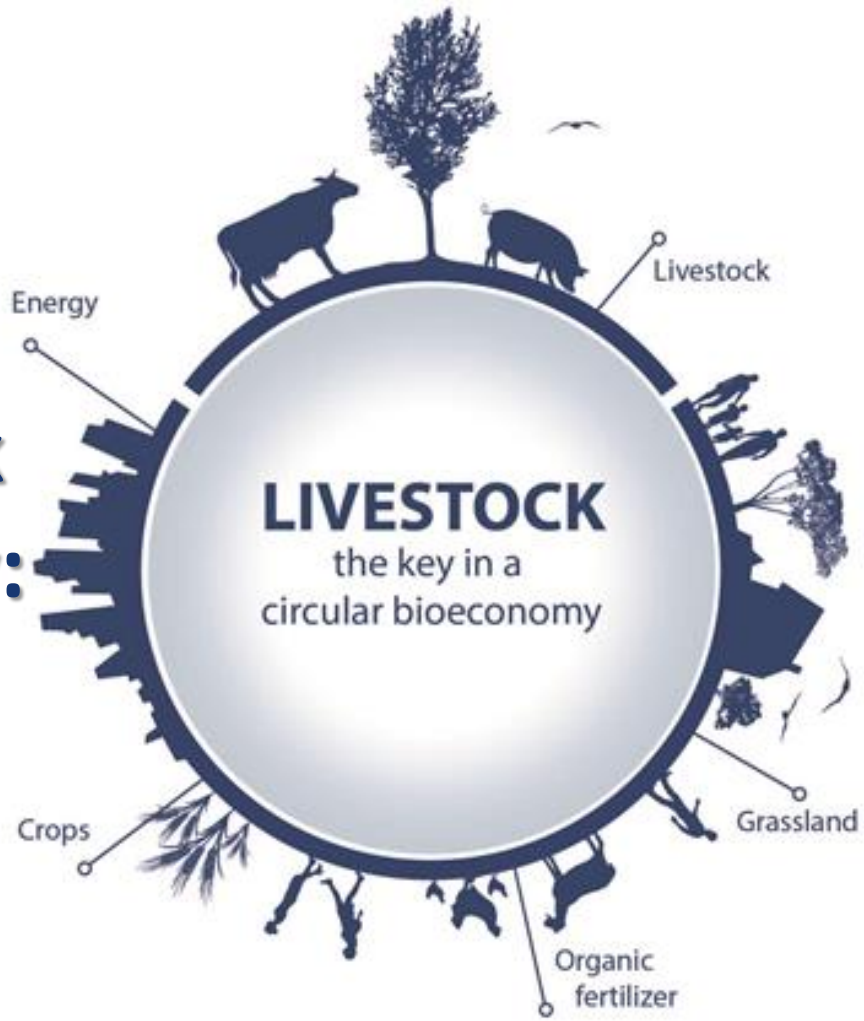
atf animal task force

A European Public-Private Platform

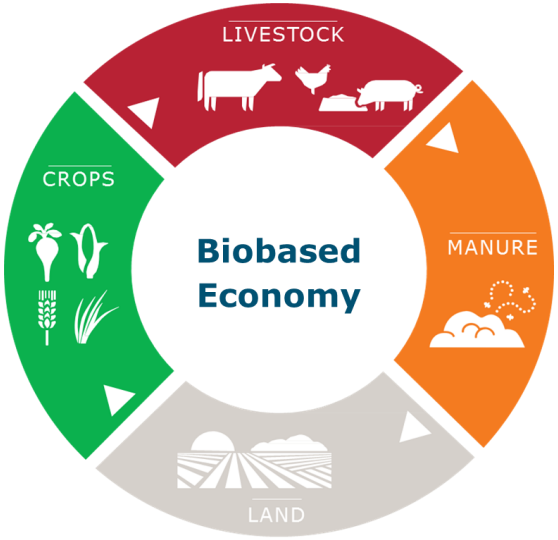
The roles of Livestock in an EU bio-economy:

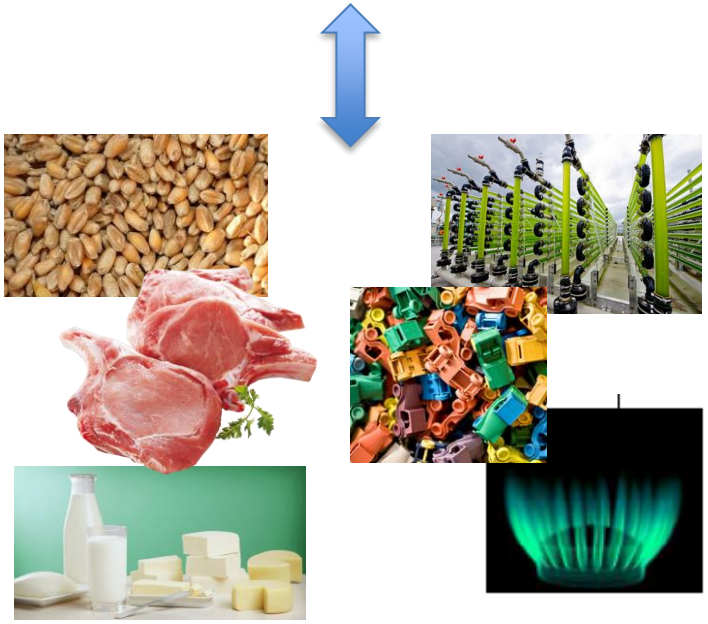


Jean-louis.peyraud@rennes.inra.fr

European Bioeconomy

- Bioeconomy should contribute to
  - food security
  - efficient use of biomass
  - resource use efficiency
  - Cop 21 objectives
  - sound use of scarce land
  - soil fertility
  - revitalisation of rural area





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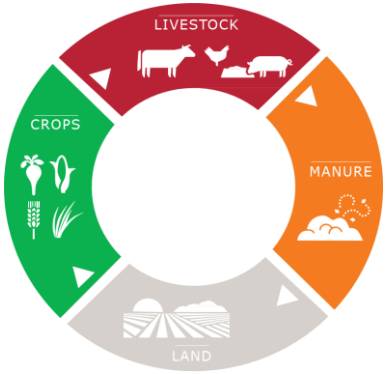
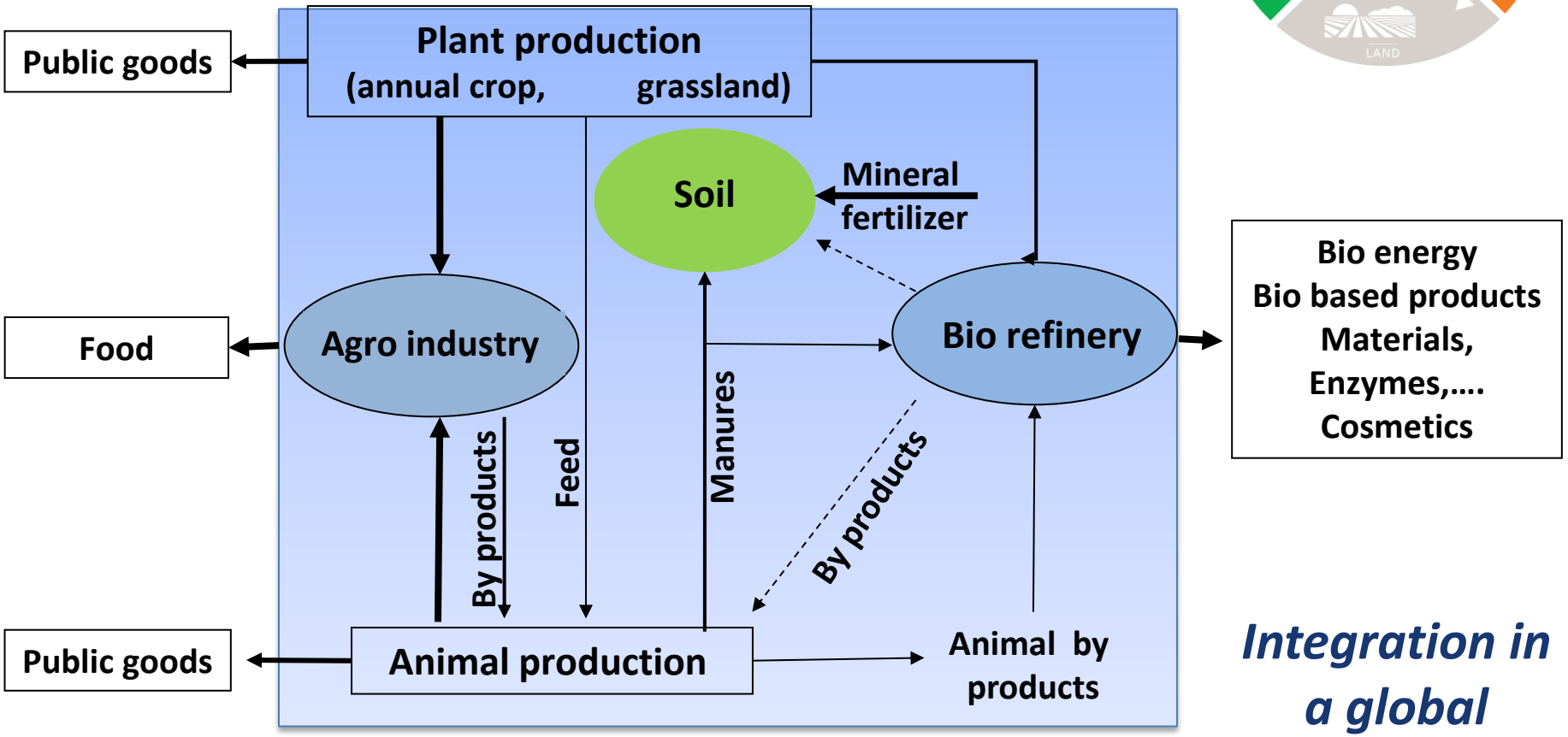
INRA SCIENCE & IMPACT

Perfect fit of livestock in the circular bio-economy





Integration in a global agro-Ecosystem

Livestock contributes to food security and healthy diets

- High nutritional quality of animal proteins
  - We need to eat larger amounts (20 to 25%) of crop protein than animal protein to meet our requirements of essential amino acids
- Supply of micro nutrients: iron, Ca, vit B12, specific FA…

Conribution to food security: use of non edible protein

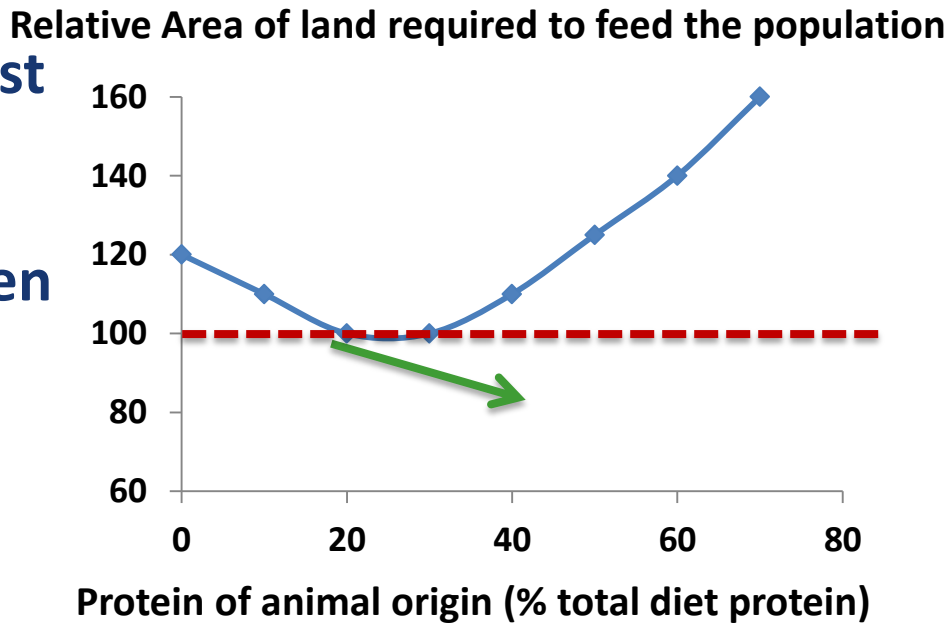
		Global efficiency	Net efficiency	
			todays	Tomorrow
DAIRY	Maïs	0.28	1.03	0.63
	maïs – grass	0.28	1.35	0.81
	grass	0.25	2.32	1.52

Kg of edible protein poduced per kg of edible protein of plant origin consumed by the cows

- **Too simplistic views are often delivered**
- **Use livestock potential to mobilize proteins from alternative feed stocks**

Contribution to a more efficient agriculture

- Maximum production of human edible proteins per ha of land
  - Agro-ecosystem using almost all biomass produced
  - Improving synergies between crop an livestock sectors considering local contexts



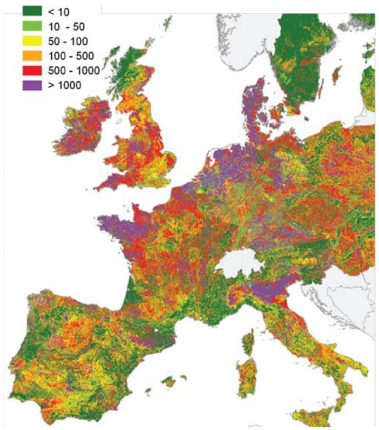
(Van Kernebeck et al., 2014)

Contribution to a more efficient agriculture

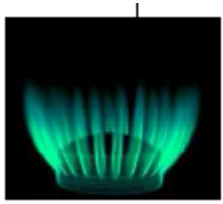
- Using of (marginal) land not able to produce plant products for human:
  - Permanent Grasslands = 73 M ha (40% Eu Agricultural Area)
  - Serving related ecosystem services, food security and vitality of rural areas

Regulation of ecological cycles: more with manure

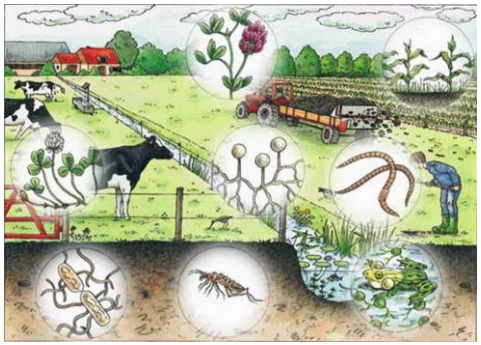
- Livestock manure is a source of N, P, K for crops
- In intensive livestock production systems
  - Need to turn a problem into a commodity
  - A win-win strategy : less dependency on imports (P and energy) and less harmful emissions



- Implementation of best technologies
  - Closing the loops – mixed farming systems
  - Manure refinement: Extraction of high value ingredients, minerals and Energy



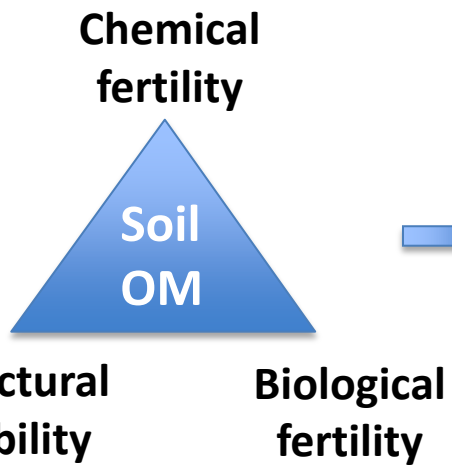
Regulation of ecological cycles: soil fertility



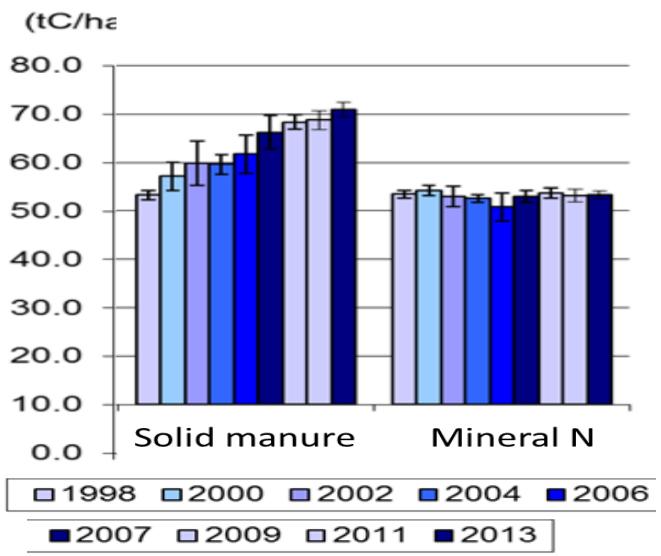
Manure application

Amount and quality of OM

Grassland

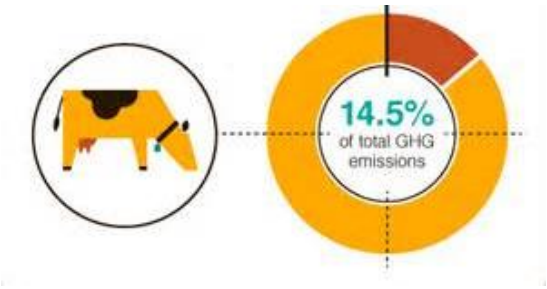


More biomass with less chemical inputs and more soil C sequestration

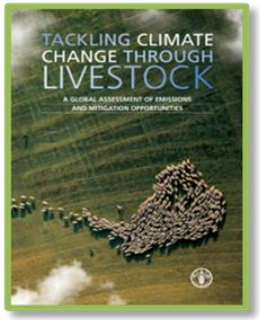


	Grassland	Crops
Organic matter (t/ha)	**70**	**30**
Invertebrates (t/ha)	**3,5**	**0,5**

Livestock without Shadow



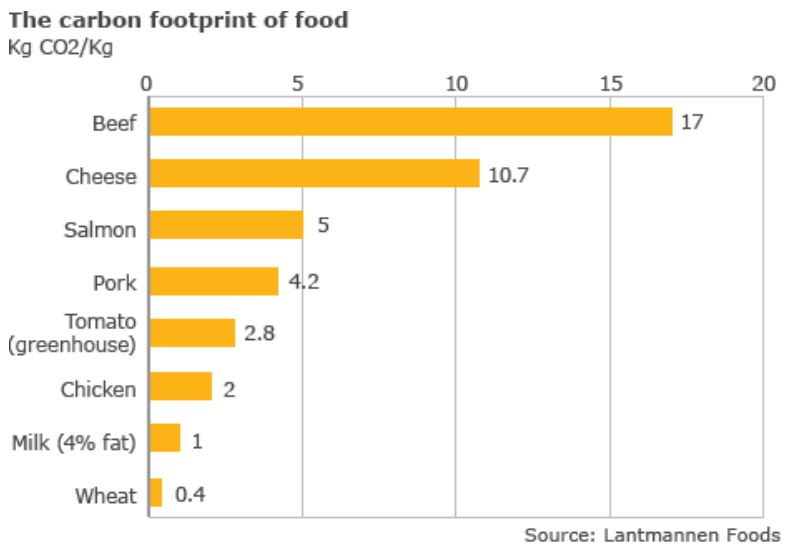
- Climate Smart
  - Perspective : 30 - 40% reduction

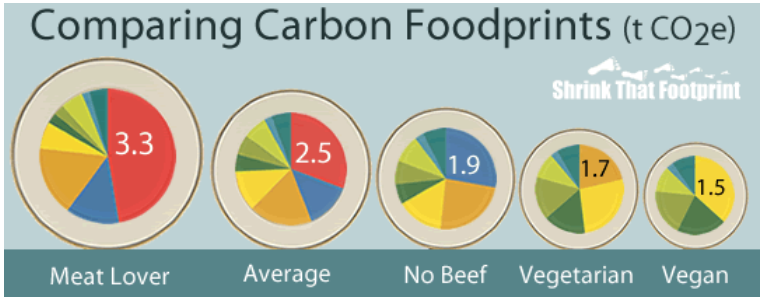


- GHG mitigation options
  - Animal selection
  - Improving animal health
  - Improving feed quality
  - Improving manure management
  - Improving grassland management
  - Improving soil C sequestration (4 p 1000)
  - Precision livestock farming

Too simplistic evaluation of C footprint of our diets

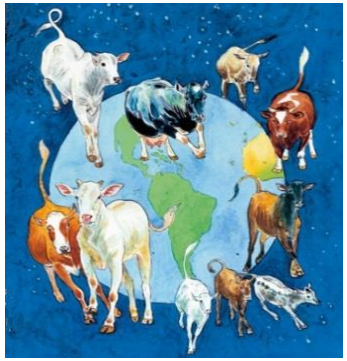
The C footprint of food (kg CO2 eq/kg)





- Summing up LCA's single products in a Linear Model
  - Does not account for integration in a global Agro-Ecosystem
  - Does not envisage optimal land use for food production
  - Does not consider C storage and other services
  - Ignores the improvement effects of the production system
- Need consequential LCA evaluation of alternative use of land

Conclusive remarks



- **Livestock has many assets to serve an efficient agriculture in a circular bio-based economy**

- **Avenues to enhance the role of animal production in a circular bio-based economy**
  - **Development of integrated agroecosystem approach (crops – livestock synergies) and new technologies**
  - **Development of public policies and market signals to stimulate, promote and support innovations**
  - **Research & Innovation, investment, governance**

Conclusive remarks

An analytical framework to explore innovations

Bio economy: cascading, circularity, refinery

Sustainable intensification: increasing yield and efficiency, lowering impacts

Agro ecology: use of ecological processes, use of biodiversity

Disciplines: Breeding, Nutrition, Health, Physiology, Welfare, Agronomy, Environment, Economy, Sociology, System, Modelling

Multiperformance
Economy, Productivity, Resilience
Resources, Environment,
Social

List of topics – big challenges
Wide range of production systems, trade-off

Exogenous innovations
Biotechnologies
Digital technologies, robotics, big data