

# Shift in diets to reduce protein consumption and animal-based share

## *Scenario in Henchion et al. 2017:*

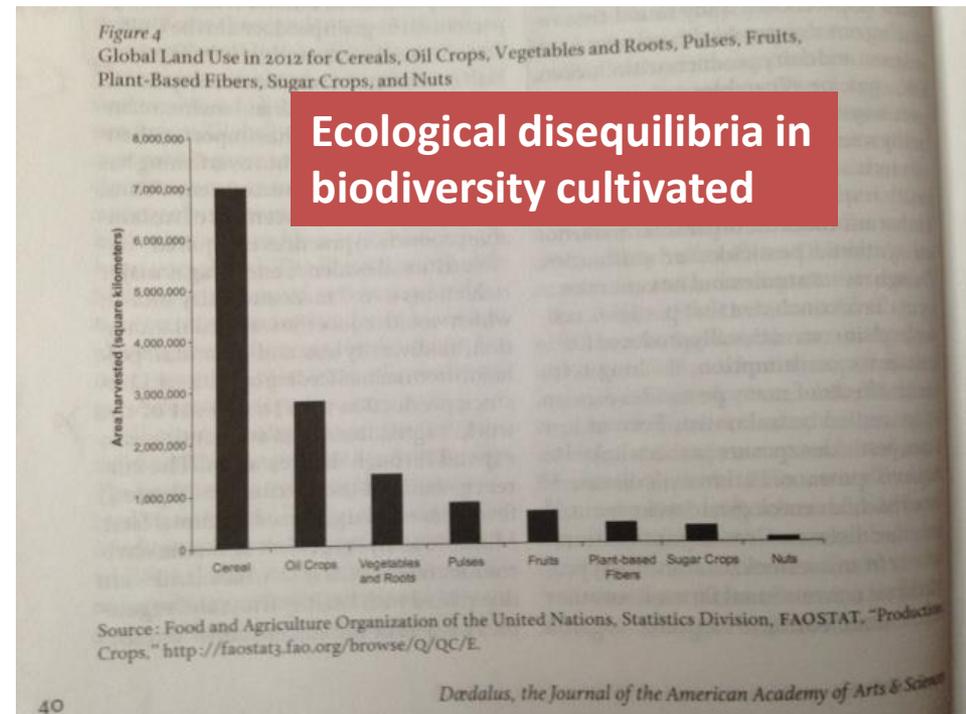
- Current protein demand for 7.3 billion inhabitants : 202 million tonnes
- 2050: all 9,6 billion inhab. consume the protein level required for sedentary adult 50g/day, then the protein demand is: 175 m tonnes

**→ - 13% protein demand**

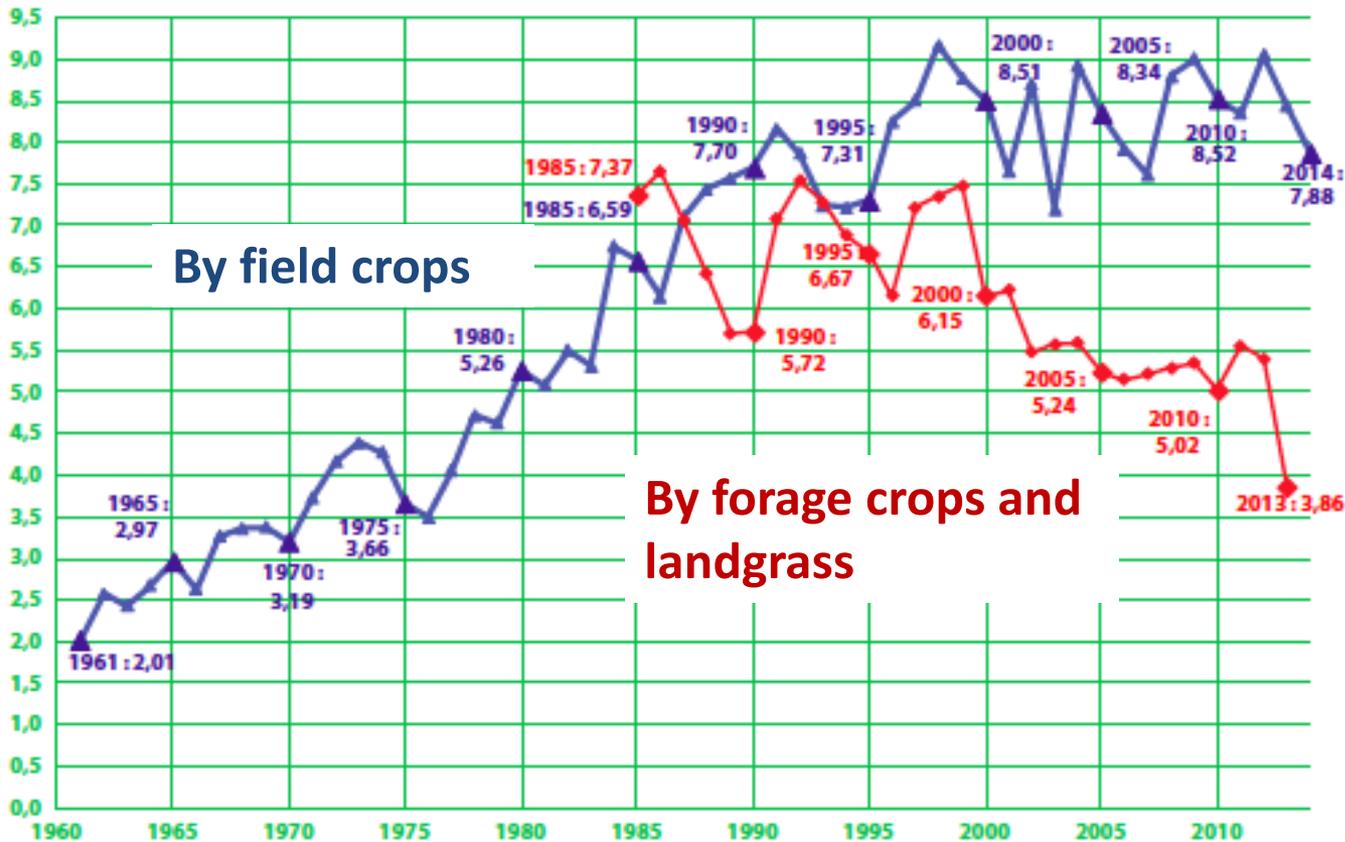
**The problem is no so much QUANTITY  
but QUALITY of which protein we consume.**

## 2. We face with unsustainable cropping systems that need more legumes in field crops to allow agroecological transition

- ↗ cultivated diversity in cropping systems = ↘ synthetic inputs
- Legumes contribute to:
  - Reduction of mineral fertilizers and GHG
  - Increase soil fertility
  - Increase yields of the following crops...
- Legumes are strongly used in organic cropping systems
- Diversity of legumes cultivated is a key

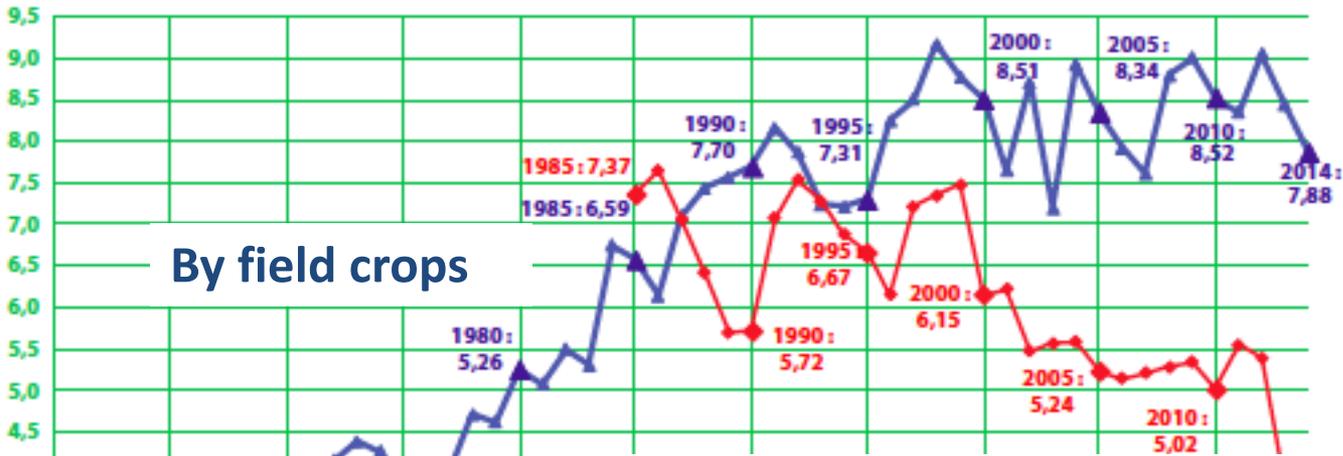


# French case : the evolution of protein production

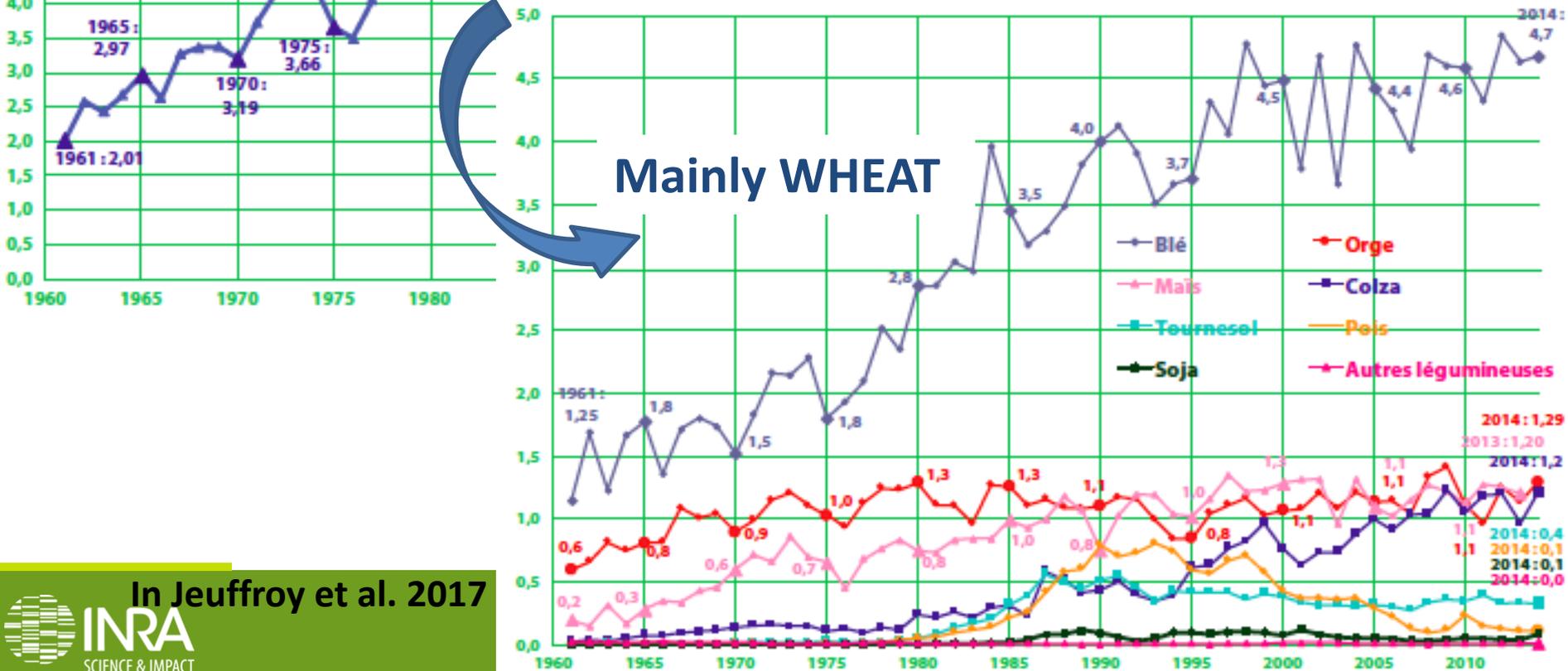


# French case : the evolution of protein production

By field crops

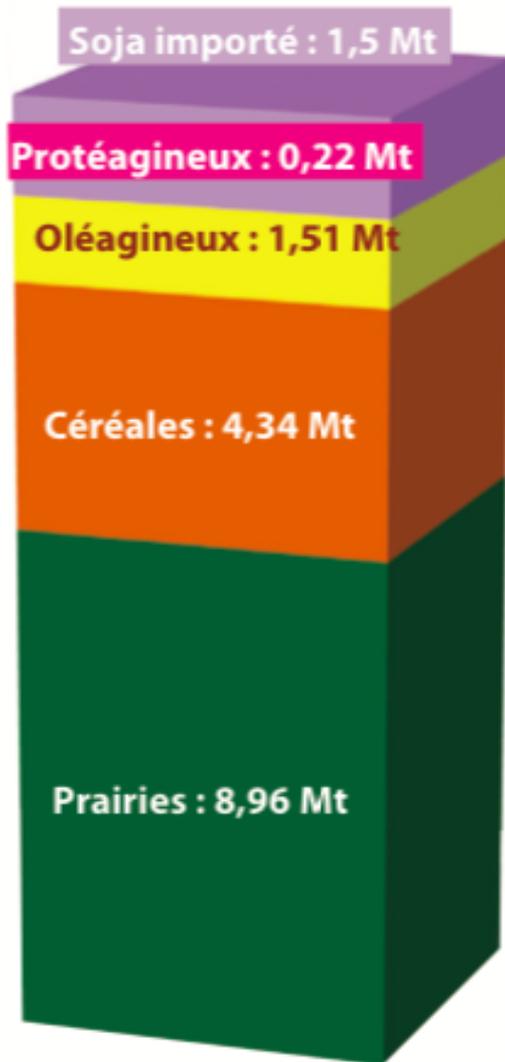


Mainly WHEAT



In Jeuffroy et al. 2017

## All Plant Proteins produced or imported in France in 2014



In Huyghe 2017

## France :

- exports 3,5 Mt of cereals proteins
- imports 1,5 Mt soya proteins
- Net exporter of plant proteins, even if importer of rich-proteins plants

And in Europe ?

The question is not “protein-dependent” but how to promote more diversified protein plants in cropping systems

# How to escape from lock-in ?

- Main consequence of lock-in: Increasing competitiveness gap between the dominant technology and the alternatives that received less investment

→ Irreversibility ?

- Only public intervention could favour change of the “trajectory”, combined with niche-innovations oriented towards radical innovations

→ Which actions ? Which innovations ?

MLP- Multi Level Perspective framework in the sustainability

transition literature

Increasing structuration of activities in local practices

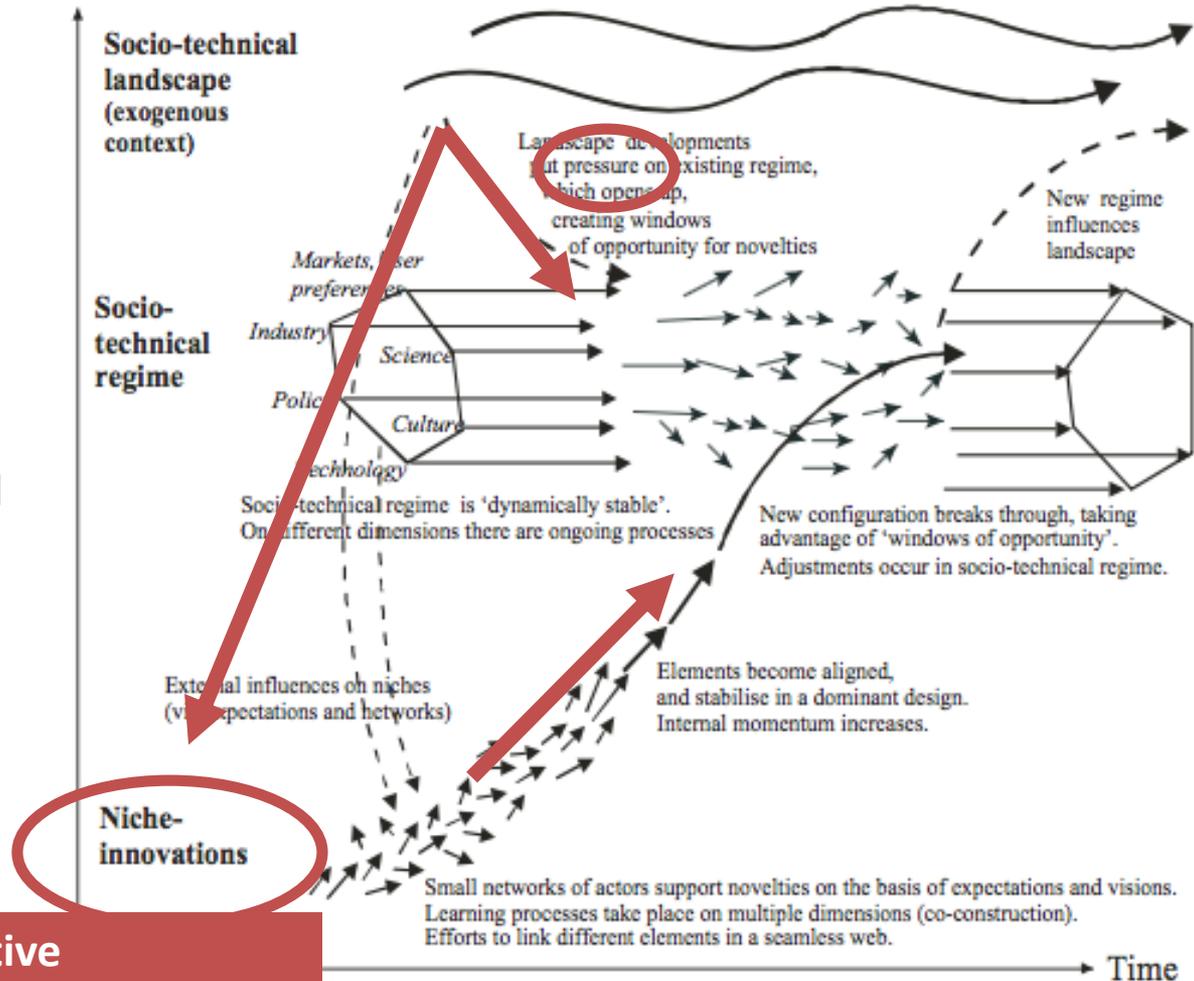
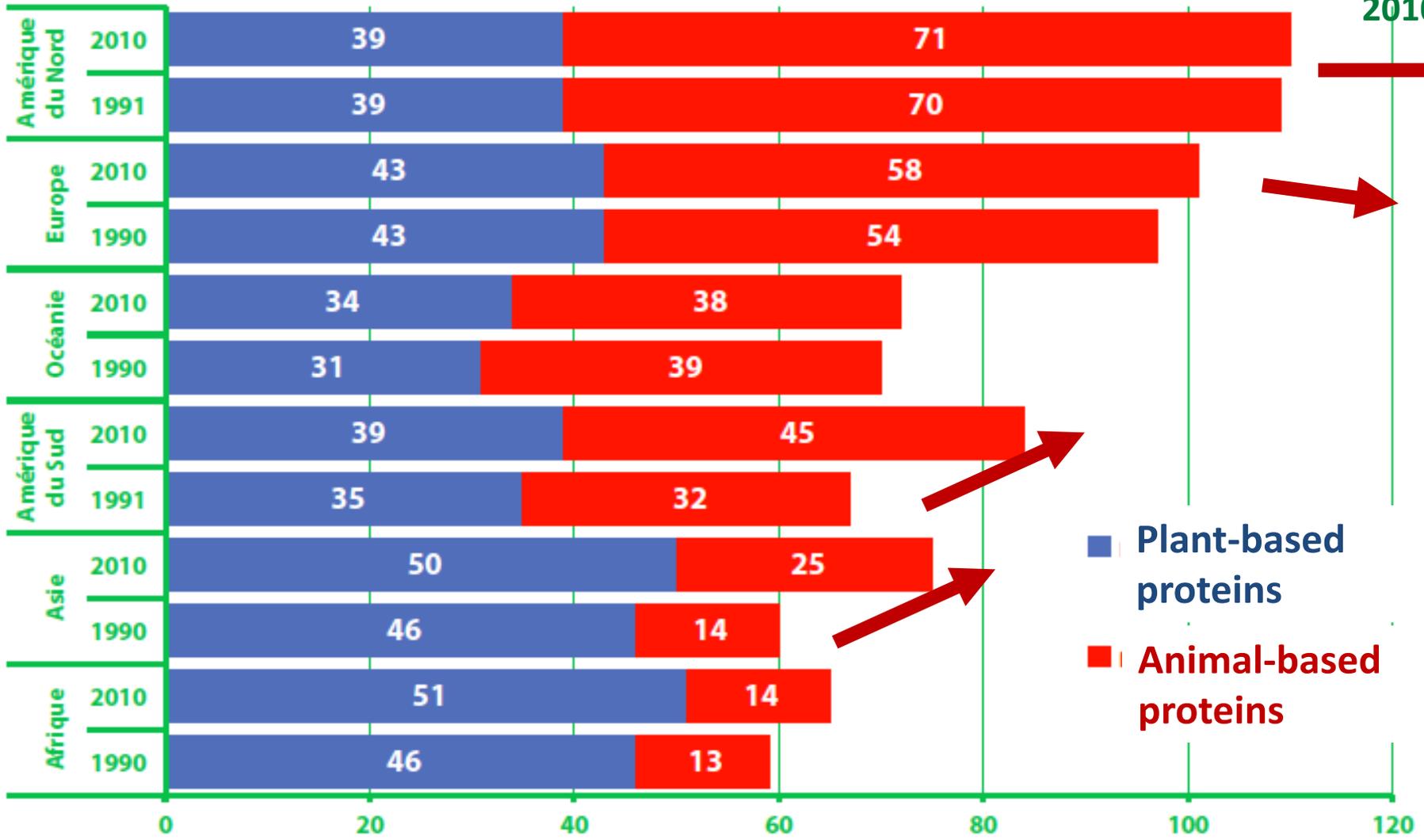


Fig. 2. Multi-level perspective on transitions.

# The increase of protein demand

Plant-based Protein (PP) and Animal-based Protein (PP) consumption in the big regions of the world : in gr/person/day, FAOstat

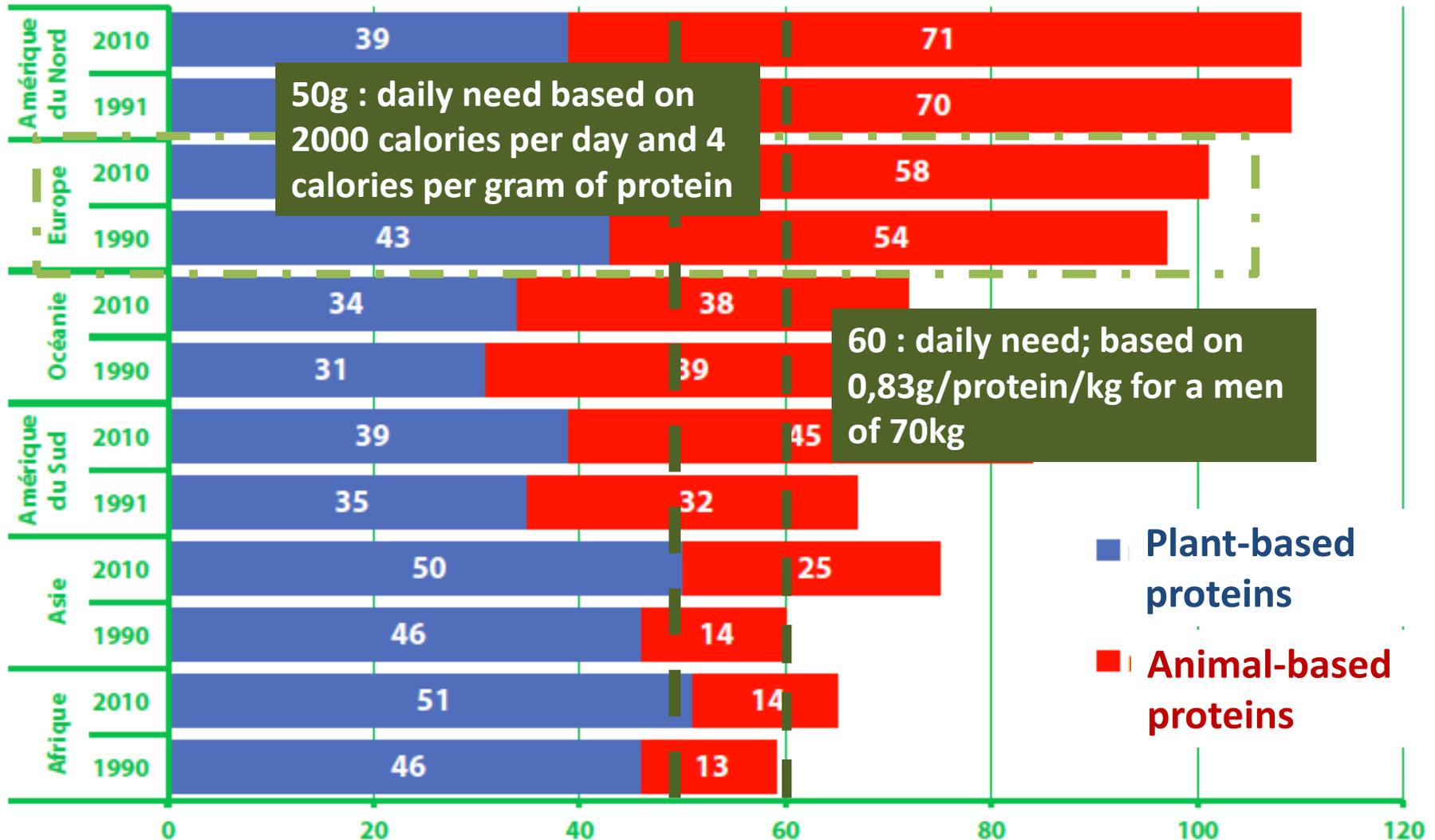
2010s



- Plant-based proteins
- Animal-based proteins

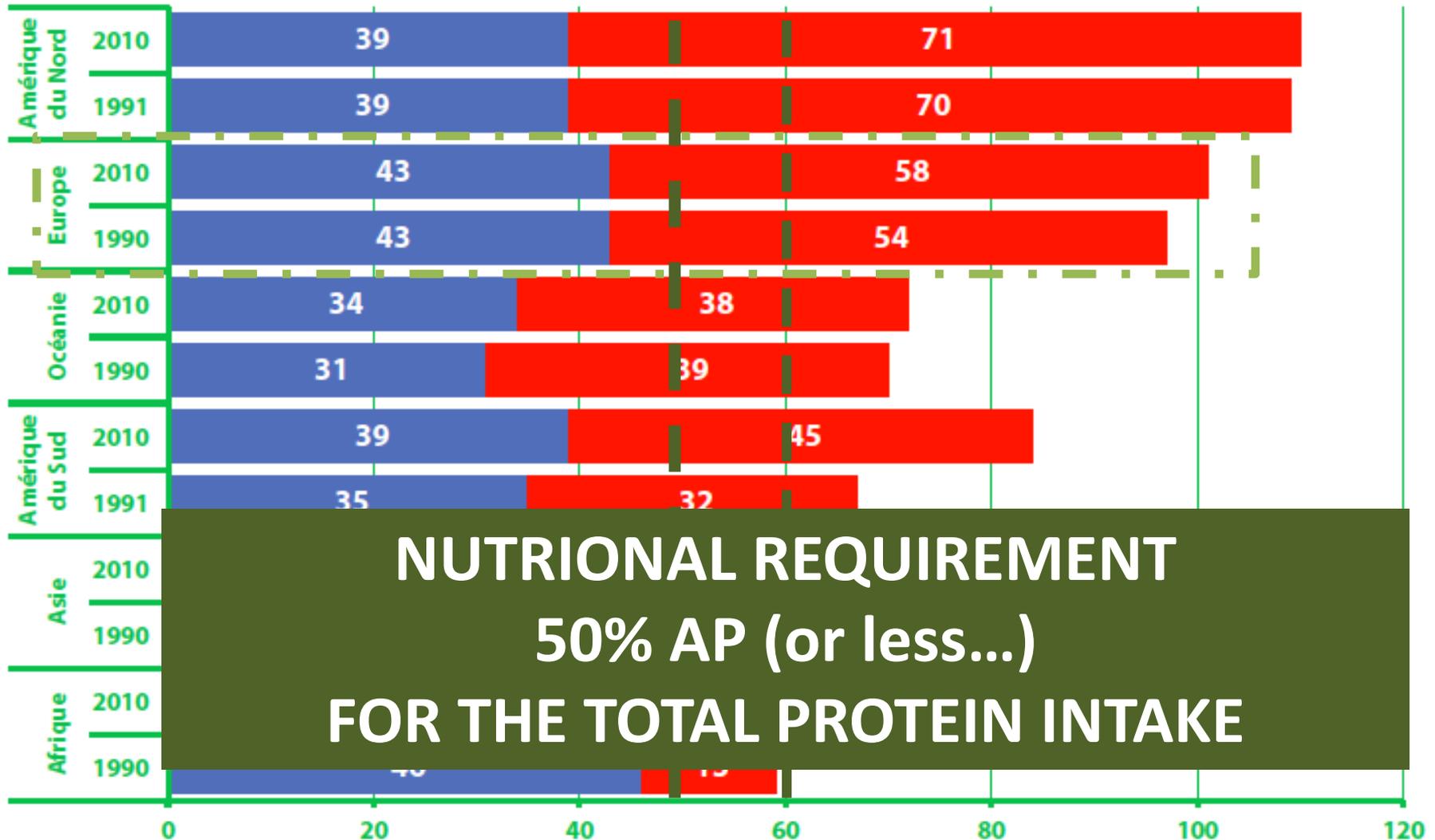
# An overconsumption of proteins

Plant-based Protein (PP) and Animal-based Protein (AP) consumption in the big regions of the world : in gr/person/day, FAOstat



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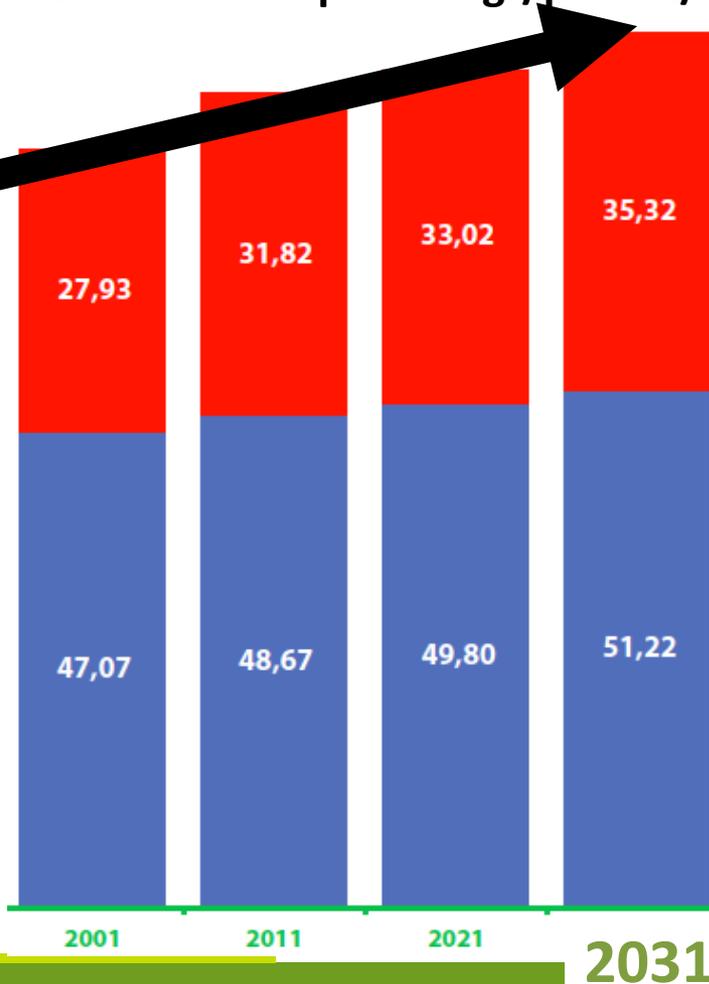
**NUTRITIONAL REQUIREMENT**  
**50% AP (or less...)**  
**FOR THE TOTAL PROTEIN INTAKE**

# But protein overconsumption progresses...

Plant-based proteins

Animal-based proteins

World consumption in gr/person/day



On average in 2031:

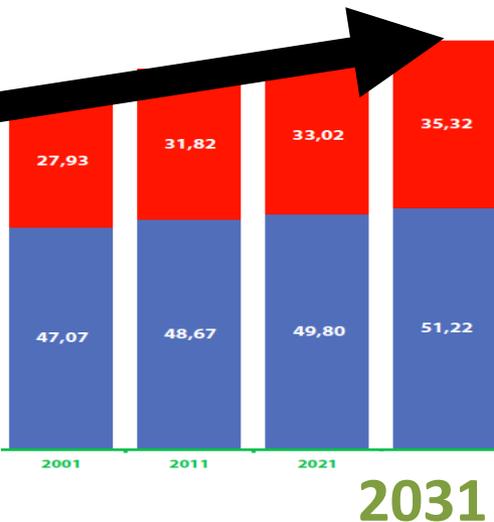
270 millions tons of proteins by year  
(based 9,6 billion global population)

+ 30% of protein consumption  
compared to 2000

*Similar results in  
Henchion et al. 2017  
Pilorge and Muel, 2016*

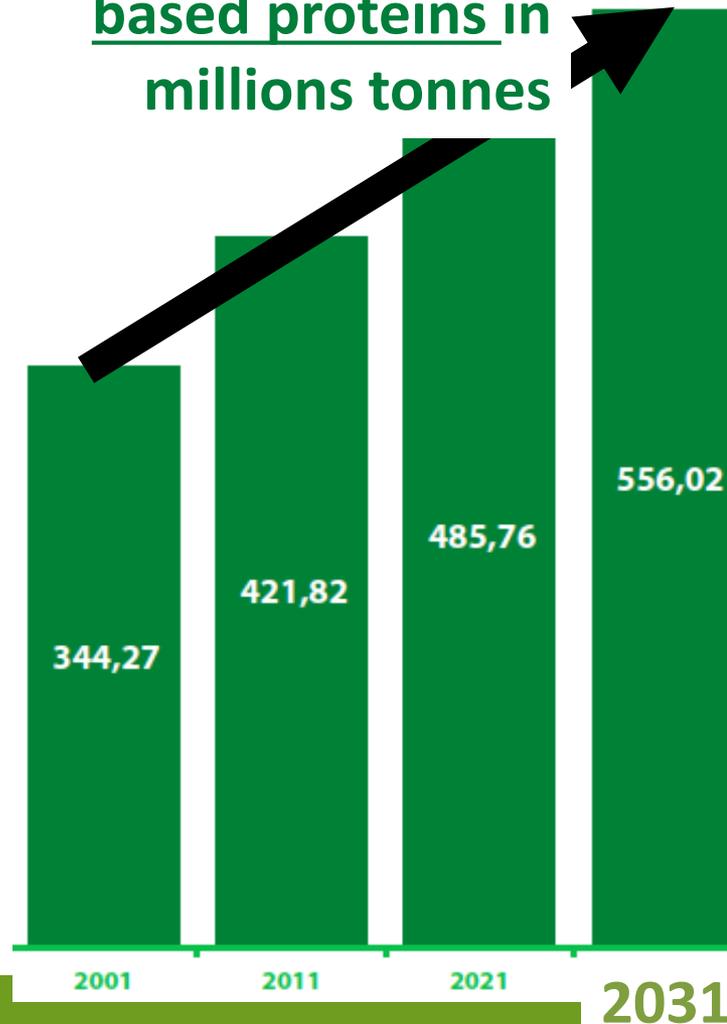
...

# ...and impossible to achieve



## CONVERSION IN PP

Equivalent in plant-based proteins in millions tonnes



**2031:**  
**+ 135 Mt protein**  
**compared to 2011**  
**=>**  
**+ 145 Mha soya**

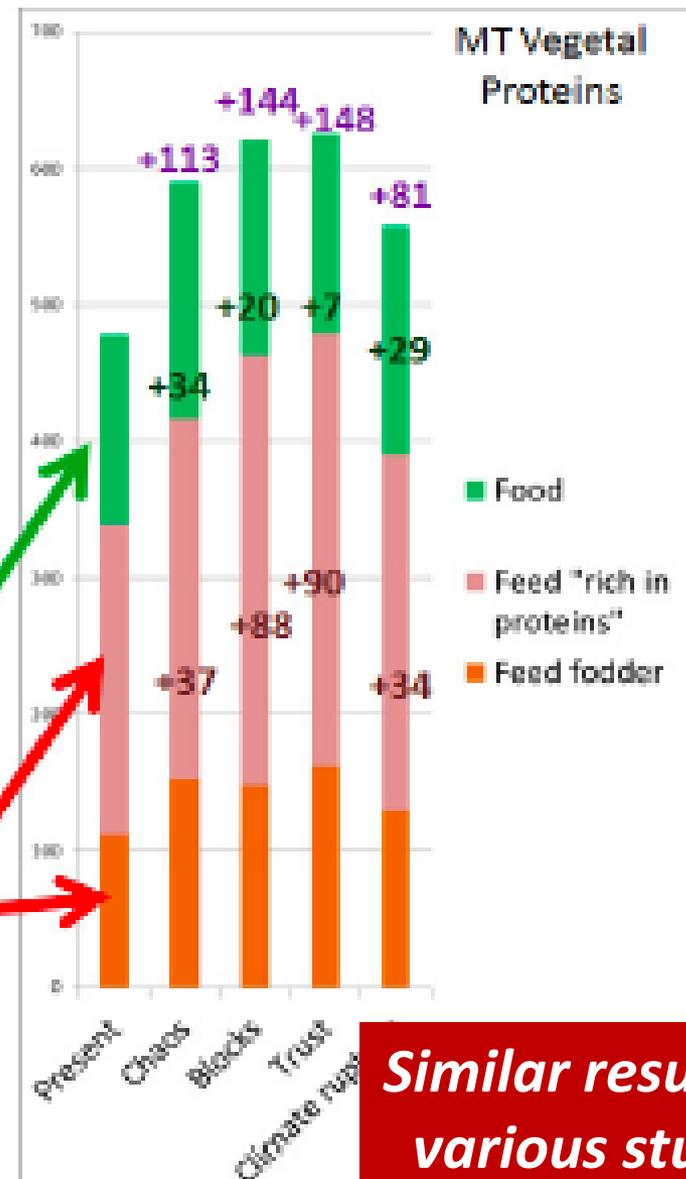
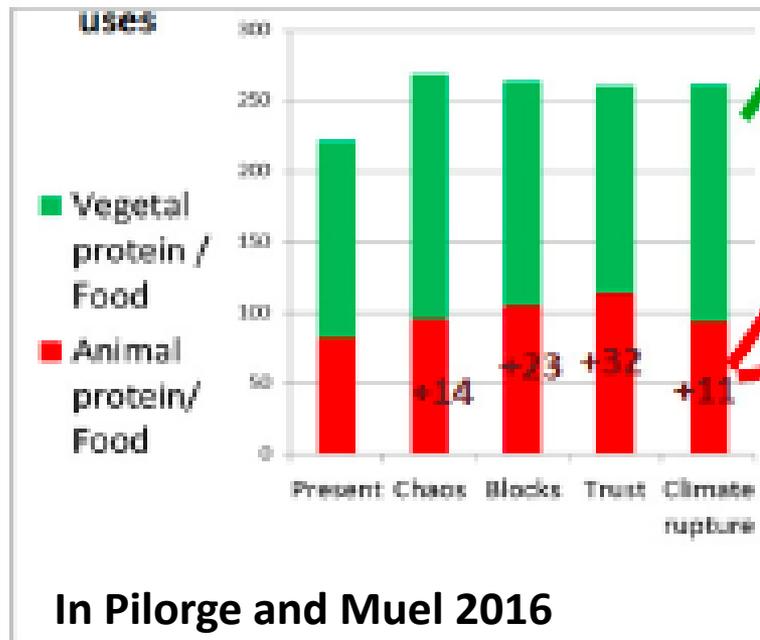
**In 2017, soya**  
**surface of the 3**  
**main producers**  
**(USA, Brasil,**  
**Argentina)**  
**=**  
**88,5 Mha**

# World demand for proteins (MT)

Depending on:

- Population growth
- Food habits

## Protein food uses



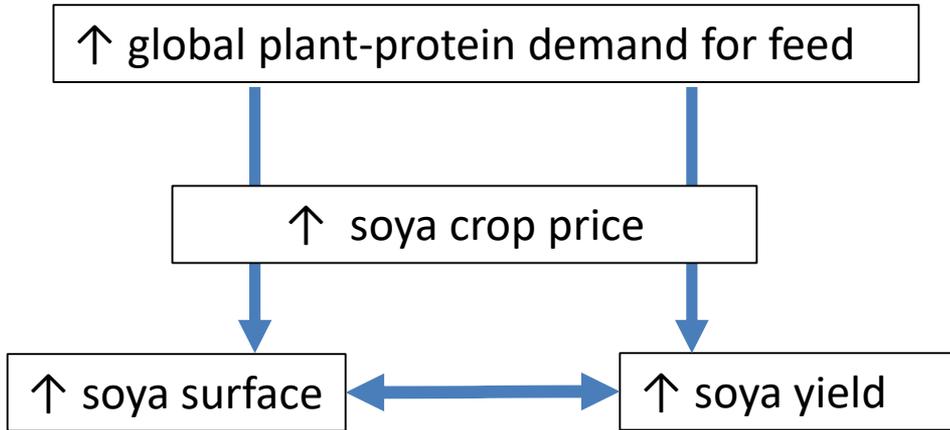
# If shift diets in Europe, do we reduce animal production or do we increase animal-based exports ?



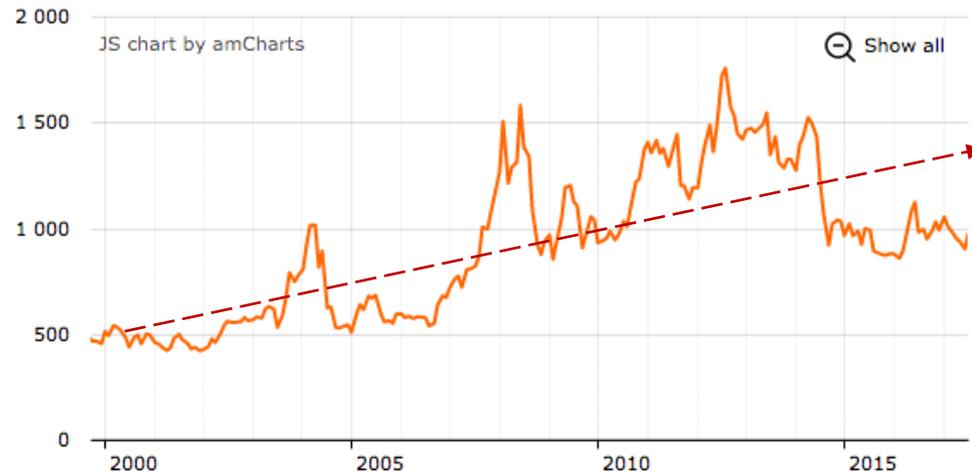
Who “pay” for environmental externalities due to livestock and cropping practices that have negative impacts on environment ?

**According to the answer to this question, the answer to the first question will change for Europe.**

# Towards more soya in the world but in Europe ?



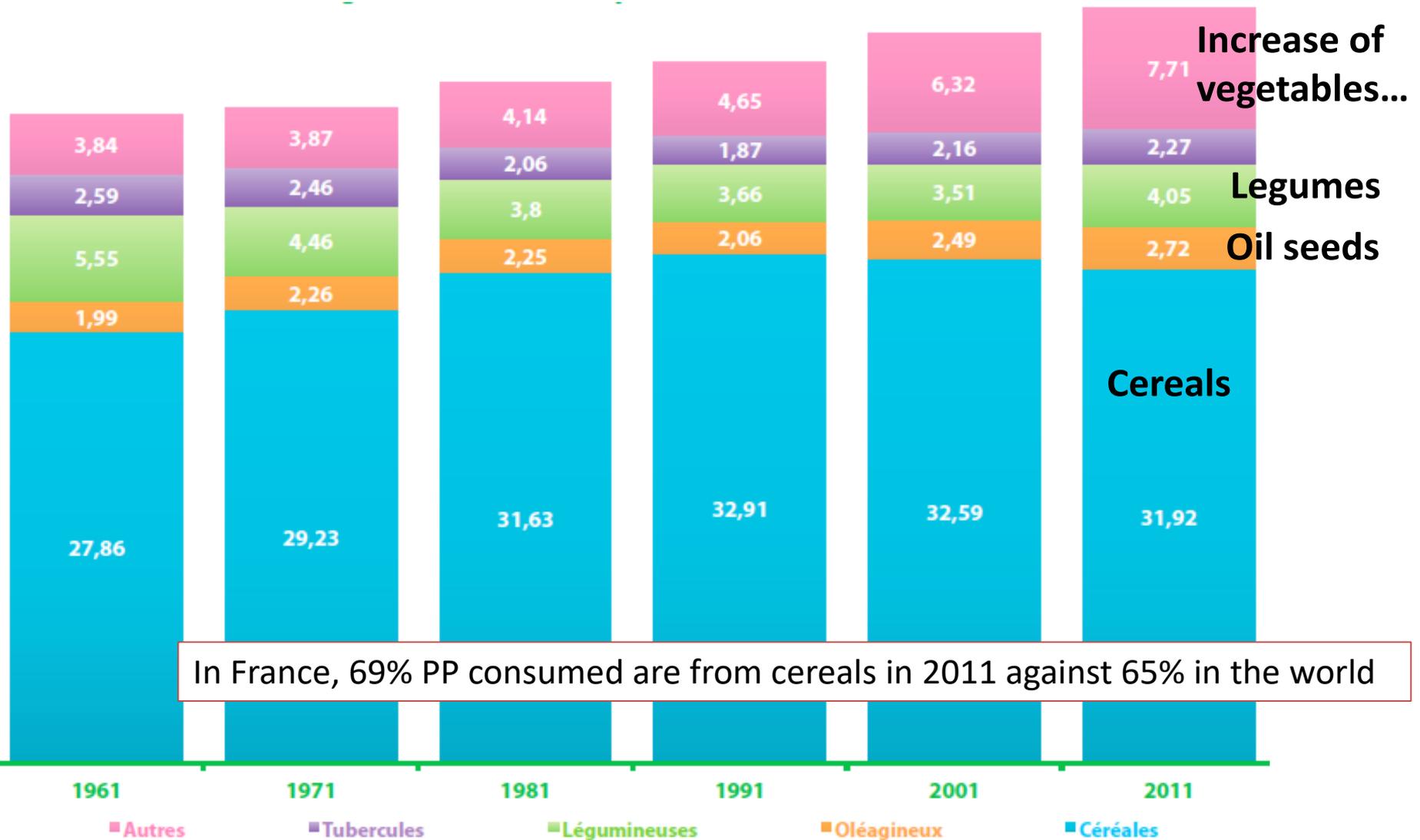
*What we know on the availability of new land areas for soya ?*



?

Change in land area use in Europe will depend on relative prices with other crops

# Which plants provide food proteins in the world ?



In France, 69% PP consumed are from cereals in 2011 against 65% in the world

1961

1971

1981

1991

2001

2011

■ Autres

■ Tubercules

■ Légumineuses

■ Oléagineux

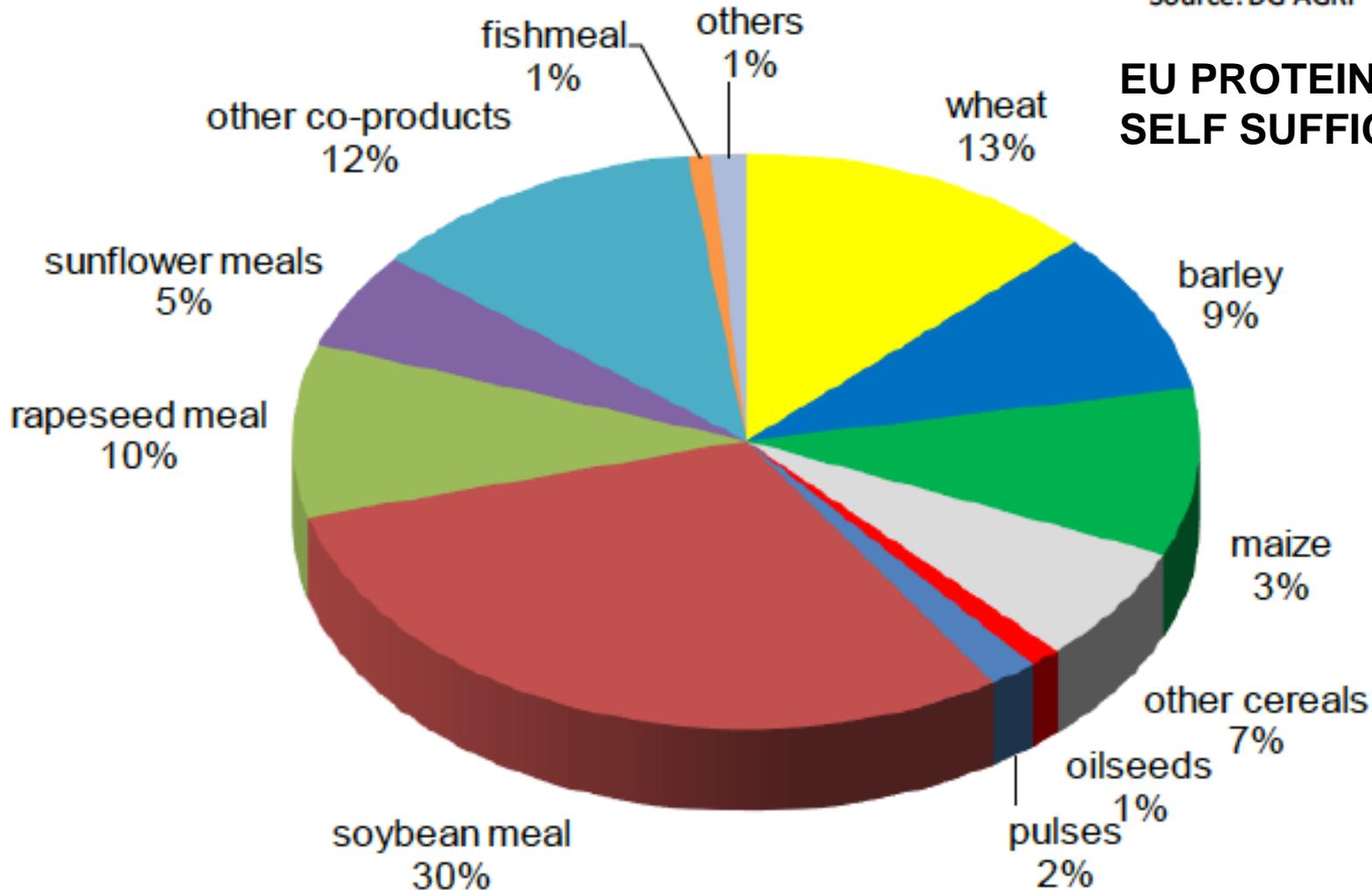
■ Céréales

# SOURCES OF PROTEINS FOR FEED USE IN EU-28 IN 2016/17 (expressed in "equivalent protein", excl. forages)

<http://www.fefac.eu/files/79278.pdf>

Source: DG AGRI

**EU PROTEIN SUPPLY  
SELF SUFFICIENCY : 61%**



# Consumption of PP in 2013

