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Livestock is essential for sustainable agri-food systems

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2020 Annual General Meeting FABRE TP and EFFAB

@AnimalTaskFrc @PeyraudJean

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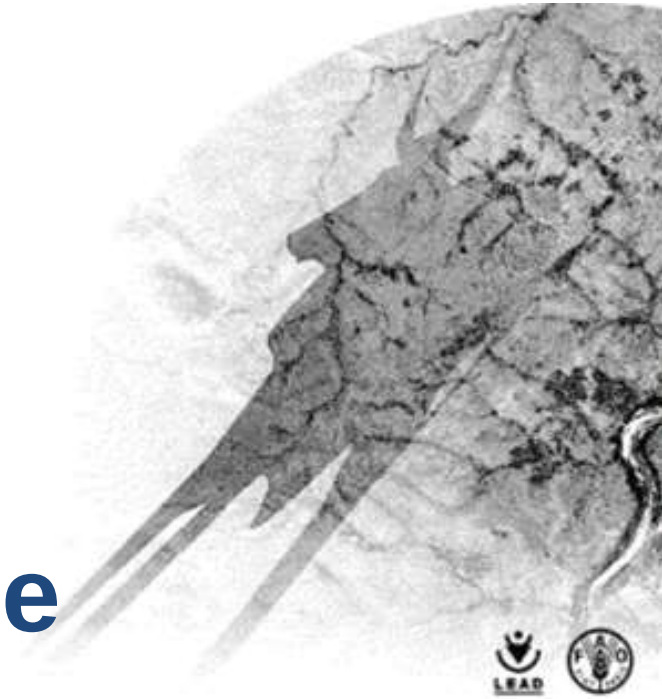

Part 1:
Benefits and shadows of livestock: beyond false assumptions, towards a more balanced vision

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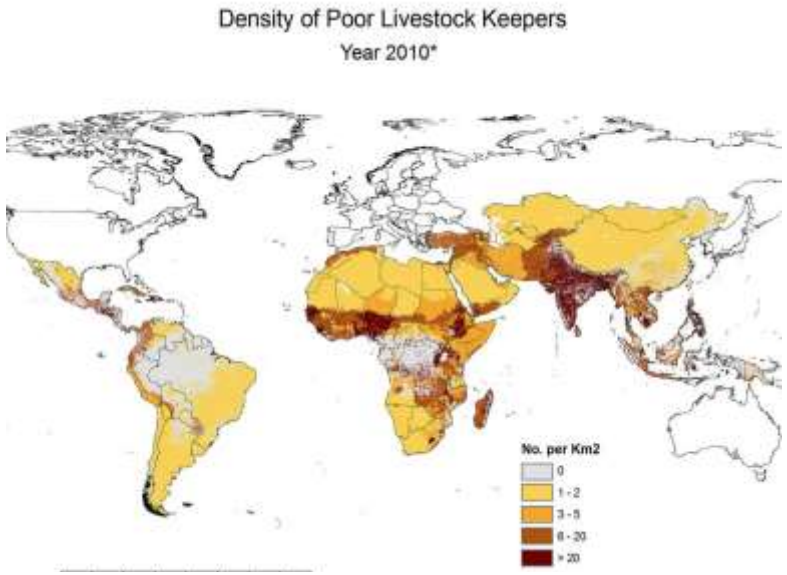
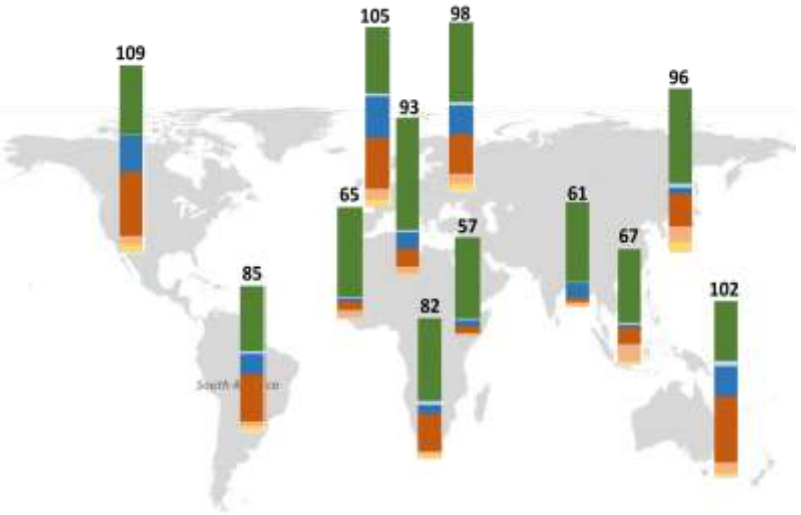
A crucial importance of livestock for global sustainability

- **Livestock provides livelihood to more than 800 million poor people**



- **A need of more protein of animal origin for nutritional security in some regions**



Food and Agriculture Organization of the United Nations

- **In smallholders family farming systems, livestock enhances food security**
  - **Nutritious food**
  - **organic fertilizer for soils & crops**
  - **workforce and transport**
  - **source of regular income & savings**
  - **gender equity**

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Livestock between Food and Feed!

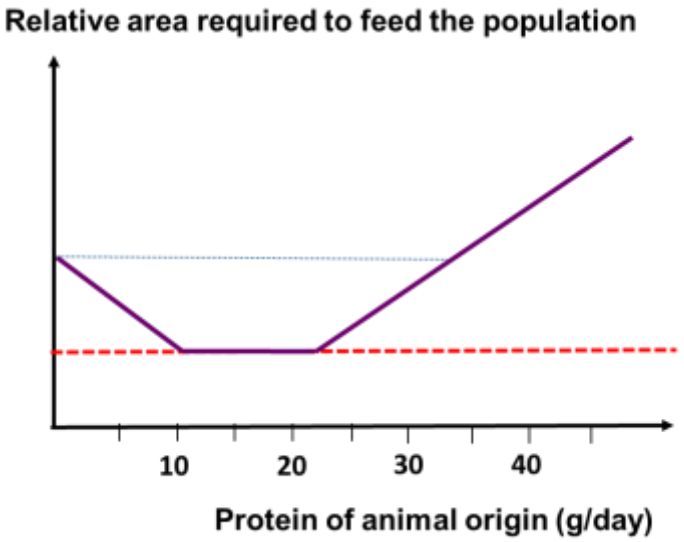
"We can feed more people by suppressing livestock" : true & false

- **Livestock consume 6 Billion tons dry matter, of which 86% are non edible as human food.**

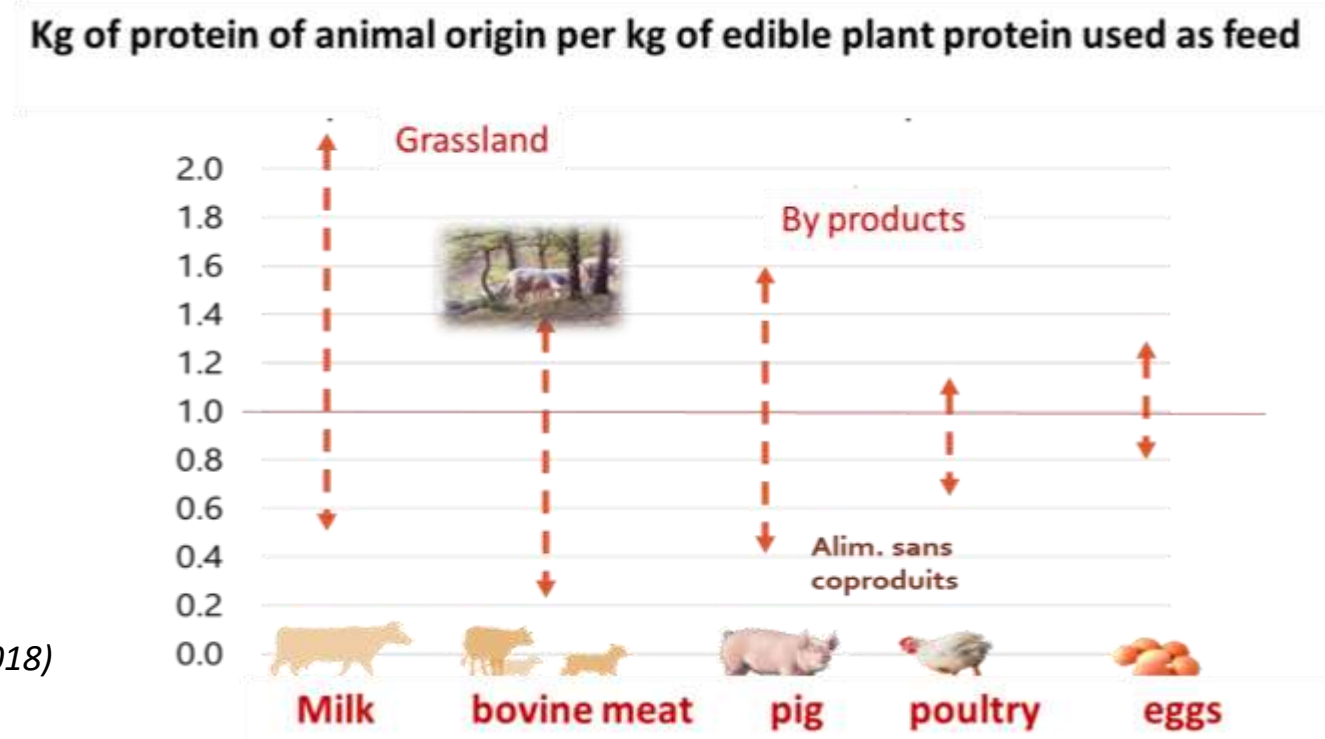
Food and Agriculture Organization of the United Nations

Mottet et al., 2018

- **Complementarity between livestock and crops to maximize production of food per unit area**



(Adapted from Van Kernebecket al., 2014 and De Boeeret al., 2018)



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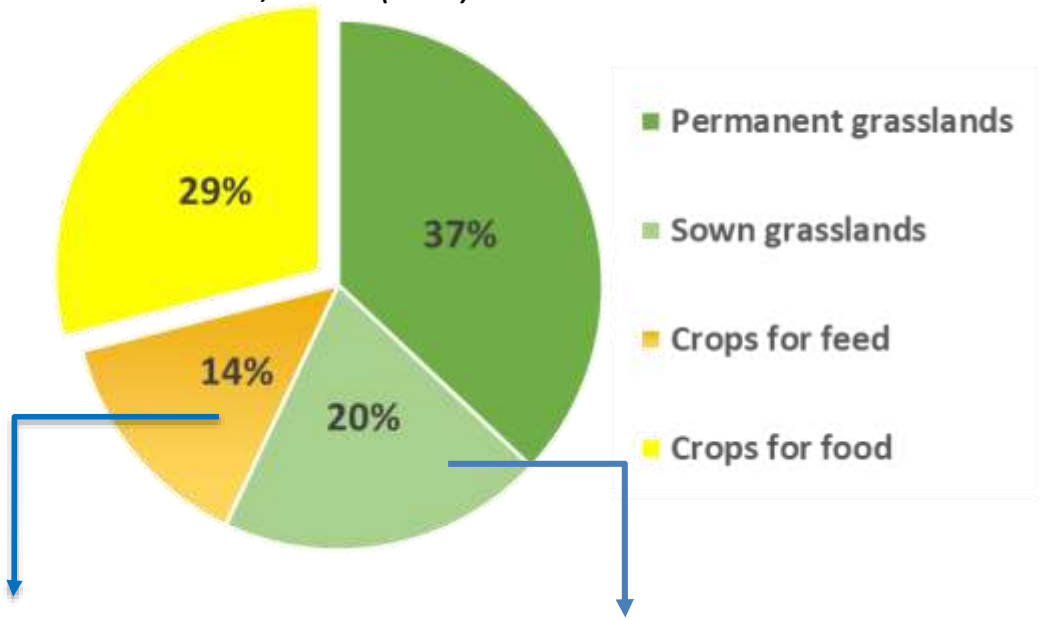
Livestock and land use

"Livestock use 70% of arable land" : yes, but

Adapted from Mottet et al., 2018 (FAO)



This part is questionable but plays an economic role for crop producers

This part might be used for crops production but it ensures the provision of ecosystem services for an agro-ecological agriculture

Ten Years For Agroecology ***IDDRI***
(Poux et Aubert 2018)

- **If we eliminate livestock,**
  - **what happens to the land that has been freed up?**
  - **What will be the impacts of the new uses in terms of:**
    - **Global warming**
    - **Soil conservation**
    - **Biodiversity ?**

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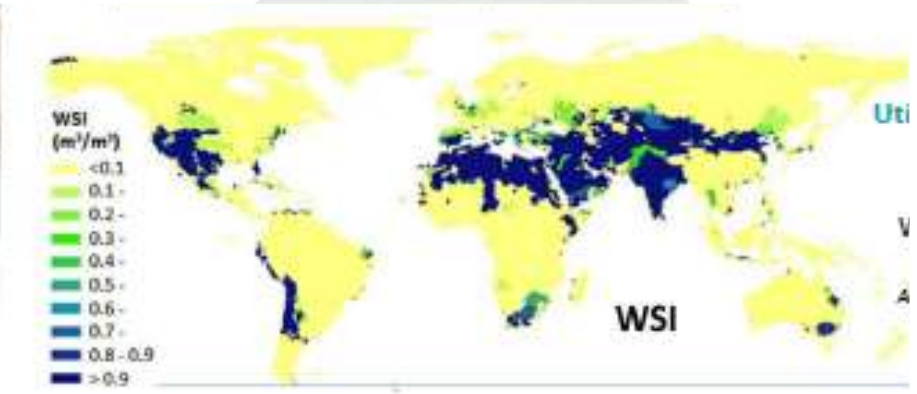
Water consumption by livestock

« 15 000 L of water per one kg of meat! » : what are we talking about?

- **Green water (soil water consumed for crop cultivation): more than 95% is recycled**
  Blue water (surface water and groundwater)

- **Livestock consume 8 to 15% of water resource worldwide (FAO, 2014) but the consequences depend of the regional water stress index**



- **Comparison of blue water consumption in European farming systems**

Doreau et al. (2014)

1 kg beef meat	**20 – 520 L**
1 kg pig/poultry meat	**190 L**
1 kg milk	**< 1 - 100 L**
1 shower	**50 – 70 L**

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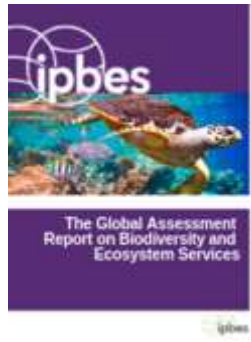
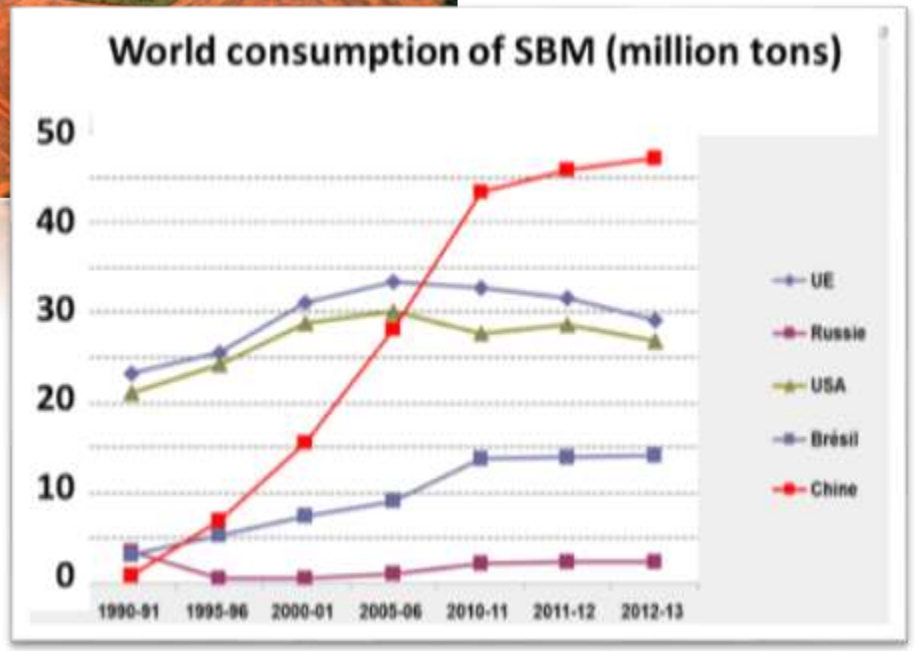
The ambivalent effect of livestock on biodiversity



- **Intensive livestock contributes to biodiversity losses**



- **Ruminants produce biodiversity**

  - **Diversity of forage species (including honey plants) and grassland types**

- **Diversification of land uses, landscapes and maintenance of open habitats (with grasslands)**

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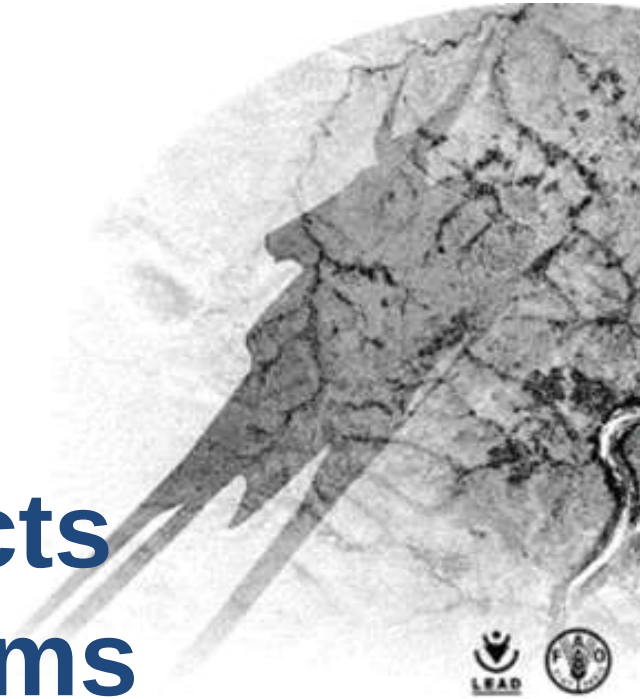

Part 2:
Some undisputable impacts of livestock farming systems that can be reduced

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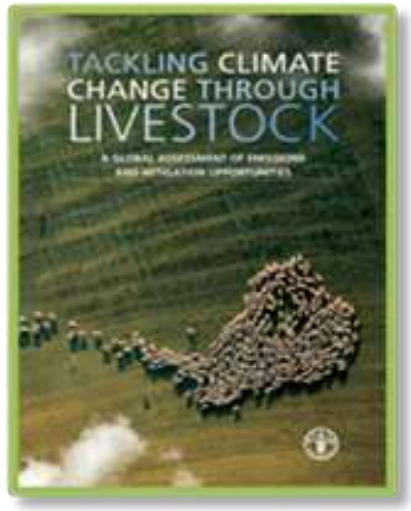
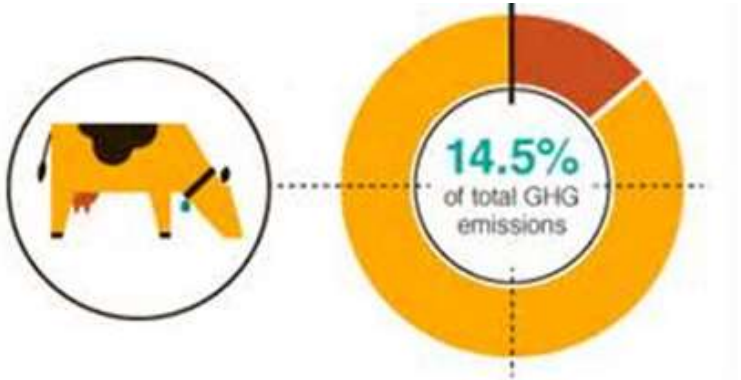
Real Carbon footprint of ruminants





- Livestock represents 2/3 of the emissions of the agricultural sector
- Ruminants = 60% of the livestock emission
- Methane = 40% of the livestock emission

> 40% reduction

- Livestock husbandry
  - Selection for low methane production
  - Improving animal health, reduce mortality (crucial in developing countries)
  - Precision Livestock Farming
  - Age at first calving and at slaughter
  - Methane inhibitors
- Smart use of manure
- C sequestration (grassland, agroforestry)
- Feed production (circularity)
  - Legumes (forages and crops)
  - Diversification of rotations)
  - Less/no specific feed production

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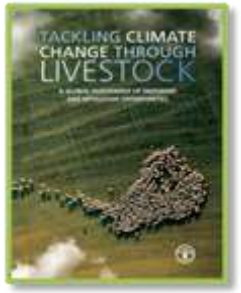
GHG mitigation and nutrition security: various issues according the regions

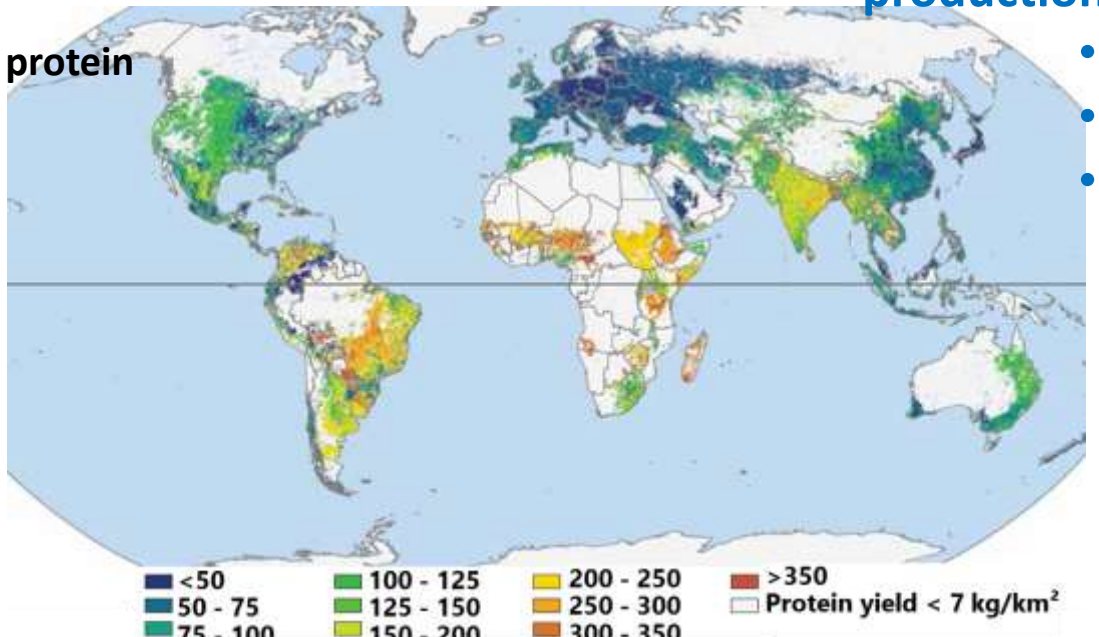
- **Europe**
  - 8% of the global cattle population,
  - Animal protein consumption is (too) high,
  - High efficiency of protein production
  - Gain in efficiency are still possible, moderate reduction of cattle population

- **Developing countries**
  - More than 70% of global cattle population
  - Improving nutrition security requires a higher consumption of protein of animal origin
  - Low efficiency of protein production
  - Increasing animal productivity to double protein production without increasing cattle population
    - Forage quality
    - Animal efficiency
    - Animal health

Efficiency of protein production (kg CO_2-eq/kg protein



Food and Agriculture Organization of the United Nations



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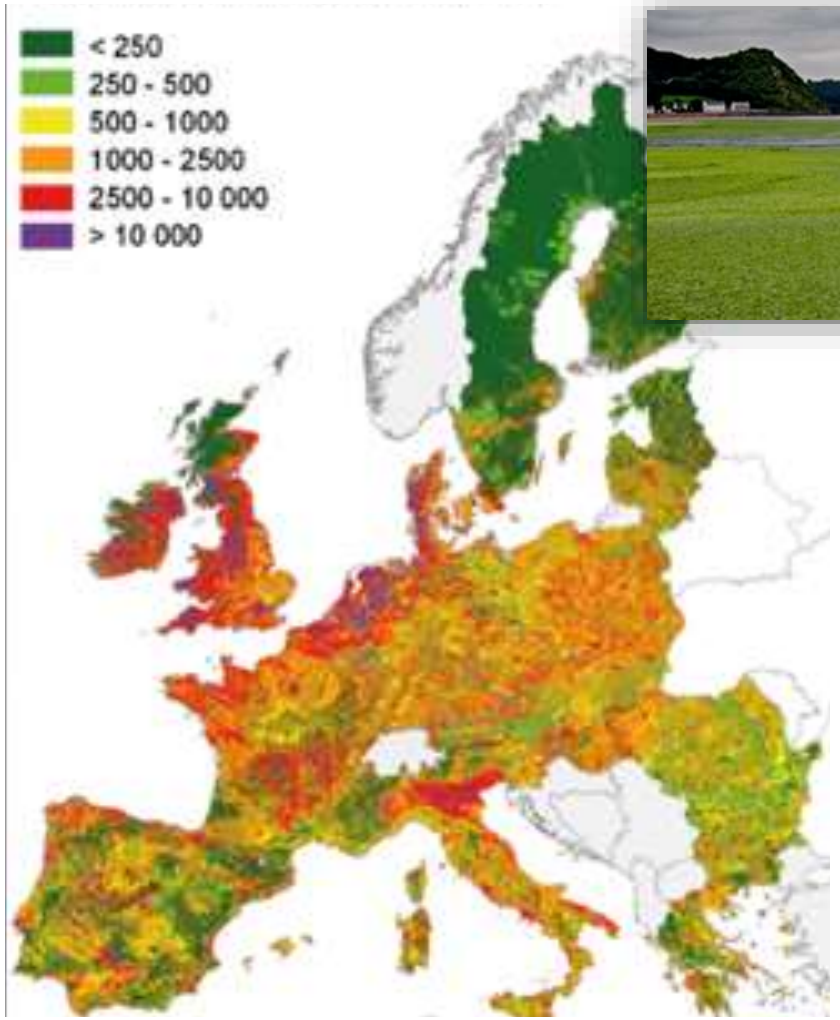
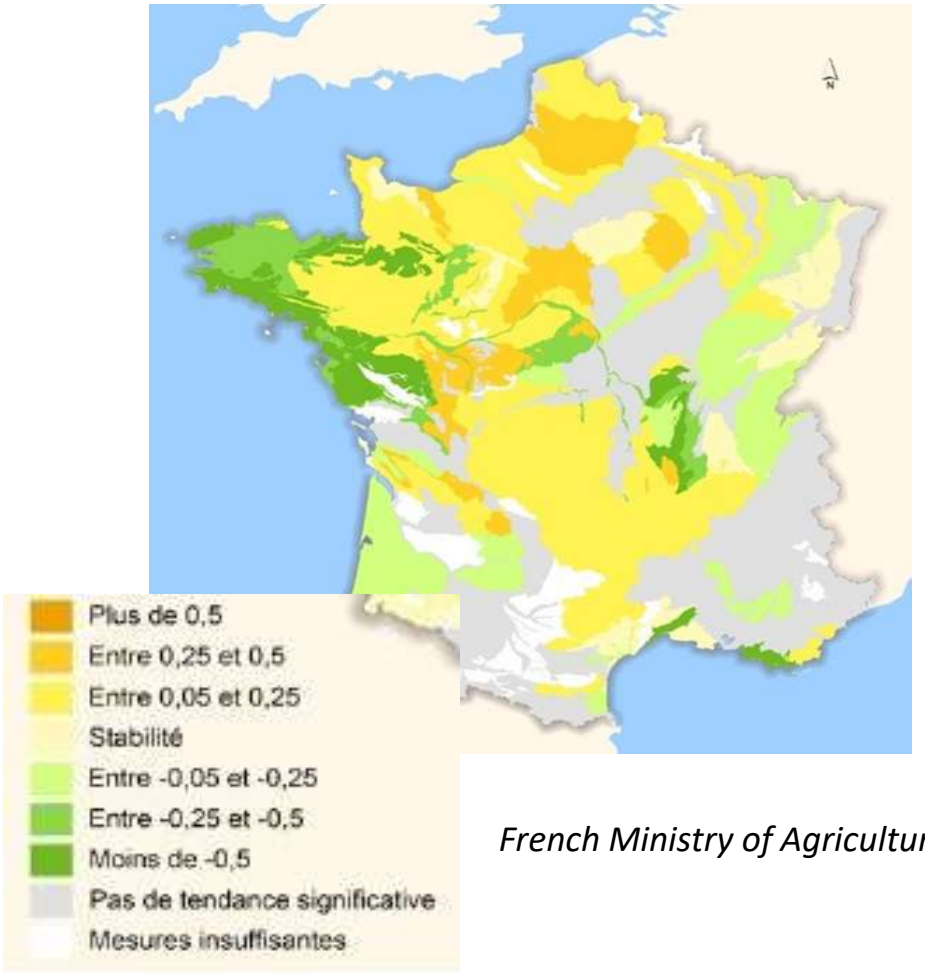
Local pollutions

NO_3 Emissions (kg N/km²/y)



Evolution of nitrate levels (mg / year) in groundwater (1998 – 2014)



French Ministry of Agriculture (2019)

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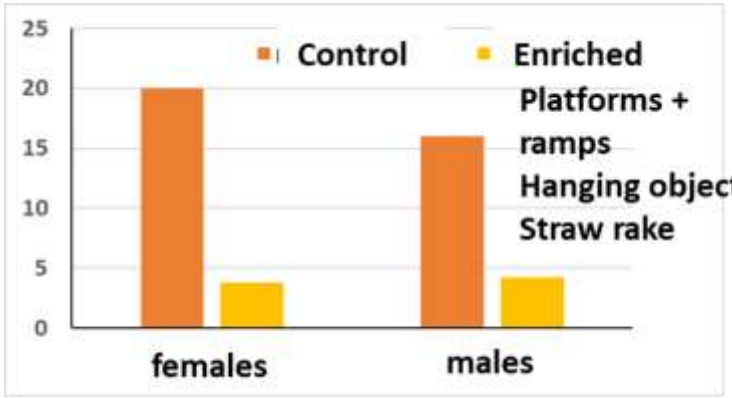
Designing animal-friendly systems

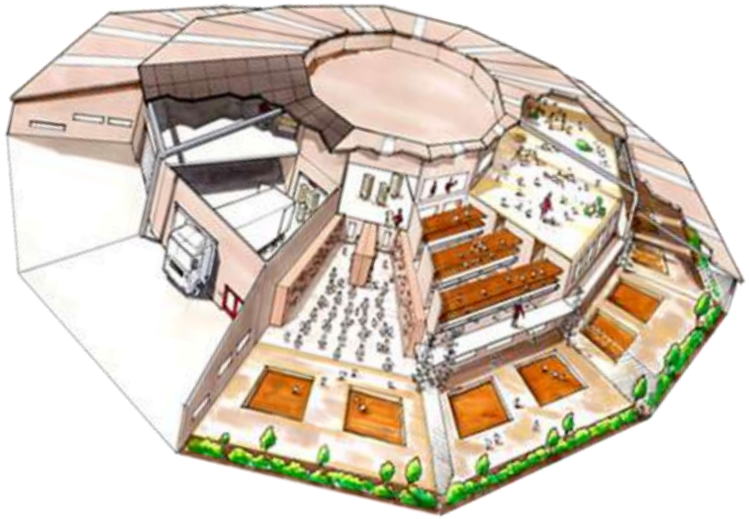
- **Enrichment of the environment**

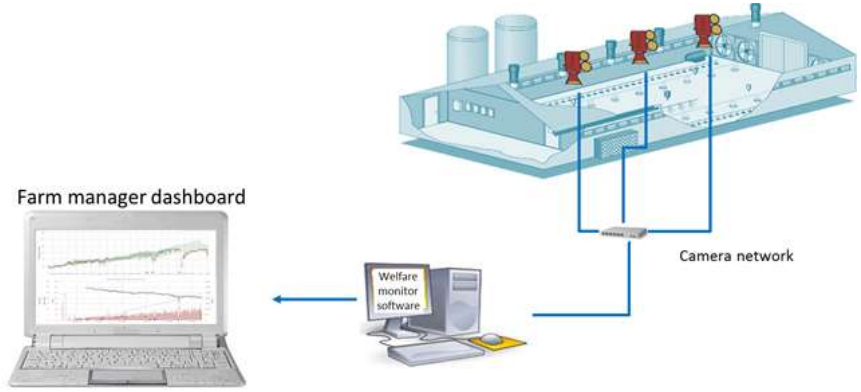
% injured animals



Mirabito et Michel (2003)

- **Innovative buildings and precision livestock farming**





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Part 3:
Changing paradigms: towards a renewed place and role of livestock farming in agri-food systems

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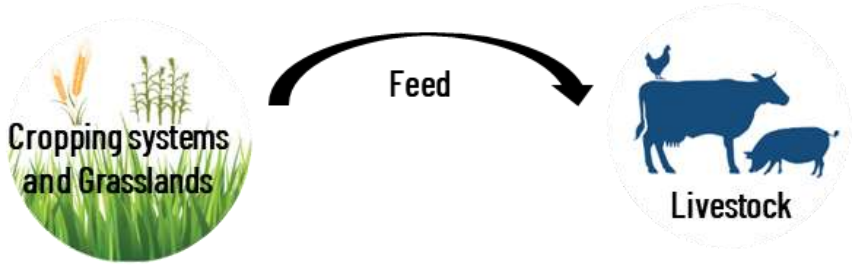
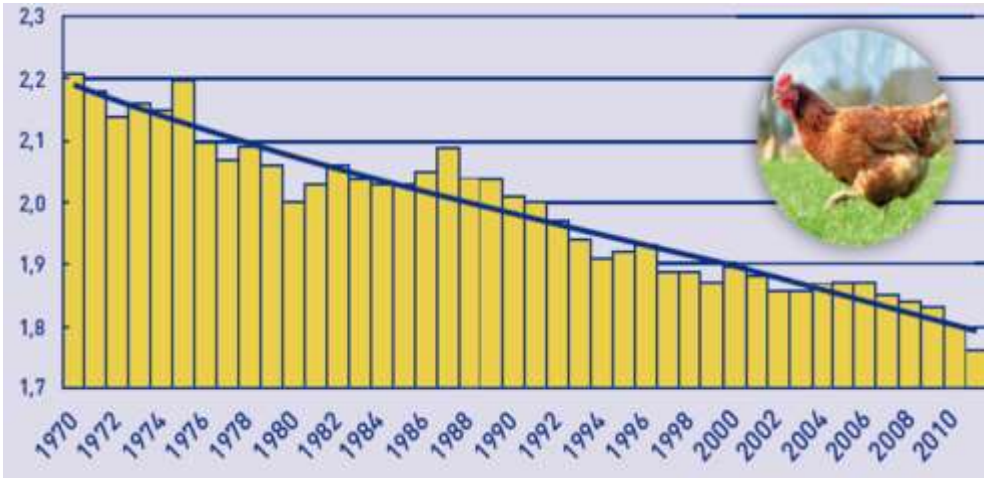
The “linear” vision





- This has led to significant productivity gains but
  - In a linear way of thinking (resource –> production –> product –> waste)
  - Without considering the amount and origin of mobilized resources
  - Without preventing the degradation of ecosystems

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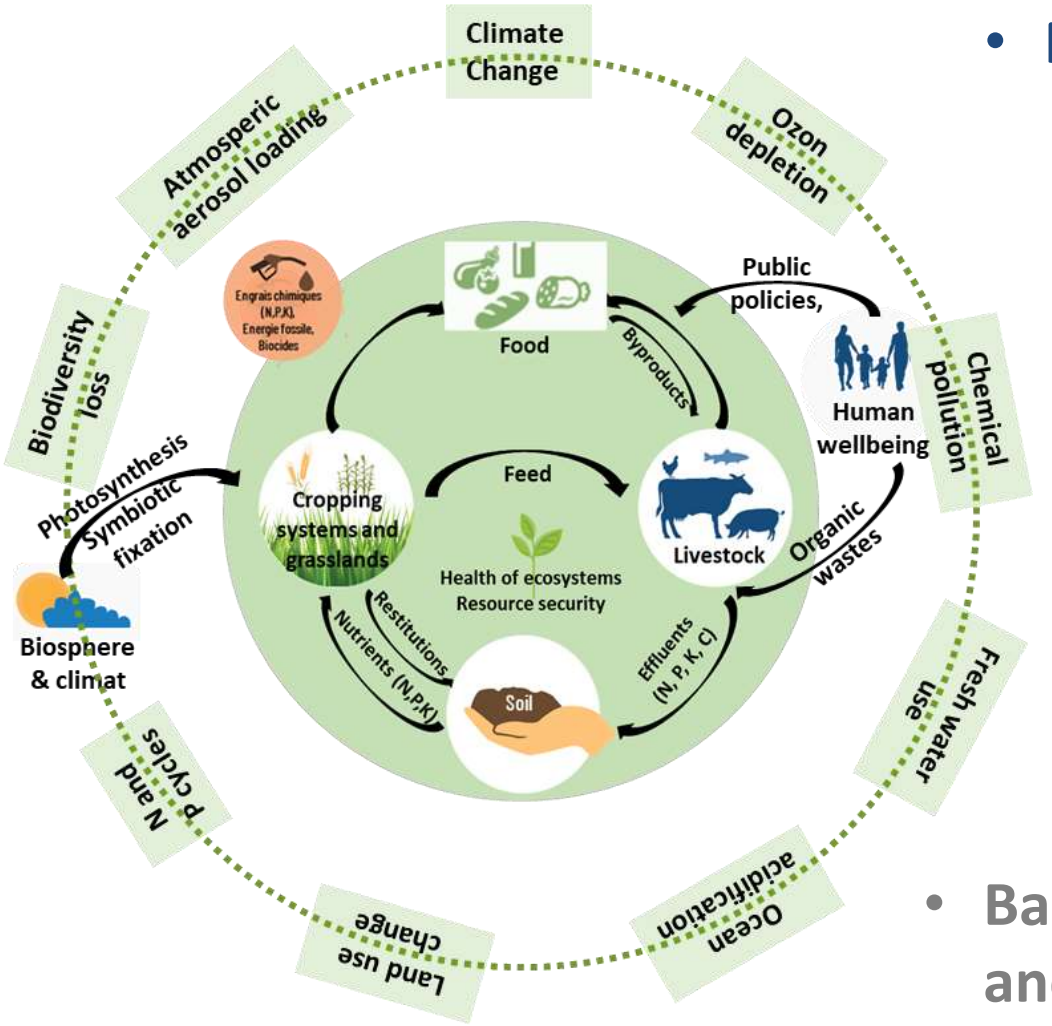
Changing the interplay between the sectors for a rejuvened agriculture

Livestock is part of the solutions for sustainable circular agri-food systems



- **Potential benefits of circularity and agroecology**
  - **Reduced dependency on protein imports, N fertilizer and fossil energy,**
  - **Mitigation of GHG emissions,**
  - **Increased soil C storage (grassland, agroforestry),**
  - **Reduced pesticides use and crops for feed production,**
  - **Regained health of ecosystems and biodiversity**
  - **Deployment of an agriculture based on healthy soils and functional ecosystems with attractive landscapes**
  - **Increased resilience of livestock farming systems**

- **Balances are to be found according to territorial contexts and politic choices (no « one size fits all » solution)**

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Part 4:
Take home messages

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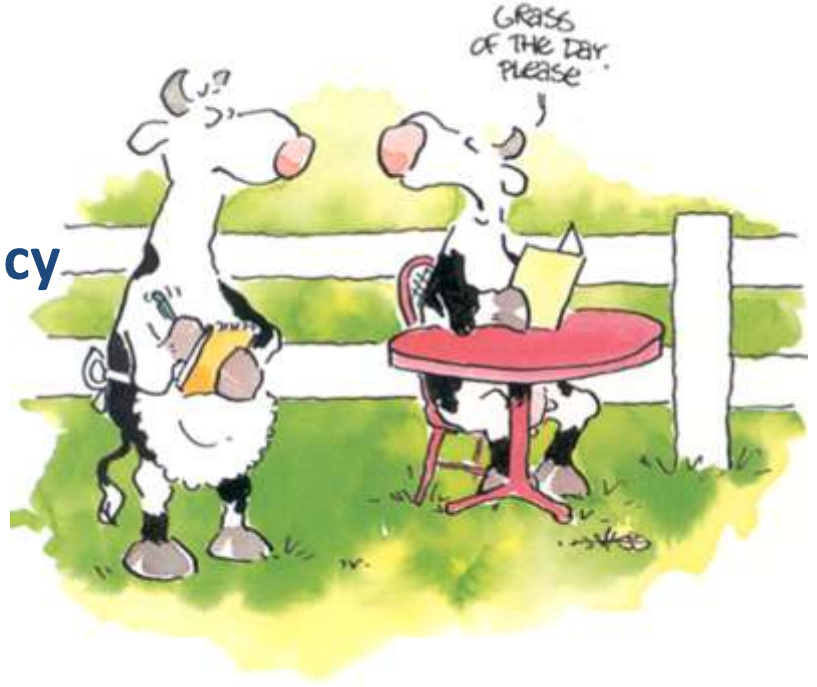

- Livestock farming systems should change to regain legitimacy
- Think twice: do not step into a simple and narrow vision of livestock farming systems
- Reducing impacts of livestock farming is essential: the shadow of livestock can be mitigated
- Livestock is not only a problem, it is also part of the solution for circular sustainable agri-food systems - ruminants
- Leave the analytical visions of the impacts by product to go towards systemic visions, proper evaluation of the roles, services and impacts of livestock
- Rethinking the place of livestock in the territories (resources / resilience), better articulate global / local, specialization / diversification, services / impacts


Thank you for your attention