European Commission

Reduction of greenhouse gases from EU agriculture: what is at stake ?

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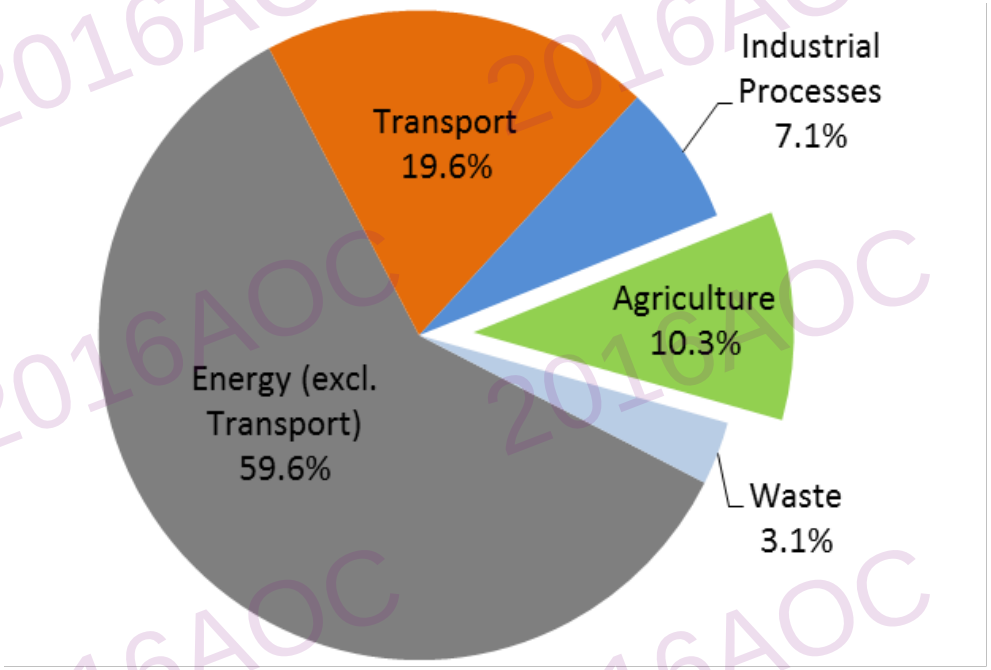
Outline

- Facts and figures on GHG emissions in the EU
- Political process in the EU
- Climate policy and potential impact on EU agriculture

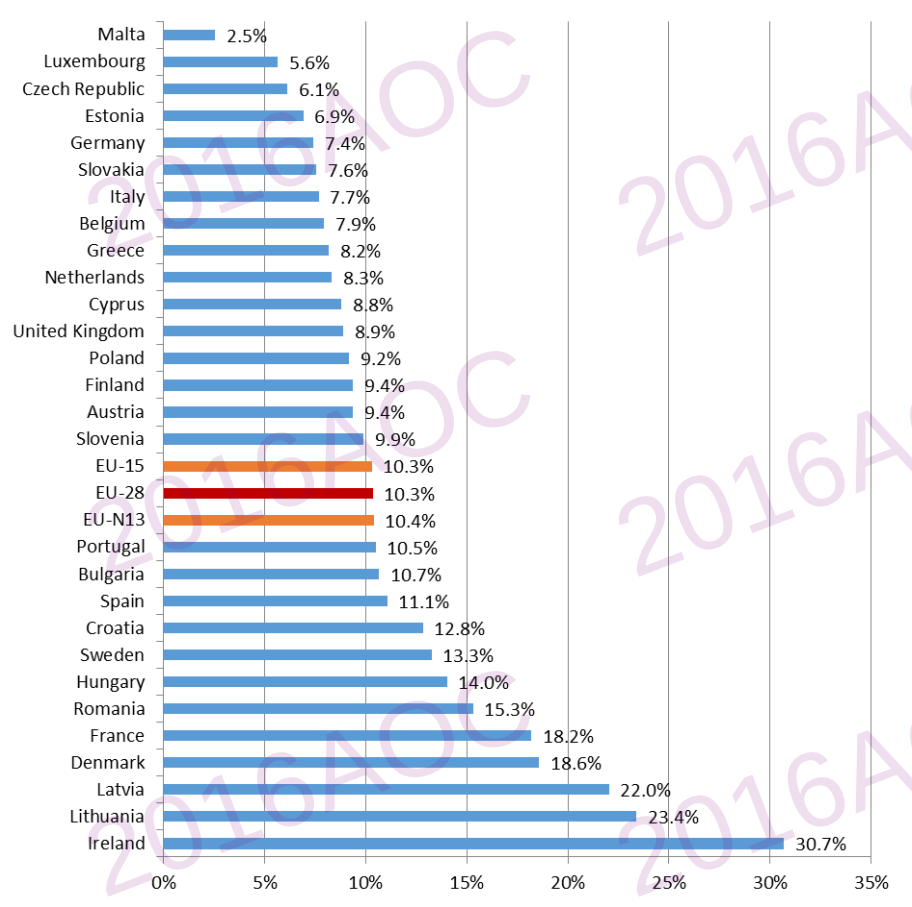
Background

Share of agriculture GHG emissions in total emissions (excl. LULUCF) in the EU-28, 2012



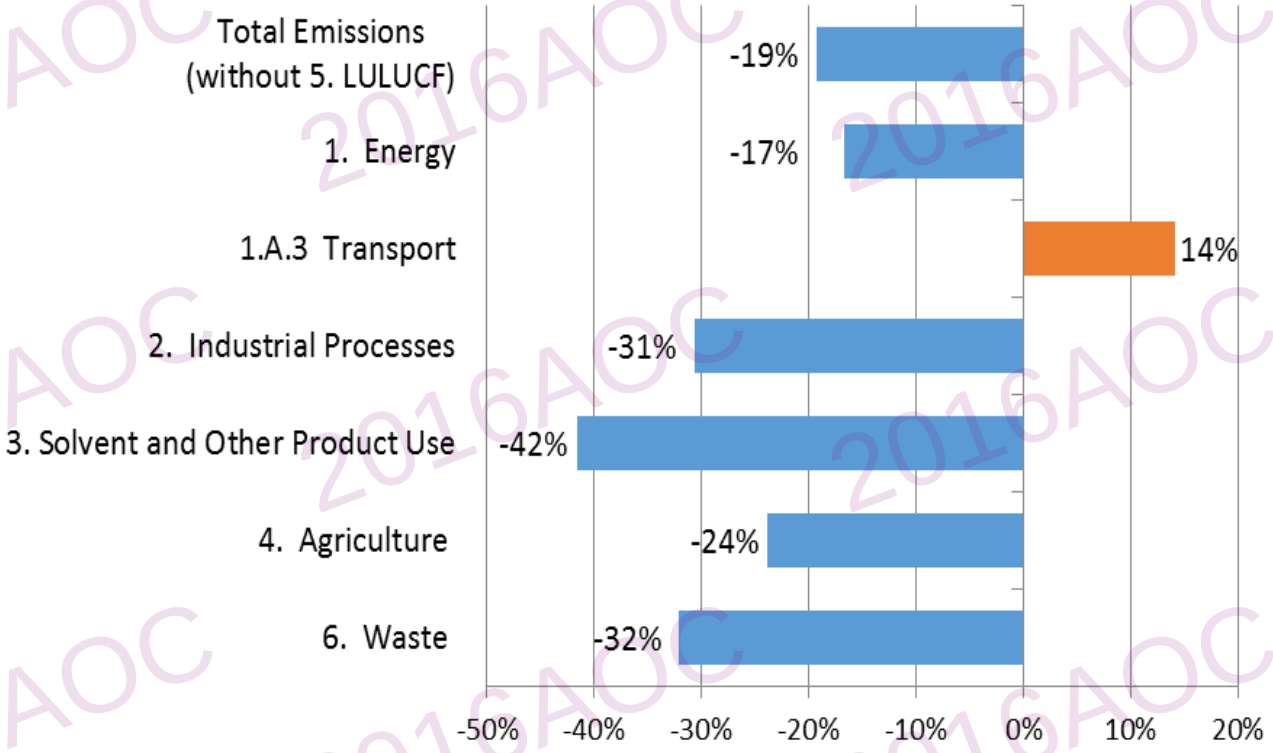
Source: EEA database (2015)

Share of agriculture GHG emissions in total national emissions in EU MS, 2012



Source: EEA database (2015)

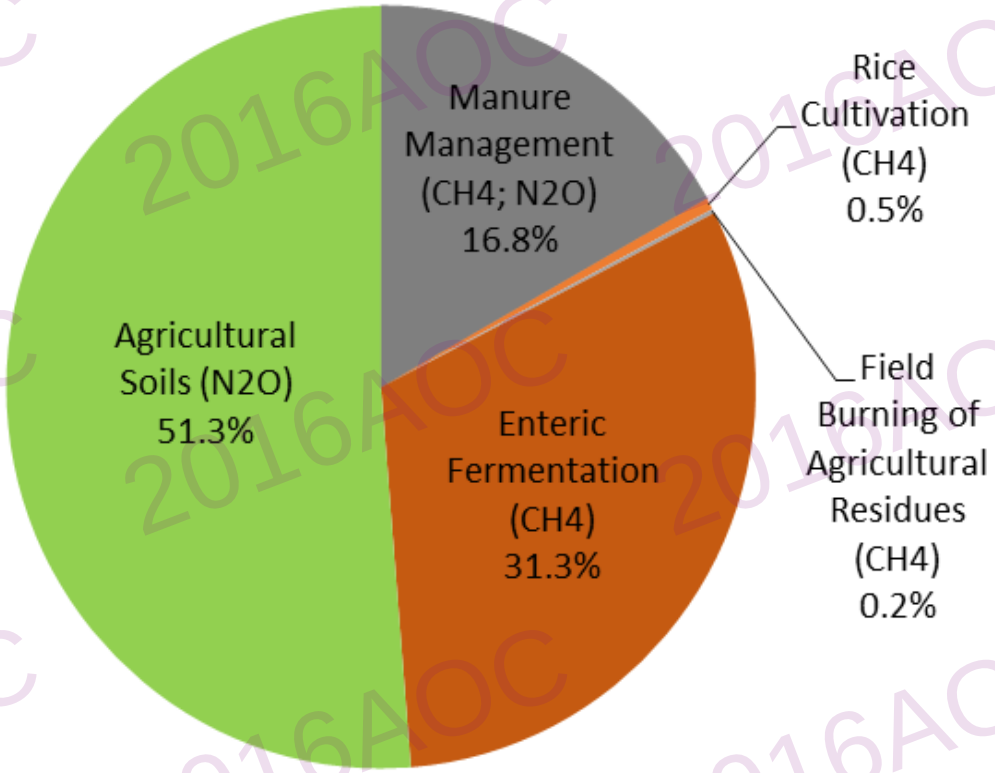
Changes in EU-28 GHG emissions by sector, 1990–2012



Agriculture: 618 million t CO2 equivalent in 1990 to 471 million t in 2012

Source: EEA database (2015)

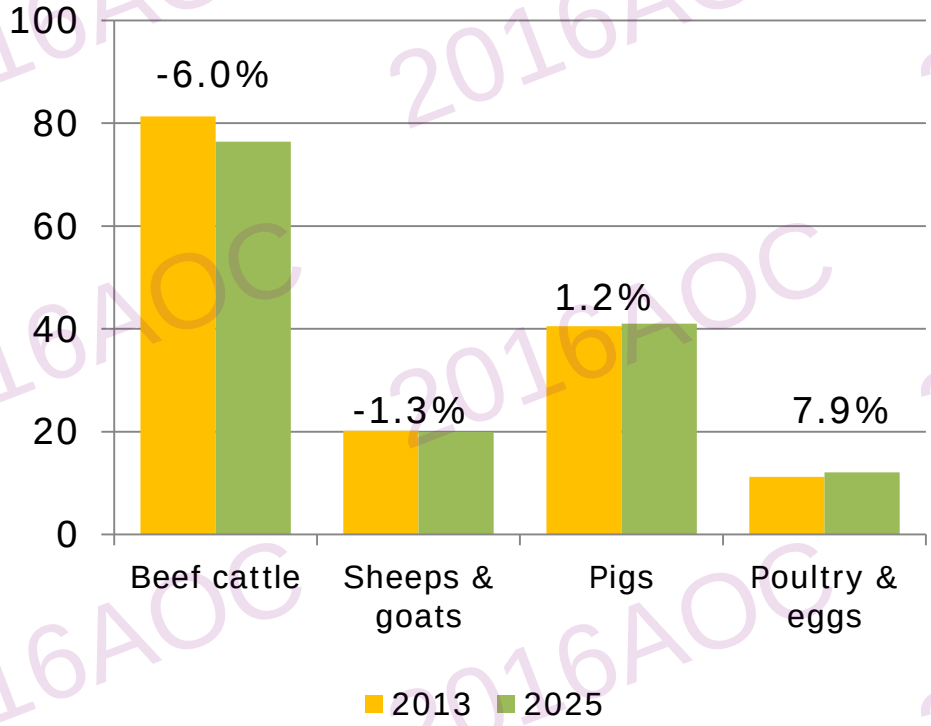
Breakdown of agricultural GHG emissions in the EU-28, 2012



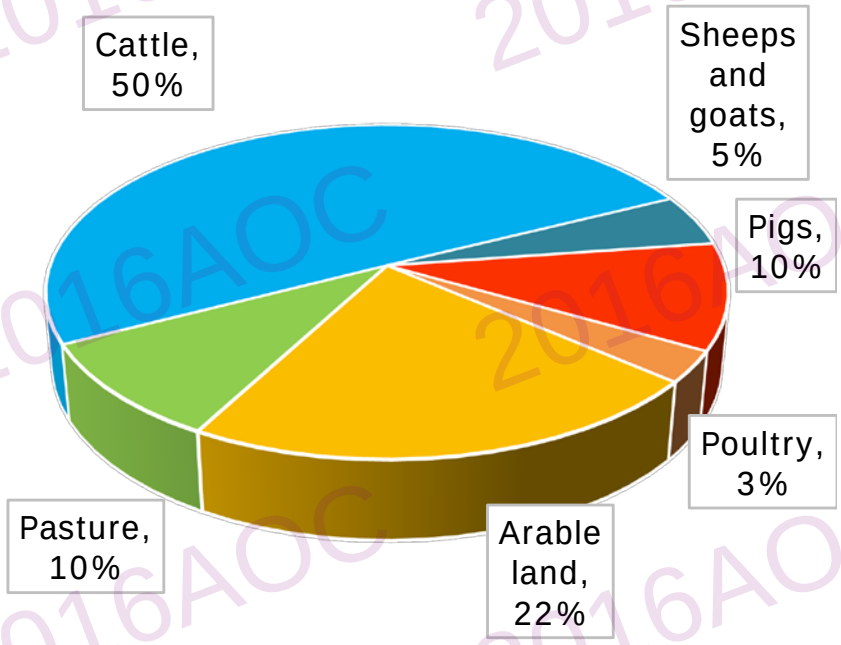
Source: EEA database (2015)

GHG emissions from EU agricultural activity decline slightly by 2025

GHG emission in agriculture
(in million t of CO_2-equivalent)



Share of GHG emission by agricultural activity in 2025



Source: JRC, based on CAPRI baseline 2015

Political process in the EU

- 2007: EU target for **2020** = 20% cut in GHG emissions (from 1990 levels)
- 2014: EU target for **2030** = 40% cut in GHG emissions
- 2015: Paris agreement
- 2016: EU legal proposal of new climate & energy package (to be submitted)

Need to evaluate the potential impact on EU agricutlure !!!

Potential impact on EU agriculture

Study by JRC, Joint Research Center, of the EU

- Preliminary results
- Do not reflect the mitigation policies already agreed or under formal discussion in the EU.

Van Doorslaer, B, P. Witzke, I. Huck, F. Weiss, T. Fellmann, G. Salputra, T. Jansson, D. Drabik, A. Leip (2015): An economic assessment of GHG mitigation policy options for EU agriculture. JRC Technical Reports, European Commission, Seville http://publications.jrc.ec.europa.eu/repository/bitstream/JRC93434/jrc90788_ecampa_final.pdf

Ignacio Pérez Domínguez, Thomas Fellmann, Franz Weiss, Peter Witzke, Jesús Barreiro-Hurlé, Mihaly Himics, Torbjörn Jansson, Adrian Leip (forthcoming), An economic assessment of GHG mitigation policy options for EU agriculture (ECAMPA II). JRC Technical Reports, European Commission, Seville

Scenario description

- A compulsory reduction of agriculture GHG emissions in the EU-28 of 20% in the year 2030 compared to 2005
- The overall 20% mitigation target is translated into heterogeneous targets per EU Member States according to a cost-effective allocation
- No targets for the rest of the world (bias to the results)
- 14 technological mitigation options available to reduce GHG emissions in the EU
- Results are compared to a reference scenario in 2030 (comparative static approach)

Selected results

- Total GHG reduction in EU:
  - 56% by use of mitigation technologies
  - 44% by change in production (decrease)
- Emission leakage: 21% of GHG reduction in EU is compensated by increased emissions in the rest of the world
- EU livestock sector is most affected:
  - beef production: -9%
  - dairy: -2%
  - pork sector: -4%
- EU looses competitiveness:
  - Costs of production increase
  - Net trade position of the EU worsens

Conclusions

- Mitigation technologies can not solely solve the problem
- Implementation of technologies comes at a cost and can influence the competitiveness of a sector
- Global approach is needed: emission leakage !!!
- Flexibility to reduce GHG emissions is needed as other EU sectors can reduce GHG emissions more efficiently

Limitations of the results

- Methodological improvements of impact assessment (linkage between technologies, production system and GHG accounting, …)
- No reduction targets in the rest of the world (competitiveness and trade !)
- Limited set of technological mitigation options
- More empirical research on the adoption of new technologies necessary

Reports and data available at:

http://ec.europa.eu/agriculture/external-studies/ecampa_en.htm

http://ec.europa.eu/agriculture/index_en.htm

http://ec.europa.eu/agriculture/milk-market-observatory/index_en.htm

http://ec.europa.eu/agriculture/markets-and-prices/index_en.htm

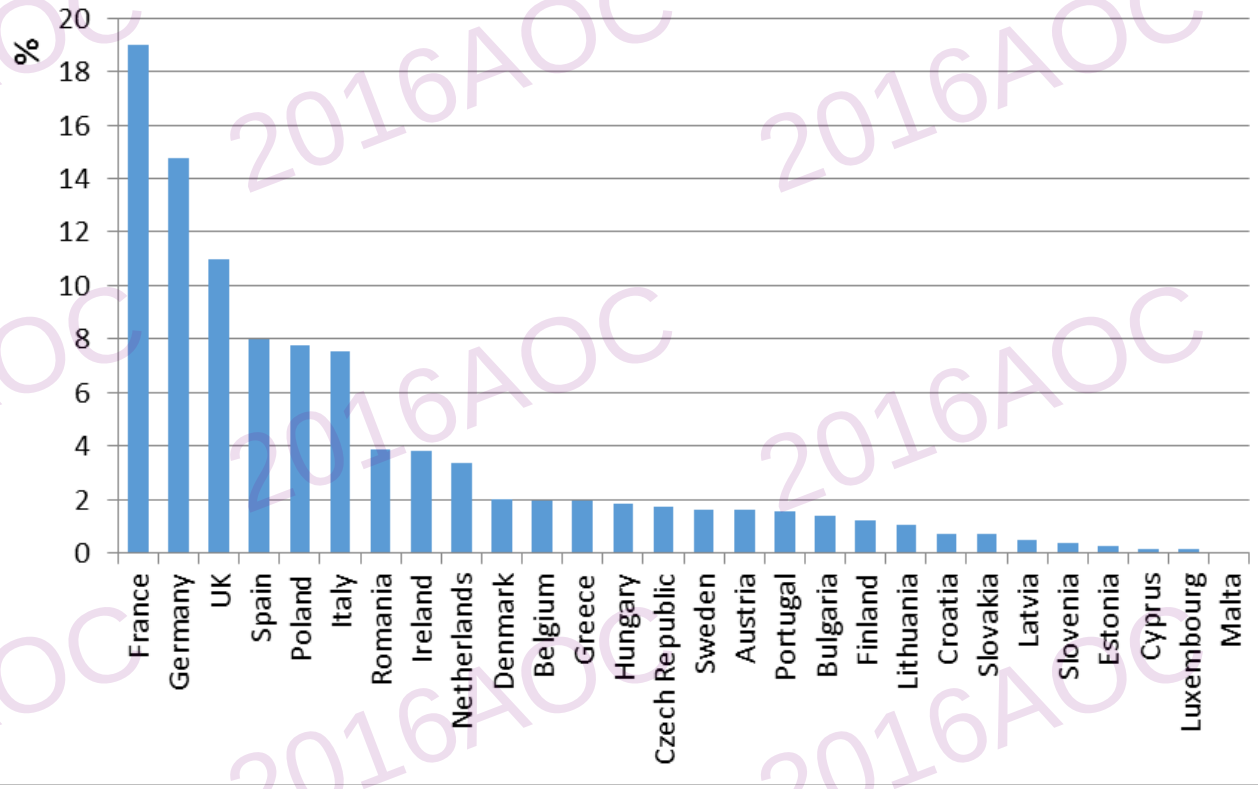
http://ec.europa.eu/agriculture/policy-perspectives/index_en.htm

http://ec.europa.eu/agriculture/trade-analysis/index_en.htm

Thanks!

Annexes

Share of Member States' agriculture GHG emissions in EU-28 total agriculture emissions, 2012



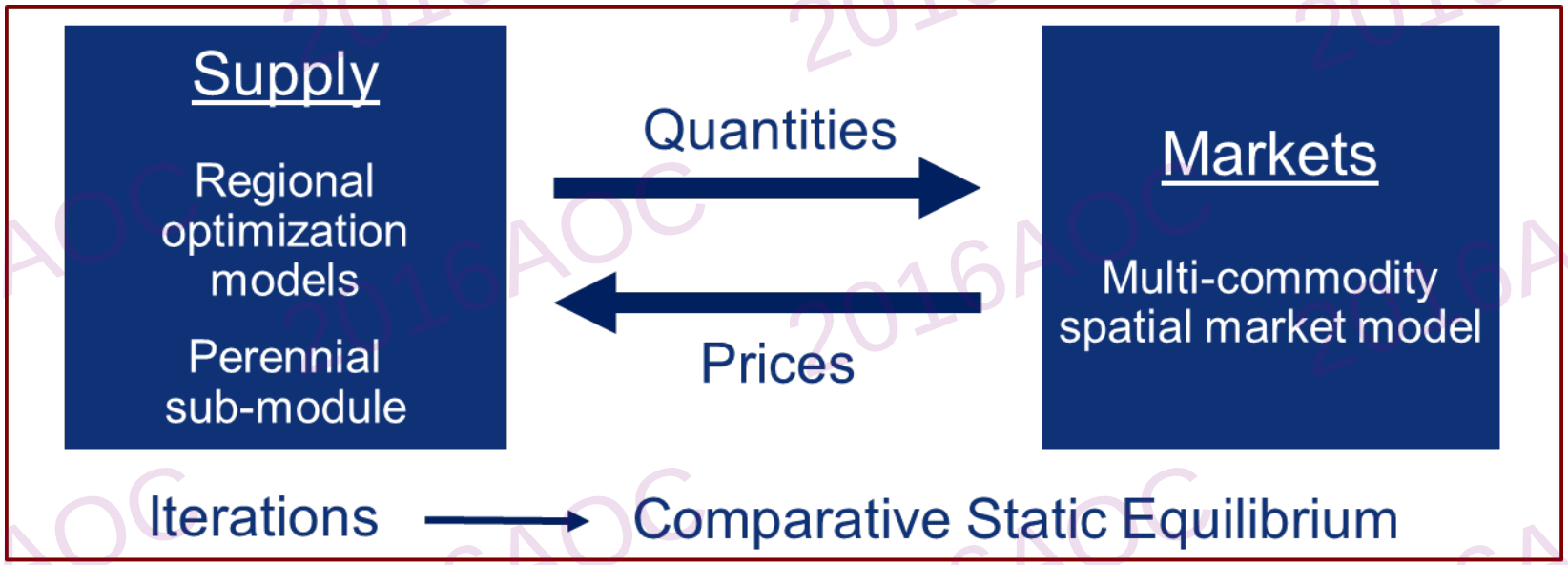
Source: EEA database (2015)

Mitigation Technologies
Anaerobic digestion: farm scale
Better timing of fertilization
Nitrification inhibitors
Precision farming
Variable Rate Technology (VRT)
Increasing legume share on temporary grassland
Rice measures
Fallowing histosols
Low nitrogen feed
Feed additives: linseed
Genetic improvements: increasing milk yields of dairy cows
Genetic improvements: increasing ruminant feed efficiency
Feed additives: nitrate
Vaccination against methanogenic bacteria in the rumen

Specification of the modelling approach

- CAPRI (Common Agricultural Policy Regional Impact Analysis) modelling system
  - An economic large-scale, comparative-static, agricultural sector model.
  - Focus on EU-28, but CAPRI is a global agricultural commodity model (production, trade).
  - CAPRI consists of two interacting modules: the *supply module* and the *market module*.

The modelling approach



- Supply module: about 280 independent aggregate optimisation models, representing regional agricultural activities (28 crop and 13 animal activities) at Nuts-2 level within the EU-28.
- Market module: a spatial, non-stochastic global multi-commodity model for 47 primary and processed agricultural products, covering 77 countries in 40 trading blocks.

The modelling approach

Calculation of *activity based* agricultural emission inventories

- The regional supply models in CAPRI capture links between agricultural production activities in detail.
  - Based on production activities, inputs and outputs define agricultural GHG emission effects.
  - CAPRI incorporates a detailed nutrition flow model per activity and region (including explicit feeding and fertilizing activities, i.e. balancing of nutrient needs and availability).
- With this information, *CAPRI calculates endogenously GHG emission coefficients following IPCC guidelines* (mostly Tier 2).
- As relevant output, emission inventories are calculated for MS and regions.

⇨ Ready to conduct (policy) scenarios.