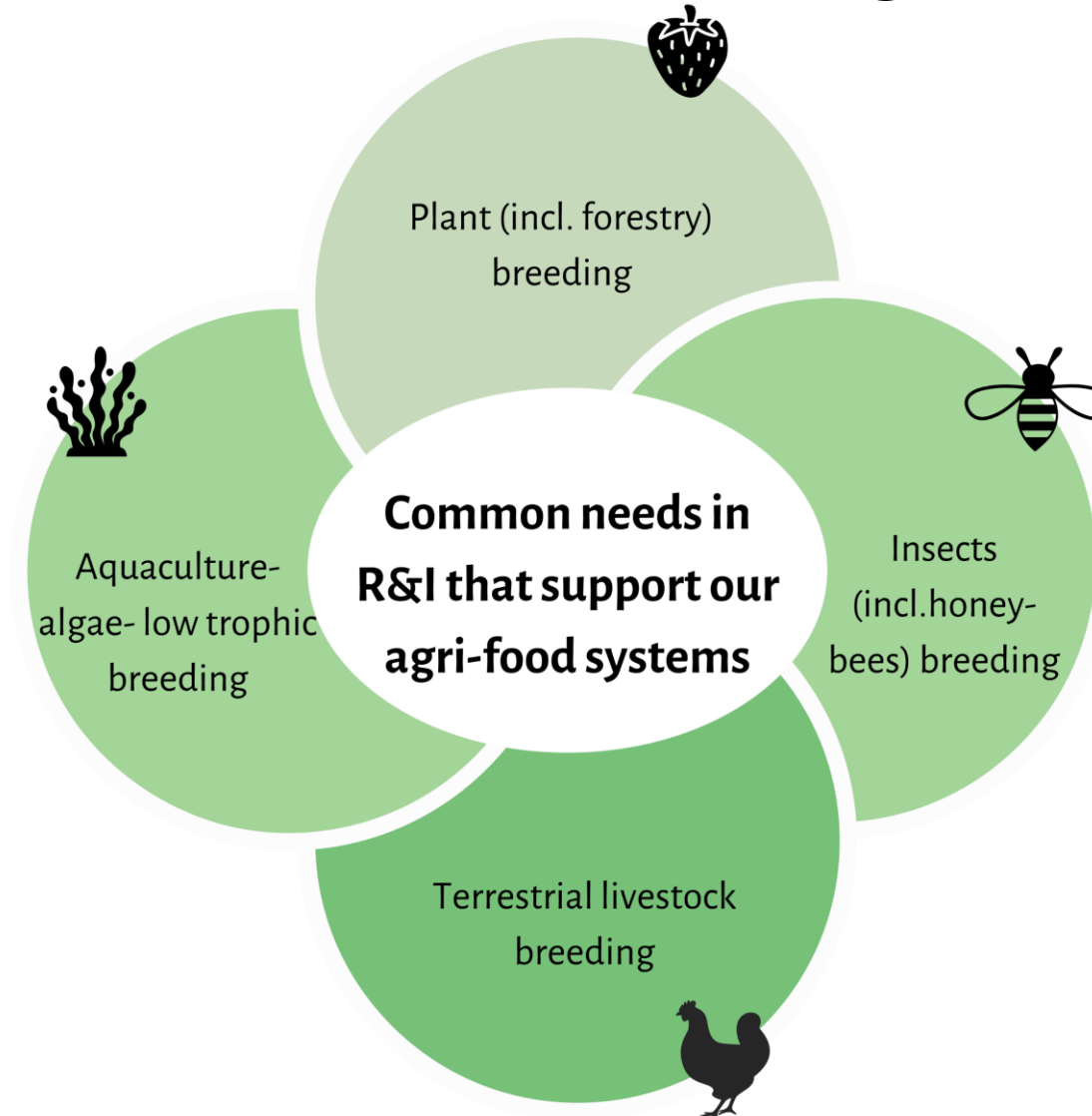


# Breeding combines knowledge and a wide range of methods and technologies



Access to knowledge, applicability and affordability of technology are not the same across sectors, species, varieties and breeds (not restricted to commercial breeds)

# Common challenges to achieving circularity, resilience and more sustainable agri-food systems



# Investment challenges and opportunities

- Economics are limiting due to long and uncertain return on investment (In EU, >90% of holders of plant variety rights (PVR) are SMEs)
  - It is often cheaper to import than grow in EU e.g., soy, meat and salmon, so little incentive to invest
- **Critical-mass investment, long-term commitment and coordination** across the EU are needed to ensure **strategic investment** and efforts, with strong focus on translation and involvement of the private sector and key stakeholders (e.g., farmers)
- Need dedicated efforts also to improve **societal awareness** of the importance of breeding for our agri-food systems



# Thank you for your attention!



Amrit Nanda  
[amrit.nanda@plantetp.eu](mailto:amrit.nanda@plantetp.eu)



David Bassett  
[david@eatip.eu](mailto:david@eatip.eu)



Ana Granados  
[ana.granados@effab.info](mailto:ana.granados@effab.info)



Laurent Journaux  
[Laurent.journaux@animaltaskforce.eu](mailto:Laurent.journaux@animaltaskforce.eu)

# Introduction to breakout sessions

## David Bassett, EATIP

- 14:10 **Breakout session 1:** The role of breeding in the green transition
- 15:00 Coffee/tea break
- 15:30 **Breakout session 2:** How to enable strategic long-term investment in breeding
- 16:15 Plenary reporting and discussions
- 17:00 Next steps and close



Plenary reporting (5 min each) and  
discussions (15 min)

# Next steps

- Workshop results will feed into a strategy for ensuring short-, medium- and long-term critical mass investment in breeding, to enable the transition to more sustainable agri-food systems and contributing to the EU Green Deal Goals
- Discussions will follow with EU and national level funders and interested stakeholders to implement the strategy

# Thank you for your time and contribution!



Amrit Nanda  
[amrit.nanda@plantetp.eu](mailto:amrit.nanda@plantetp.eu)



David Bassett  
[david@eatip.eu](mailto:david@eatip.eu)



Ana Granados  
[ana.granados@effab.info](mailto:ana.granados@effab.info)



Laurent Journaux  
[Laurent.journaux@animaltaskforce.eu](mailto:Laurent.journaux@animaltaskforce.eu)