



Towards  
**INMS**

# Nitrogen, and Environment and the Food Challenge

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Nitrogen on the Table  
launch  
European Parliament  
12 Jan 2016



# UNECE Convention on Long-range Transboundary Air Pollution

- Gothenburg Protocol – close link to National Emissions Ceilings Directive
- Task Force on Reactive Nitrogen (TFRN)
  - Nitrogen air pollution and its mitigation
  - Make the links between N forms and issues
  - Informing on the quantitative relationships
  - International science-policy interface



# The European Nitrogen Assessment

Sources, Effects  
and Policy Perspectives

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## COMMENT

Vervuiling met  
stikstof kost  
miljarden

Nitrogen  
taint alert

Warning over nitrogen footprint

Pollution à l'azote : une lourde facture pour l'Europe

### Too much of a good thing

Curbing nitrogen emissions is a central environmental challenge for the twenty-first century, argue Mark Sutton and his colleagues.

*Nature* 14 April 2011

Farming  
Union defends use of nitrogen in  
high-octane climate change debate



CAMBRIDGE

[www.nine-esf.org/ENA](http://www.nine-esf.org/ENA)



# Five key threats

The WAGES of  
too much nitrogen

Water quality

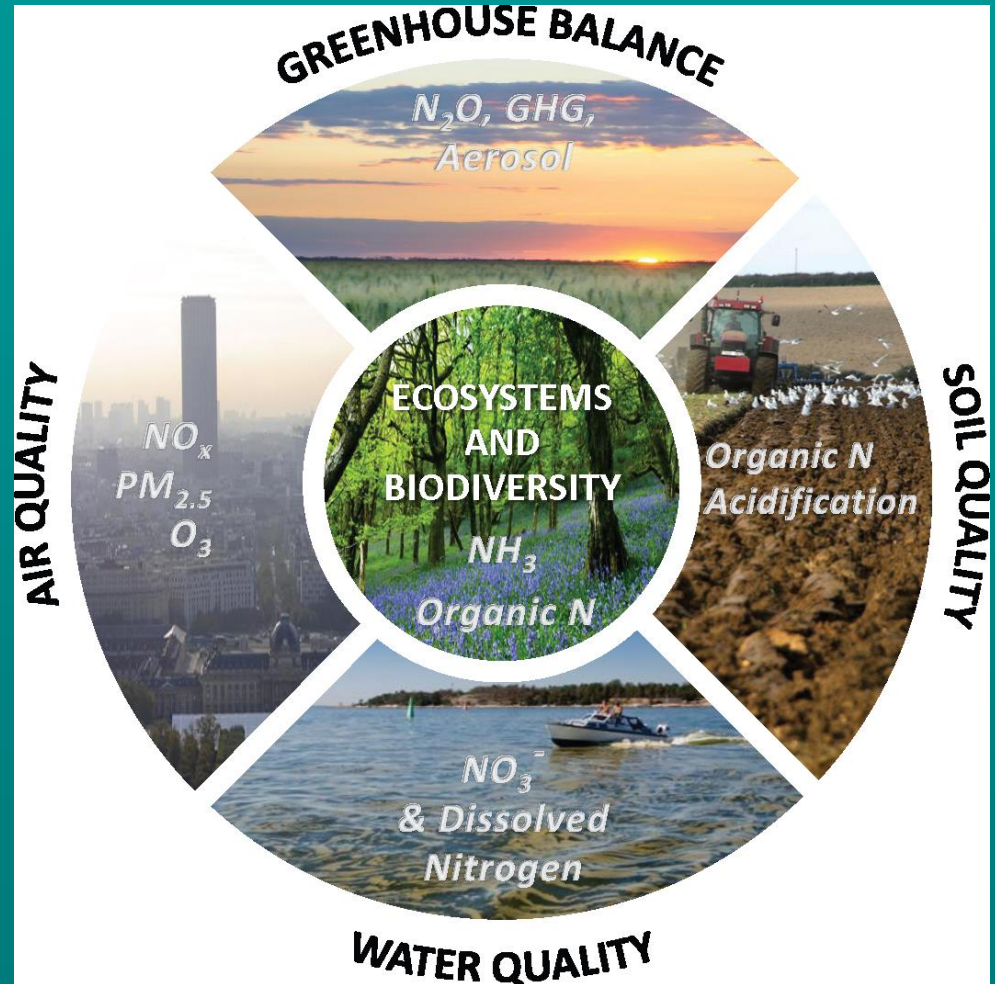
Air quality

Greenhouse balance

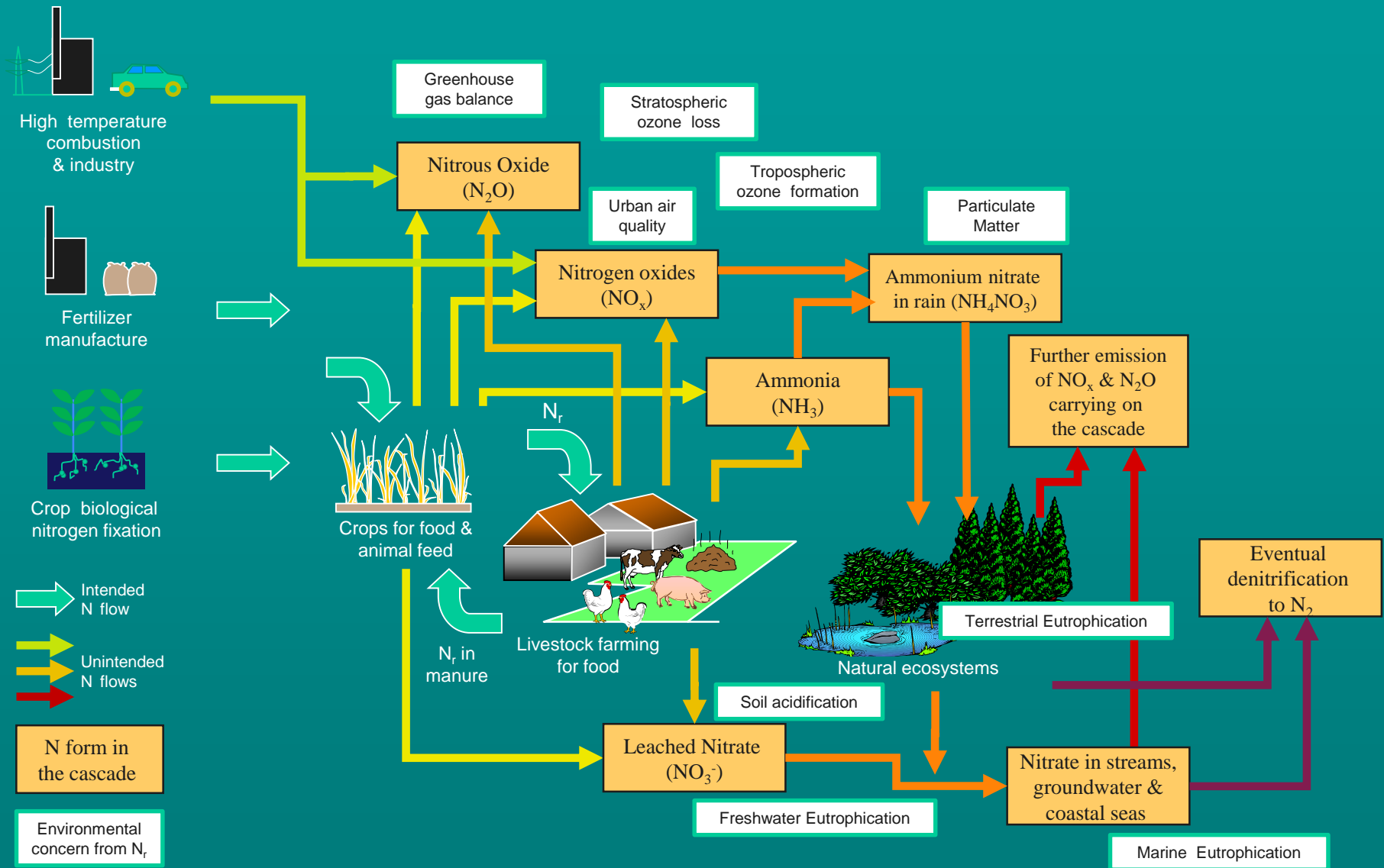
Ecosystems

Soil quality

Plus better food &  
energy supply



# Simplified view of the Nitrogen Cascade

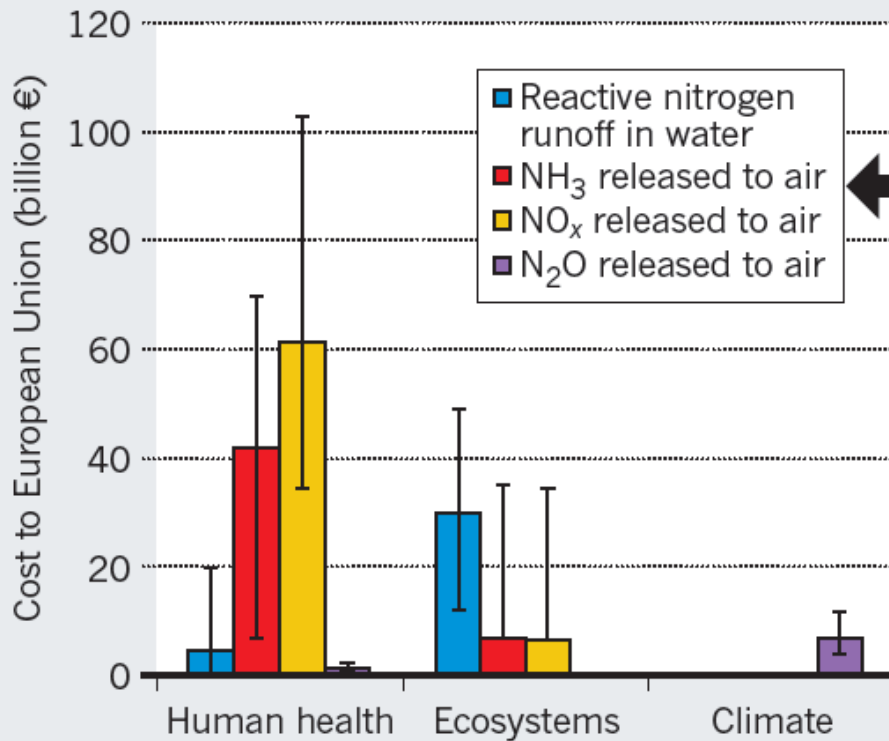


How do EU policies fit?

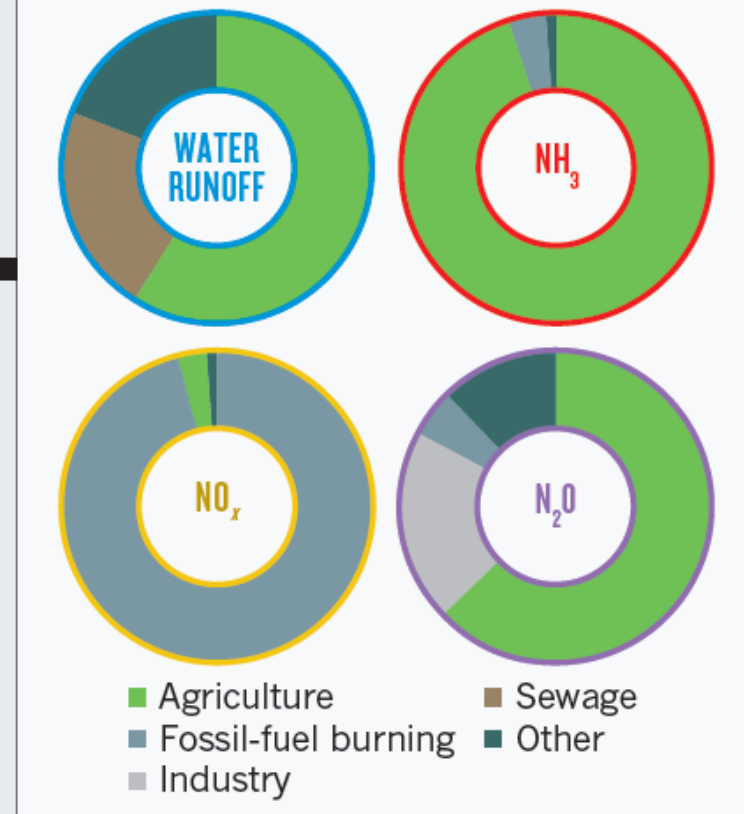
# Nitrogen Damage Costs & Sources

## DAMAGE COSTS OF NITROGEN POLLUTION

Agriculture and fossil-fuel burning load the environment with reactive nitrogen, affecting water, soils and air.



## MAIN NITROGEN SOURCES



EU Damage cost: 70 - 320 billion € / year

*Nature* 14 April 2011

# Which are the key EU nitrogen losses to reduce?

Loss as  $N_r$  to air: 8 M tonne/yr

Loss as  $N_r$  to water: 5 M tonne/yr

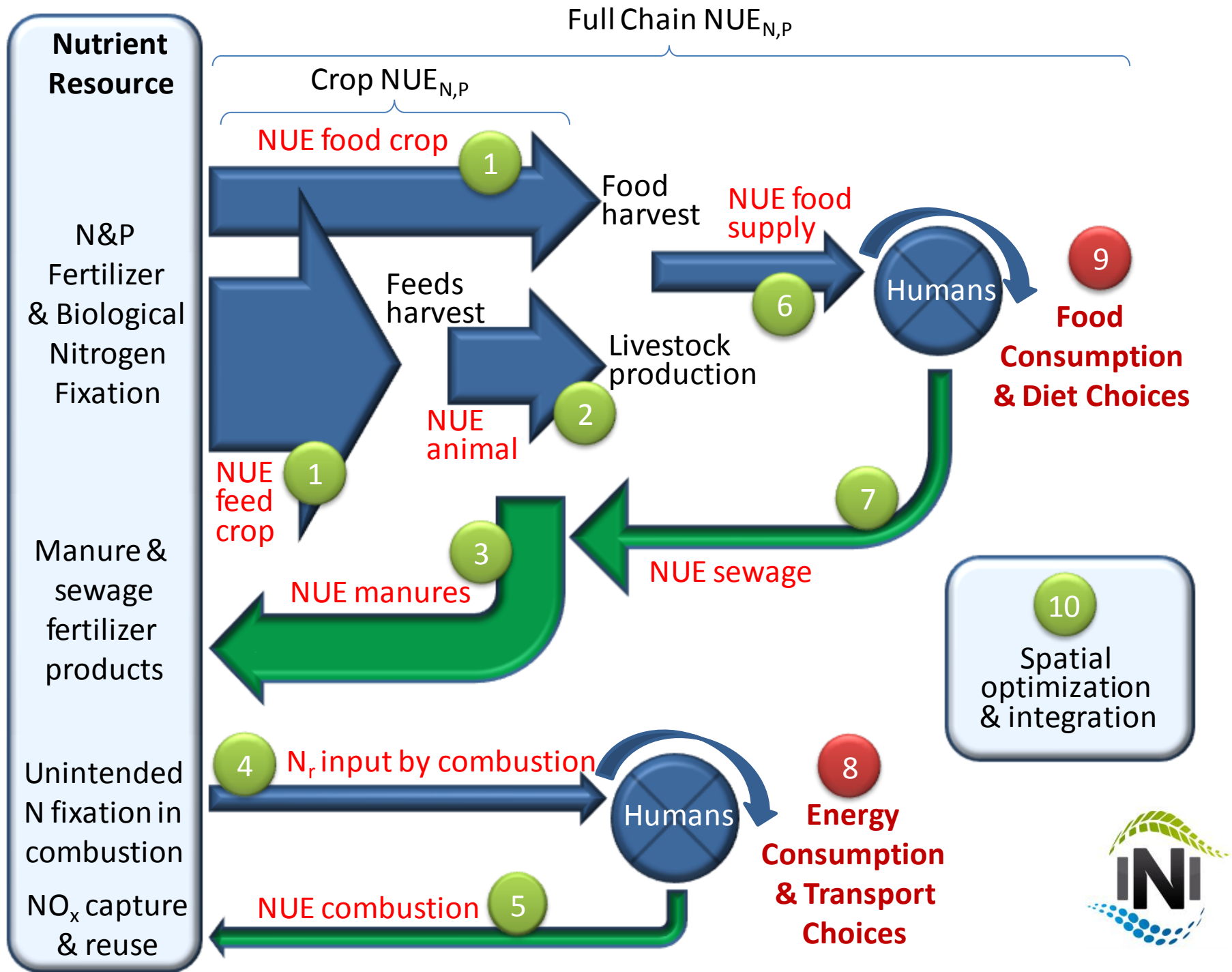
Loss as  $N_2$ : 9 M tonne/yr

Total N loss: 22 M tonne/yr

At €0.8/kg N = €18 billion per year

Component N losses to air:

$NH_3$ : 3.2     $NO_x$ : 3.5     $N_2O$ : 1.2    (M tonne/yr)





# Technical or societal measures?



Splash Plate Spreader  
- 1950s technology



## Options for Ammonia Mitigation

Guidance from the UNECE Task Force on Reactive Nitrogen



# Expert Panel on Nitrogen and Food

- Established by TFRN in 2011
- First Co-chairs: Henk Westhoek & Christian Palliere
- New co-chair from 2015: Adrian Leip, JRC
- Produce: ENA Special Report on Nitrogen and Food

# Linking International Nitrogen Policy Frameworks



An opportunity  
for EU leadership



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# Nitrogen Choices for Society

- **Nitrogen has multiple benefits and threats**  
Society has not given it enough attention.
- **EU nitrogen policies fragmented**  
air, climate, land, water, agriculture etc.
- **Nitrogen cycle strategies offer win-win-wins**
  - Food, health, environment, jobs etc
  - Nitrogen Efficiency, Circular Economy, Innovation
  - Addressing the barriers
- **Technical vs Societal options**  
Double benefit with both approaches: 40%, 40%  
Debate on food for health, but environment evidence clear