

Nitrogen - Can an integrated approach be hosted under the CLRTAP?

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Outline

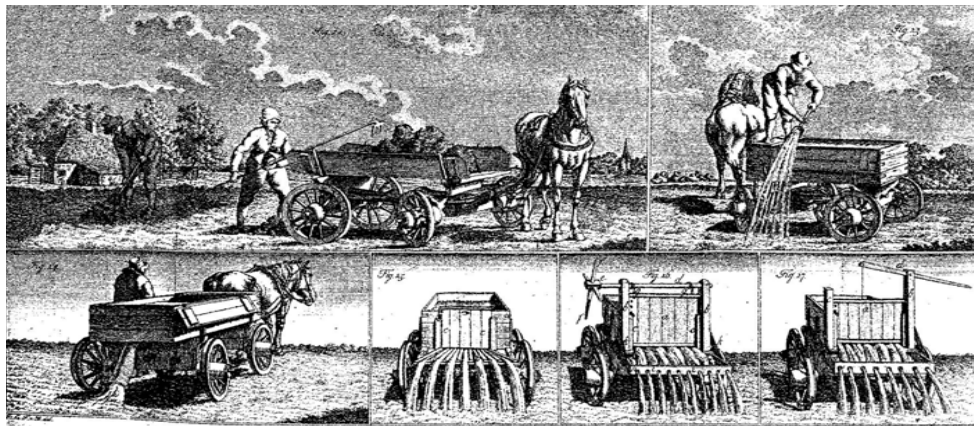
- Why Nitrogen:
 - The key issues
 - Creation of reactive N
 - The main effects
- The International Nitrogen Initiative
- CLRTAP and Nitrogen

Natural sources of reactive nitrogen



Historical development

Closed nutrient cycles



Manure = food

Fertilizer



Increased
production



Intensive livestock
breeding

All organisms depend on Nitrogen



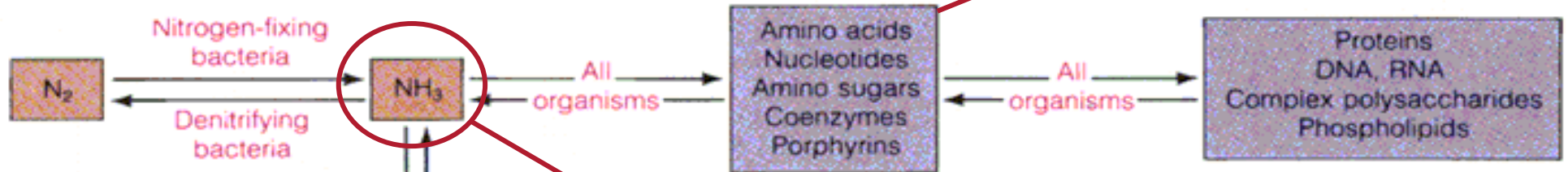
Insufficient protein in the diet may prevent the body from producing adequate levels of peptide hormones and structural proteins to sustain normal bodily functions

40% of the world population exist because of fertilizers.

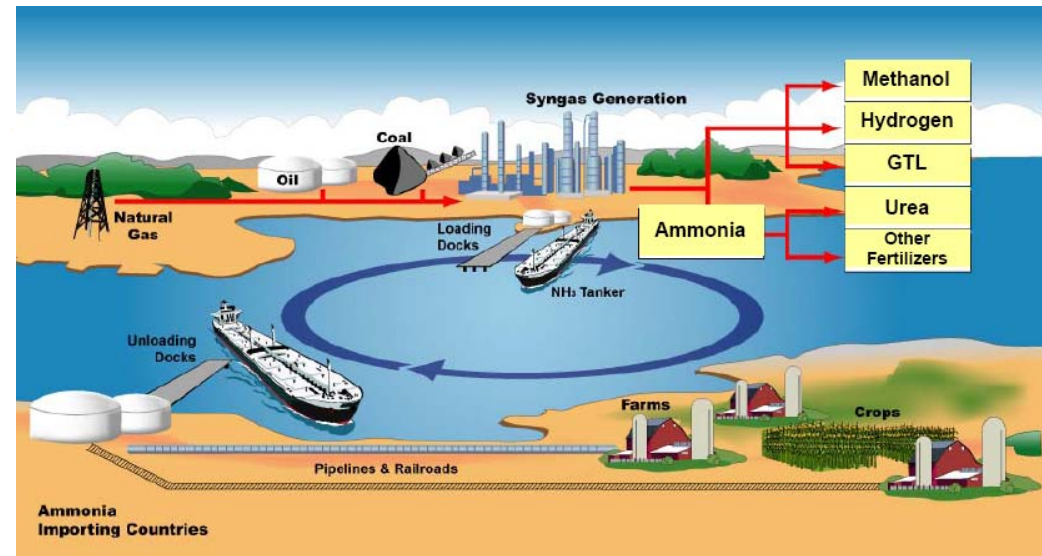
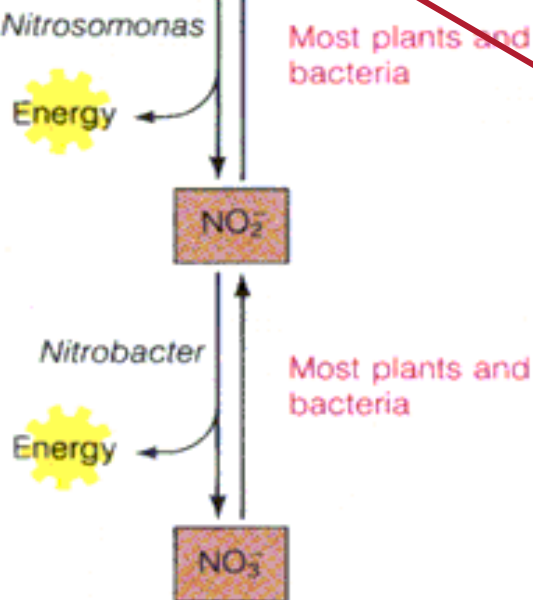


..... too little too much

Key issues: life and production

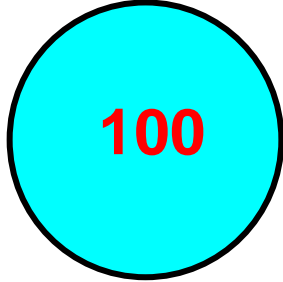


World production (2004): 142 Millions MT/year

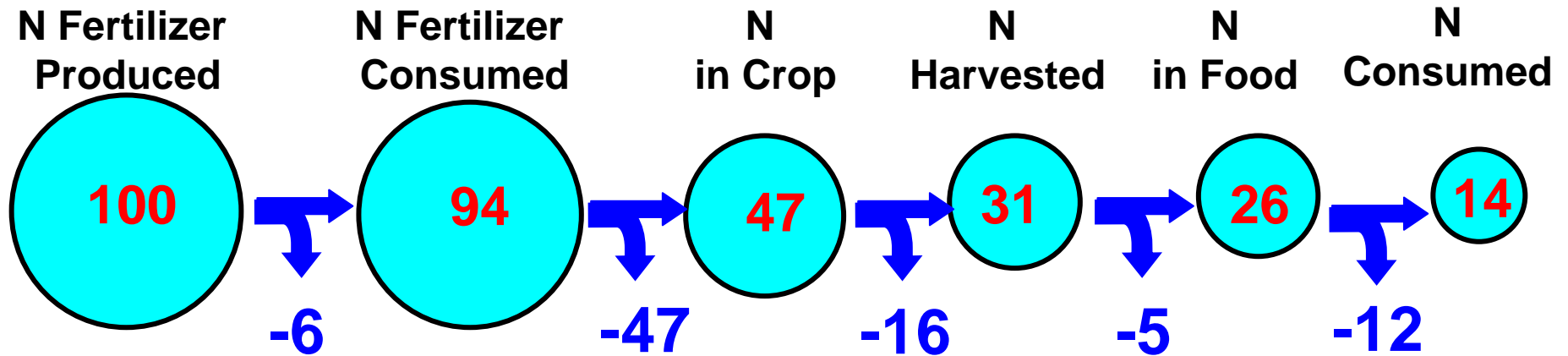


The fate of fertilizer Nitrogen

N Fertilizer
Produced

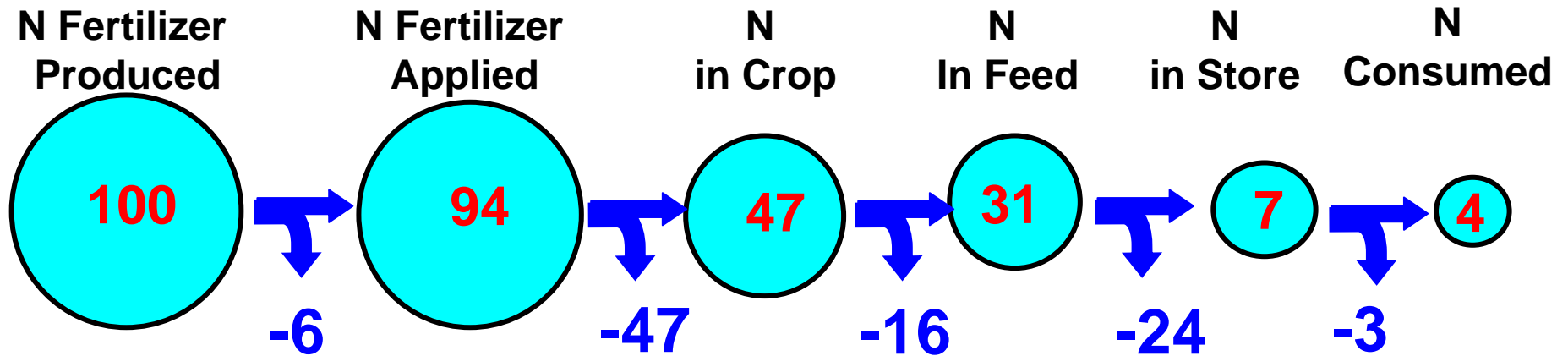


The fate of fertilizer Nitrogen



14% of the N produced in the Haber-Bosch process enters the human mouth.....if you are a vegetarian.

The fate of fertilizer Nitrogen



4% of the N produced in the Haber-Bosch process and used for animal production enters the human mouth.

Key issues: we love energy

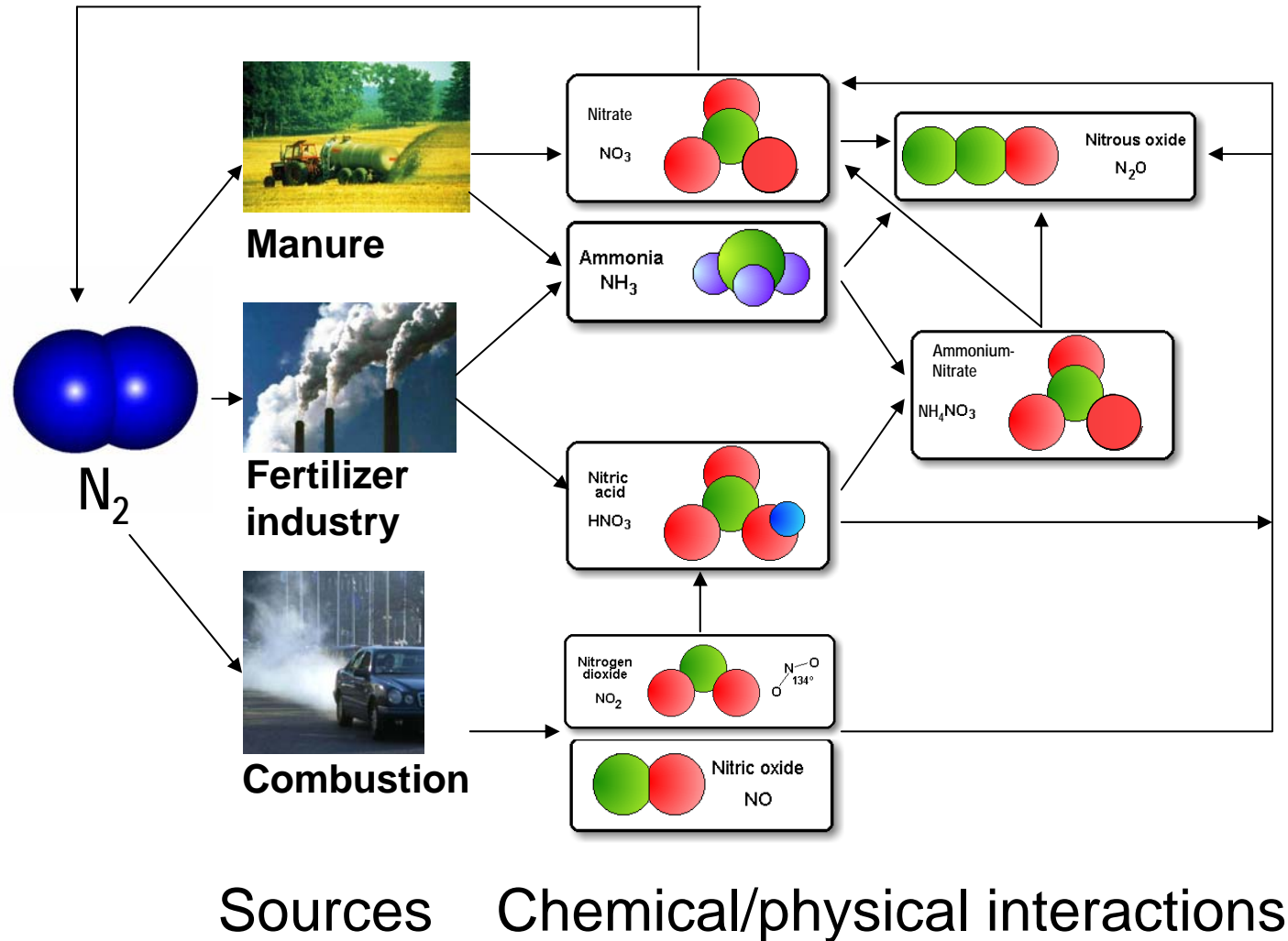


Fossil fuels and nitrogen

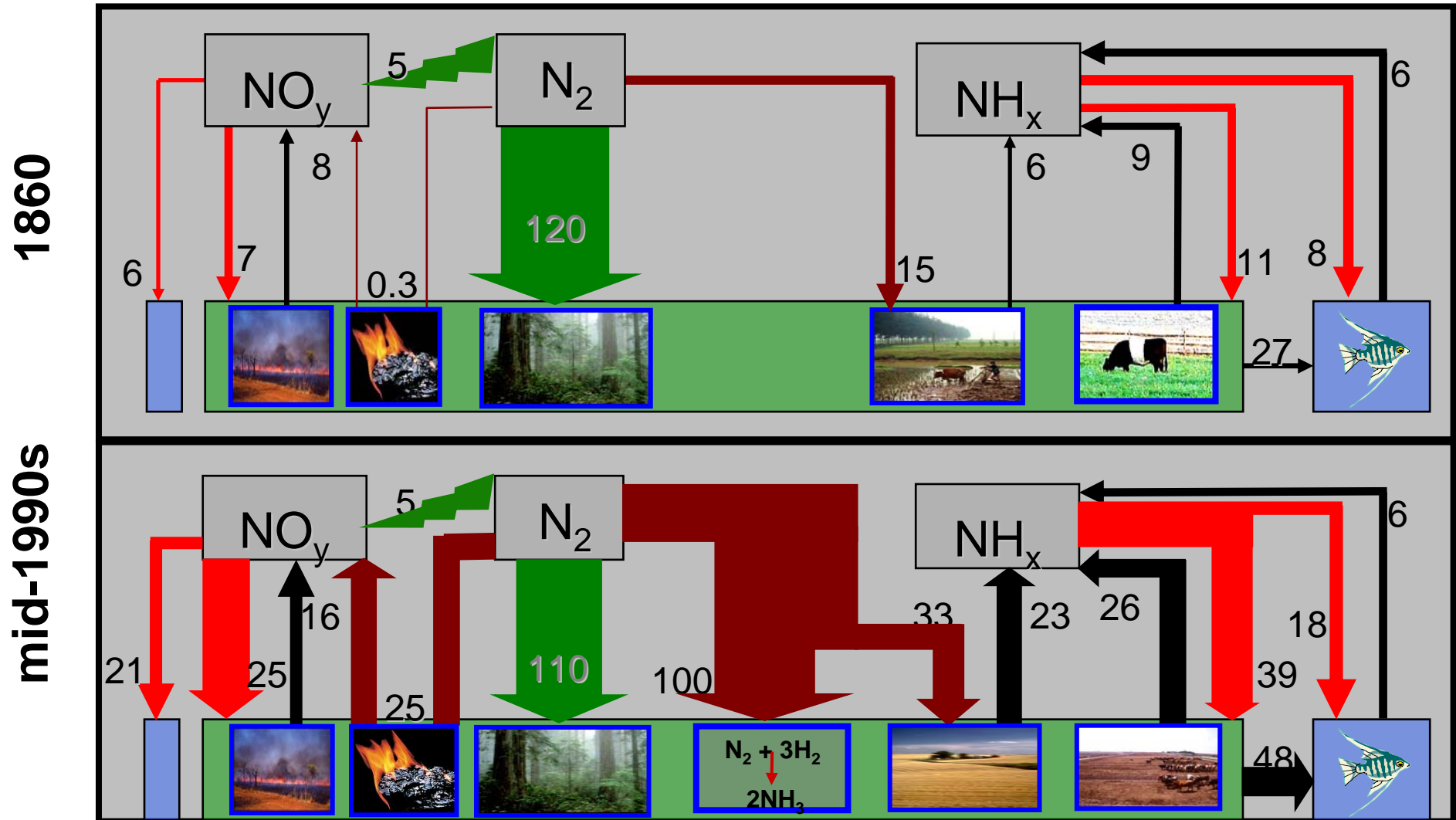
- NO_x emissions from combustion
- Fertilizer production
- Globalisation through transport
- Increased production through increased manpower



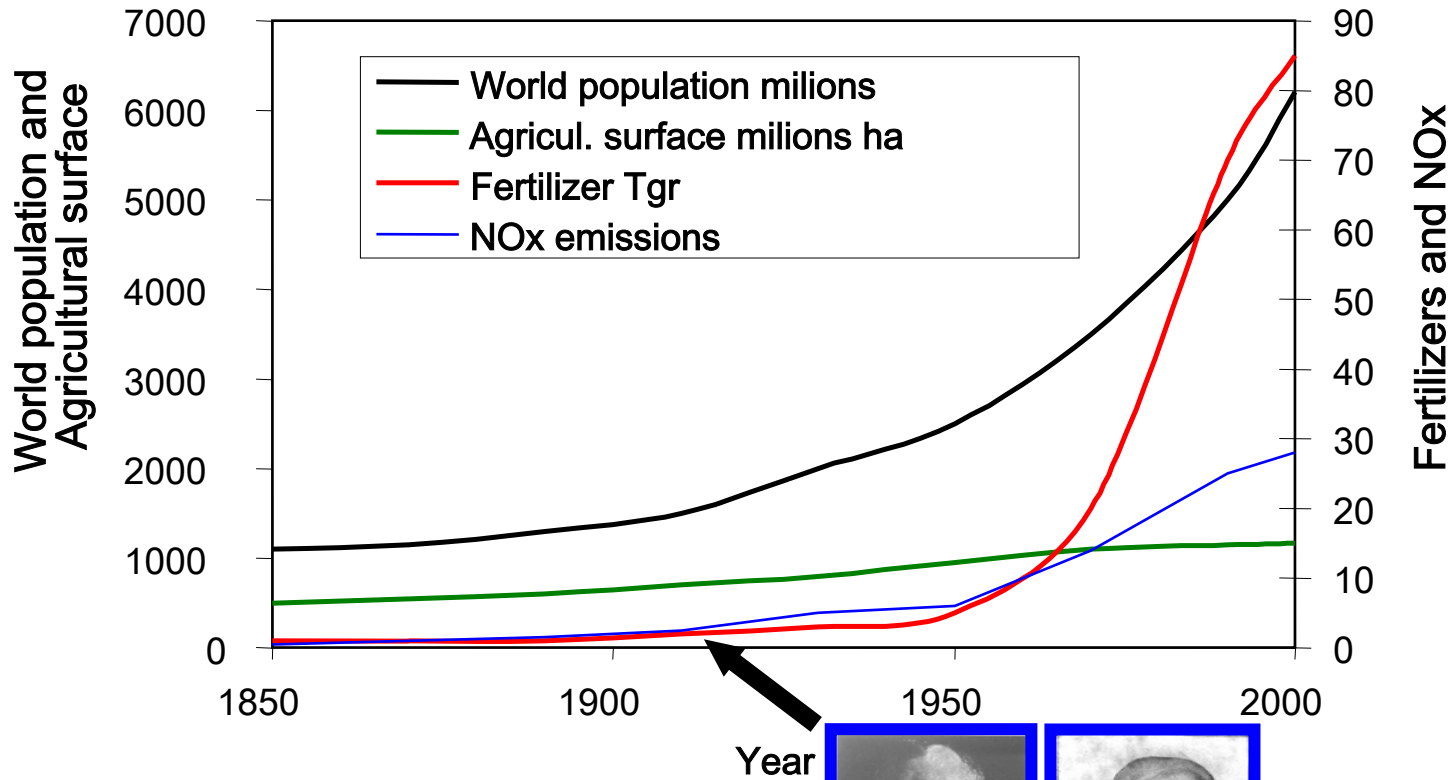
Nitrogen pollution starts with N_2



The Global Nitrogen Budget in 1860 and mid-1990s, TgN/yr



N = food; Energy = N



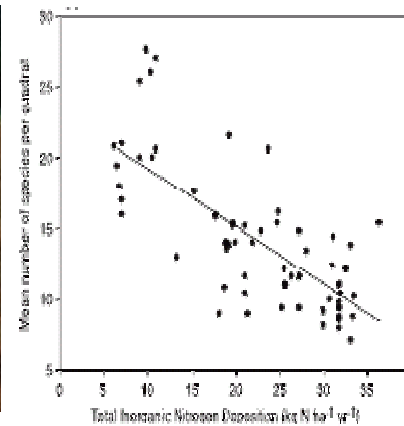
Year



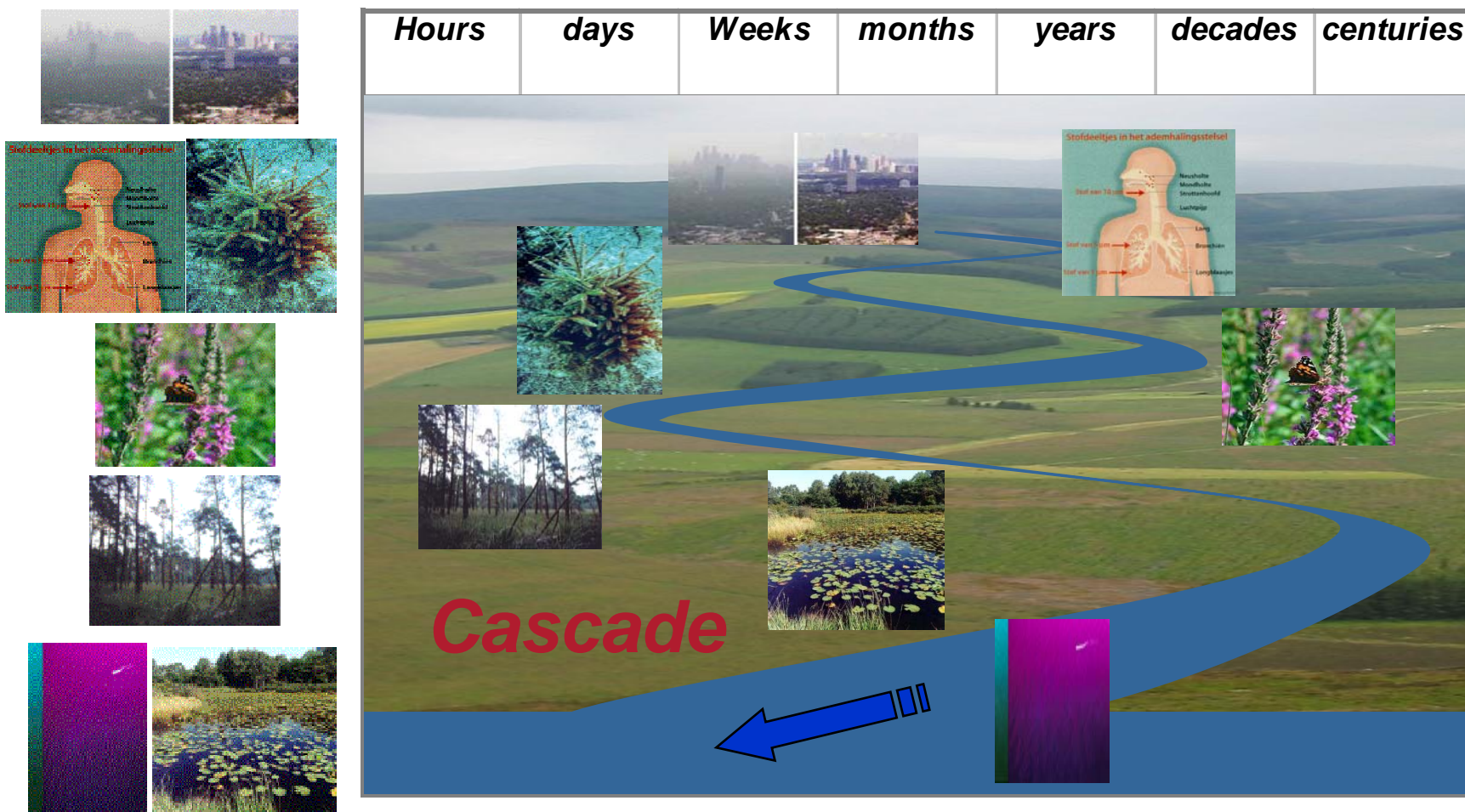
Carl Bosch Fritz Haber



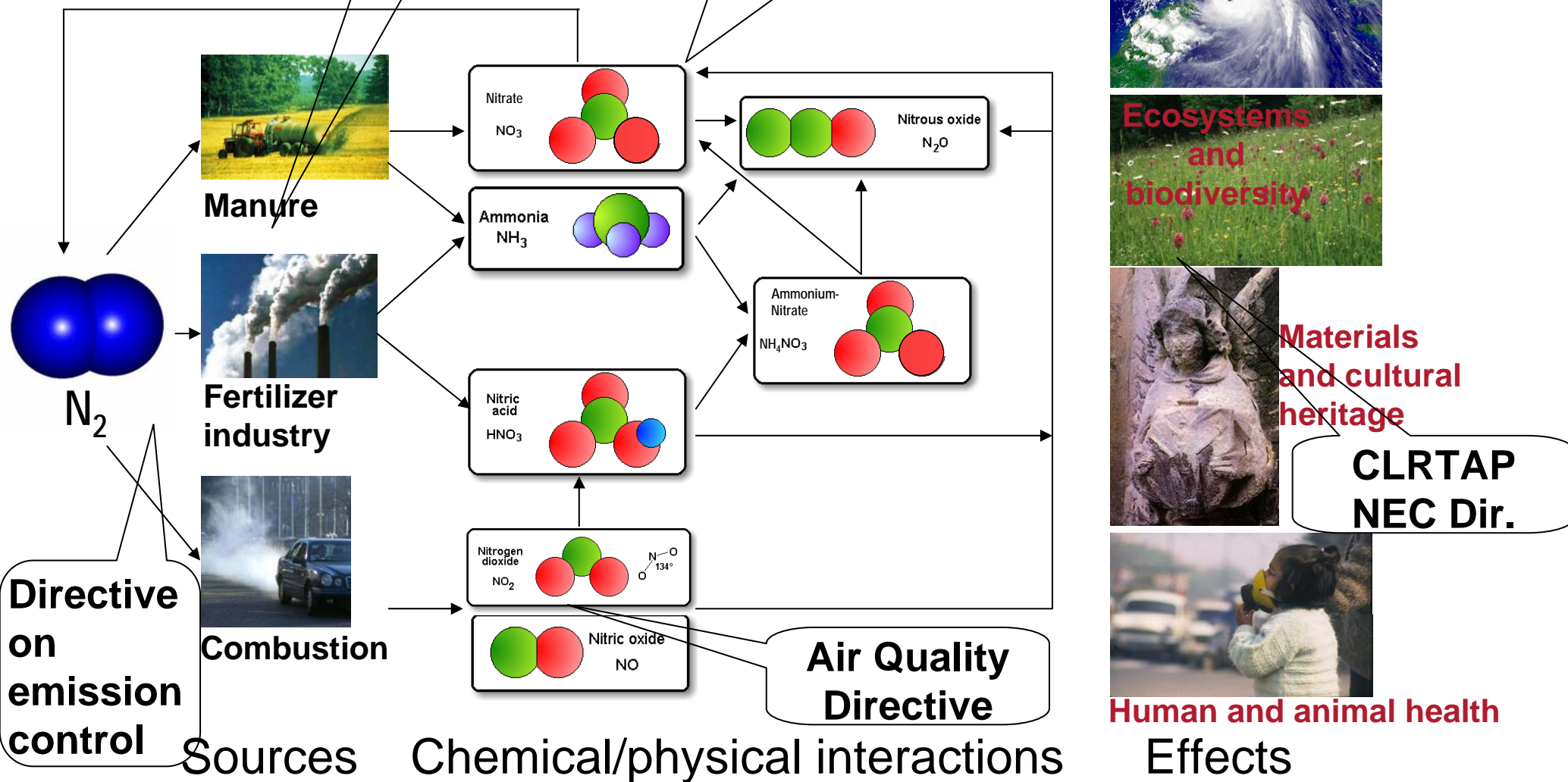
Effects of reactive nitrogen in the environment



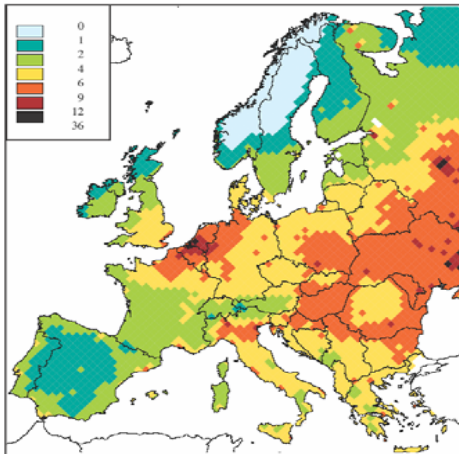
Cascade effect of reactive nitrogen



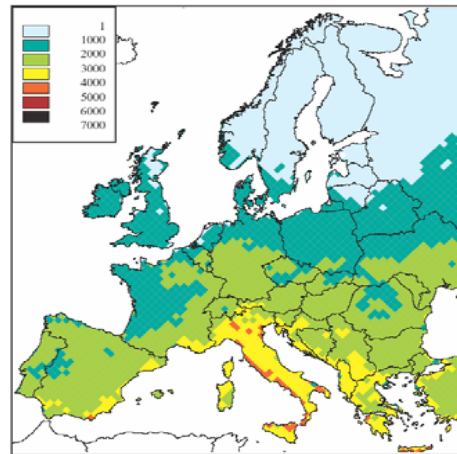
Nitrogen pollution: integral approach



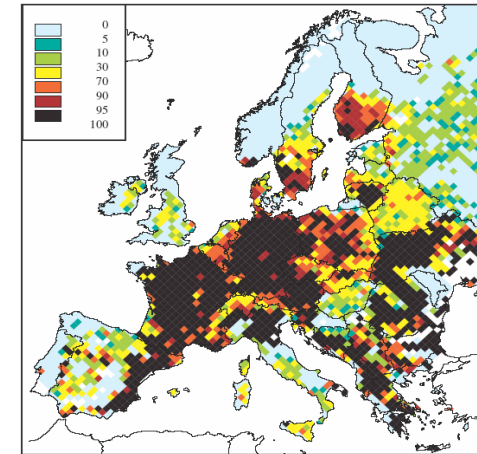
Remaining problem areas in 2020; Light blue=no risk



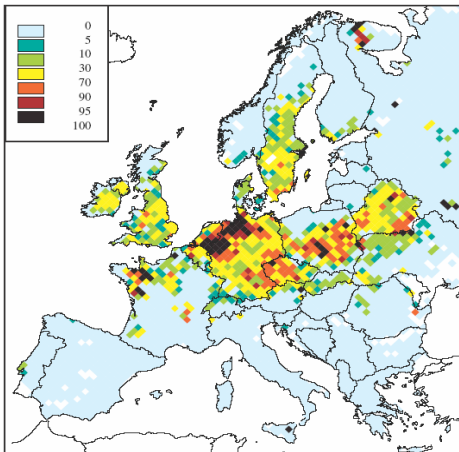
Health - PM



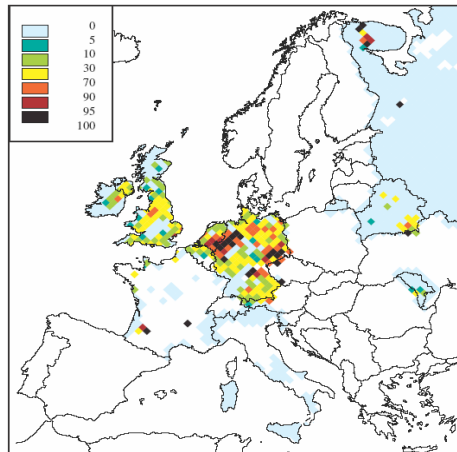
Health+vegetation - ozone



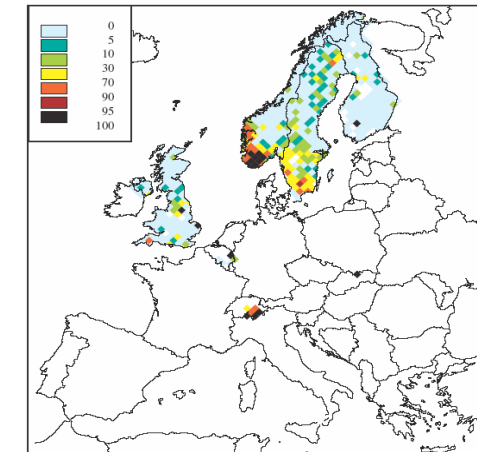
Vegetation – N dep.



Forests – acid dep.



Semi-natural – acid dep.
Energy research Centre of the Netherlands



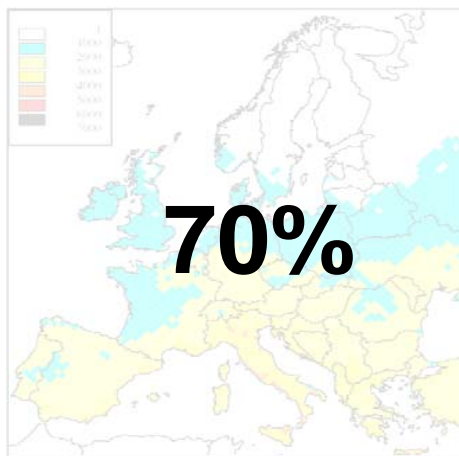
Freshwater – acid dep.
www.ecn.nl

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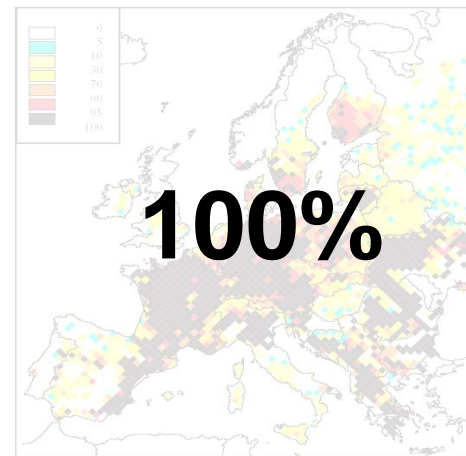
Remaining problem areas in 2020; The role of N?



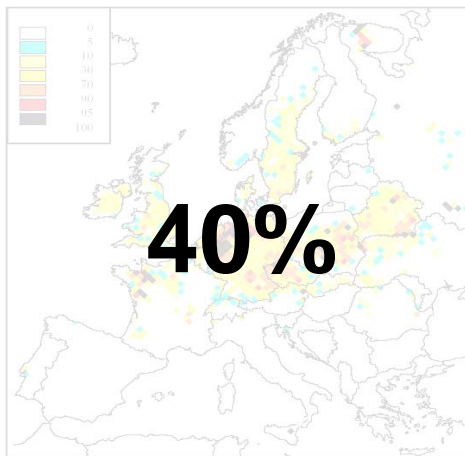
Health - PM



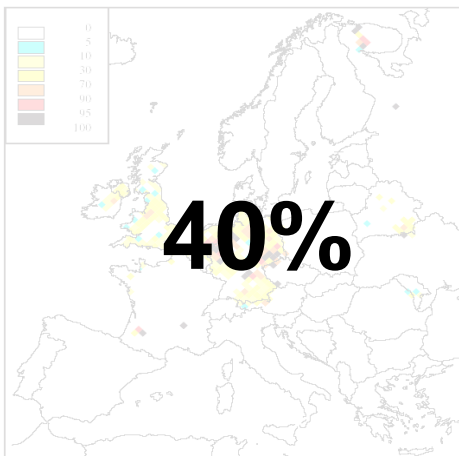
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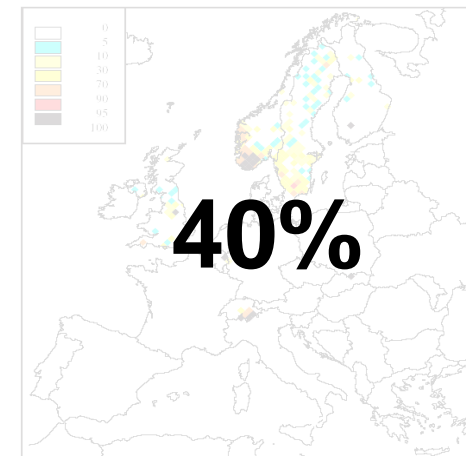
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International Nitrogen Initiative



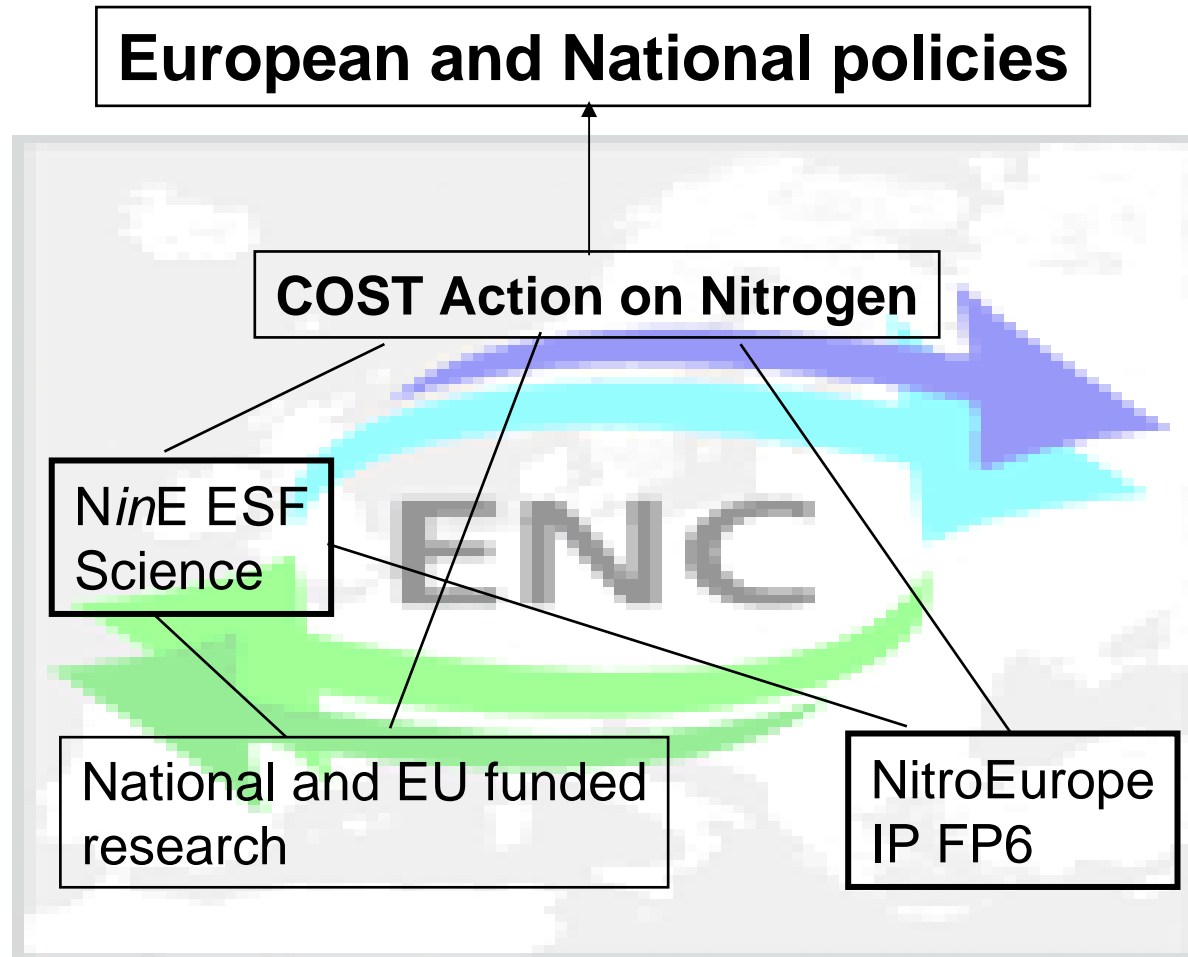
The graphic is a 2x2 grid. The top-left quadrant shows a hand holding a small green plant with soil. The top-right quadrant has a blue background with the word 'Minimize' in large white letters, followed by the text 'the negative effects of nitrogen on human health and the environment' in smaller white letters. The bottom-left quadrant has a blue background with the word 'Optimize' in large white letters, followed by the text 'the beneficial role of nitrogen in sustainable food production' in smaller white letters. The bottom-right quadrant has a blue background with a white square containing the 'ini' logo (two curved arrows, one blue and one green, around the letters 'ini'). Below the logo is the URL 'http://www.initrogen.org' in red text.

Minimize
the negative effects of nitrogen
on human health and the environment

Optimize
the beneficial role
of nitrogen
in sustainable
food production

ini
<http://www.initrogen.org>

European Nitrogen Centre

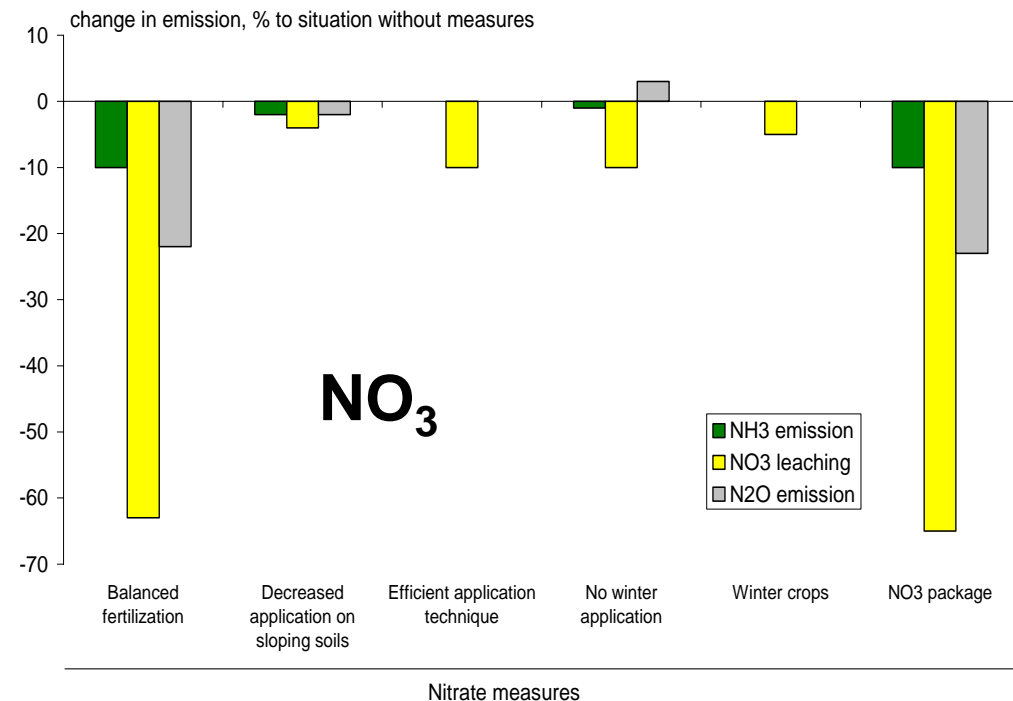
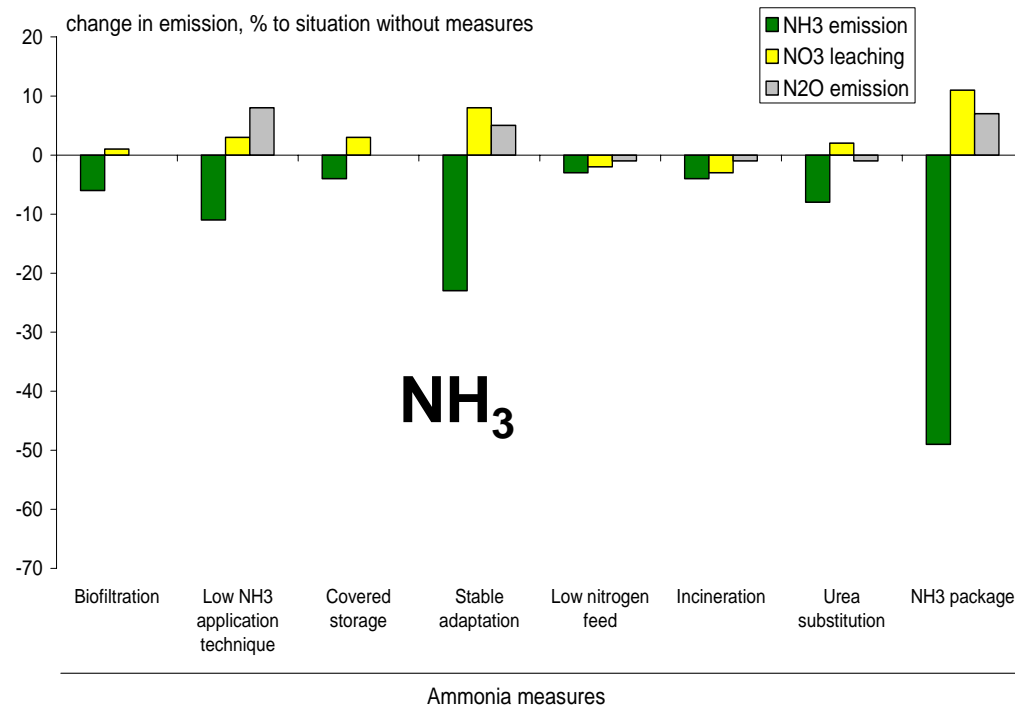


Integrated Assessment,
Policy support

European Nitrogen
Assessment
Scientific coordination

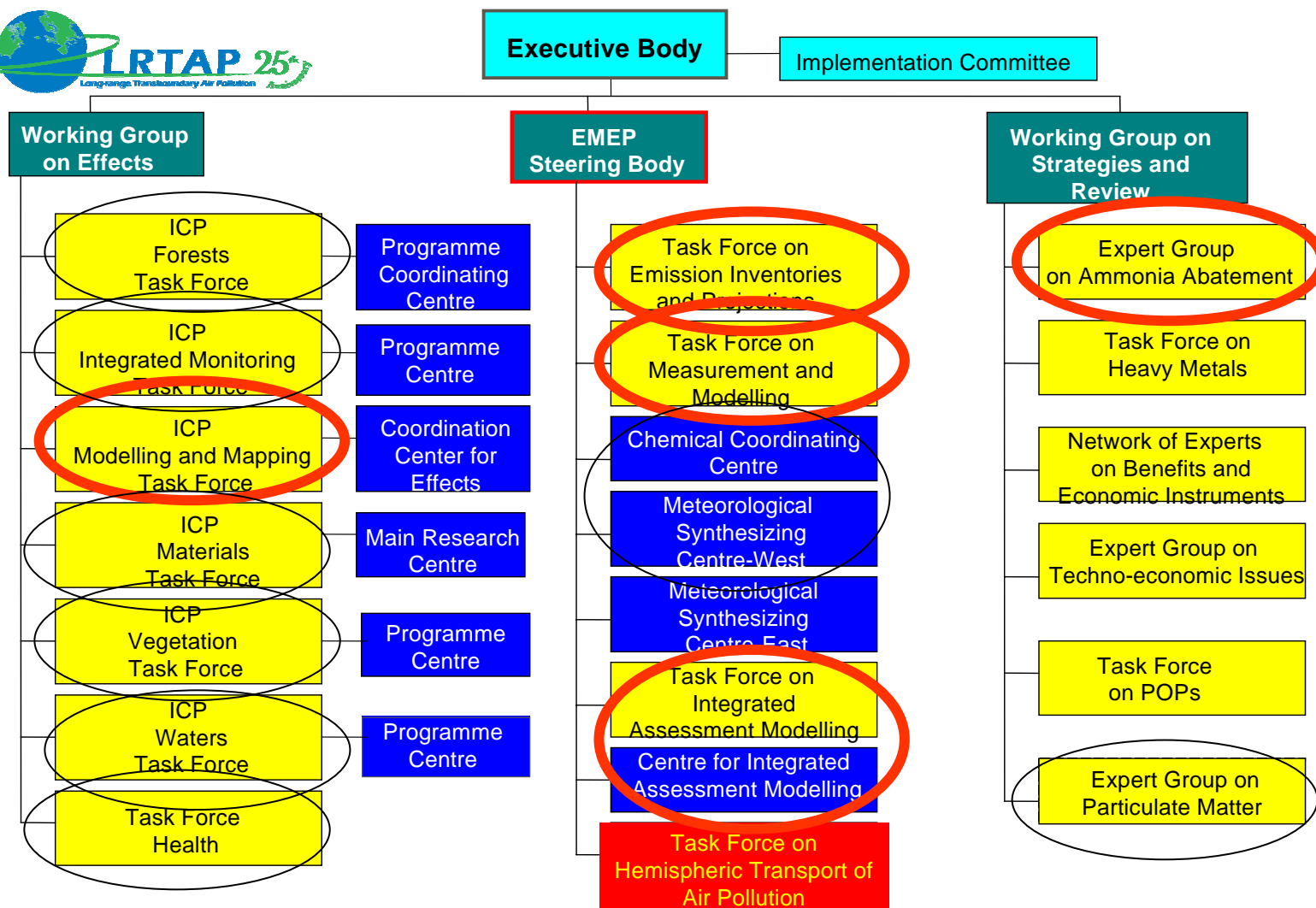
Science
Knowledge basis

Effect of single measures: pollutant swapping?



Oennema et al., Contract No 070501/2005/422822/MAR/C1

Nitrogen and the Convention



Nitrogen - Can an integrated approach be hosted under the CLRTAP?

- Effects: revisions of the concepts (dynamic critical loads, mass balances, biodiversity).
- Improvements in emission data and the interrelationships between different forms of N
- Address scientific and political aspects of pollutant swapping
- Improvements in IAM and parameterisation of the source-receptor relationships
- Quantifications of links between regional air pollution and climate change and climate change policies

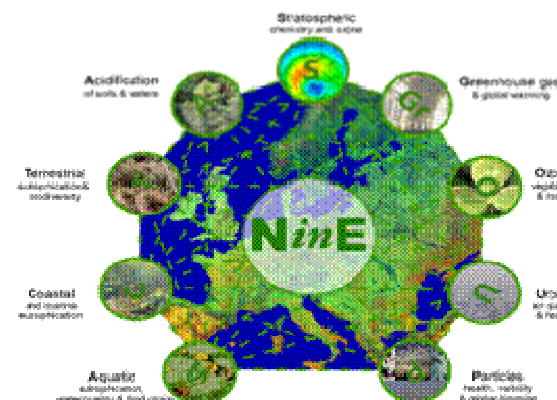


www.cost729.org

More information on nitrogen:



www.initrogen.org



www.nine-esf.org



www.nitrogencentre.org



<http://www.nitroeuropa.eu/>