



Sustainability in the livestock chain

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David Pennington, Fabrice Mathieux**

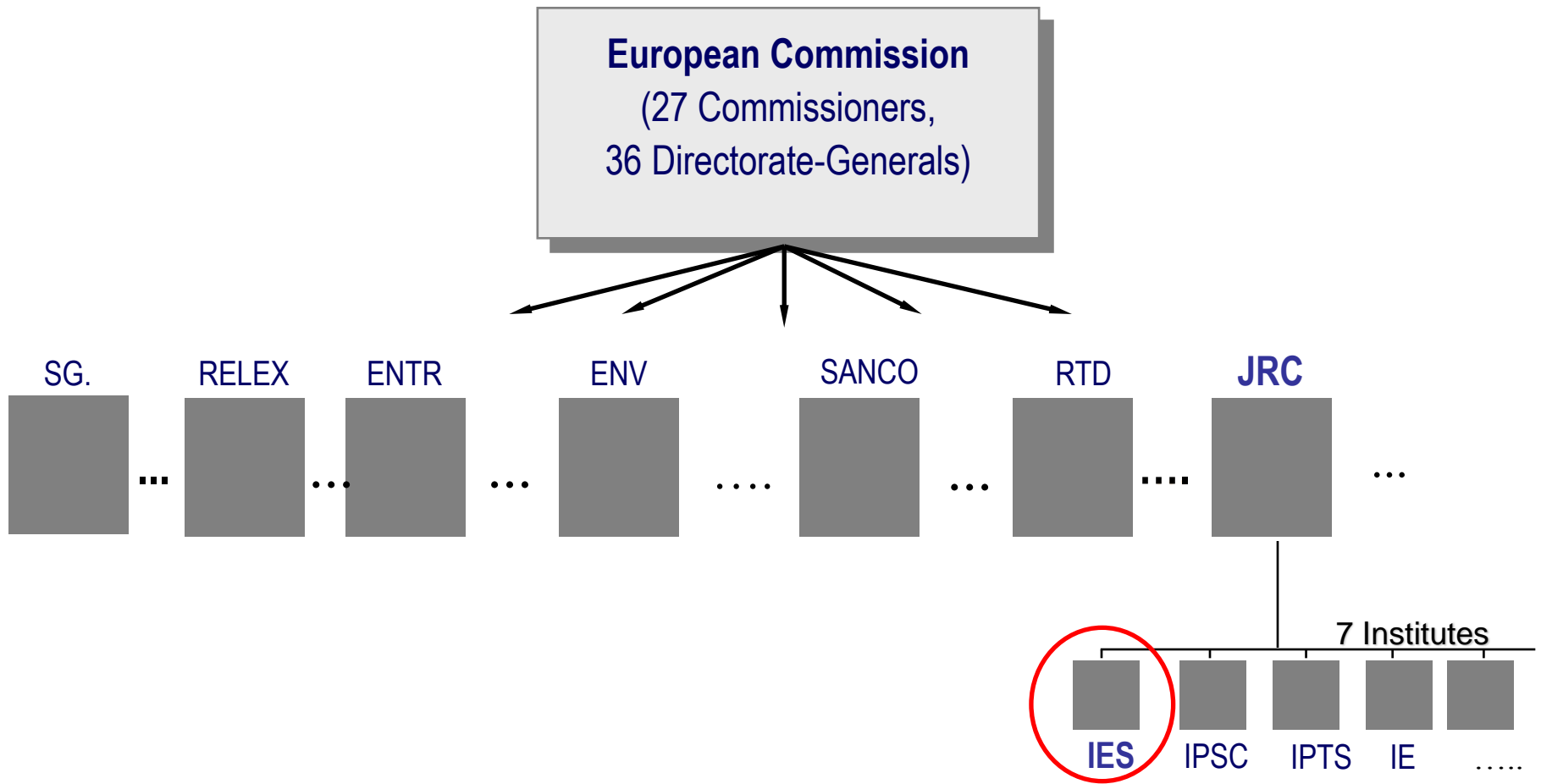
**Joint Research Centre (JRC)
Institute of Environment and Sustainability (IES)**

YEMCO Spring Conference 30.-31.3.2012, Bologna

European Commission

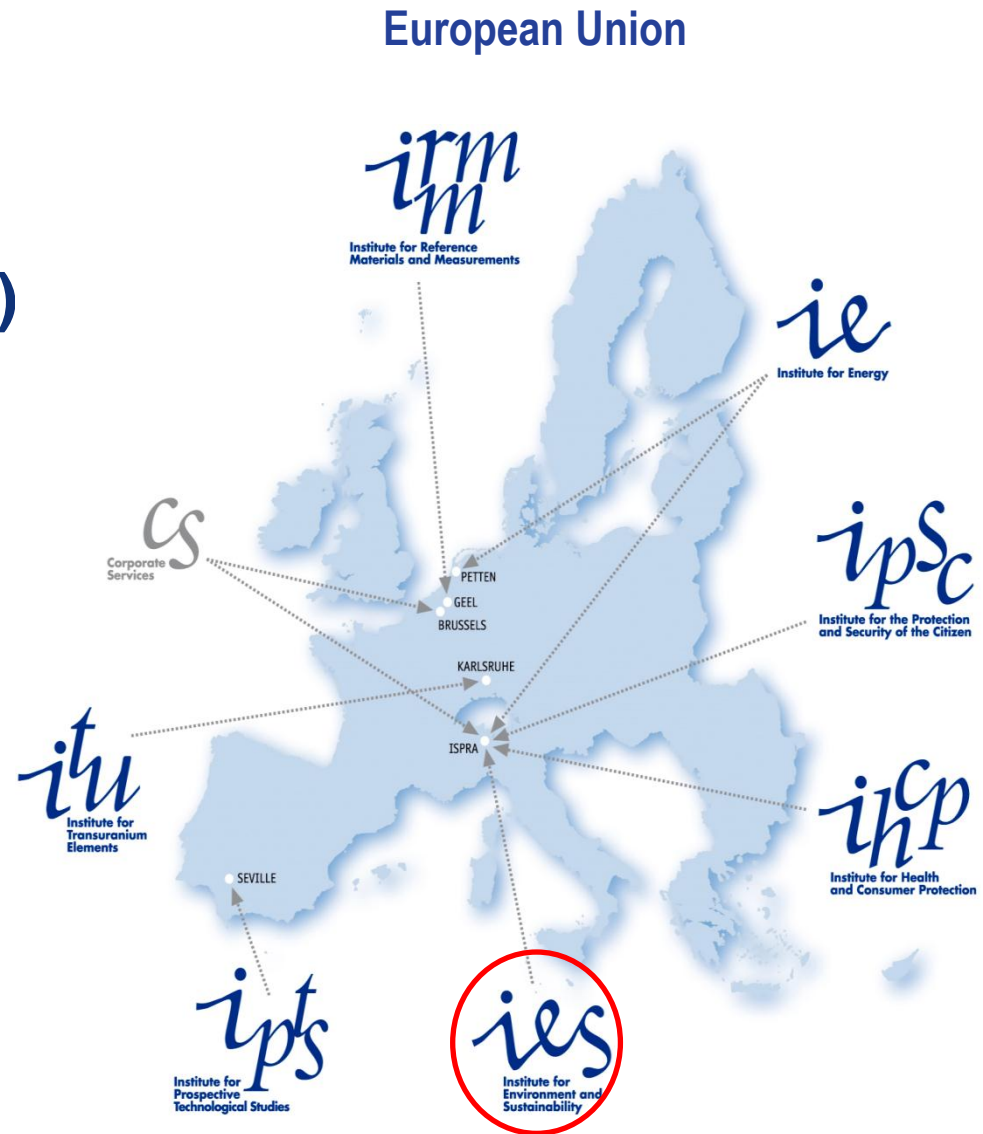
Joint Research Centre (JRC)

Institute of Environment and Sustainability (IES)



European Commission, Joint Research Centre (JRC) Institute for Environment and Sustainability (IES)

"The mission of the IES is to provide scientific-technical support to the European Union's policies for the protection and sustainable development of the European and global environment"



Outline of the presentation

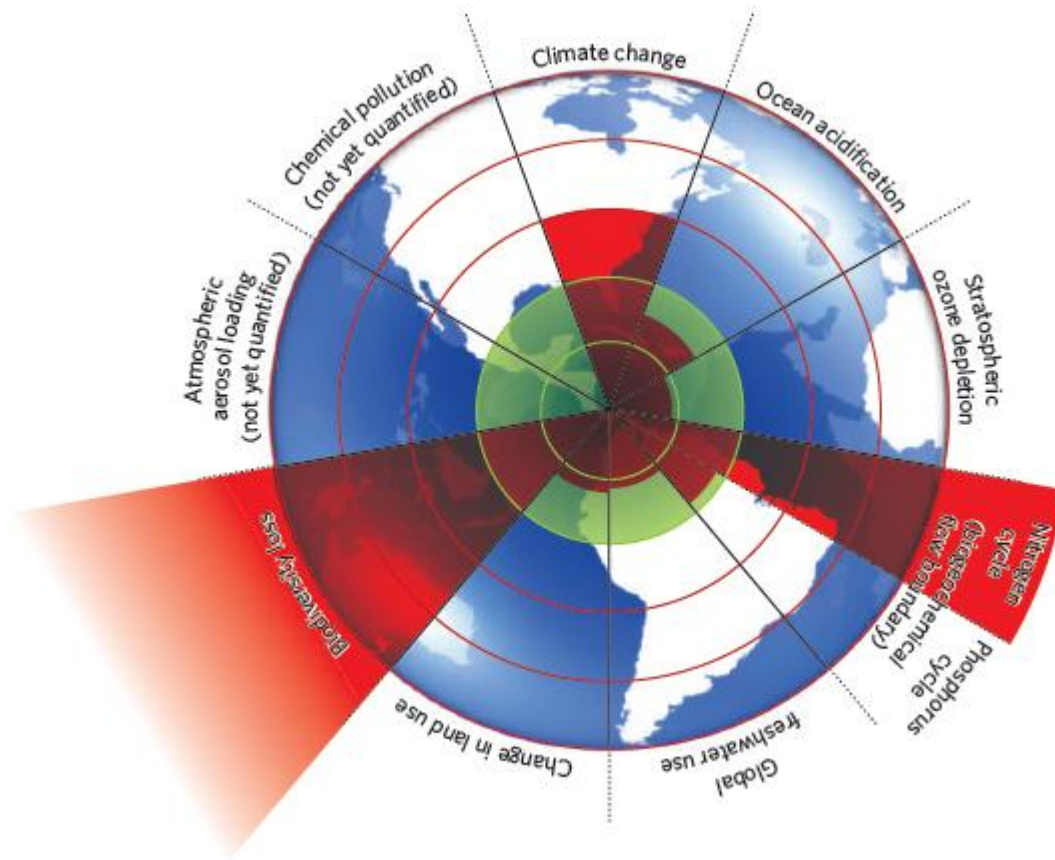
- *Environmental impacts of livestock production in the EU*
- *How can the environmental impact of livestock production be reduced*
 - **JRC research projects**

Part I

ENVIRONMENTAL IMPACTS OF LIVESTOCK PRODUCTION IN THE EUROPEAN UNION

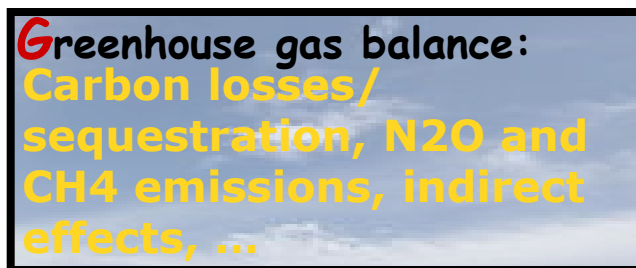
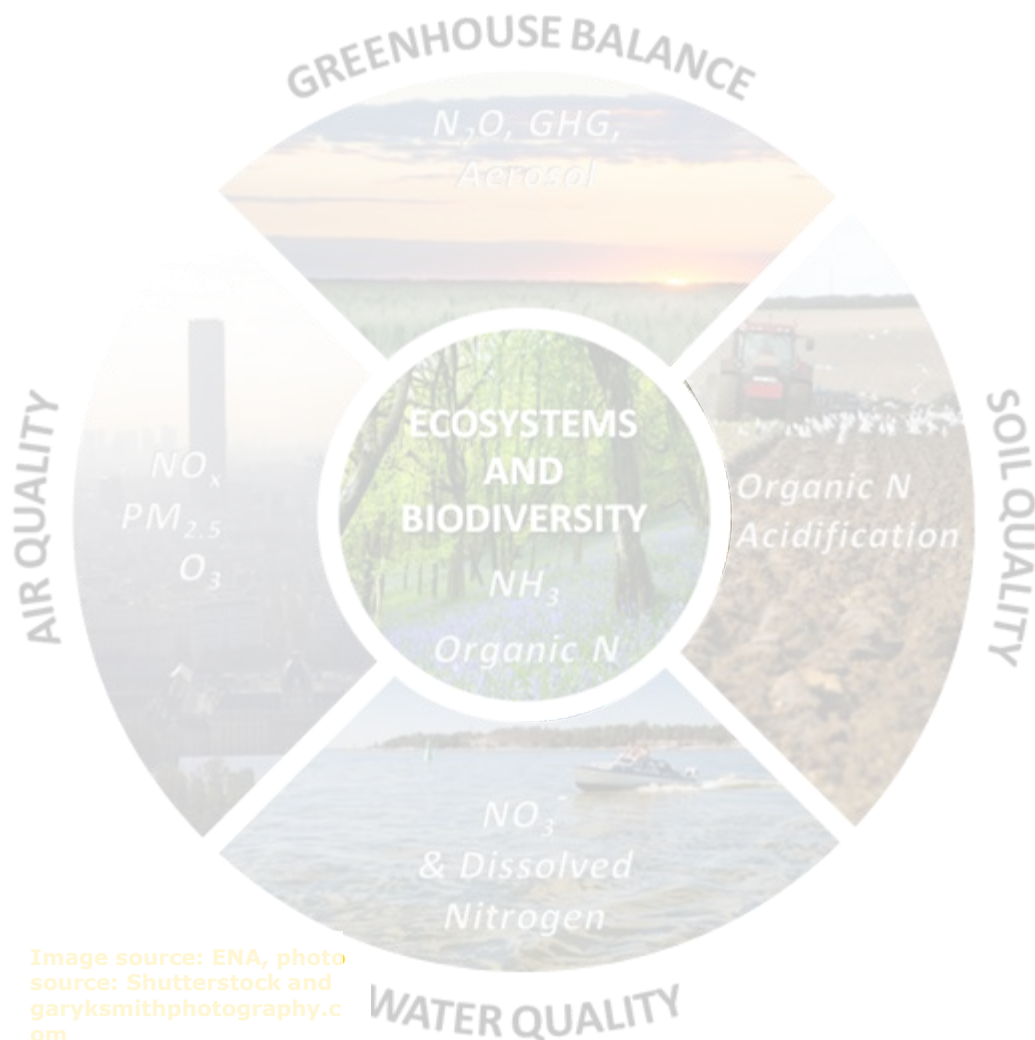
Planetary boundaries

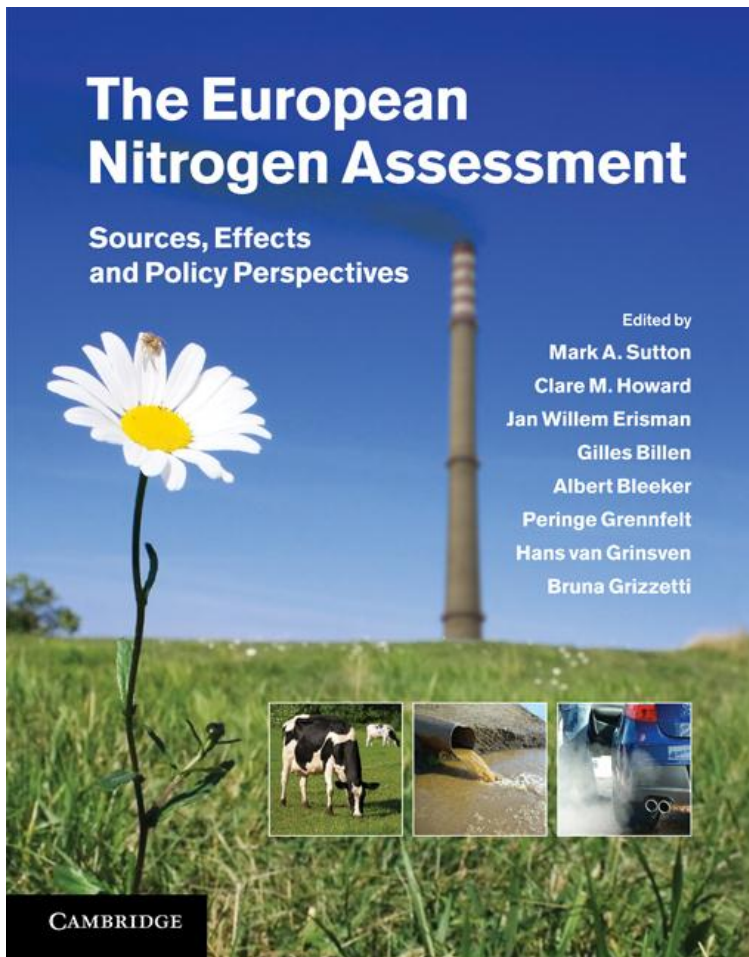
Safe operating space for humanity



Rockström et al. (2009)
Nature 461:472-475

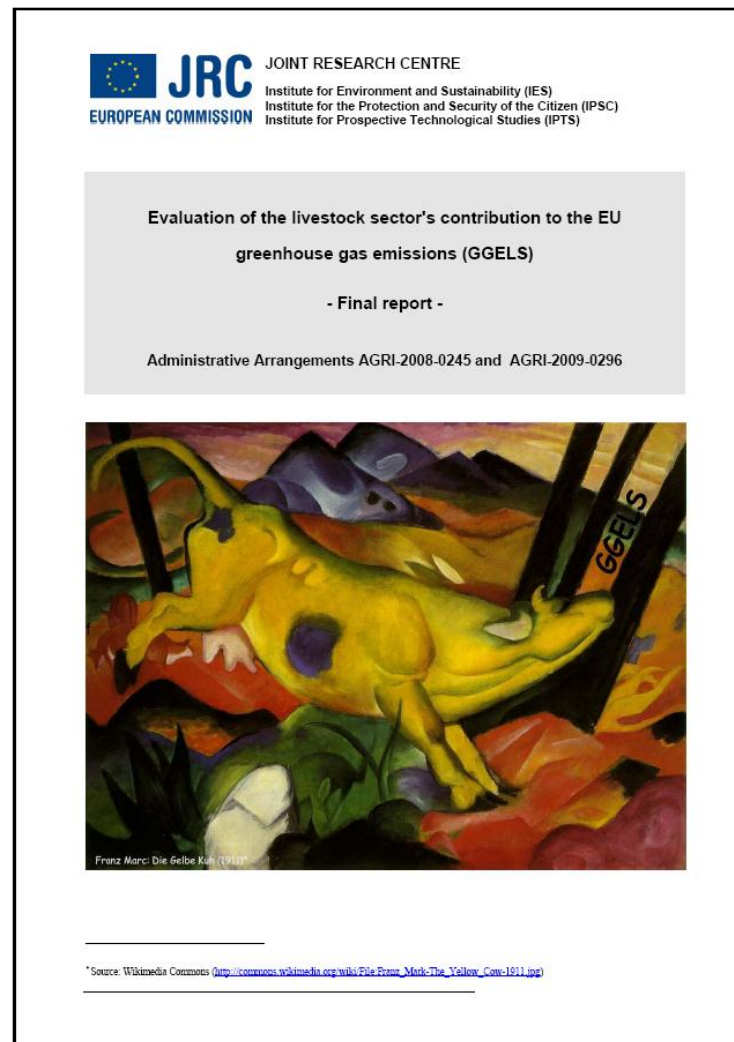
The five key threats





ENA: Assessing impact of nitrogen on five key threats

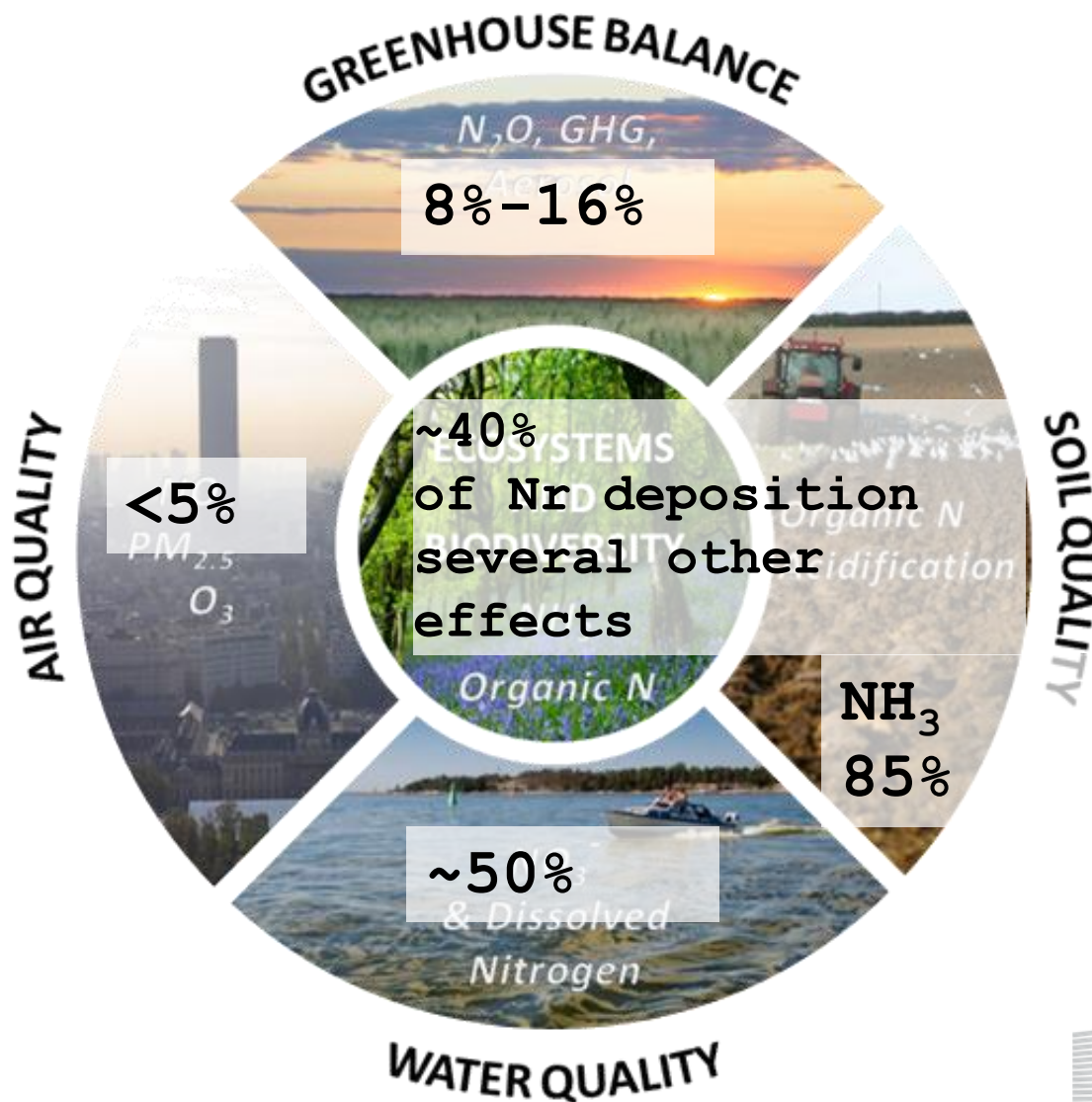
<http://nine-esf.org/ENA-Book>



GGELS: Quantification of EU-GHG emissions from livestock production systems

<http://afoludata.jrc.ec.europa.eu/index.php/dataset/detail/236>

The contribution of livestock production to environmental impacts in the EU

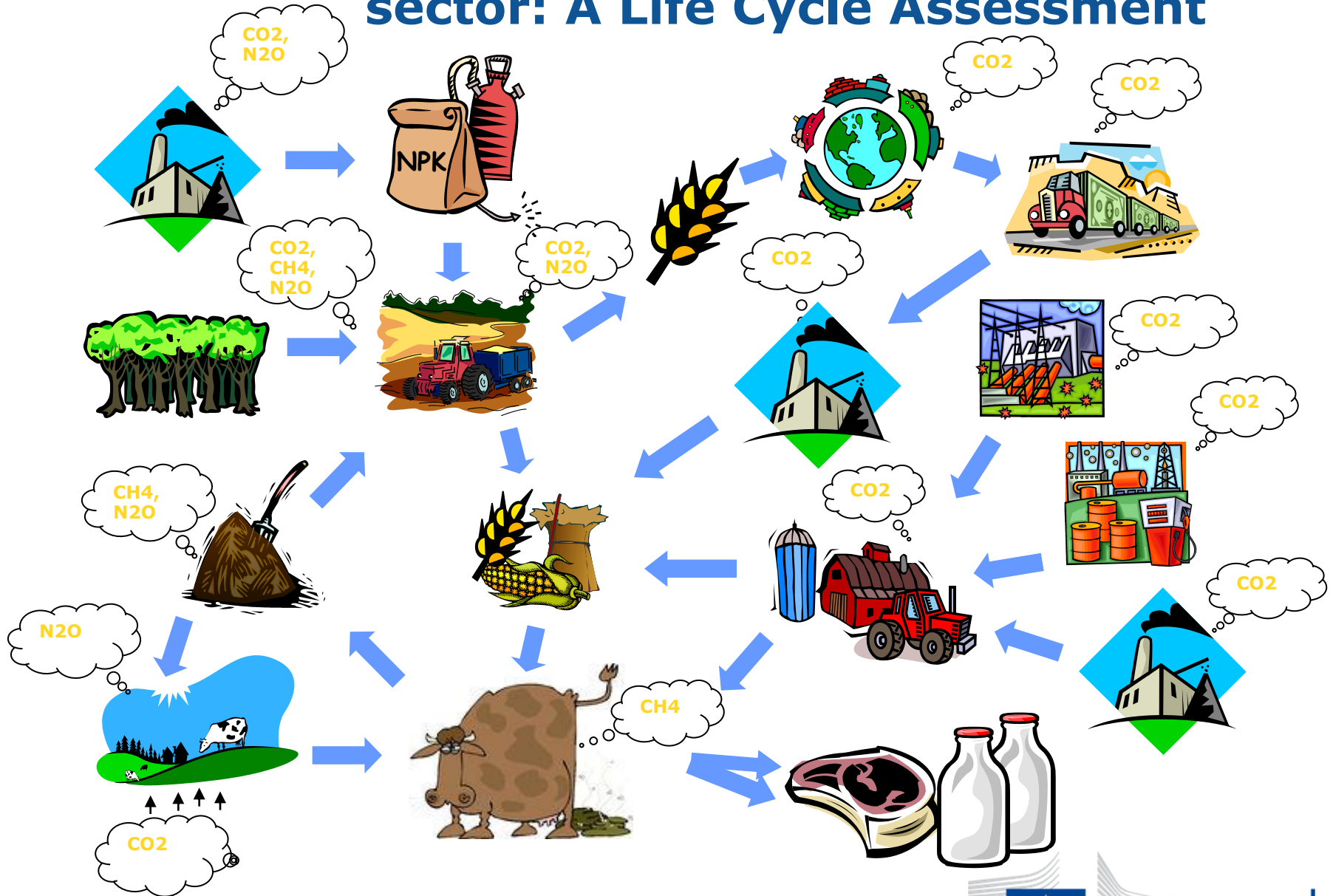


RESOURCES

Land use 48%

Water use 20%

GHG emissions of the EU livestock sector: A Life Cycle Assessment



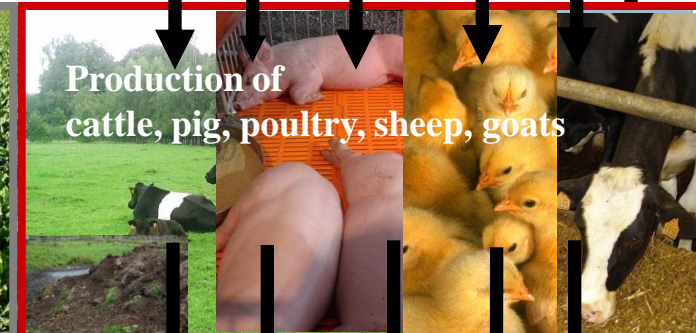
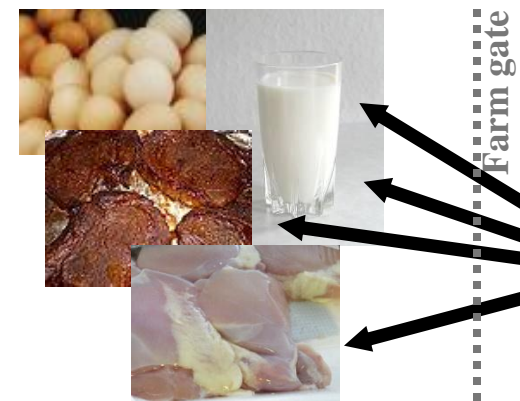
LCA of livestock products

system boundaries

○ Allocation required



not considered in GGELS
etail,
packaging,
consumption, waste



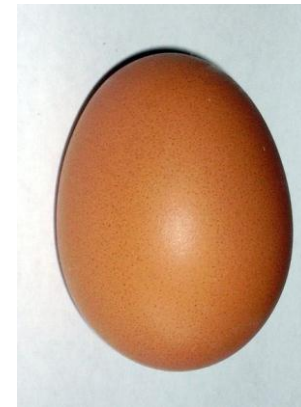
agriculture

Source of pictures: <http://commons.wikimedia.org/>

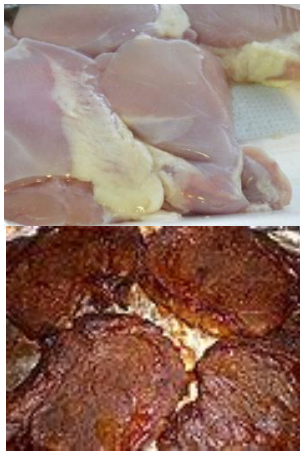
GGELS-LCA: Functional units



1 kg of milk



1 kg of eggs

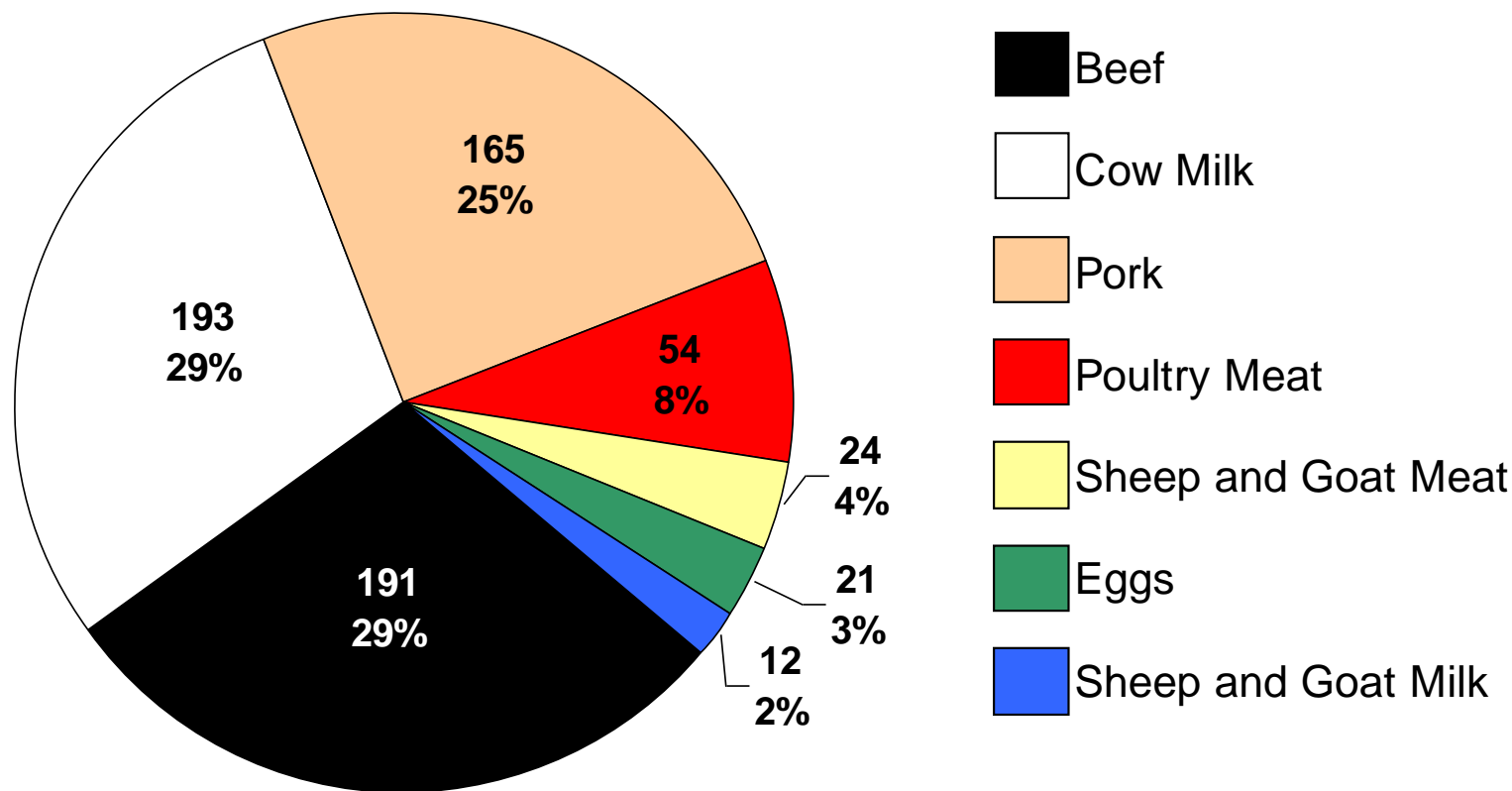


1 kg carcass of
meat

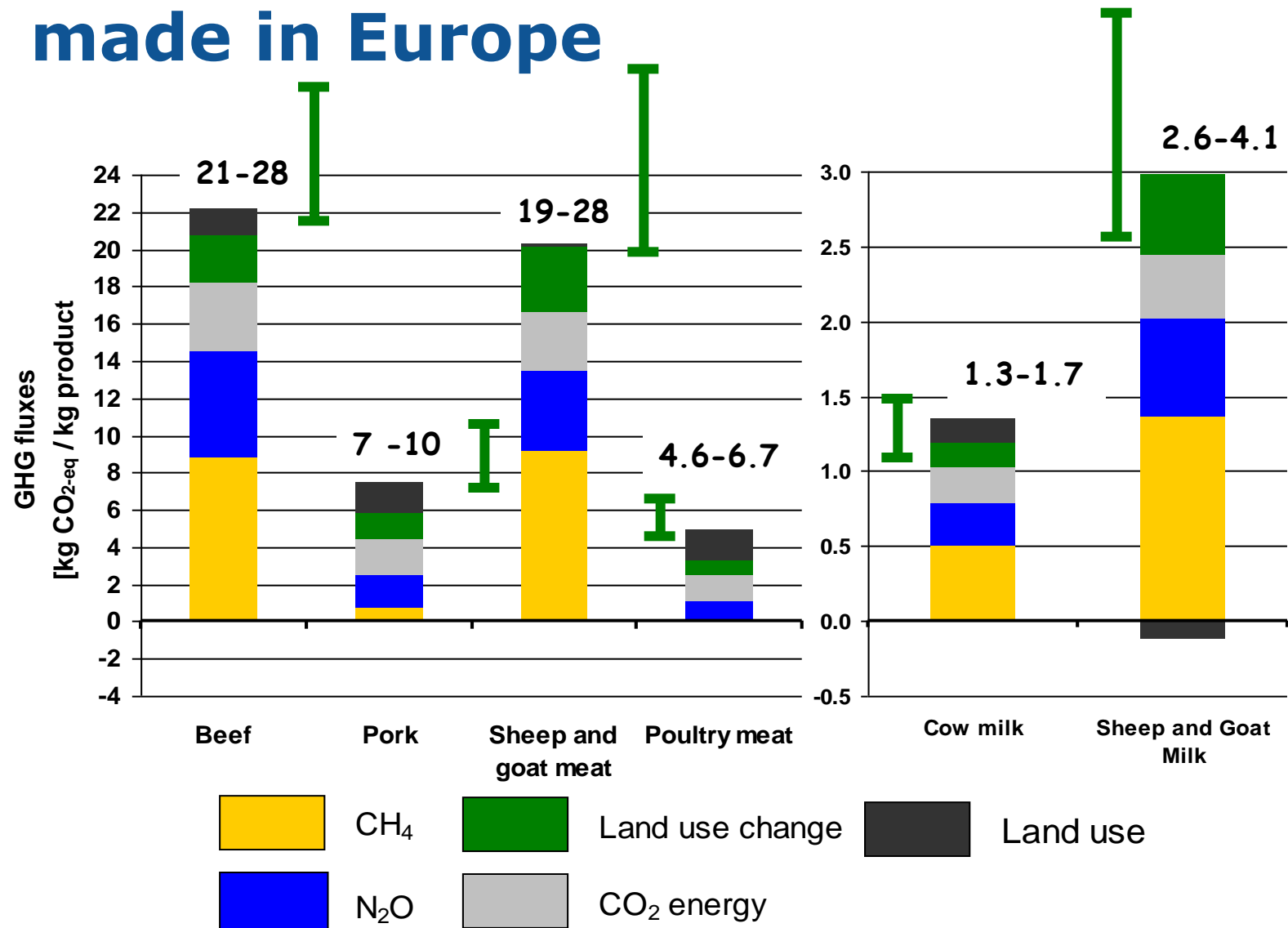
GHG emissions from livestock production in Europe

Total GHG fluxes EU27: 661 Mt CO₂-eq

13% of total GHG emissions in the EU



GHG intensities of animal products made in Europe



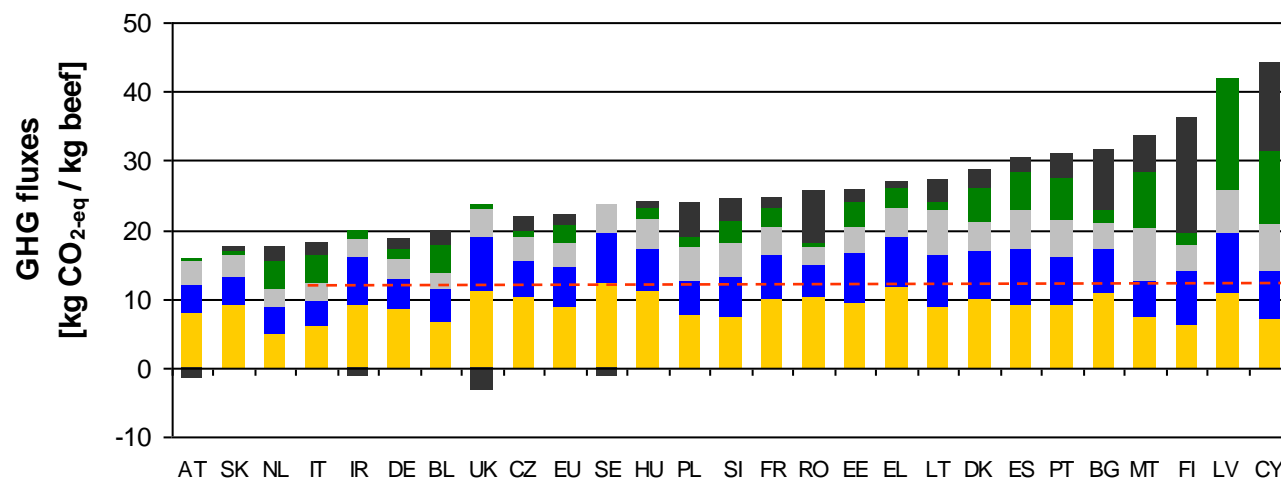
I Error bars indicate range of emissions from land use change scenarios

Leip et al. (2011)
GGELS

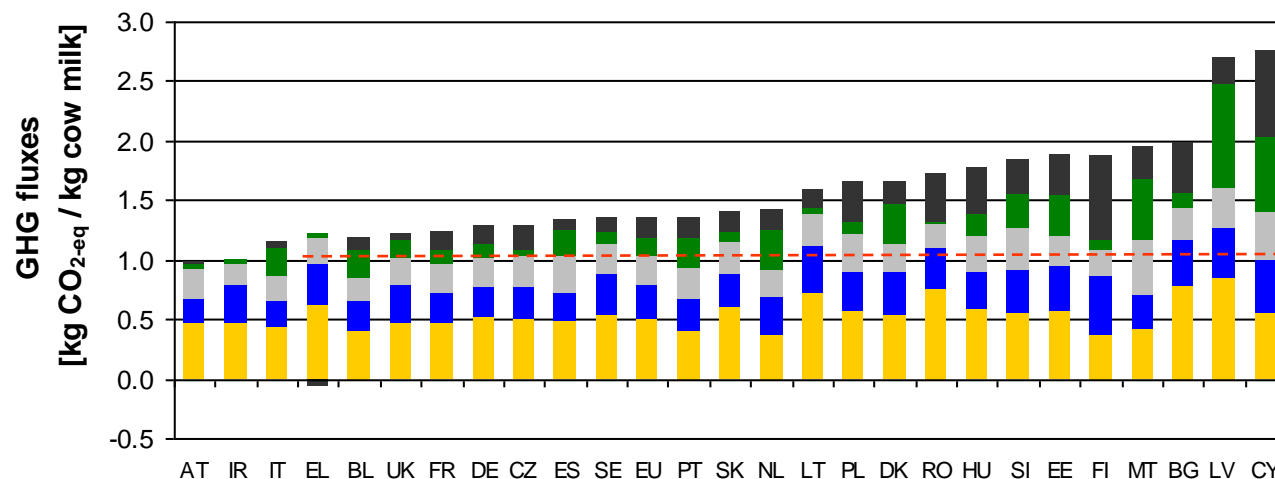


European
Commission

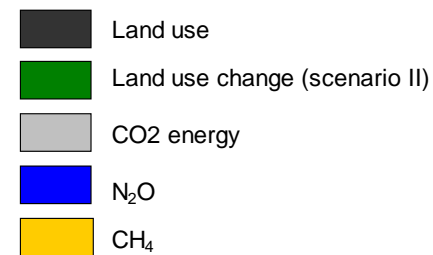
Beef



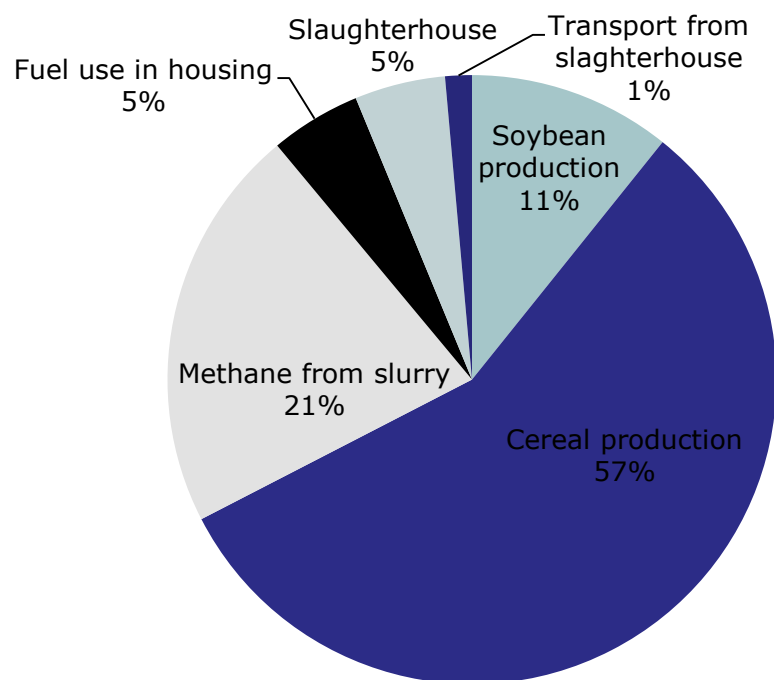
Cow Milk



EU member state

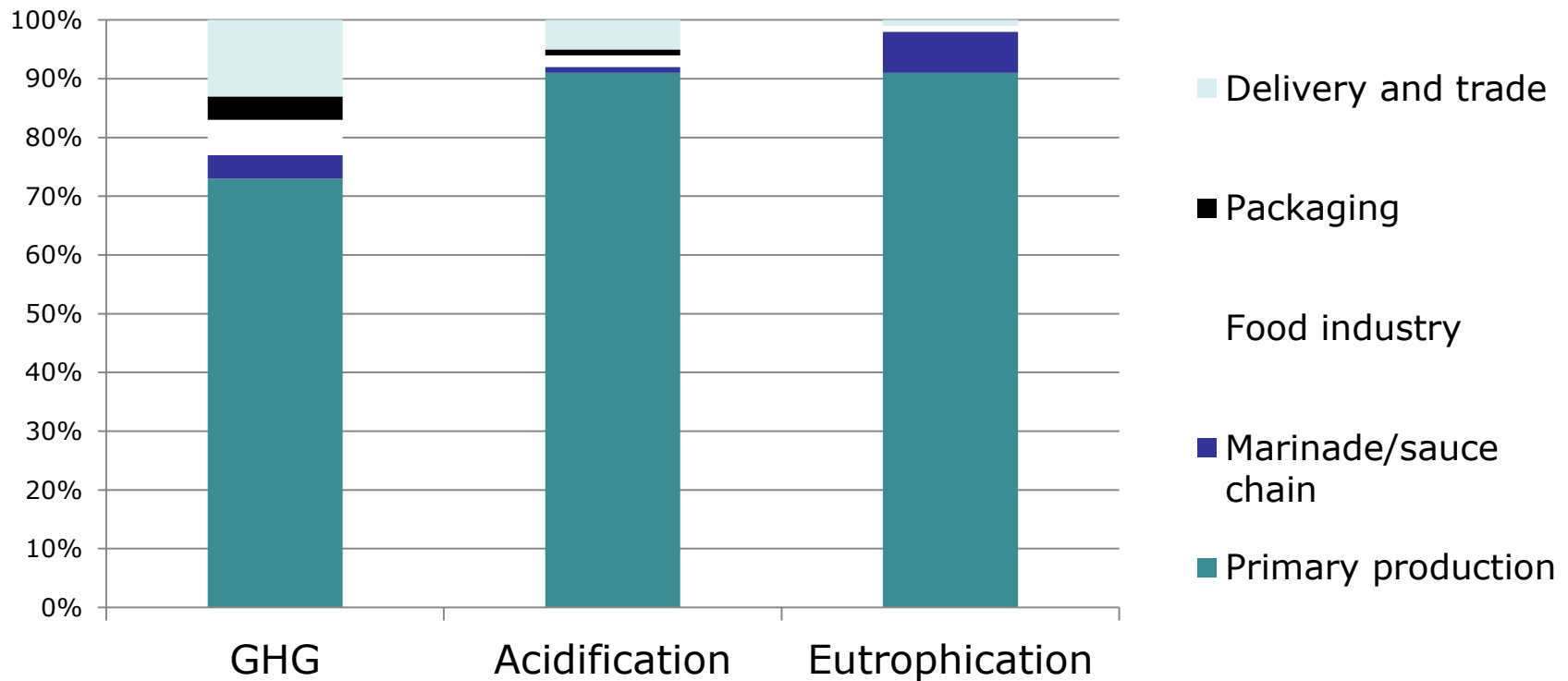


Contribution of different stages of Danish pork production on GHG emissions



Dalgaard et al. (2007) Danish Pork Production
An Environmental Assessment

Marinated broiler production: LCA impact through the supply chain

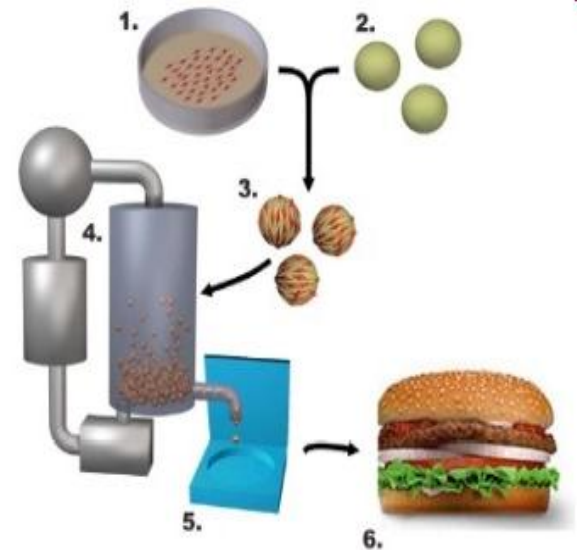
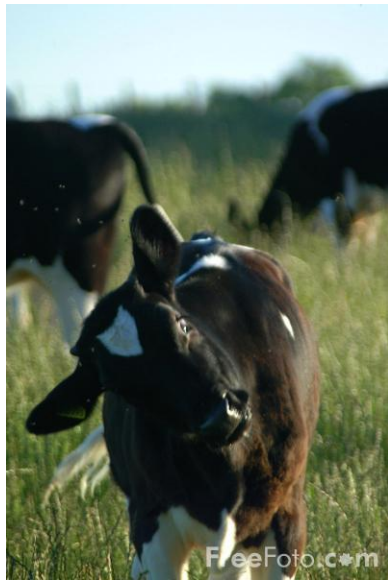


Usva et al. (2009) Agricultural and Food Science 18:460-476

Part II

REDUCING ENVIRONMENTAL IMPACTS OF LIVESTOCK PRODUCTION

Environmental impacts of cultured meat production



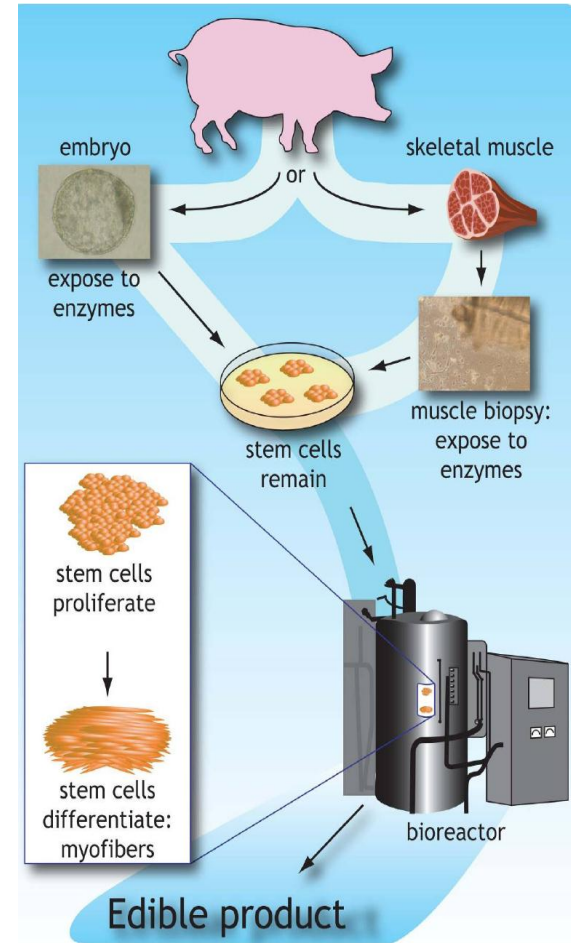
Tuomisto, H.L. & Teixeira de Mattos, M.J. 2011. Environmental impacts of cultured meat production. Environmental Science & Technology, 45: 6117-6123

What is cultured meat?

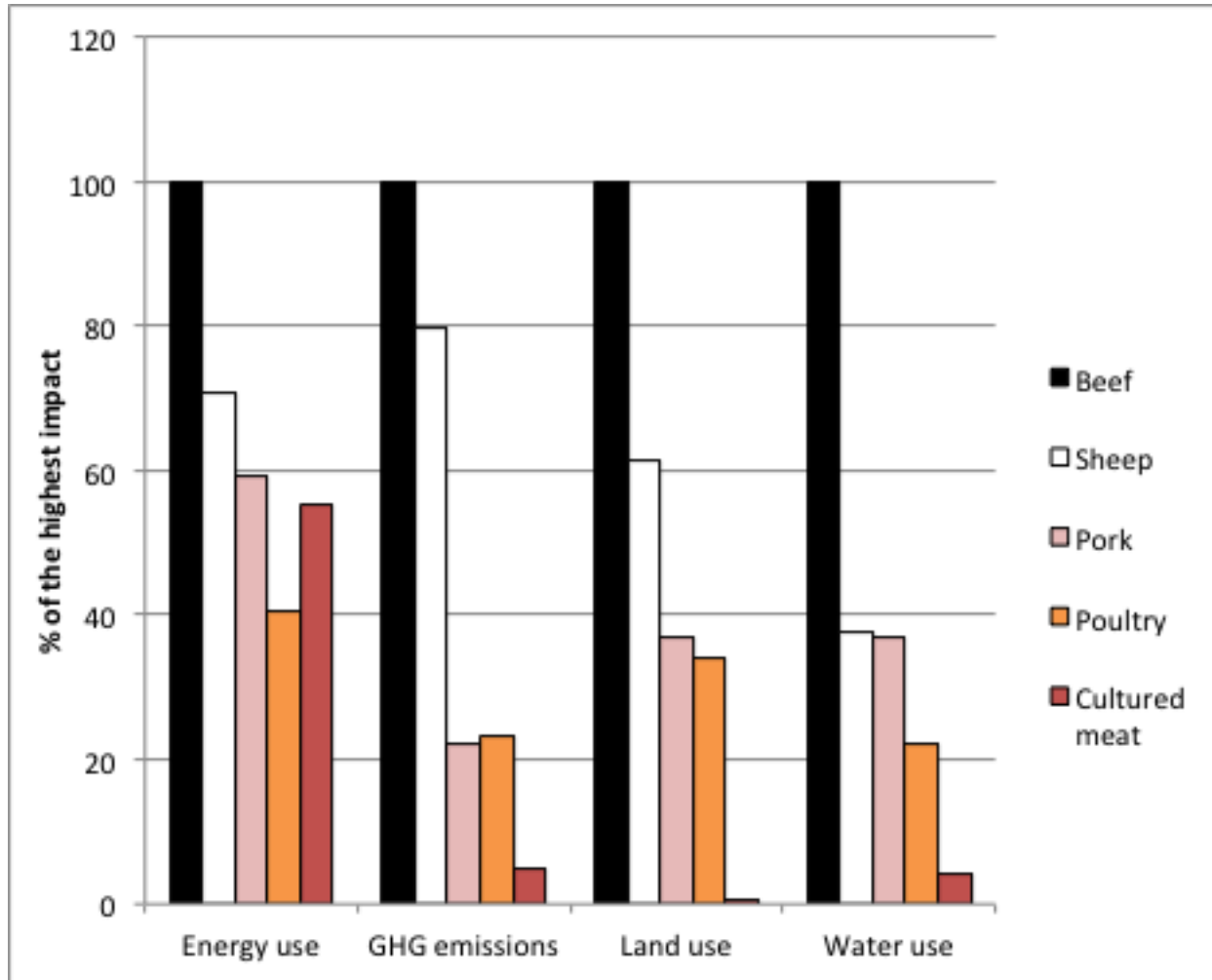
- *Also known as laboratory-grown meat or in vitro meat*
- *Produced by growing animal cells in a laboratory*
- *At a research stage*

Haagsman et al. (2009)

Production of Animal
Proteins by Cell Systems



Impacts of cultured meat production compared with conventionally produced meat in Europe



(Tuomisto & Teixeira de Mattos, 2011)

Low-carbon farming practice project

- *to assess policy options for promoting low carbon farming practices in the EU*
- *Develop an EU-wide farm-level carbon calculator*
 - **Assesses the carbon footprint of a farm and its products**
 - **Recommends mitigation options to reduce GHG emissions**

Improvement possibilities at farm

- *Improvements in feeding*
- *Replacement of imported soya with locally produced protein options/artificial amino acids*
- *Improve livestock productivity*
- *Optimisation of grazing*
- *Coverage of liquid manure*
- *Reduce methane from enteric fermentation*
- *Biogas production from manure*



European Food Sustainable Production and Consumption Round Table



Vision: *Promote science-based, coherent approach to Sustainable Consumption and Production in the food sector, consider interactions across the entire food chain*

3 Working areas: *Methodology, communication, continuous improvement*

Members: *EC, 24 European food chain business associations, The Sustainability Consortium, World Resources Institute*

EC co-chairs: *DGs ENV, SANCO, JRC, ENTR*

Others: *UN Environment Programme (UNEP), European Environment Agency, National governments, UN Food and Agriculture Organization (FAO), UN Development Programme (UNDP), Eurogroup for Animals, Spanish Consumers Union*



Key Objectives



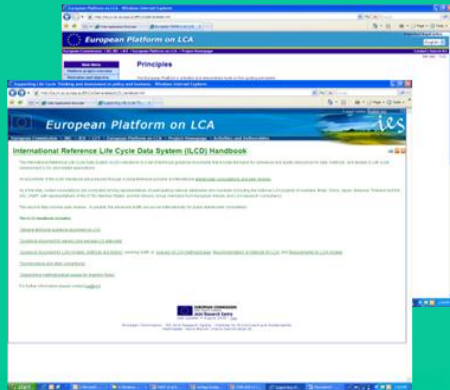
- *Establish scientifically reliable and uniform environmental assessment methodologies for food and drinks*
- *Identify suitable tools and guidance for voluntary environmental communication to consumers and other stakeholders*
- *Promote continuous environmental improvement measures along the entire food supply chain;*

Environmental footprint of products and organisations

- *DG Environment and JRC develops a harmonised methodology for the calculation of the environmental footprint of products*
- *Based on Life Cycle Assessment approach*
- *Includes specific rules for different product categories*

European Platform on LCA

Resource directory
Website
User forum

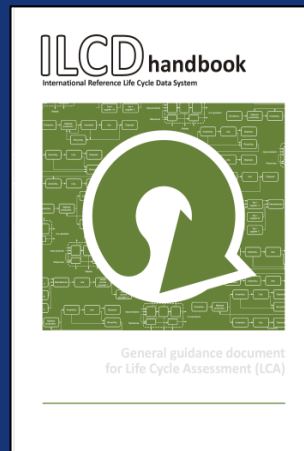


European Reference Life Cycle Database (ELCD)



International Reference Life Cycle Data System (ILCD)

ILCD
Handbook

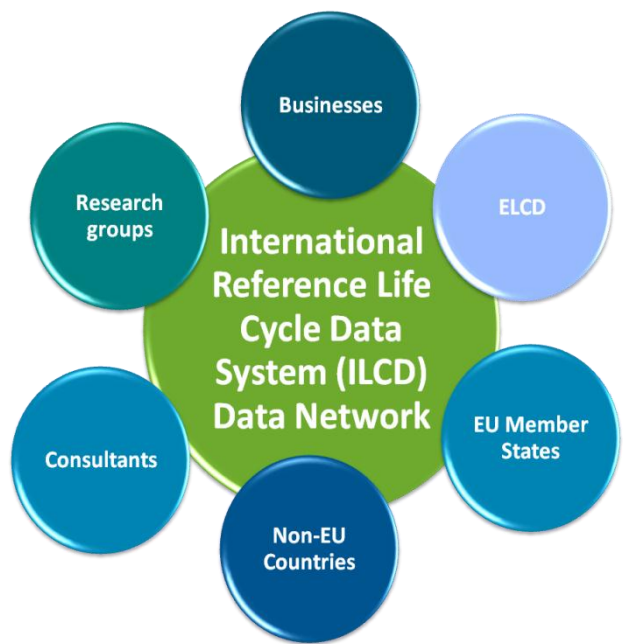


ILCD
Data Network
(new)



ILCD Data Network

ILCD Data Network: a web-based infrastructure for better availability of consistent and quality-assured LCA data



- *Open for all data providers: not in competition with other LCI databases*
- *Non-centralised: data kept and published on website of individual owner/developer (under own conditions)*
- *Emphasis on consistency and quality of datasets: requirements based on ILCD Handbook : "Entry-level" requirements*
- *Supporting tools and templates provided for free*

Thank you!

Links to the JRC projects:

- *Low carbon farming and cultured meat production:*
[*hanna.tuomisto@jrc.ec.europa.eu*](mailto:hanna.tuomisto@jrc.ec.europa.eu)
- *GHG emissions of livestock production in the EU:*
[*http://afoludata.jrc.ec.europa.eu/index.php/dataset/detail/236*](http://afoludata.jrc.ec.europa.eu/index.php/dataset/detail/236)
- *Food Sustainable Production and Consumption Round Table:* [*info@food-scp.eu*](mailto:info@food-scp.eu), [*http://www.food-scp.eu/*](http://www.food-scp.eu/)
- *Environmental footprint:*
[*http://ec.europa.eu/environment/eussd/product_footprint.htm*](http://ec.europa.eu/environment/eussd/product_footprint.htm)
- *ILCD Data Network:* [*lca@jrc.ec.europa.eu*](mailto:lca@jrc.ec.europa.eu)
- *Other LCA related projects:* [*http://lct.jrc.ec.europa.eu*](http://lct.jrc.ec.europa.eu)

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