PBL Netherlands Environmental Assessment Agency

The protein puzzle

18 May 2011 | Maurits van den Berg & Henk Westhoek

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The consumption and production of meat, dairy and fish in the European Union

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Who is PBL?

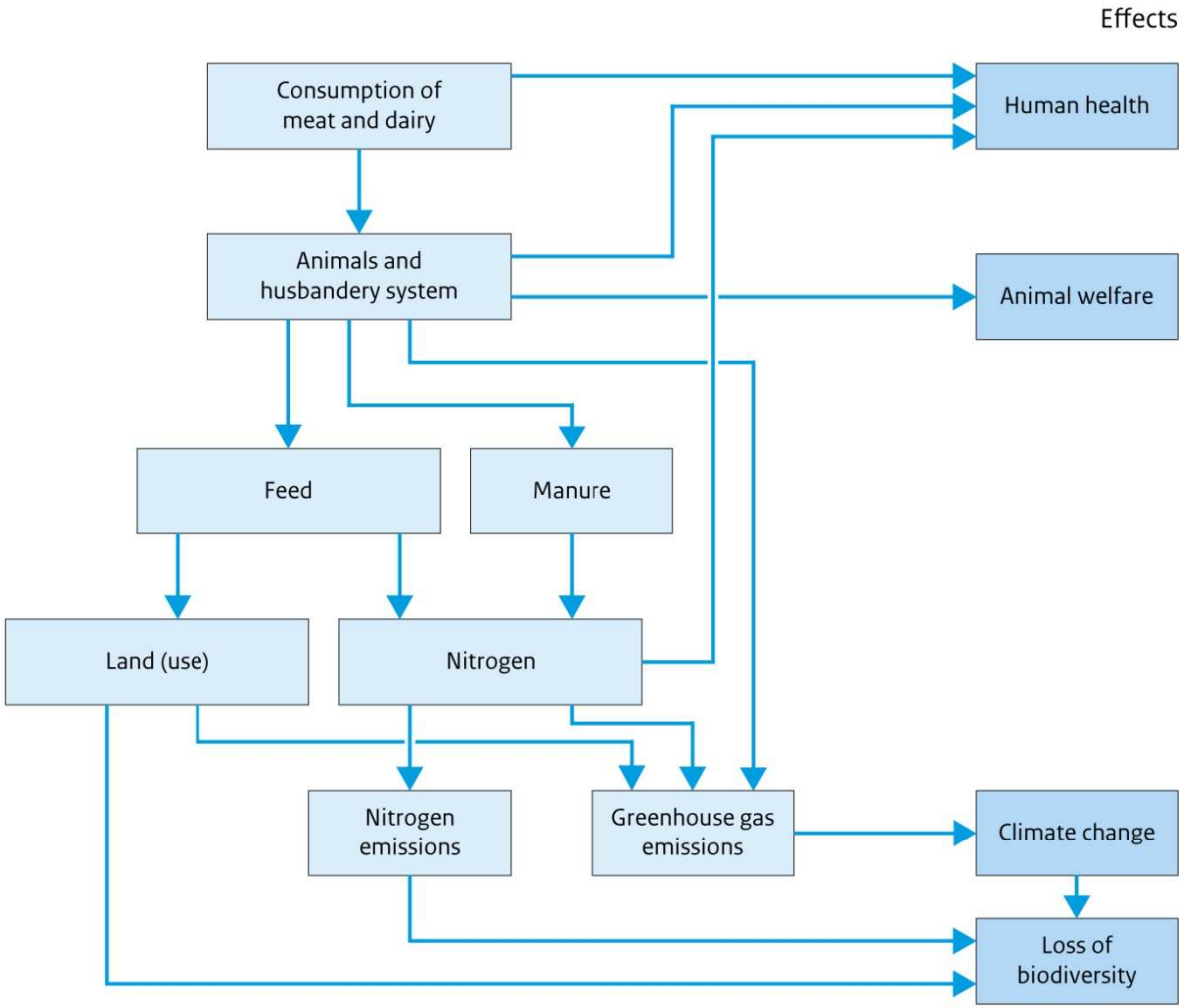
- PBL is the national institute for strategic policy analysis in the field of environment and spatial planning
- Solicited and unsolicited research
- Mostly outlook studies, analyses and evaluations in which an integrated approach is considered paramount
- Policy relevance, independency and scientific rigor

- Source: www.pbl.nl/en/aboutpbl

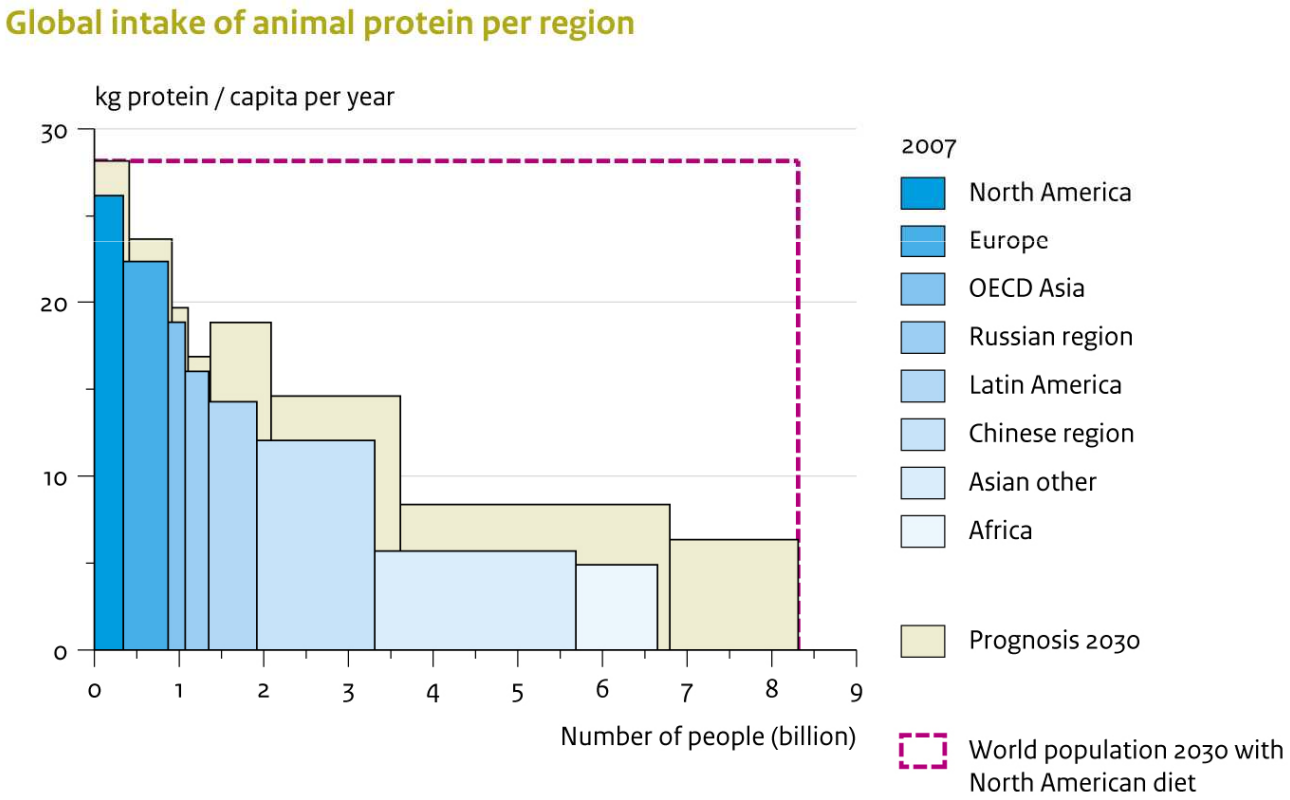
1. Why the protein puzzle?

- Much discussion on impacts impact of consumption of meat, dairy and fish
- Food system is complex, no concise up-to-date overview of facts and figures
- No good insight in effects of measures to mitigate negative impacts
- Many stakeholders: EU, national governments, producers, traders, retailers, NGOs, consumers (actors in he food chain)
- Policy window: reform of Common Agricultural Policy and Common fisheries policy; Resource efficiency initiatives etc.

Causal diagram of effects of meat and dairy consumption

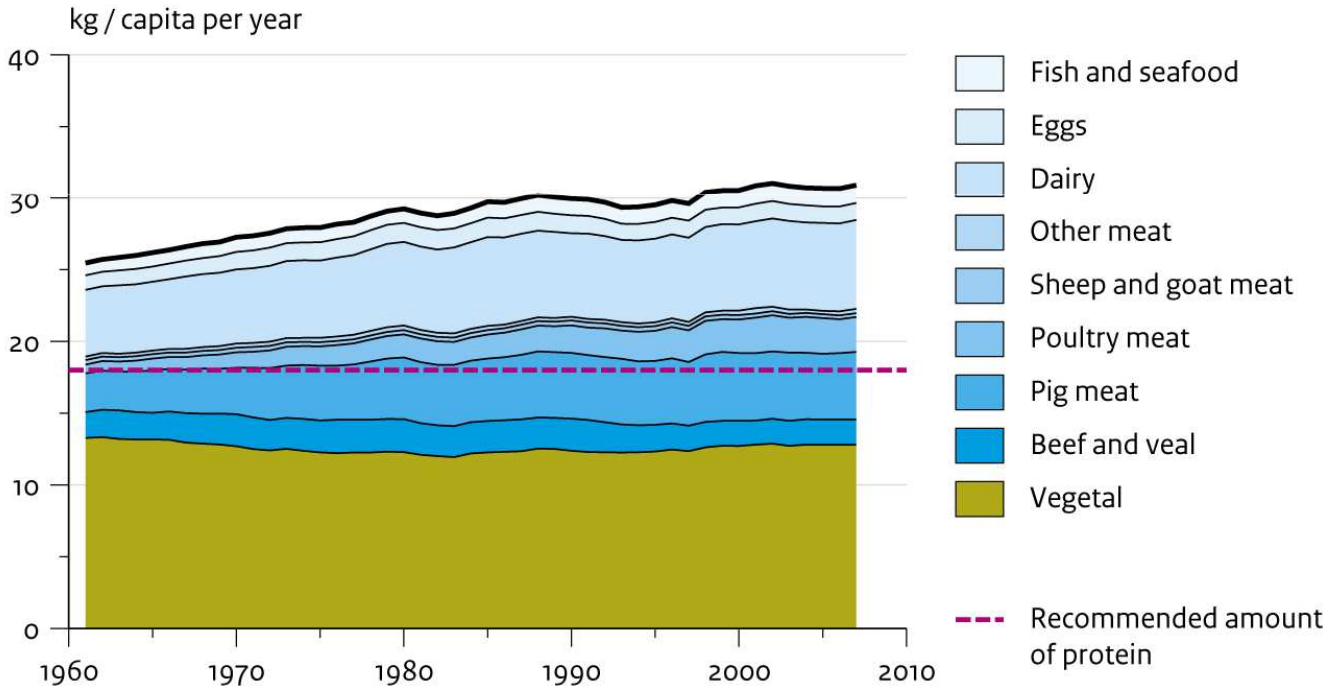


2. Consumption of animal products (global): Strong increase expected

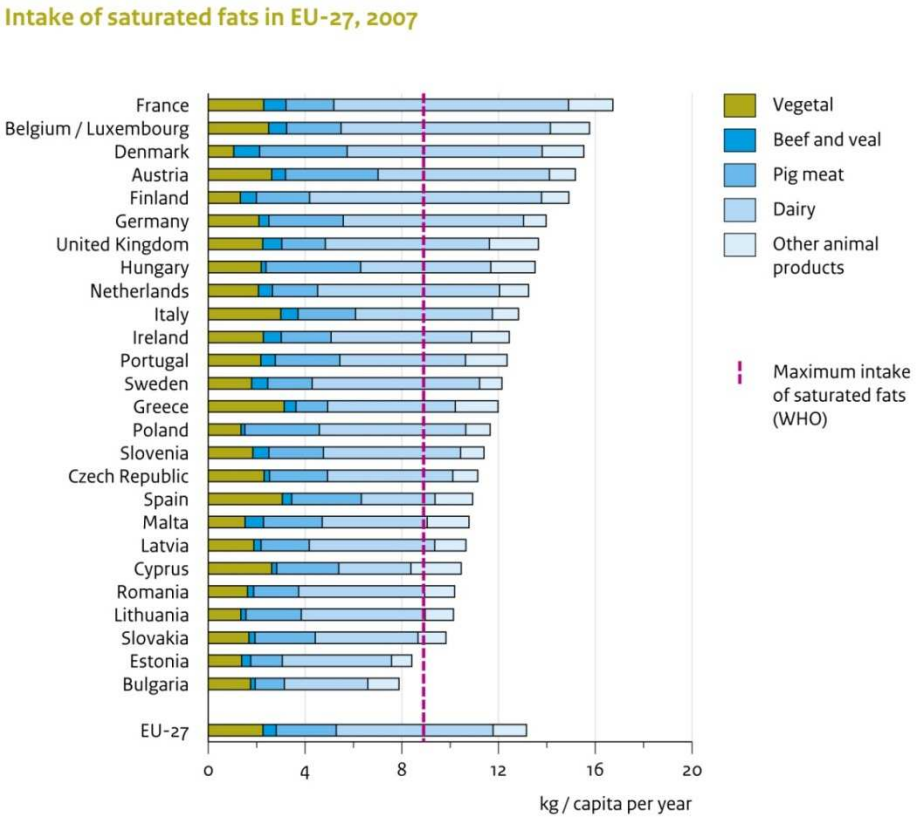


EU Consumption: 70% more protein than needed

Intake of protein in EU-27



EU Consumption: 40% more saturated fat maximum recommended intake



3. Livestock production and impacts: Feed production has a pivotal role in environmental effects

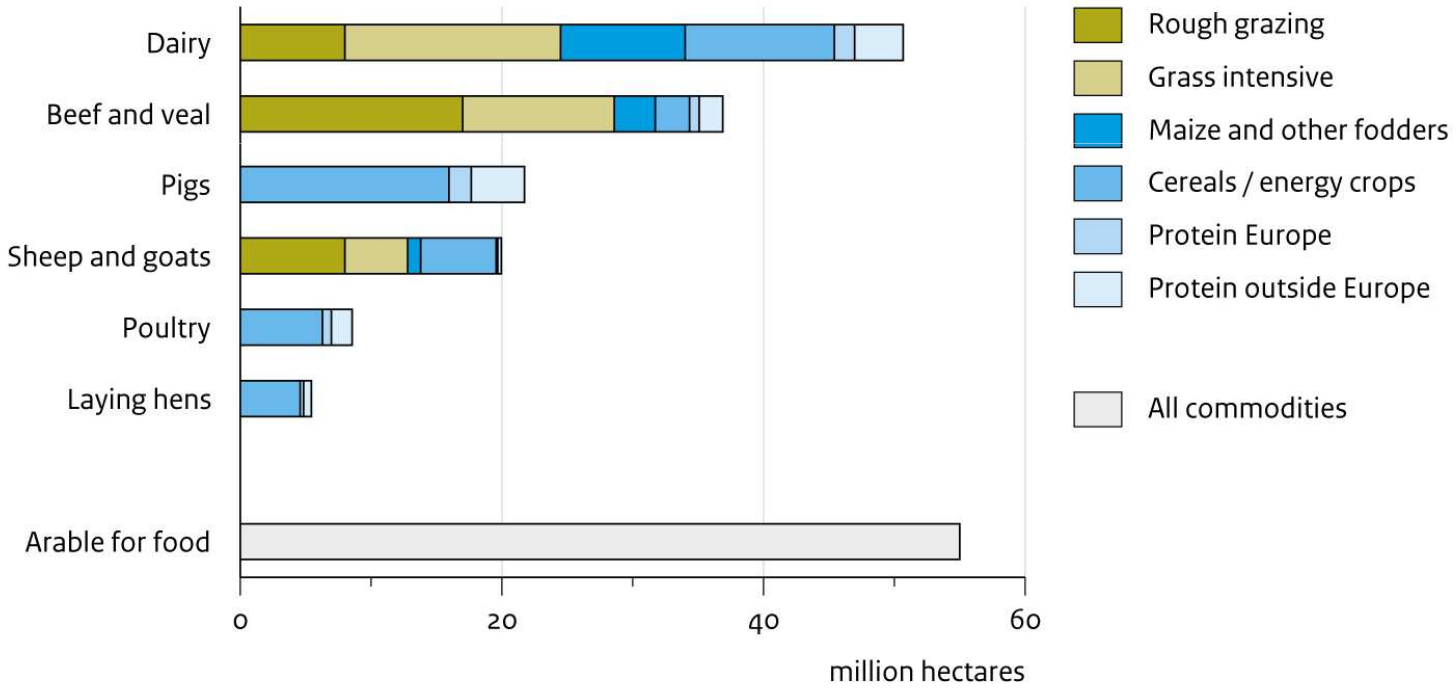
- Producing feed (including grass) requires land → loss of biodiversity
- Nitrogen fertilisers and manure -> emissions of ammonia and nitrate
- Significant share of greenhouse gas emissions are related to land use

The EU situation

- Two thirds of EU agricultural area is for livestock production: all the grasslands and half of the arable area
- About 12 million hectare outside the EU, mainly for soy production
- Each European "consumes" almost 3 kg feed (including grass) per day

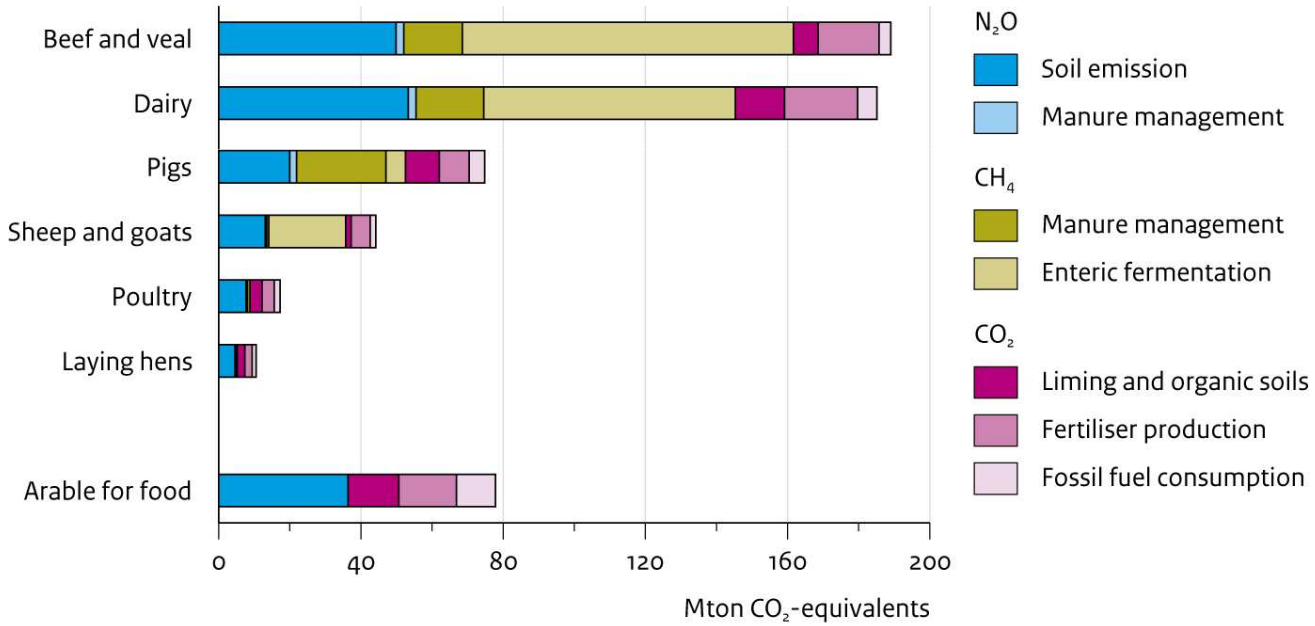
EU livestock production: beef and dairy dominant in land use

Land use per sector in EU-27, 2005



EU Livestock production: causes around 10% of EU greenhouse gas emissions

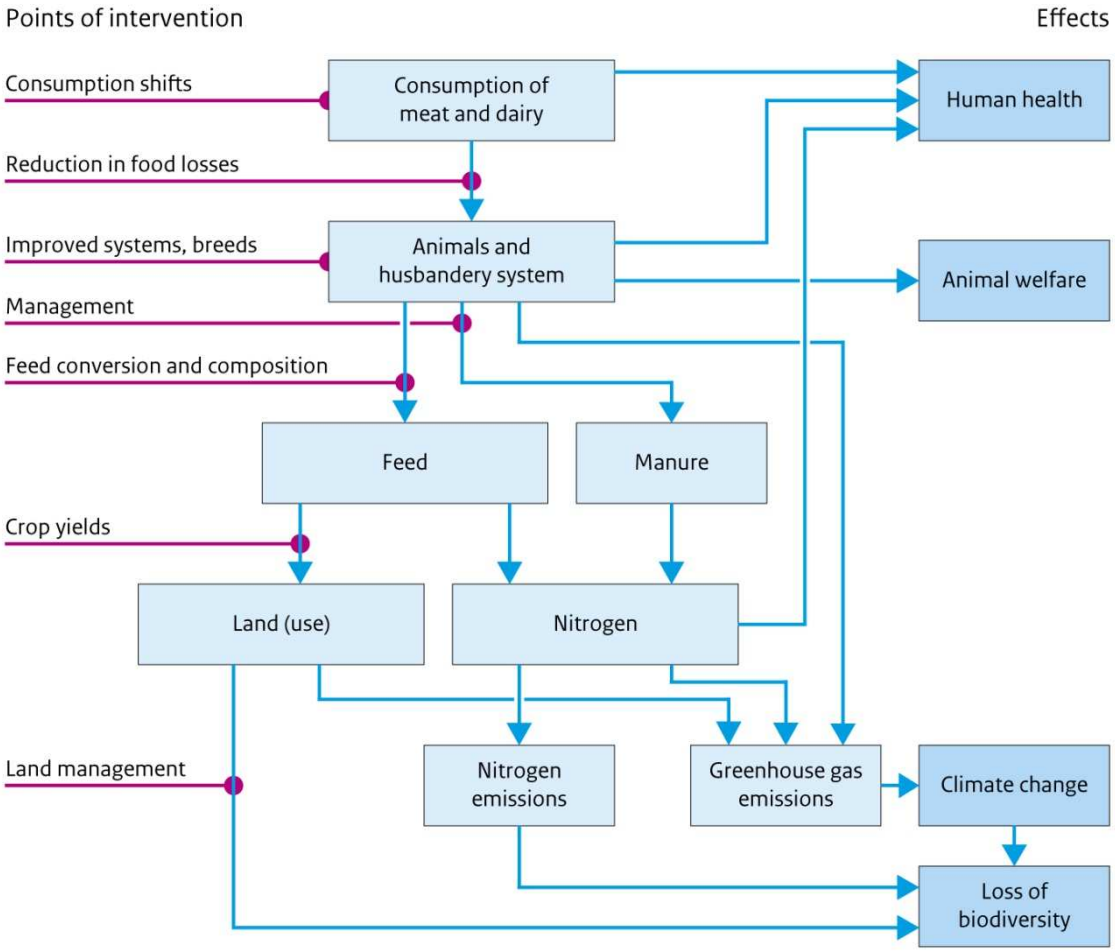
Greenhouse gas emissions per sector in EU-27, 2005



4 Options to address impacts

1. Reduction of consumption of meat, dairy and fish
2. Shift consumption to products with less impacts
3. Enhance resource efficiency

Causal diagram of effects of meat and dairy consumption and points of intervention



Assessing options to mitigate effects

Characteristics of the study:

- Global scope, with special attention to EU
- Integrated; special attention to (animal) protein demand and supply
- Analytical
- Looking into ambitious transformations
- Focus on “what if”

Options analyzed (until 2030)

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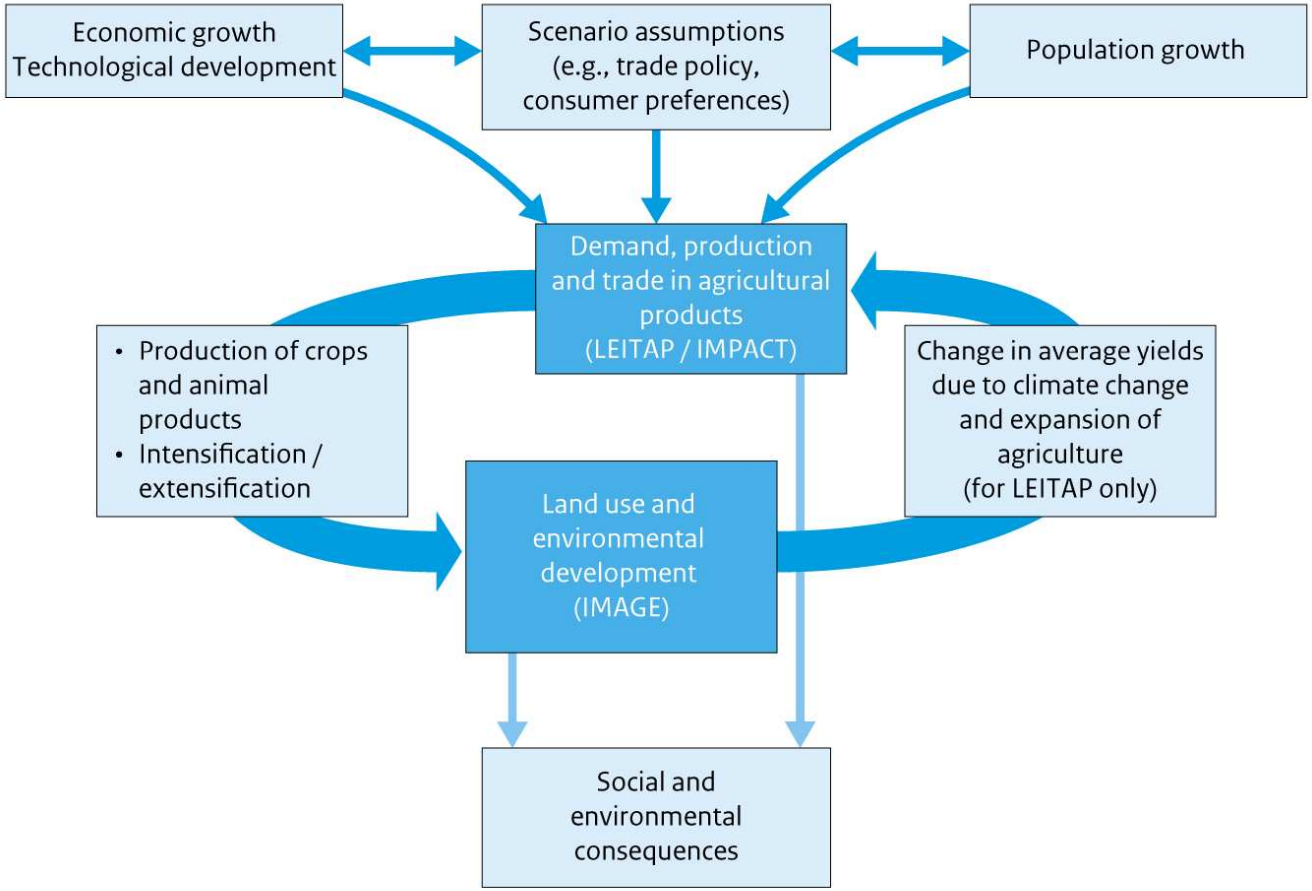
Option name		Description
Reference		-
Healthier diet	EU	• Diet conform WHO in EU27
Substitution red meat	EU	• Substitution of 40% red meat by white meat
Animal Friendly	EU	• Shift to animal friendly produced meat and dairy (EU27) – increased feed needs
-10, -20, -50% animal products	EU	• Reduced consumption of animal products
Organic	EU	• As Animal friendly + 25% organic agriculture (EU27)
Low wastage	Global	• Reduce food waste by 15% points (Global)
High crop yield increase	Global	• Increase of productivity growth of arable land by 40%
Livestock Eff increase	Global	• Livestock food conversion efficiency 15 % higher

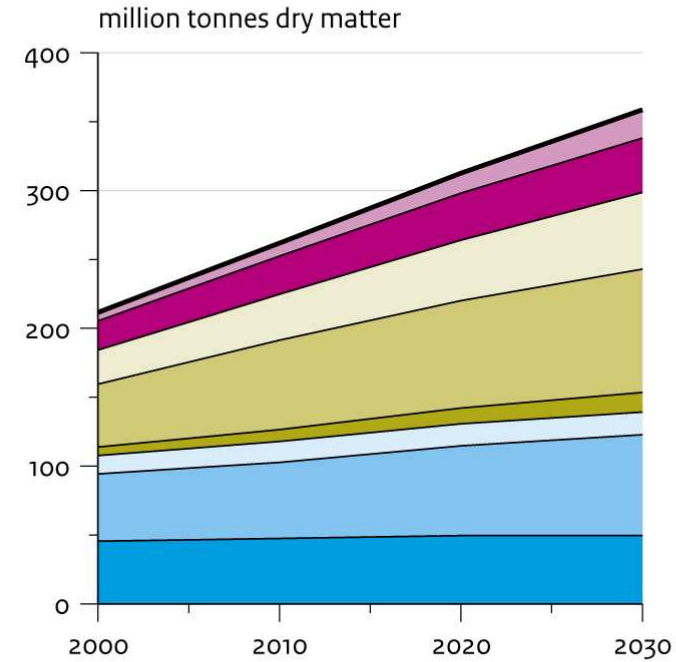
All transformations phased in until 2020

Modelling framework of LEITAP, IMPACT and IMAGE

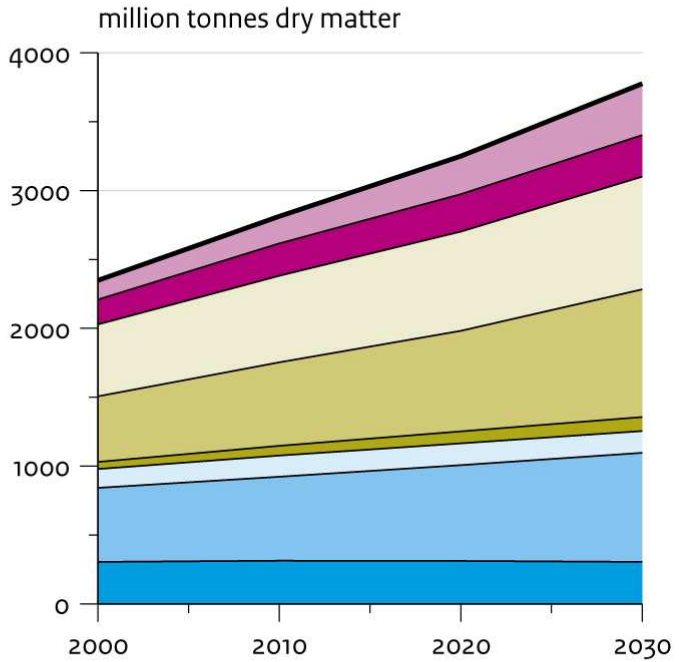


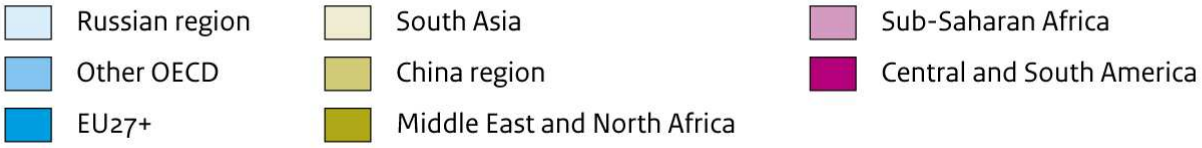
Global livestock and crop production, LEITAP calculations

Livestock production

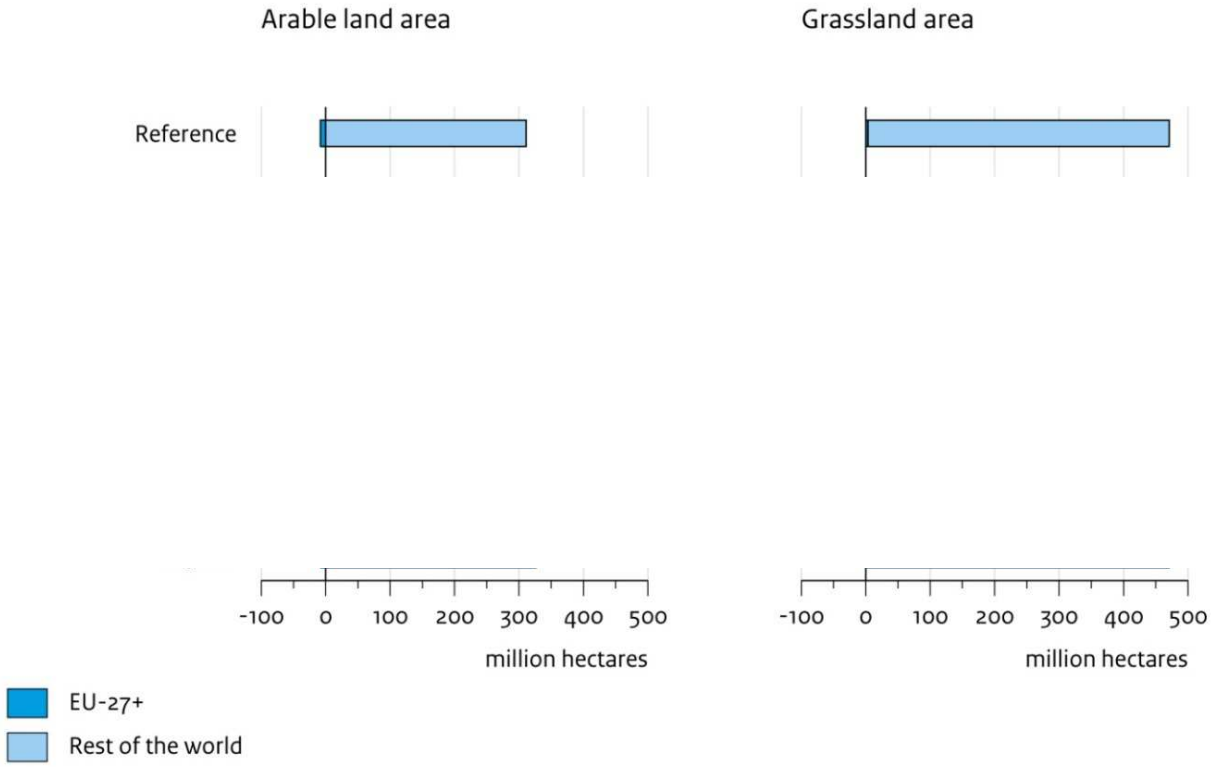


Crop production

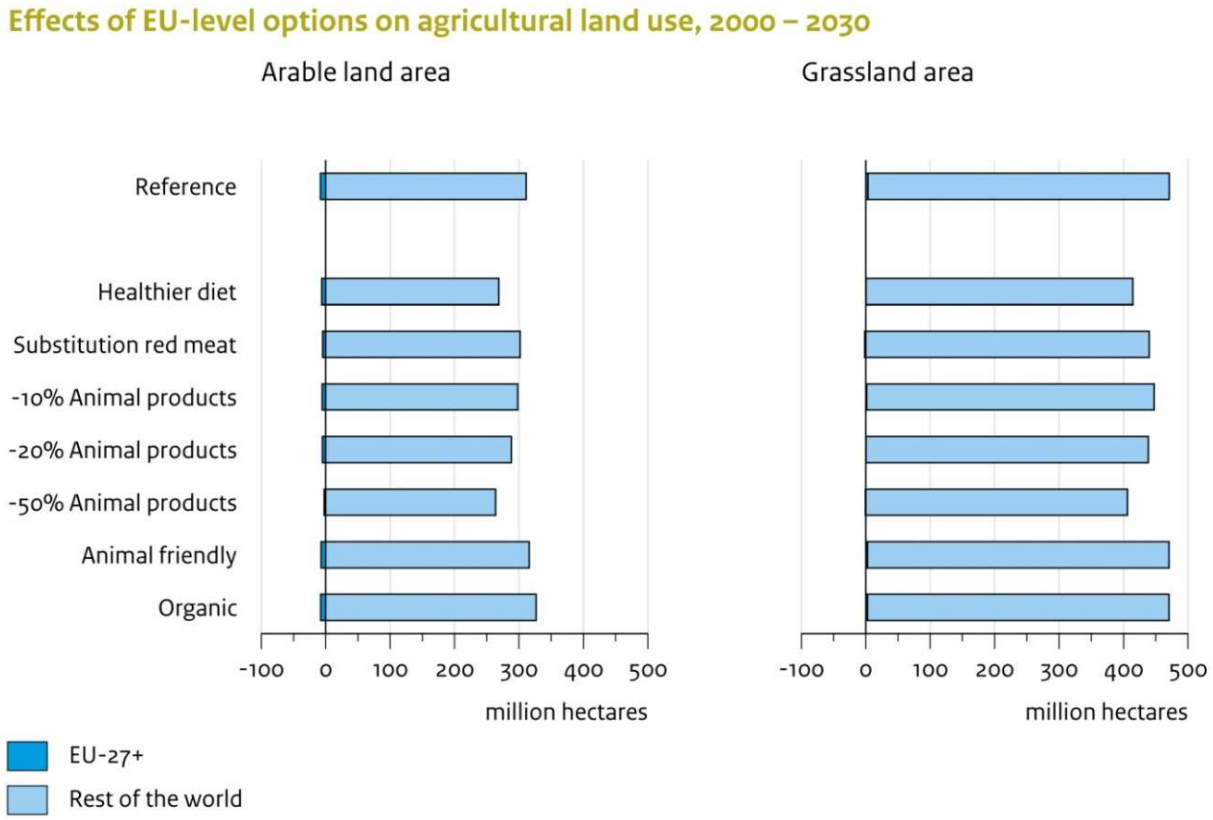




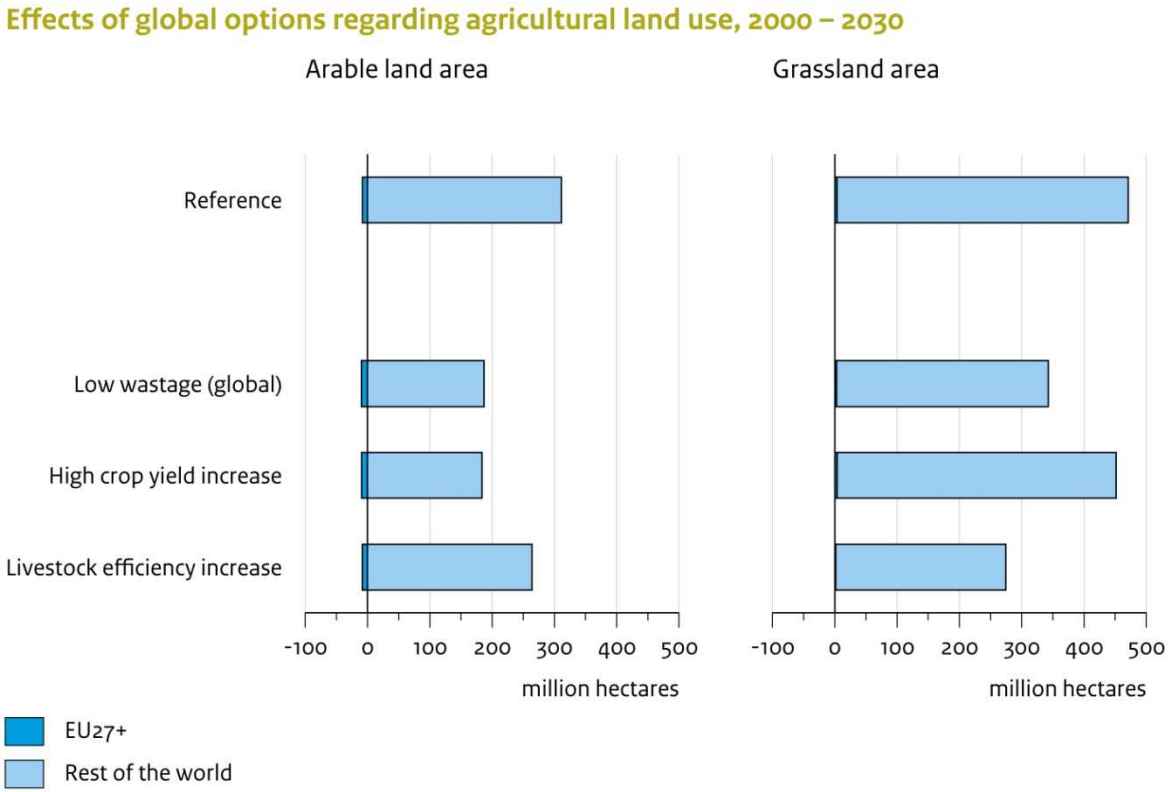
Effects of EU-level options on agricultural land use, 2000 – 2030



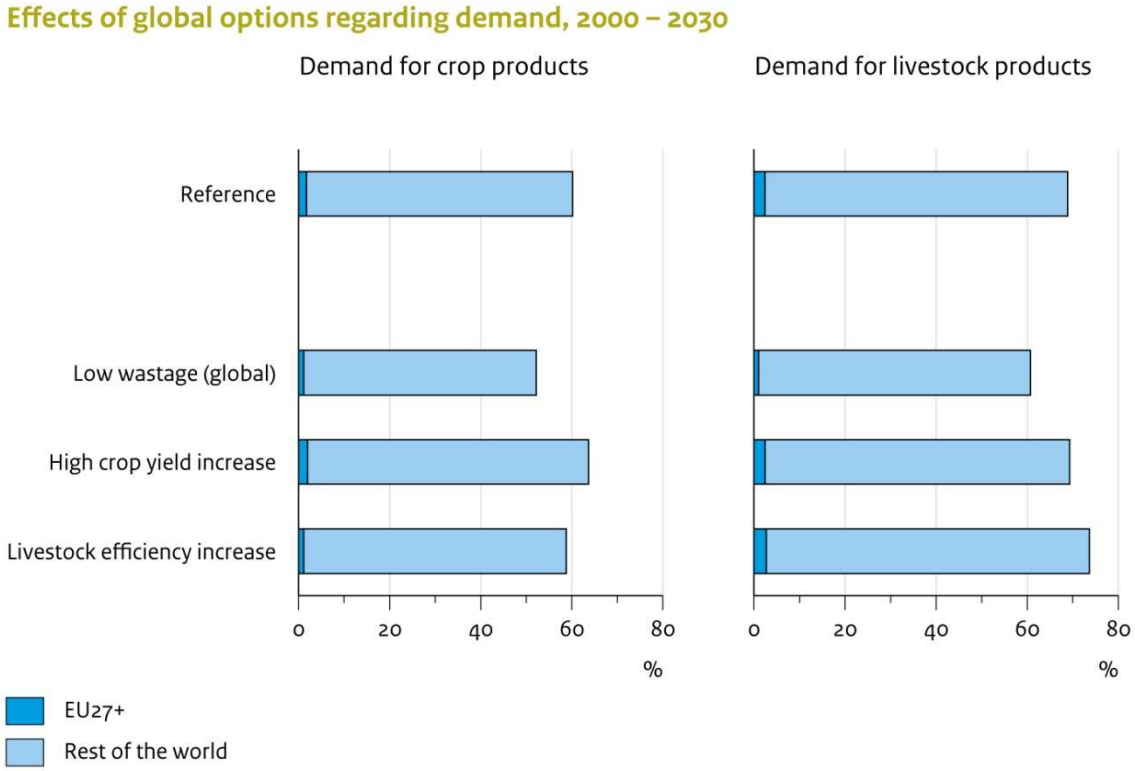
Alternatives: EU consumption options result in less land conversion outside the EU



Global options results



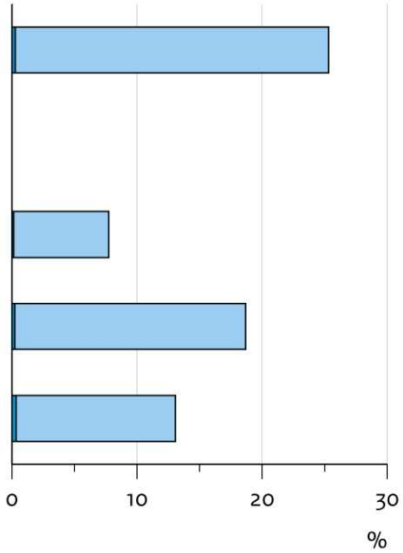
Global options results, rebound effects



6. Alternati

Effects of global options regarding the environment

Greenhouse gas emissions from agriculture and land-use change, 2000 – 2020



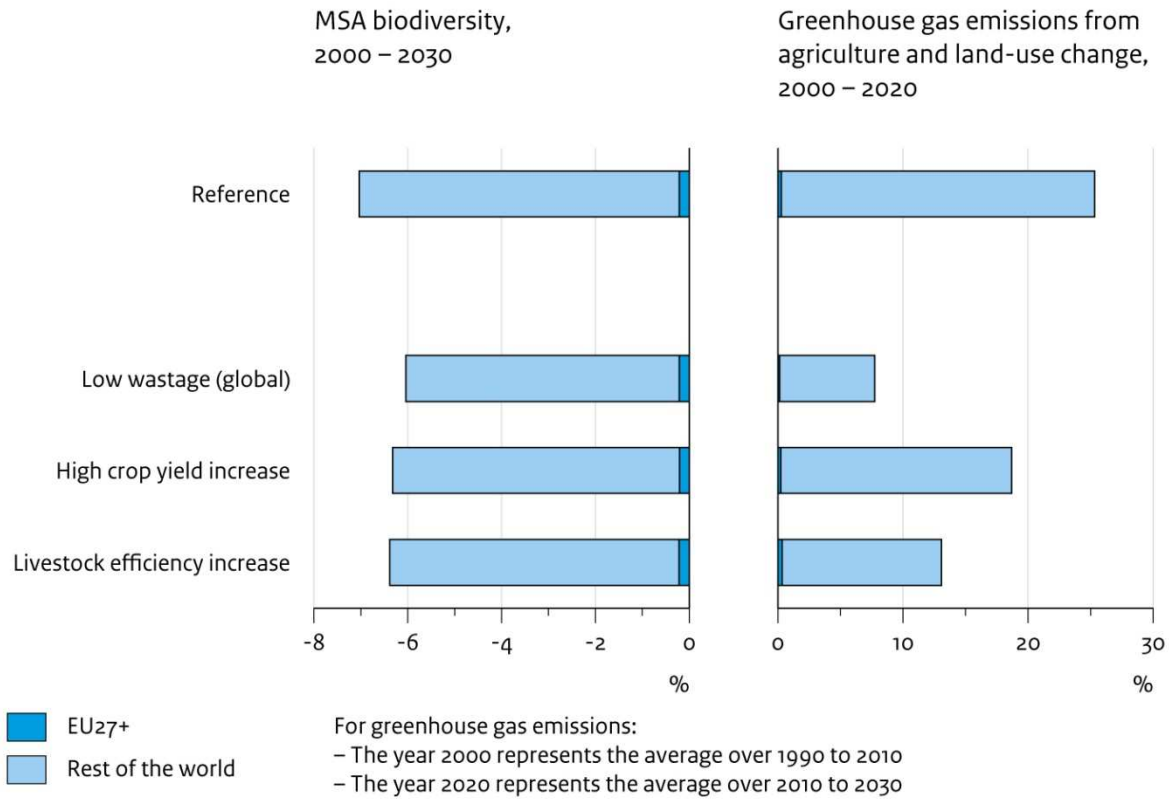
EU27+

Rest of the world

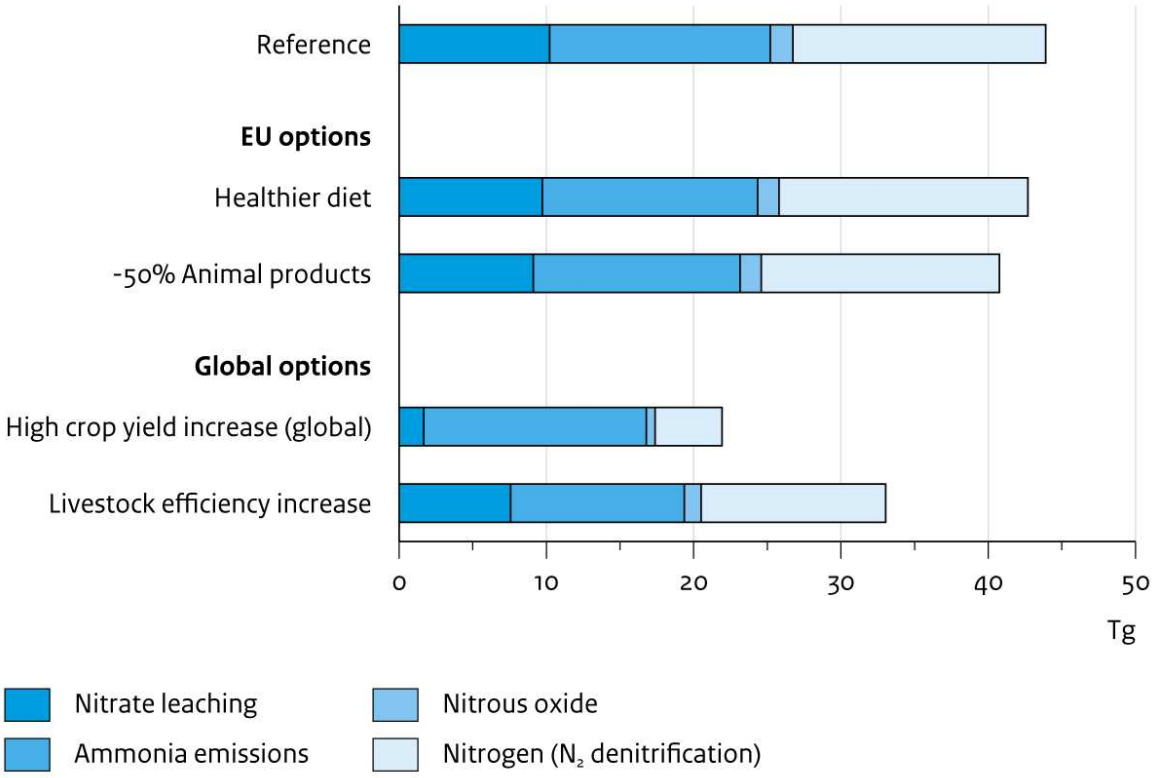
For greenhouse gas emissions:
– The year 2000 represents the average over 1990 to 2010
– The year 2020 represents the average over 2010 to 2030

6. Alternati

Effects of global options regarding the environment



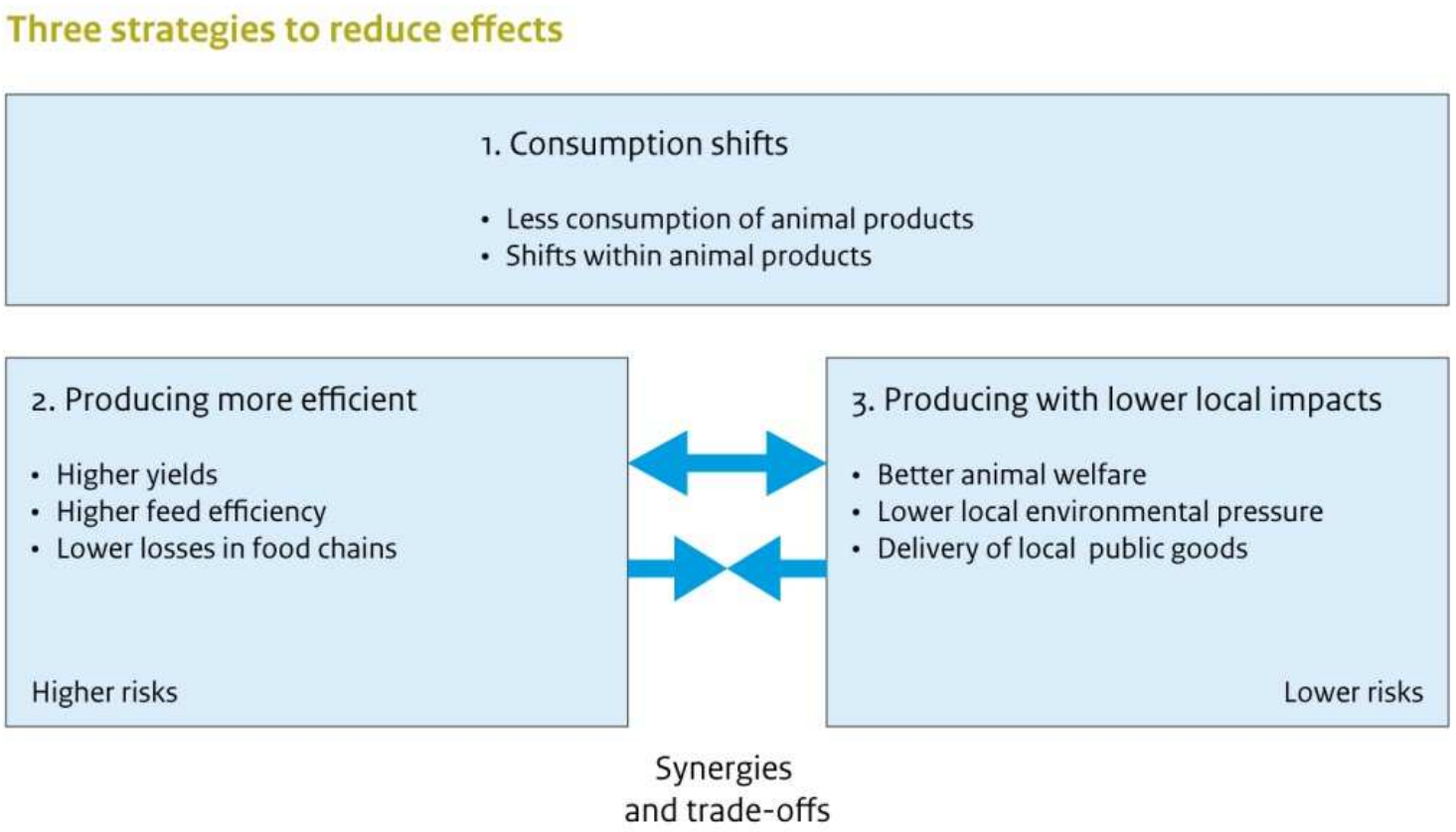
Effects of EU and global options regarding nitrogen losses, 2000 – 2030



Conclusions from the modelling analysis

- Shifts in consumption as well as resource efficiency help to mitigate negative effects
- Effects of EU options mainly outside the EU
- Substantial rebound effects - not always negative – may require accompanying measures to ensure balance

Three strategies to reduce effects



Opportunities for consumers, farmers and actors in the food chain

Consumers

- could shift to products with lower environmental impact

Retailers, food companies and farmers

- Could enlarge the offer on the shelves of more sustainable products
- In cooperation with farmers: development of new production techniques, including marketing of these products
- Business-to-business certification

Conclusions

- Global and EU livestock production have large impacts on the environment;
- A number of options exist to reduce these impacts, both at the consumption side as at the production side;
- Options to enhance resource efficiency have a large potential but accompanying measures are required;
- EU and national policies can play an important role;
  but so far there are no policies targeted at consumption and few targeted at making livestock and fisheries more sustainable
- Consumers and actors in the food chain can also act independently (in fact there are already many initiatives)

Thank you