



PBL Netherlands Environmental
Assessment Agency



Nitrogen on the Table

The influence of food
choices on nitrogen
emissions and the European
environment

*Special Report of the European
Nitrogen Assessment*

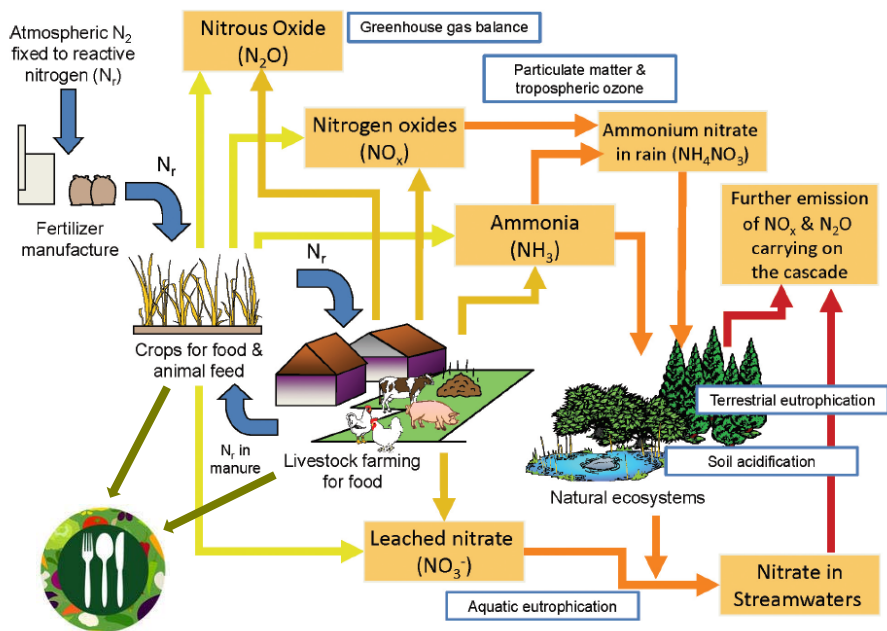
12 January 2016 | Henk Westhoek



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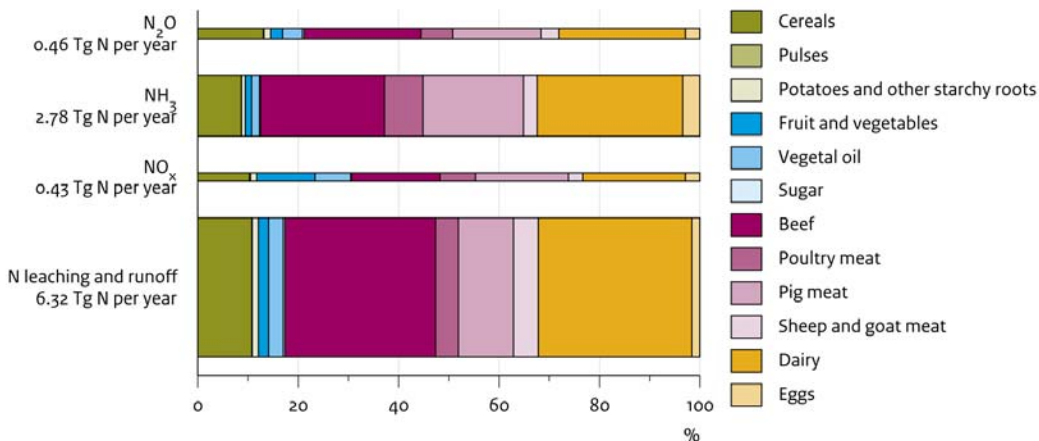
Key messages

- Only 22% of the nitrogen input into the EU agricultural system is transformed into food; the rest is lost in various forms;
- Livestock sector is responsible of 80% of agricultural nitrogen losses to the environment (mainly nitrate and ammonia);
- A 50% lower meat and dairy consumption and production would lead to:
 - EU diets more in line with health recommendations
 - Around 40% lower nitrogen emissions
 - 25- 43% lower greenhouse gas emissions
 - EU would import less soy, and export more cereals



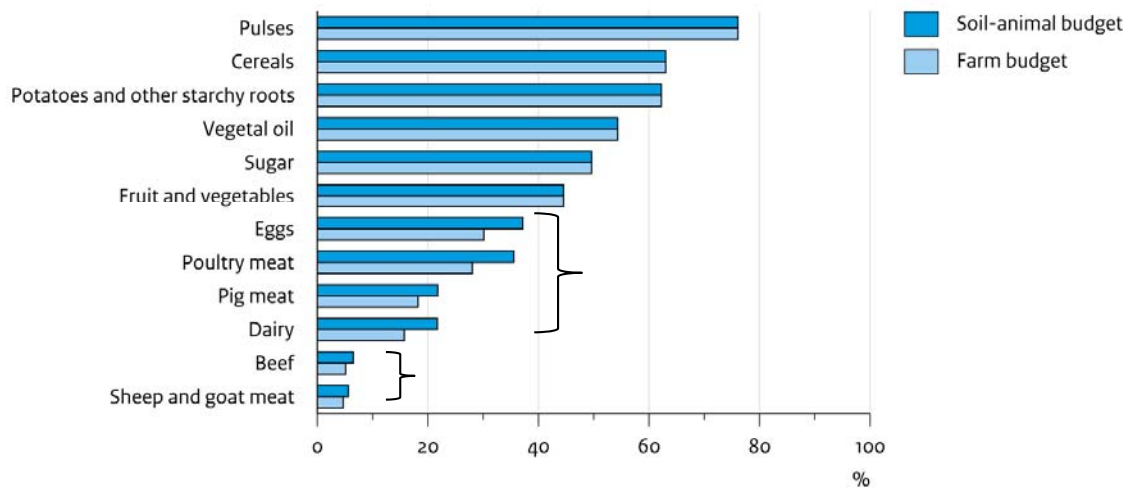
Livestock sectors dominate nitrogen emissions

Emissions of reactive nitrogen in EU27, 2004



Nitrogen use efficiency: plant-based larger than animal

Nitrogen use efficiency in EU27, 2004

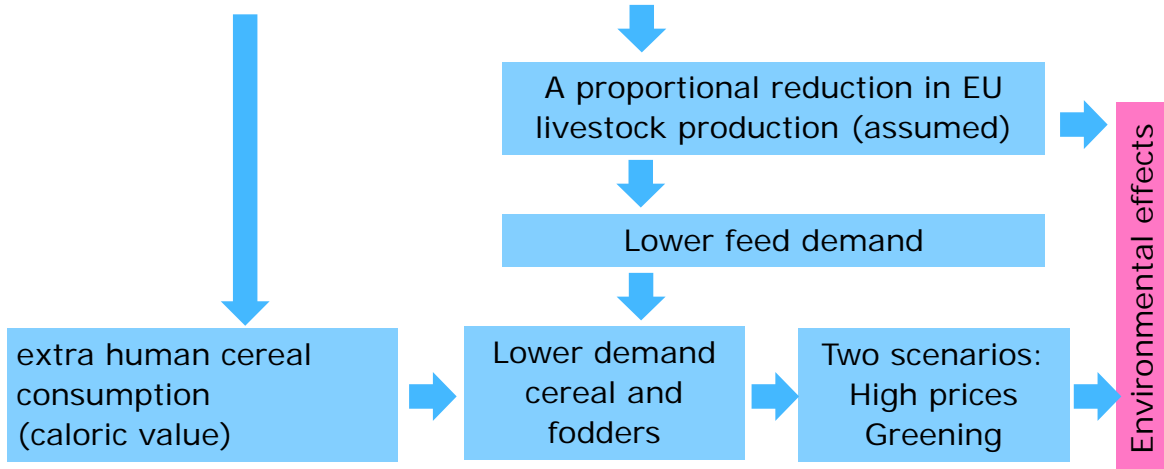


2. What would happen if consumers reduced meat and dairy consumption by 25- 50%?



25 to 50% reduction of consumption of

- *beef and dairy*
- *pig and poultry*



Health benefits: lower intake of saturated fats as well as of red meat

Per capita intake of saturated fat in EU27

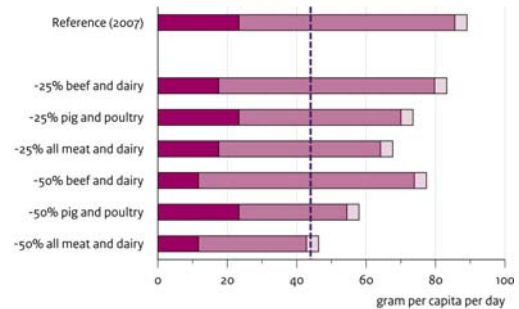
Reference, 2007



Alternative diet (minus 50% meat and dairy)



Intake of red meat in alternative diets in EU27



Major environmental effects of minus 50% meat and dairy consumption

- Around 40% lower nitrogen emissions from EU agriculture
- Soy import could be reduced by 75%
- Freeing up land-use for other purposes

Greening scenario

- 43% lower greenhouse gas emissions from agriculture
- bio-energy production; extensification of land use

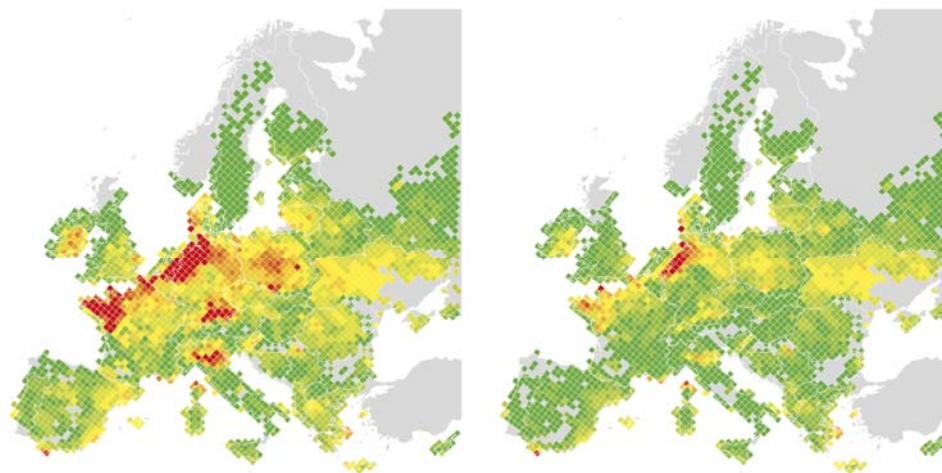
High prices scenario

- 25% lower greenhouse gas emissions
- EU becomes a major exporter of cereals, increase from ~5 to max 170 million tonnes per year

Exceedances of critical loads for eutrophication

Reference, 2009

Alternative diet (minus 50% meat and dairy)



Equivalents nitrogen per hectare and year



Large effect on nitrogen deposition
through reduced ammonia emissions

Would changes in diets be realistic?

Consumption side: Diets are far from static:

- Large differences in meat consumption patterns within Europe:
 - Some countries around 45 kg per capita (Sweden,)
 - Other countries over 60 kg per capita (Spain, Austria)
- Large historic changes
 - Poultry meat in EU: factor 3 increase 1960 – 2000
 - E.g. Spain: pig meat factor 4 increase 1970 – 1995
- Movements in various countries to reduce meat consumption

Potential effect of lower meat and dairy consumption on farmers

- Higher consumption of fruits and vegetables → higher revenues for crop farmers.
- In pig and poultry production: higher animal welfare → 20% lower production with same or even higher revenues for farmers.
- Role of EU policies (e.g. CAP) in supporting transformation?





In conclusion:

- Food choices do matter, both for human health as well as for the environment
- Health:
 - Shift to plant-based products means lower intake of saturated fat and red meat
- For the environment: multiple positive effects:
 - lower nitrogen emissions (ammonia, nitrate, nitrous oxide)
 - lower greenhouse gas emissions
 - land use savings; lower import of soy /production bio-energy
- Global food security: higher export of cereals – lower import of soy