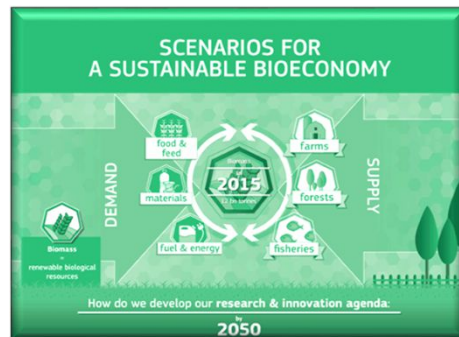


# Introduction to the European Bioeconomy & outcomes from the SCAR 4th Foresight's 5 principles:

Food first, Sustainable yields, Cascading approach, Circularity, Diversity



## SCAR Foresight

Sustainable Agriculture, Forestry and Fisheries  
in the Bioeconomy: **A Challenge for Europe**

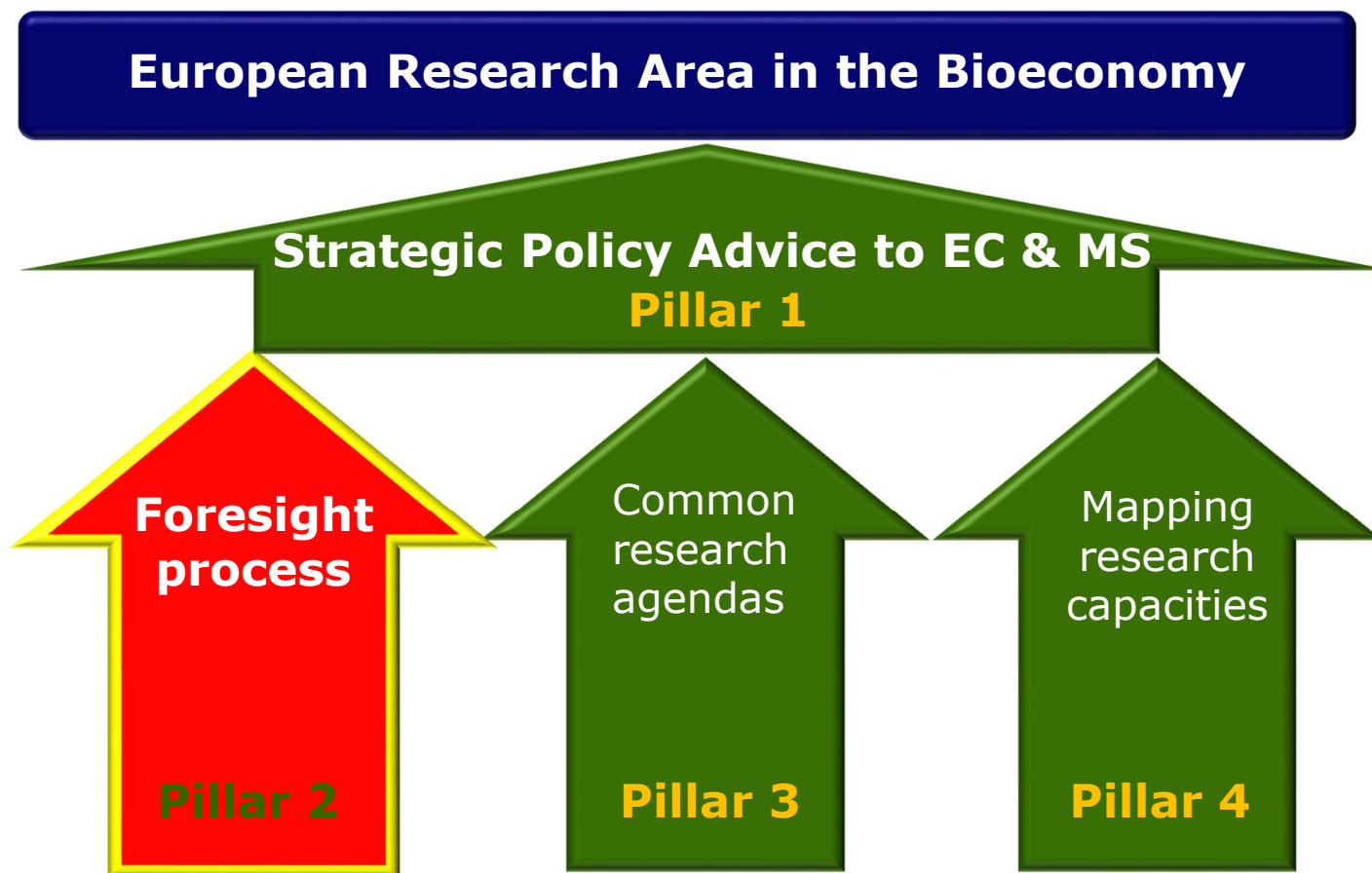
**Erik Mathijs**, Gianluca Brunori, Michael Carus, Michel Griffon, Luisa Last,  
Ingrid Olesen, Antje Potthast, Eva Lehoczky, Tiina Koljonen, Margaret Gill

### SCAR Foresight Group

Elke SAGGAU (Chair), Egizio VALCESCHINI, Stefano BISOFFI



# Foresight: a pillar of SCAR activities



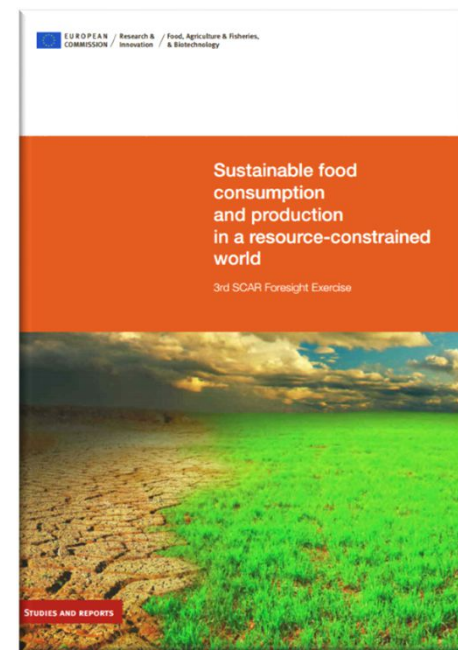
# Fourth Foresight in a series ...



2007



2009

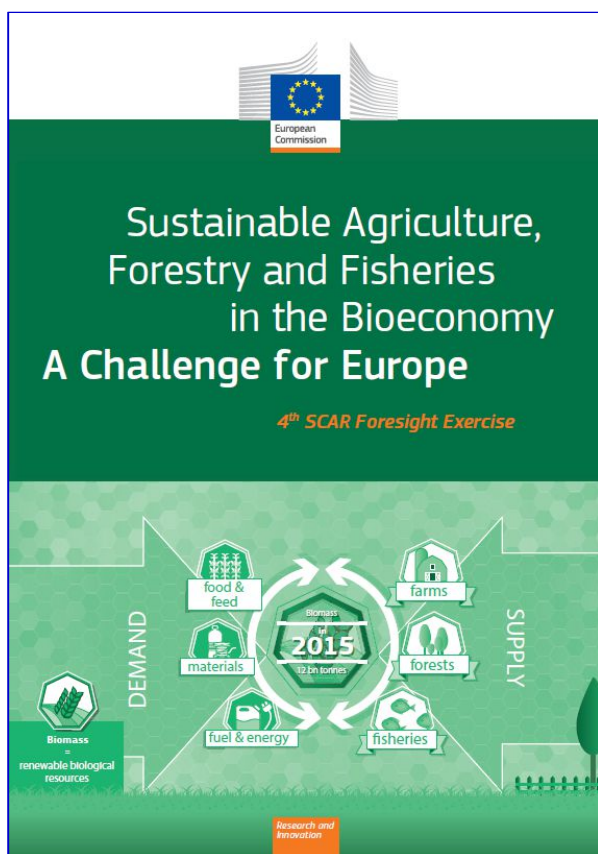


2011

... all available at:

<https://ec.europa.eu/research/scar/index.cfm?pg=about#foresight>

# 4<sup>th</sup> Foresight (2015), the first in the Bioeconomy



**Long term view: 2050**

Explores **what might happen** by developing the paradigm of the **bioeconomy** with the fundamental constraint of **sustainability**.

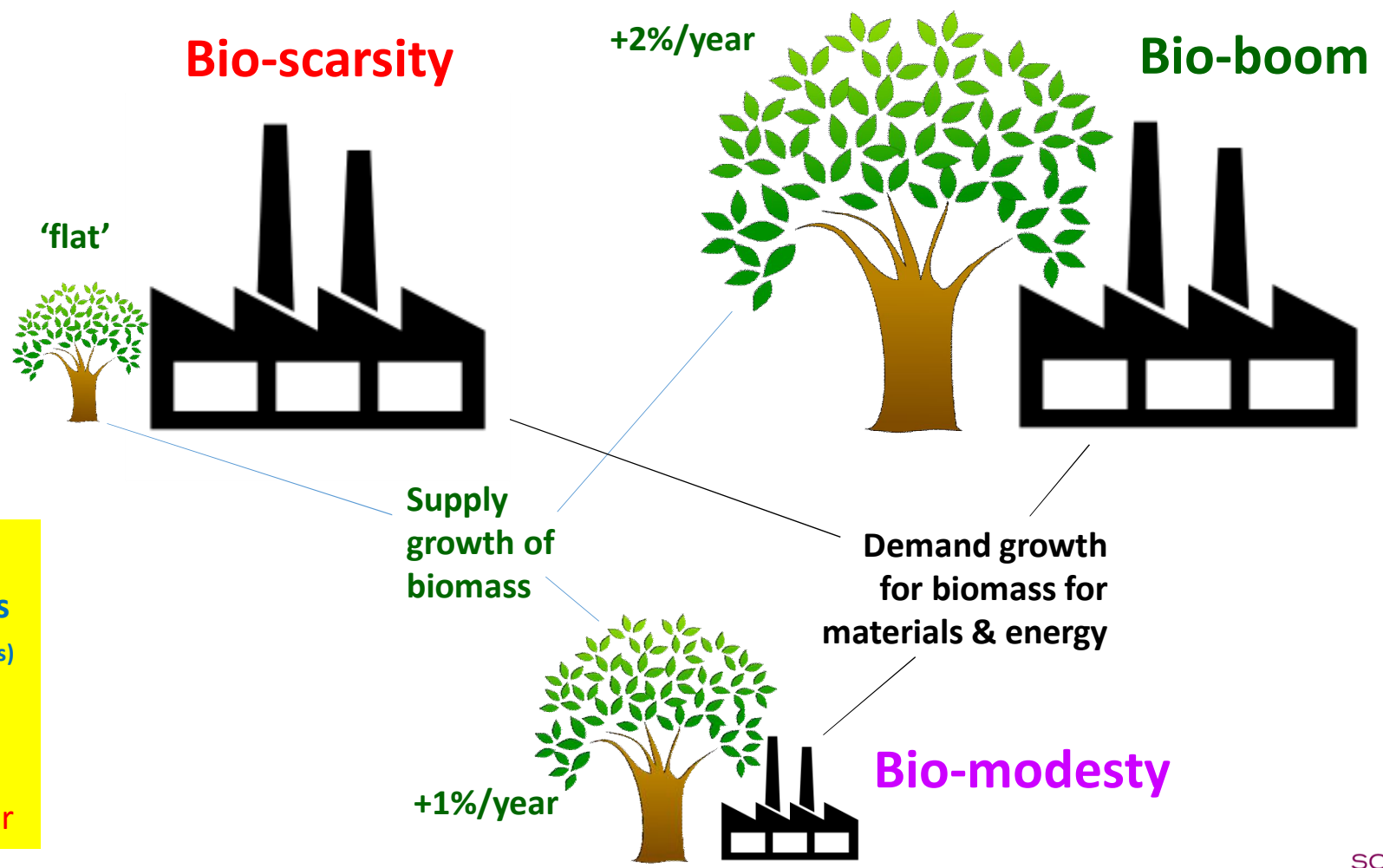
Analyses **dilemmas**, possible **conflicts**, **opportunities** and **threats** for different regions and social groups.

Anticipates future **challenges** & research questions

Identifies guiding **principles** for future actions.

# Scenarios: biomass for materials & energy

'Shell style'



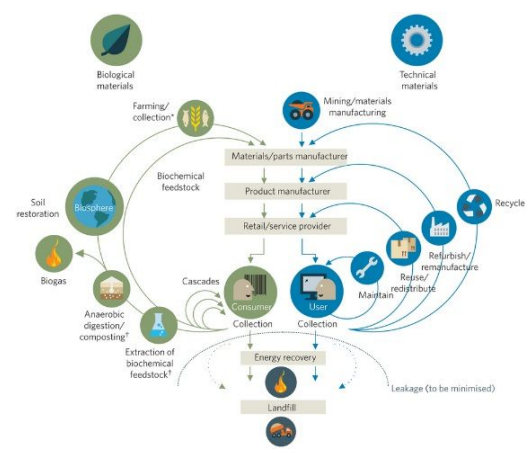
- Assumptions:**
- Food/feed demands satisfied (FAO projections)
  - FLW: 30% → 20%
  - Feed efficiency: +0.4% → +0.6%/year



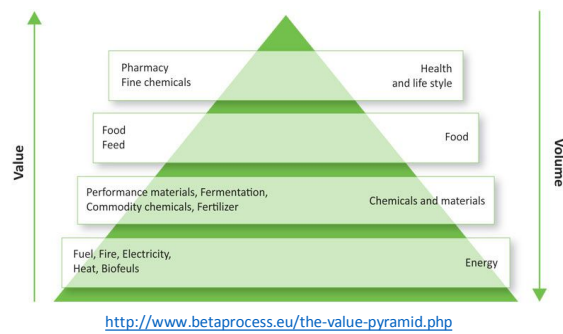
# Five key principles for a sustainable bioeconomy



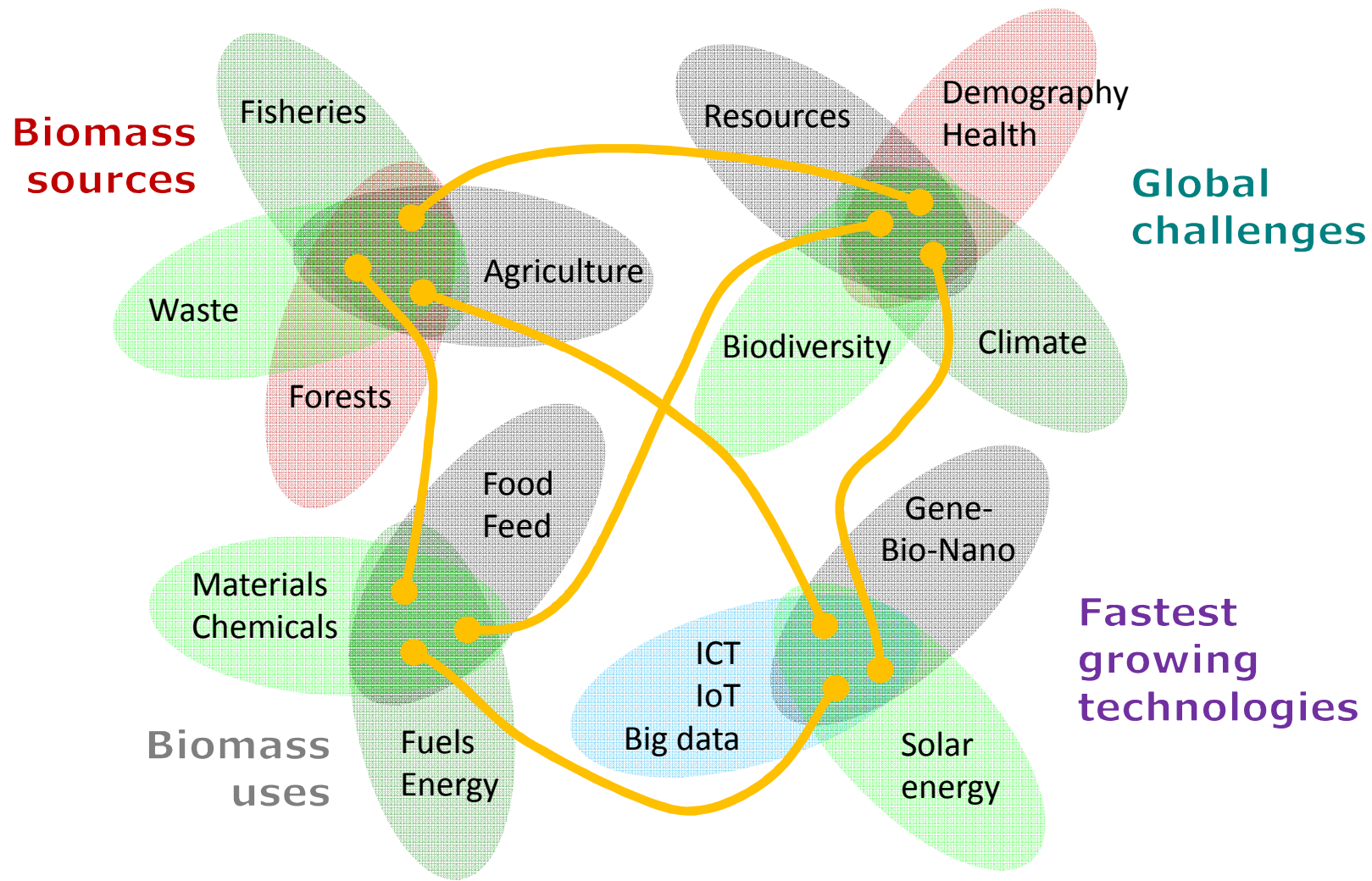
- **Food first**
- **Sustainable yields**
- **Circularity**
- **Cascading approach**
- **Diversity**



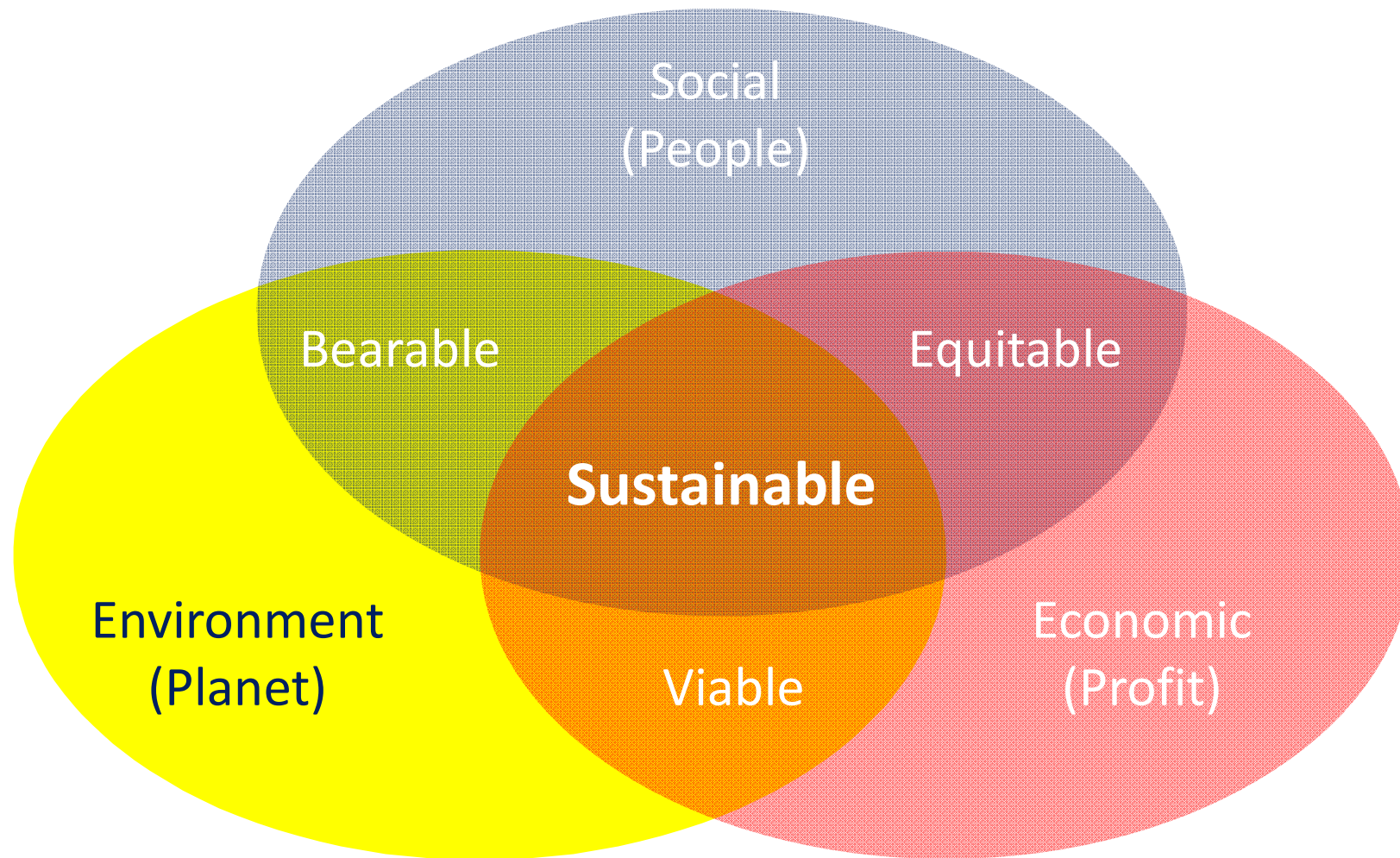
<http://www.ellenmacarthurfoundation.org/circular-economy>



# Growing complexity



# A sustainability dilemma





# A diversity of sectors

## Animal productions are a very diverse area:

- Animals (large and small ruminants, pigs, poultry, ...)
- Products (meat, milk, eggs, ...)
- Feeding systems (pastures, grasslands, intensive, ...)
- Farms (family, integrated, specialised, ...)



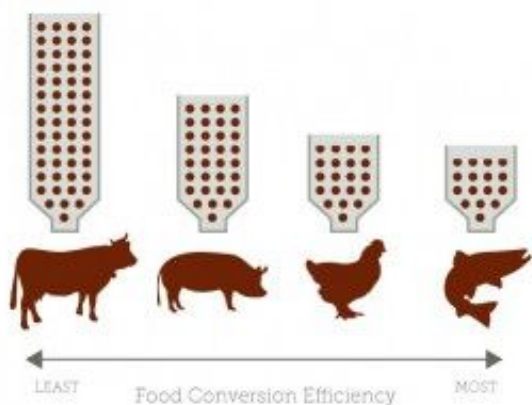
# Food vs feed

## Is it an issue and where?

- Specialised feed crops (animals as "land multipliers")
- Feed from pastures and grasslands (ecosystem value!)
- Feed from sideproducts (e.g. oilseed meal)

### Food Conversion Efficiency

Pounds of feed to produce one pound of animal protein



# Animals and climate change

## Challenges and opportunities

- Ruminants and methane
- Energy from waste
- Nitrogen and phosphorus in excrements (problem to opportunity)
- Soil organic matter and manure



110 kg methane  
produced annually by



1 dairy cow



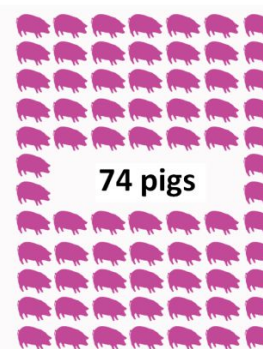
2 beef  
cows



14 sheep



22  
goats



74 pigs



# Sustainable diets?

## Diets and lifestyles:

- Digestibility, essential aminoacids, fats, ...
- Proteins/fresh weight (1/4 meat; 1/10 vegetables)
- WHO recommended protein intake (0.66-0.83 g/kg/d)
- Current trends (e.g. meat+dairy vs income) dependable?
- Vegetarian/vegan diets increasingly fashionable



National Geographic Magazine



<http://www.smithsonianmag.com/>



<http://travelstrong.net/high-protein-vegetarian-recipes/>

# Major research issues

- Increased efficiency by precision livestock farming
- Improved feeding, improved housing
- Breeding for efficiency and low emissions
- Recovery of valuable chemicals from side streams
- Animal health and zoonoses (One Health)
- Antibiotics!
- Socio-economic aspects
  - ✓ Resilience (e.g. dairy sector)
  - ✓ Diversification of incomes, cultural heritage of territories
  - ✓ Integration with organic farming
  - ✓ International trade vs food sovereignty