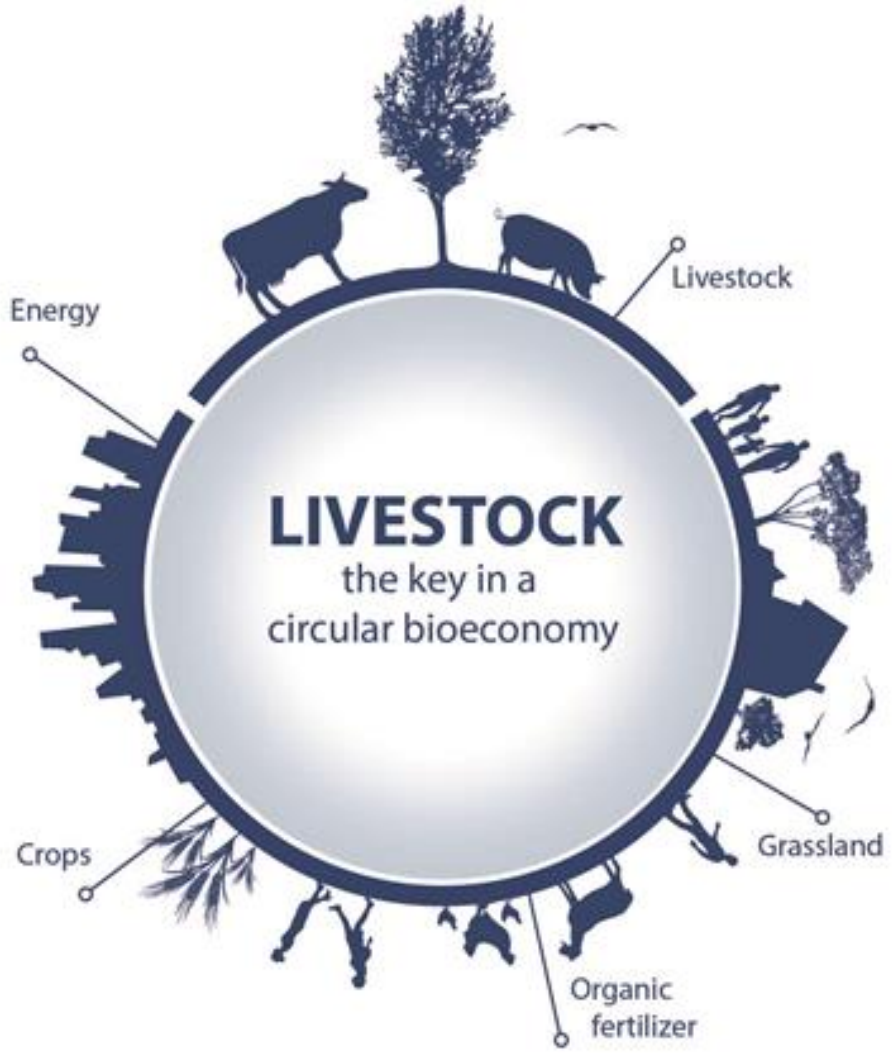
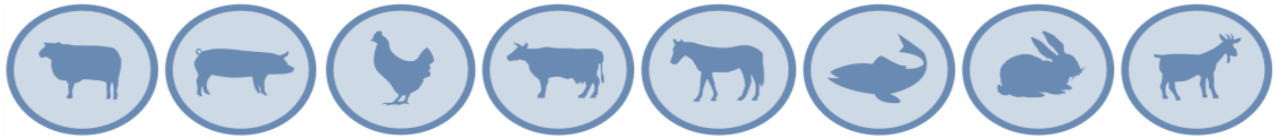
atf animal task force

A European Public-Private Platform

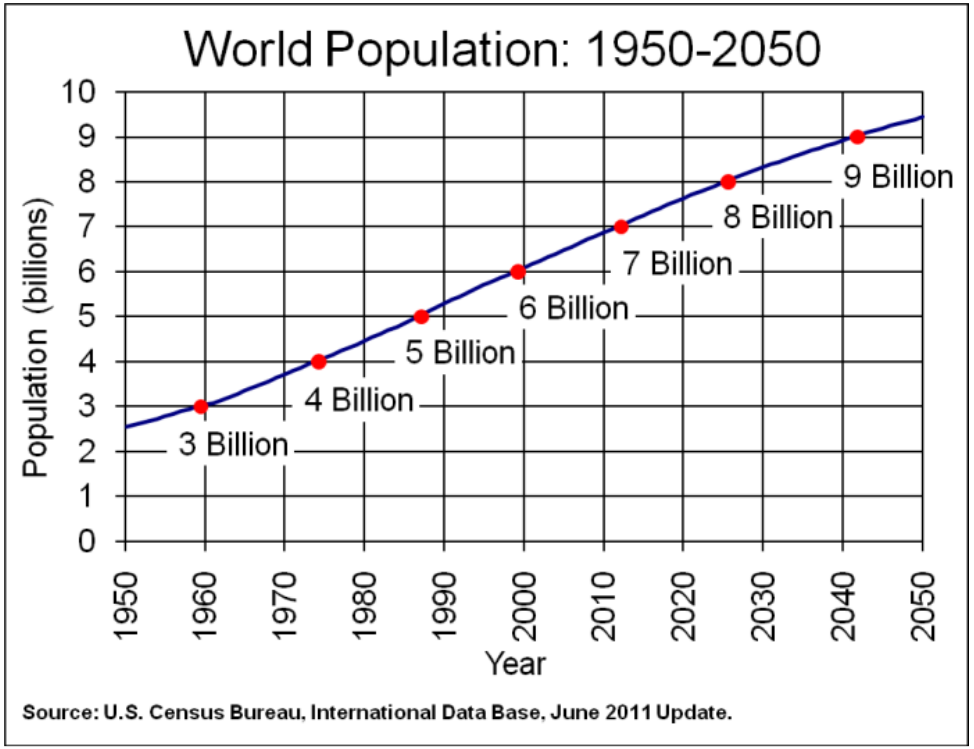


J.L Peyraud

INRA



Perspective of Livestock production 2050



Food

Meat: +70% (465 Mt)

Milk: +60% (1045 Mt)

Eggs: +60% (110 Mt)

atf animal task force

A European Public-Private Platform

Societal Challenges Livestock Production: ATF vision

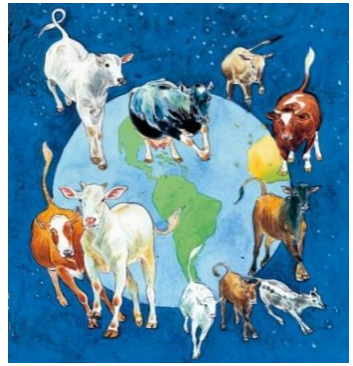
- **Resource Efficiency**


- **Healthy livestock and People**

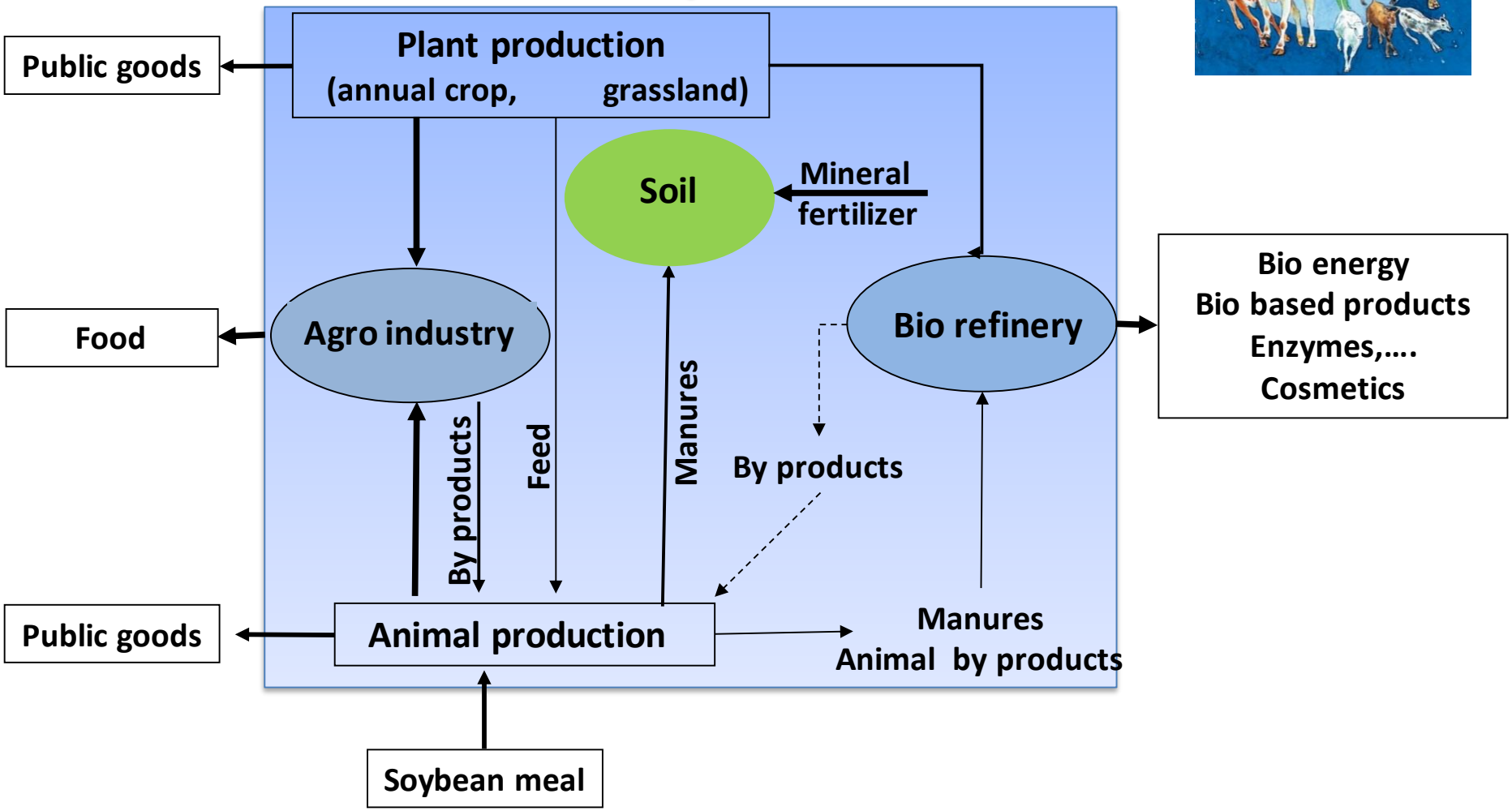
- **Responsible Livestock Production**


atf animal task force

A European Public-Private Platform

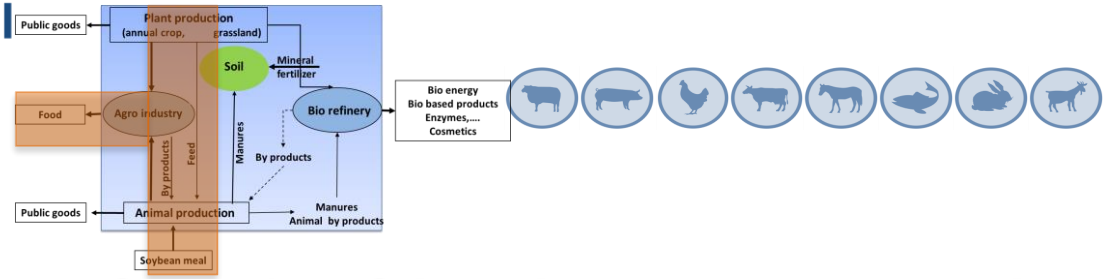


ATF vision: Livestock, the key in a Circular bio-economy



atf animal task force

A European Public-Private Platform



Livestock provides food of high nutritional value

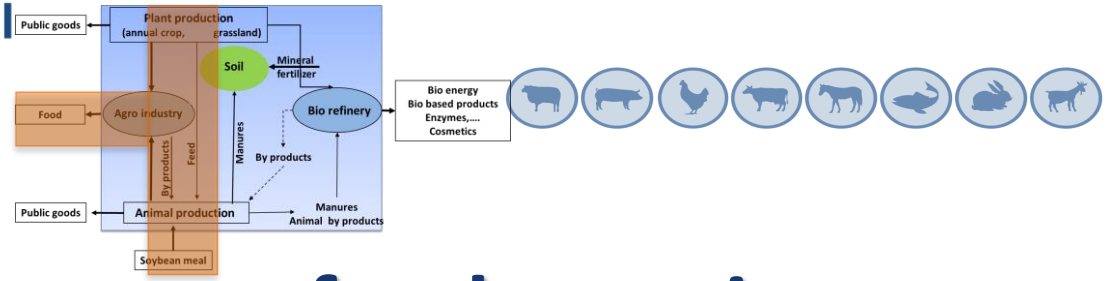
- Digestible Indispensable Amino Acid Score (FAO, 2007)
  - Content, Proportion and profile of IAA, Digestiblity
  - Importance of children (brain functions) Seniors (sarcopeny)

	DIAAS index
Milk	139
Beef	131
Soya	102
Wheat	65
Peas	82

- Other micro nutrients
  - Iron (heminic) : 17% of young women (18-29 years old) have iron deficiency (France)
  - Ca, Vit B12
  - Fatty acids : rumenic acid, omega-3

atf animal task force

A European Public-Private Platform



Livestock contributes to food security

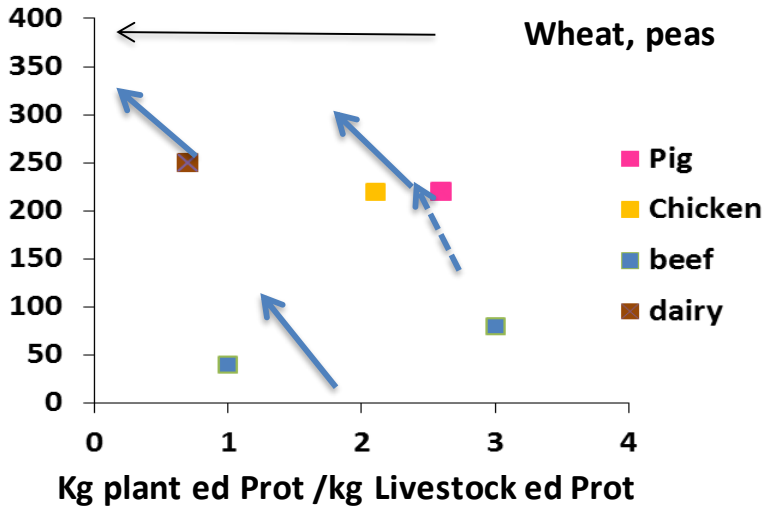
- Too simplistic evaluation of livestock efficiency
  - Confusion between human edible and non edible protein utilisation
  - Ruminant are inefficient or efficient ?

	Total	PC
Pig	3	2,6
Poultry	2,2	2,1
Bovine int- ext	5 - 9	3 - 1
Dairy	3,2	0,7

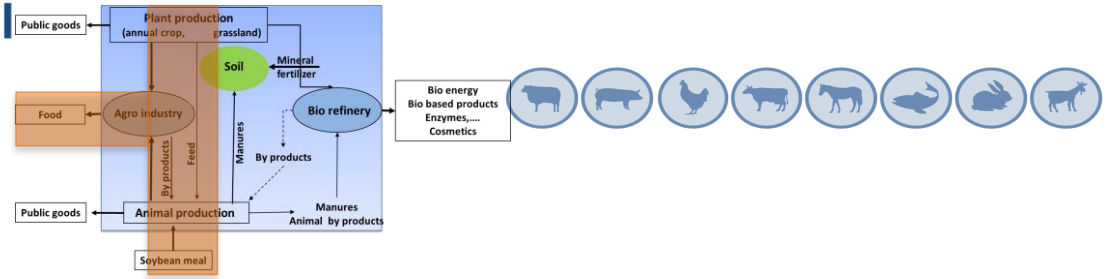
Adapted from Wilkinson (2011)

- Animal efficiency should be (re)evaluated
  - Efficiency per kg of edible Prot and per ha
  - LCA analysis – allocations
  - Margins of progress : Use of alternative feeds, innovative processed by-products and more efficient livestock

Kg ed Prot /ha, *Adapted from De Vries et de Boer (2010)*

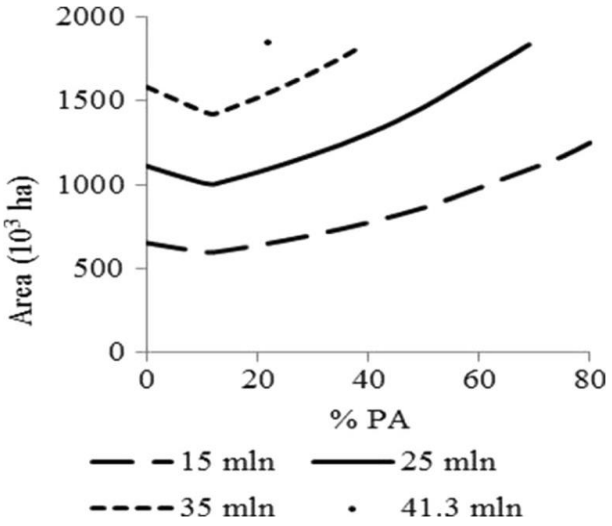


atf
animal task force
A European Public-Private Platform



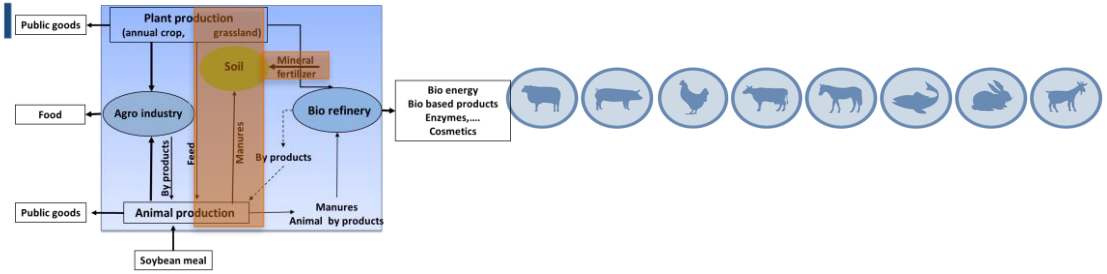
Livestock contributes to a more efficient agriculture

- Using of marginal land not able to produce plant products for human
  - Grasslands and rangelands : 73 millions ha (40% European AA)
  - Productivity vs provision of services
- Livestock production is required for an efficient use of land
  - What are the responses curves in various territories/countries ?
  - Improving synergies considering local contexts



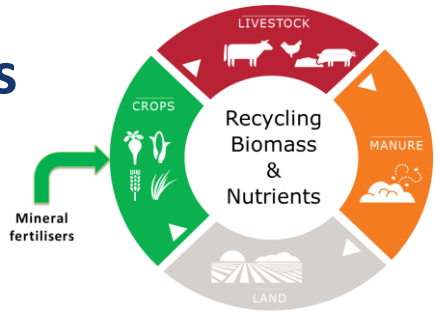
atf animal task force

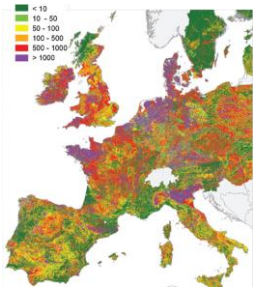
A European Public-Private Platform

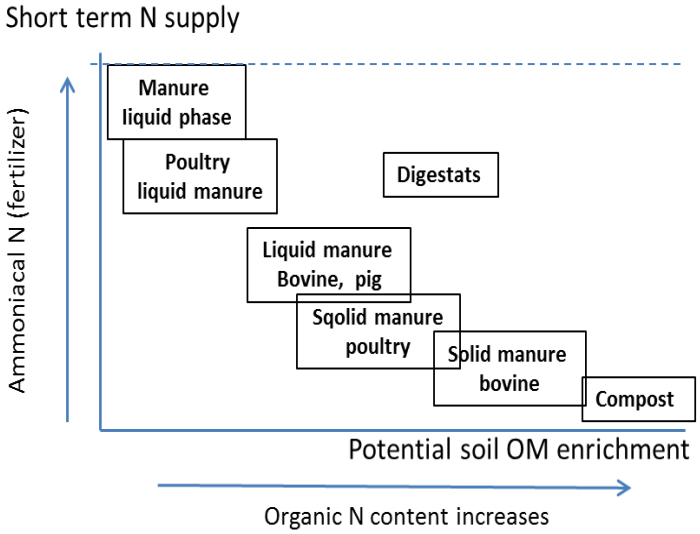


Livestock regulates the ecological cycles

- **Reduction of the use of mineral fertilizers**
  - 1.8 Mt N vs 2.1 Mt for mineral fertilizers and 310 kt P vs 286 t for mineral fertilizers
  - Reduction/ utilisation of gas losses
  - DSS for improving use of liquid manure
- **Return of Organic Matter to the soil**
  - Soil physical properties and soil microbita (specific and functional biodiversity)
  - Speciation C/N/P to favour soil C sequestration
  - Dissemination of antibiotic resistance
  - Innovative organisations (actors)
  - Multi-functionnality of straw
- **Role of grassland and legumes**
  - Regulation of N, P, C flow
  - Protein and N autonomy

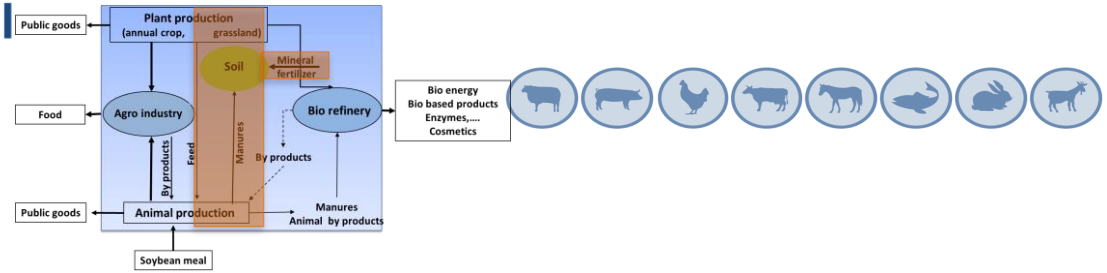






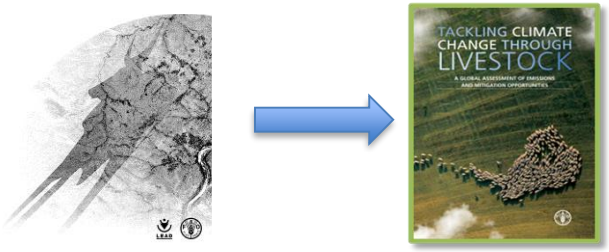
atf animal task force

A European Public-Private Platform



Livestock contributes to GHG mitigation

- **Perspective : 30 - 40% reduction**

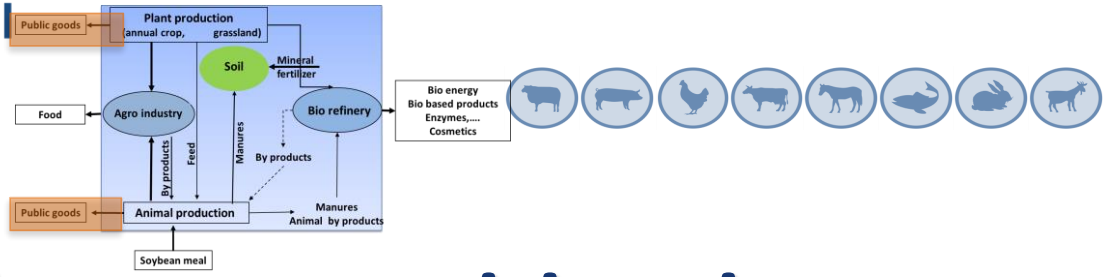


- **GHG mitigation options**
  - Genotyping low methane production for selection
  - Animal health, husbandry and feed quality
  - Manure management
  - Improving C sequestration soils (4 p 1000)
  - Precision livestock farming
  - *Balance between meat and milk production*

- **Cooperation between FACCE and HDHL is promising to enable a Climate Smart and Sustainable Nutrition Security approach**

atf animal task force

A European Public-Private Platform

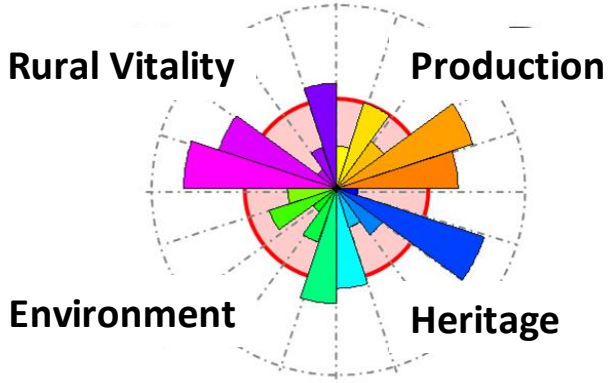


Livestock provides non-provisionning ecosystem services

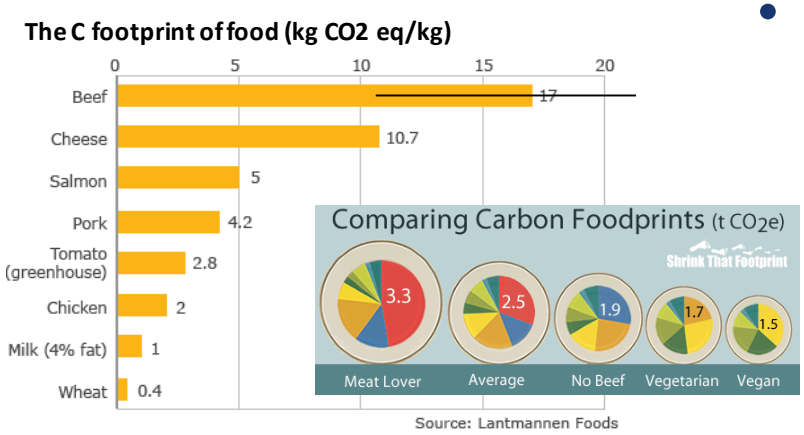
- Maintenance of grassland and its services
  - Grassland lifespan and management : C storage, specific and functional biodiversity

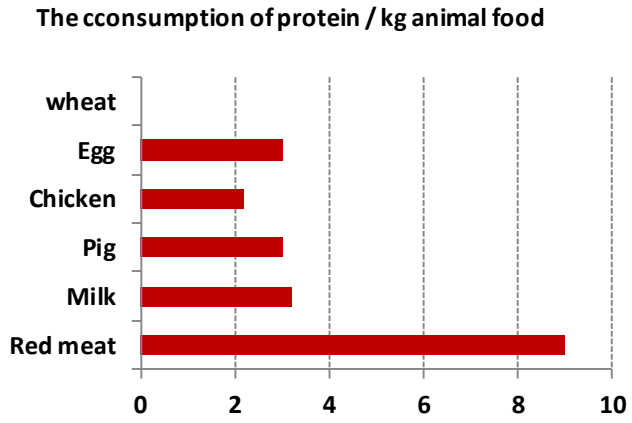
	Grassland	Crops
OM (t/ha)	80	40
Invertéebrates (t/ha)	3,5	0,5
Erosion (t OM/ha/y)	0,3	3,6
Pesticides	0	+

- Concept of bundles of services
  - Composition of the bundle of services: variation according to local contexts
  - Synergies and trade off between services
  - Levers that can improve delivery of services
  - Scenario of evolution : farm to food chain and territory



Too simplistic evaluation of C and feed vs food competition





- **Summing up LCA's single products in a Linear Model**
  - **Does not account for integration in a global Agro-Ecosystem**
  - **Ignore the use of non edible protein and marginal land**
  - **Does not envisage optimal land use for edible protein production**
  - **Does not consider C storage and others services**
  - **Ignores the effects of the production system**
  - **Ignores the Feed for Food Footprint**
  - **Do not quantify the multiples effects induced by the reduction in livestock production**

atf animal task force

A European Public-Private Platform

Research gaps

Resource efficiency

- **Assessing the roles and impacts of Livestock**
  - Soil sustainability: physical, chemical fertility, functional biodiversity,
  - Evaluation of C footprints of our diets,
  - Contribution of animal production to the protein security,
  - Effects of any reduction in Europe of the consumption of milk and meat products (vs trade) on the availability of biomass and soil and rural vitality

- **Improving the roles of livestock and the coupling between livestock and crops**
  - Efficient and safe feed chains (cascading approach) : maximal use of biomass (food then feed), alternative feeds/forages
  - Robust and efficient animals and herds: trade-off between productive and non productive functions, identification of appropriate phenotypes, new breeding programs
  - Closing the loops: emission factors (allocations), mitigations, maximisation of C storage, manure management (phosphates),
  - Biorefinery of animal by products,

atf animal task force

A European Public-Private Platform

Societal Challenges Livestock Production: ATF vision

- Resource Efficiency

- **Healthy livestock and People**

- Responsible Livestock Production

atf animal task force

A European Public-Private Platform

Research gaps

Healthy Livestock and people

- **Antimicrobial resistance in the concept of "one health"**
  - Mechanism of dissemination: reservoir of resistance, transfer within food chains,
  - Prevention : early detection (PLF), robustness, acquisition and stimulation of immunity, role and installation of microbiota, feeding and husbandry practices, local organisation,
  - Alternatives therapies: use of viruses (phages), vaccines development,
- **Disease prevention and control**
  - New diagnostic tools,
  - Prediction of pathologic emergences and risk assessment , conditions of pathogens transmission,
  - Host-pathogen dialog and reciprocal adaptation : pathogen biology, host defences (inflammatory and immune responses) and interaction, mechanism of infection,
- **Animal Welfare**
  - Animal based indicators
  - Emotional processes
- **Nutritional quality of animal products**
  - Comprehension of the role of nutrients and the matrix effect

atf animal task force

A European Public-Private Platform

Societal Challenges Livestock Production: ATF vision

- Resource Efficiency

- Healthy livestock and People

- **Responsible Livestock Production**

atf animal task force

A European Public-Private Platform

Research gaps

Responsible Livestock production

- **Responsible farming systems**
  - Adaptive capacity of farming system: trade-off between efficiency and resilience
  - Design and transition toward innovative (multi-performing) systems,
  - Impact of innovations on workload and work complexity,
  - More value out from grassland
- **Integration of farm systems into sectors and territories**
  - The territorial scale of farming systems: evaluation of services, trade-offs and synergies between services
  - Benefits and risks of the co-existence of a diversity of systems/ food systems,
  - Collective organisation: chairing the risks, adaptive capacities of certified quality systems
- **Tools to favour innovation**
  - Evaluation methods: global assessment, common and shared approaches/data,
  - Incentives public policies for encouraging more balanced performances,
  - Tools and methods for efficient advising of farmers