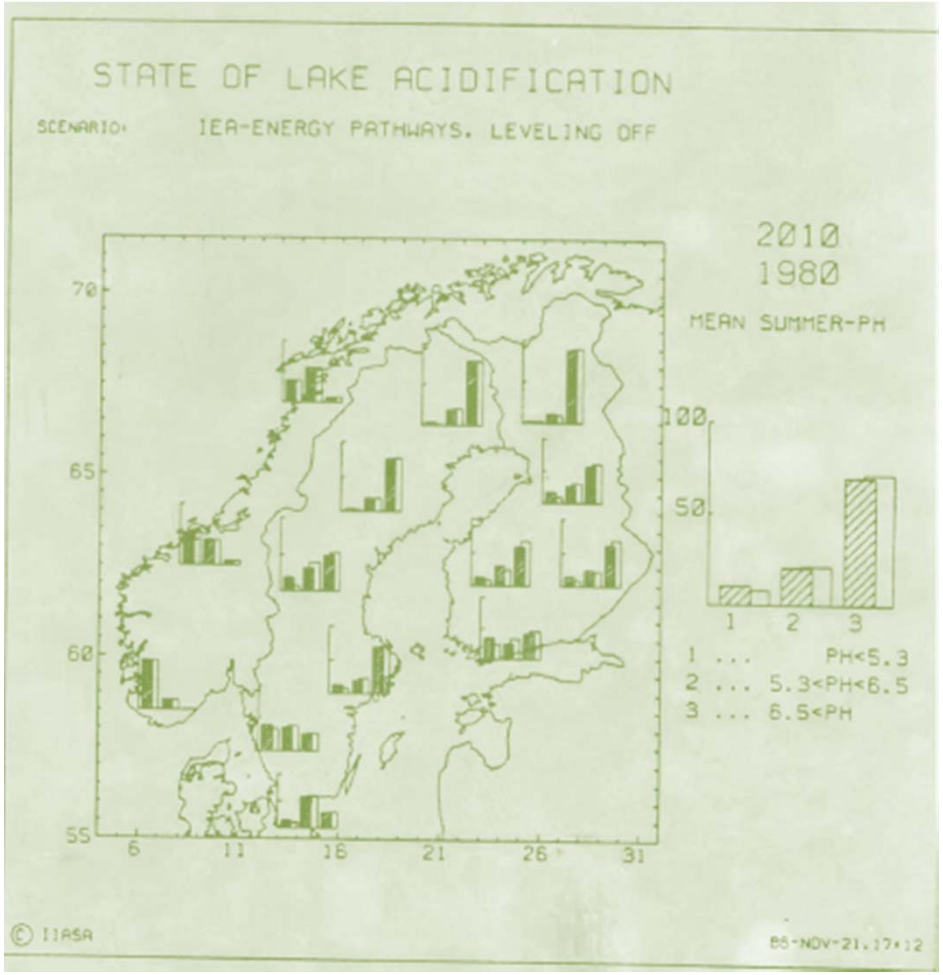
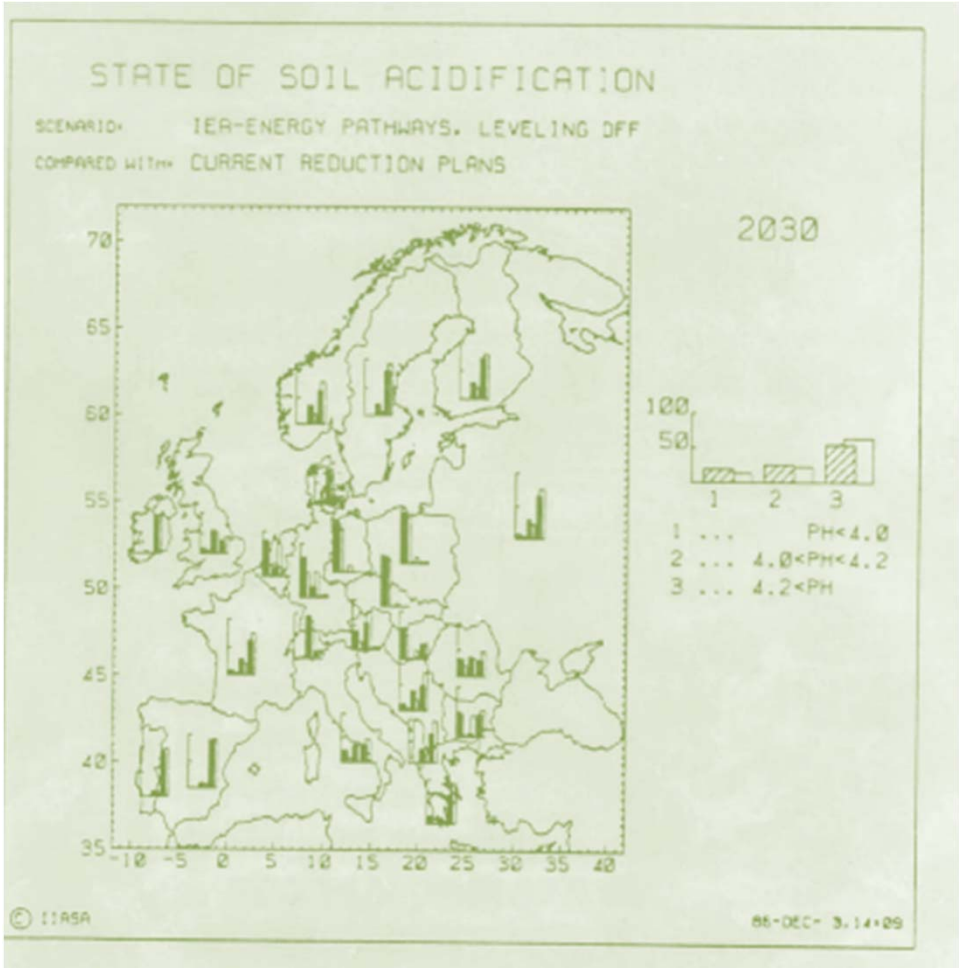
Use of ecosystem effect data in policy making
past, present, future

Rob Maas

13-09-2017

Effect mapping and modelling - 1985





Dynamic modelling in RAINS - 1985

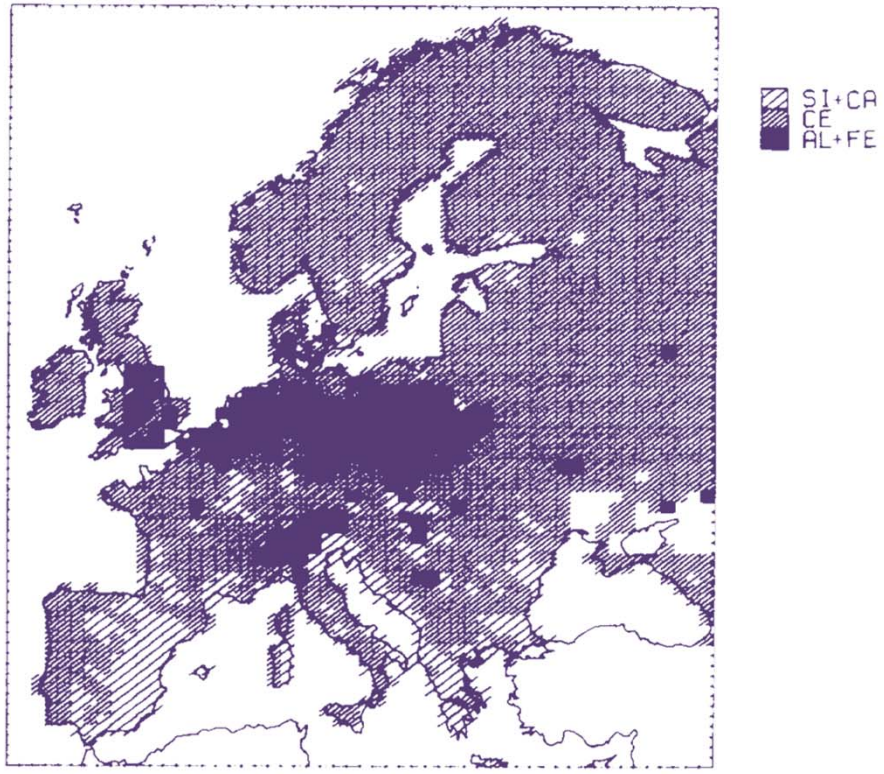


Fig. 6. Model estimates of the soil acidity in Europe in 1980. Si + Ca represent the silicate and carbonate buffer ranges, CE cation exchange buffer range, and Al + Fe aluminium and iron buffer ranges.

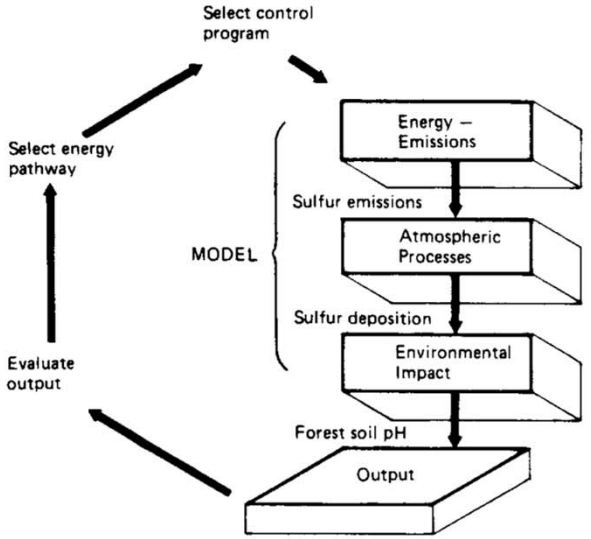
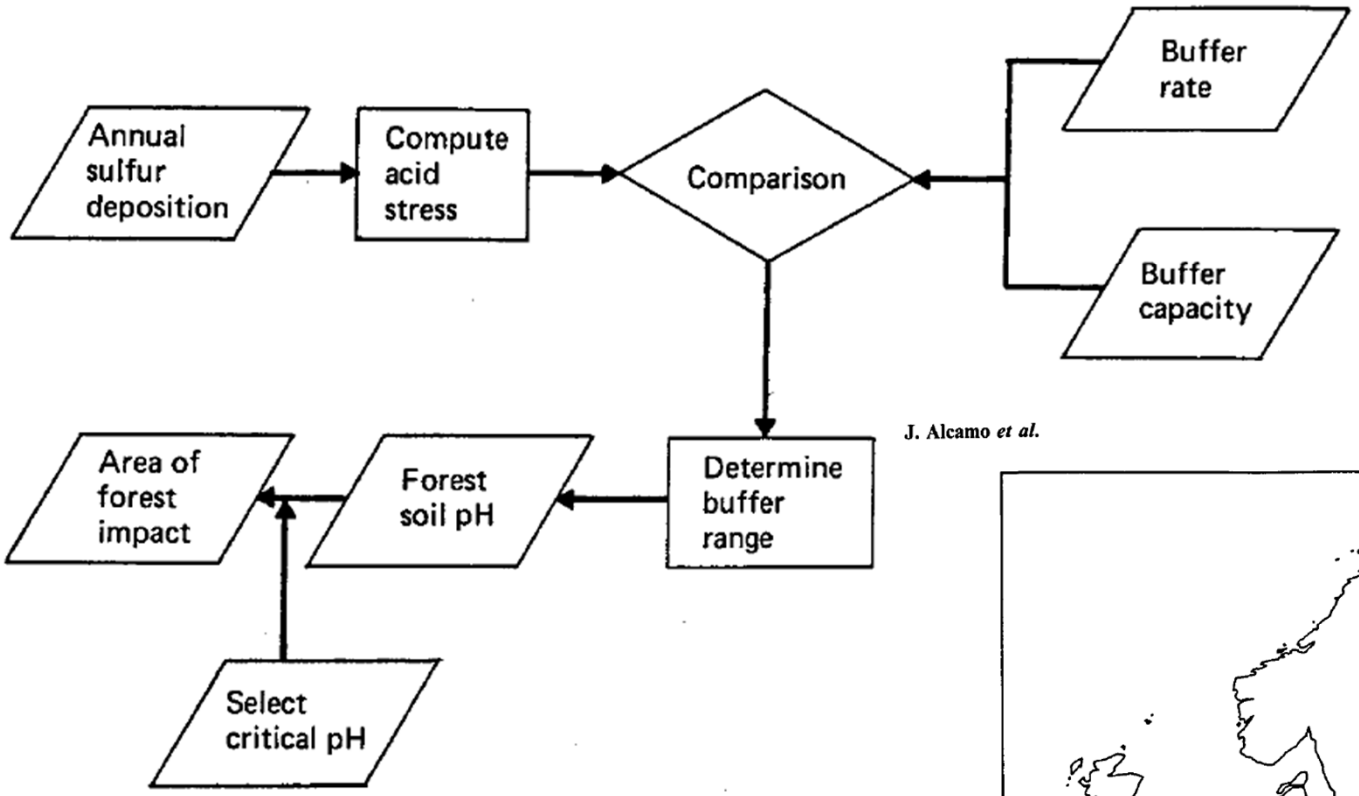


Fig. 4. The IIASA acid rain framework and procedure for using the model.

Kauppi et al, Ecological Modelling,1986



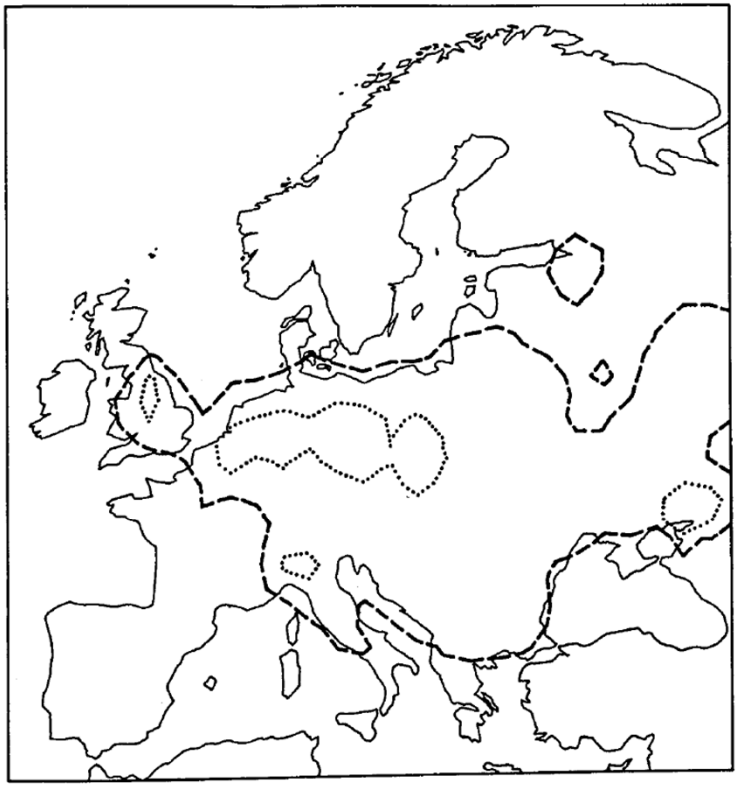


Figure 11. Computed sulfur deposition in Europe for the two scenarios in Figure 10. Computed location of the line of 2 g m^{-2} year^{-1} total sulfur deposition: ---, energy pathway three without pollution controls; ...., energy pathway three with "major pollution controls".

1991: Critical load maps

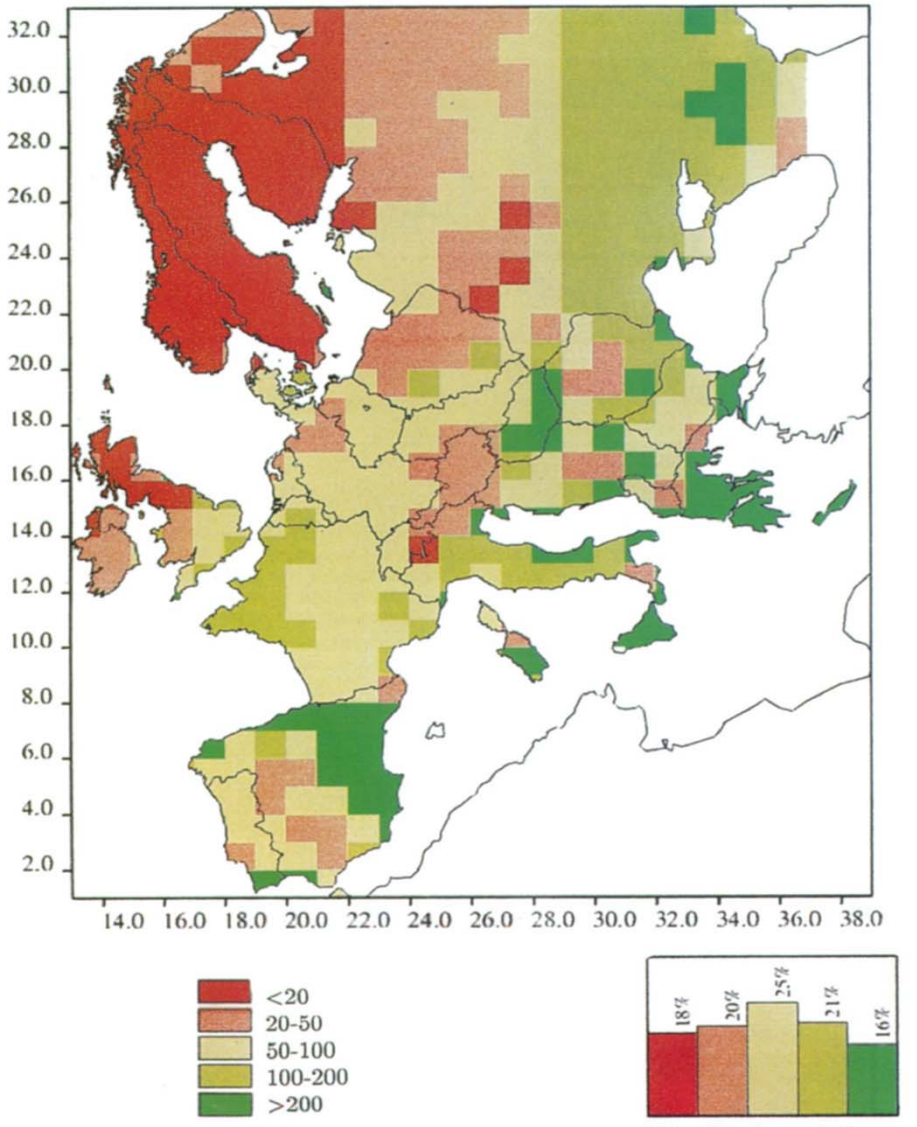


Figure 1. The CCE European map of critical load of actual acidity (5th percentile) produced on the basis of national data (6).

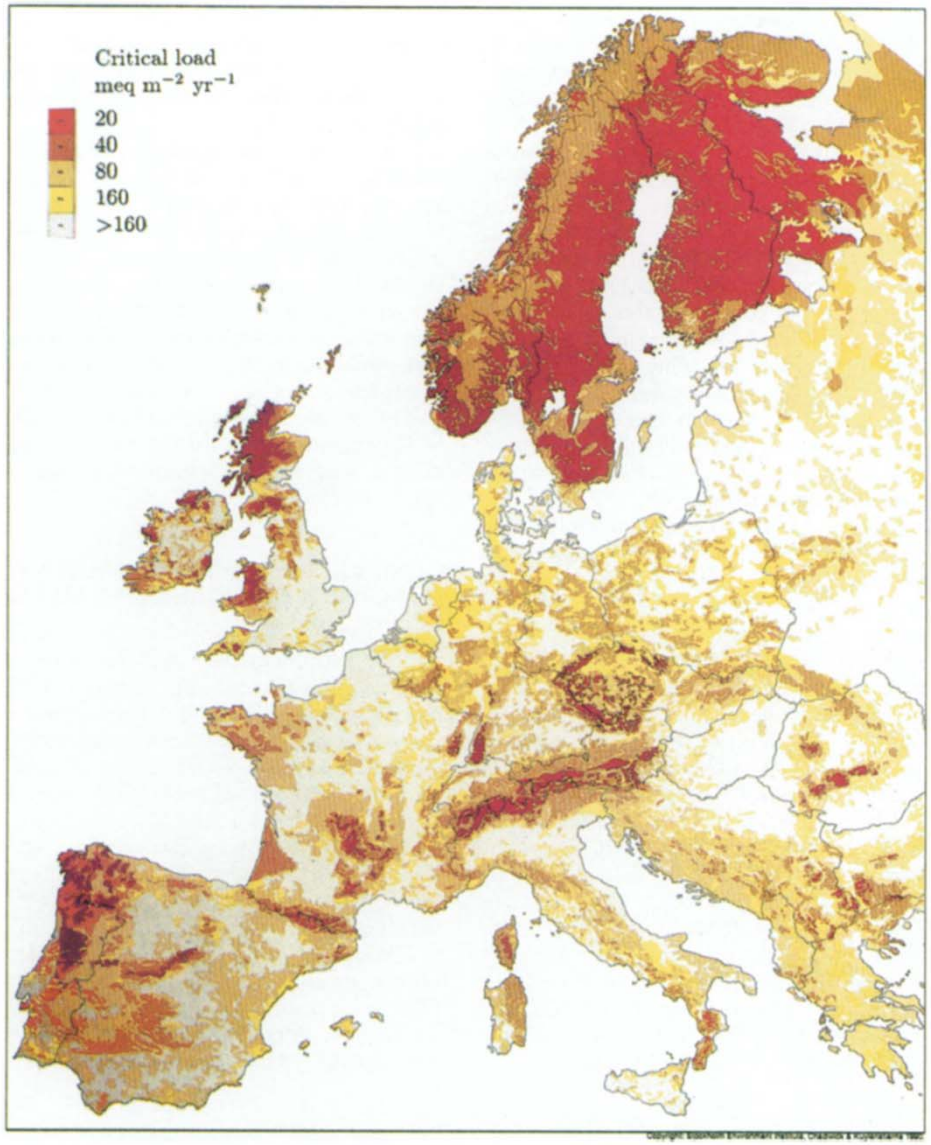


Figure 2. The SEI European map of relative sensitivity to acidic deposition and critical loads

Gradual increase in complexity

1979: Joint measurement program: EMEP

1985: 1st Sulphur Protocol (flat rate reductions)

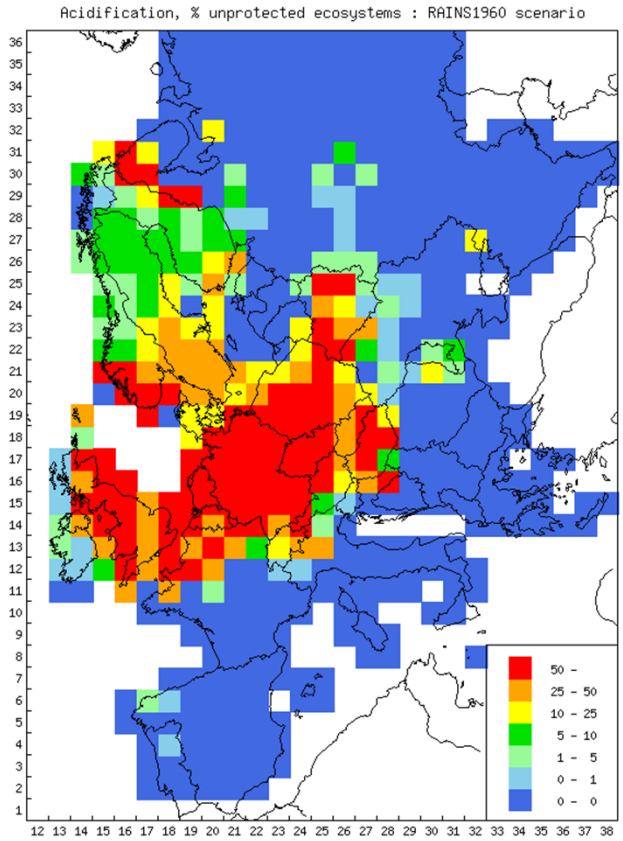
1994: 2nd Sulphur Protocol (critical loads, 3 IAMs)

1999: Multi-Pollutant Multi-Effect Protocol (RAINS)

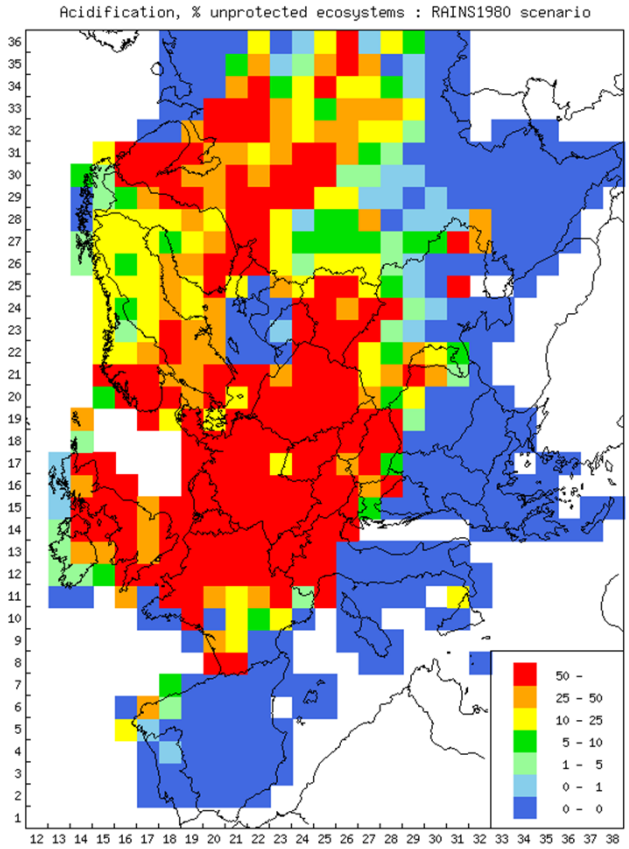
2013: Inclusion of PM2.5, (urban) health impacts, hemispheric transport, climate change (GAINS)

Future debate …. link to Sustainable Development Goals … food, health, climate, biodiversity

1999 - Gothenburg Protocol
> 95% of the forests protected against acidification
+ co-benefits for human health

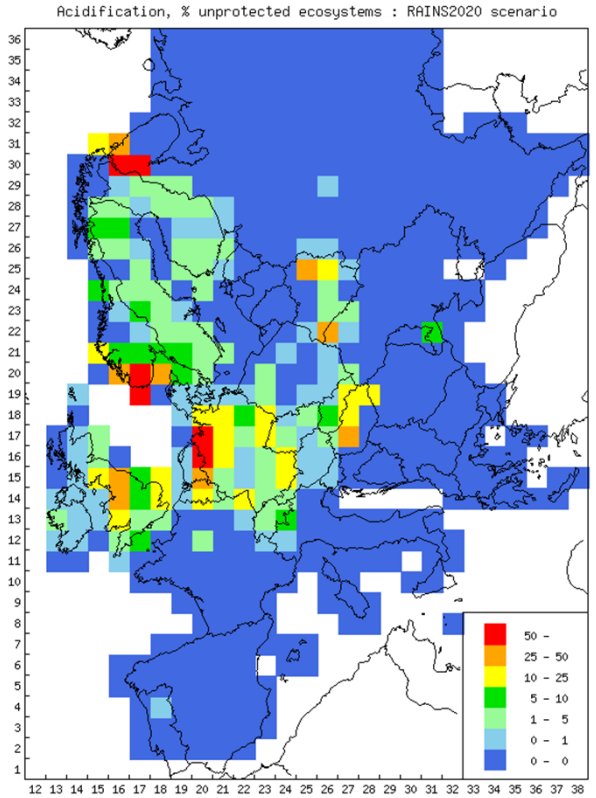


1960



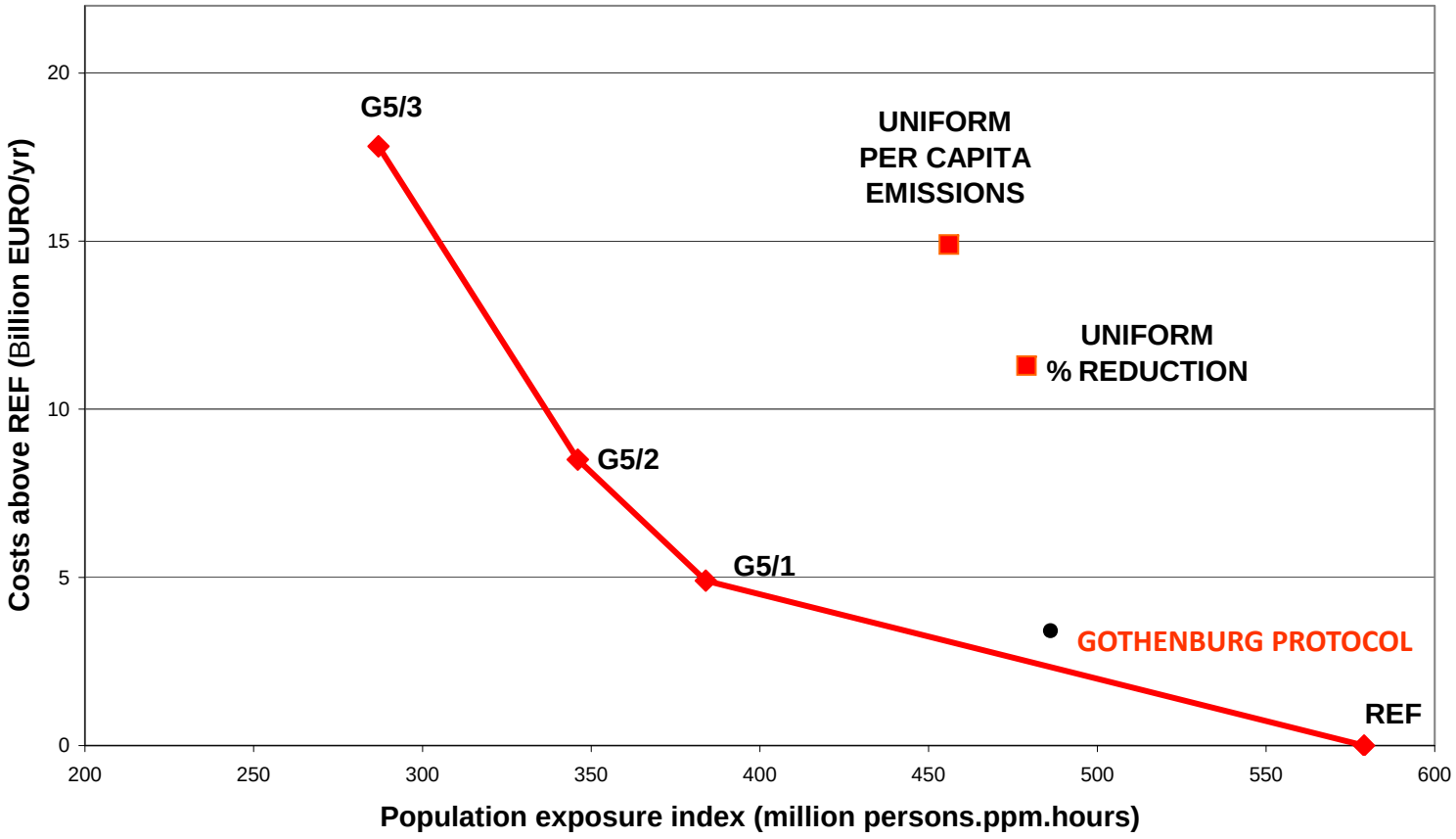
1980

2020

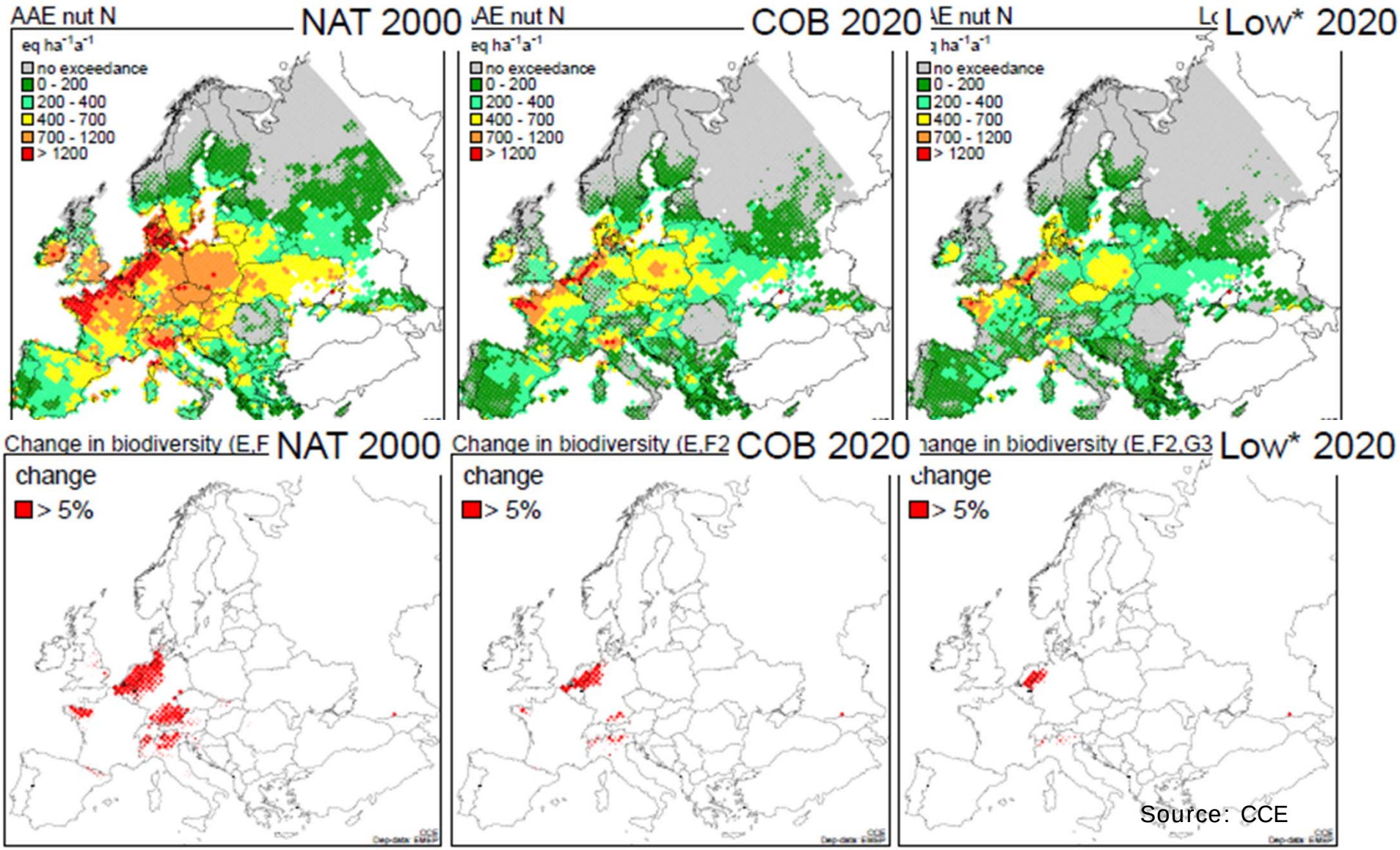


Source: IIASA

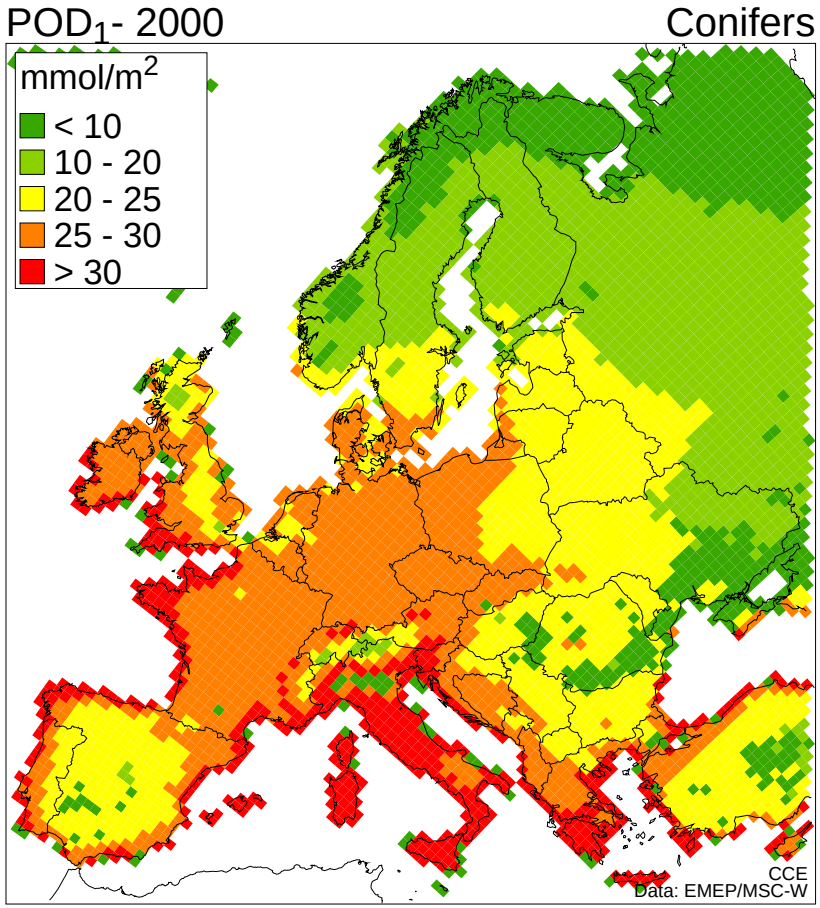
Is the strategy really cost-effective?

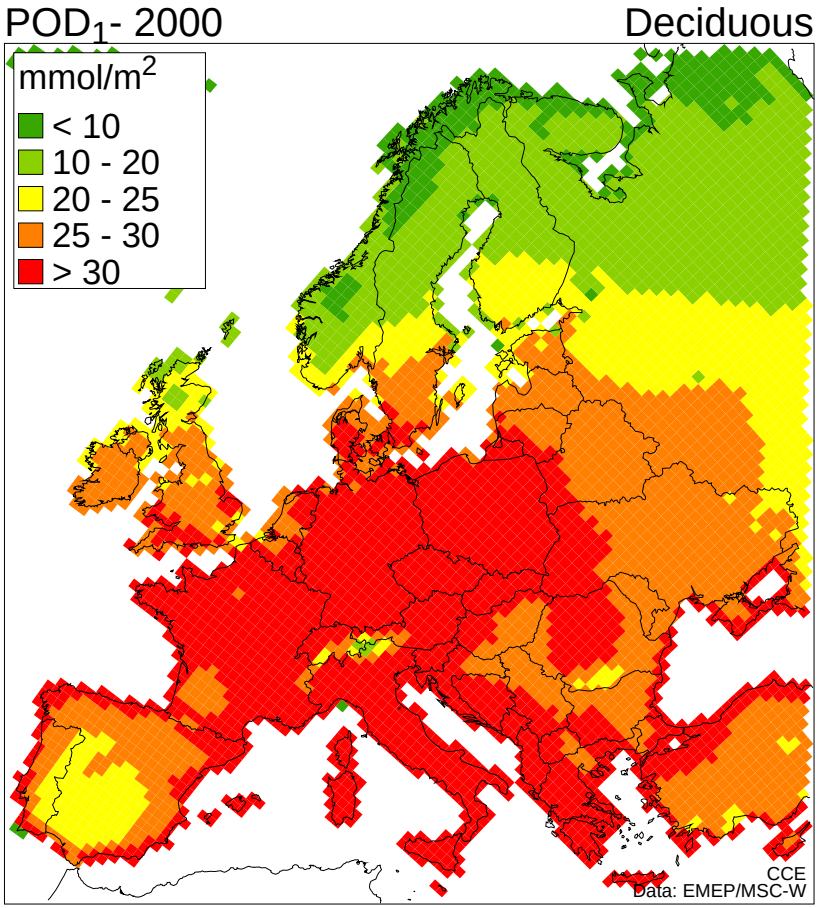


At present … in most Natura2000 areas …
Nitrogen still accumulates …. Loss of biodiversity (ex post analysis)



Loss of ecosystem services:
- Ozone damage to forests: reduced carbon sequestration



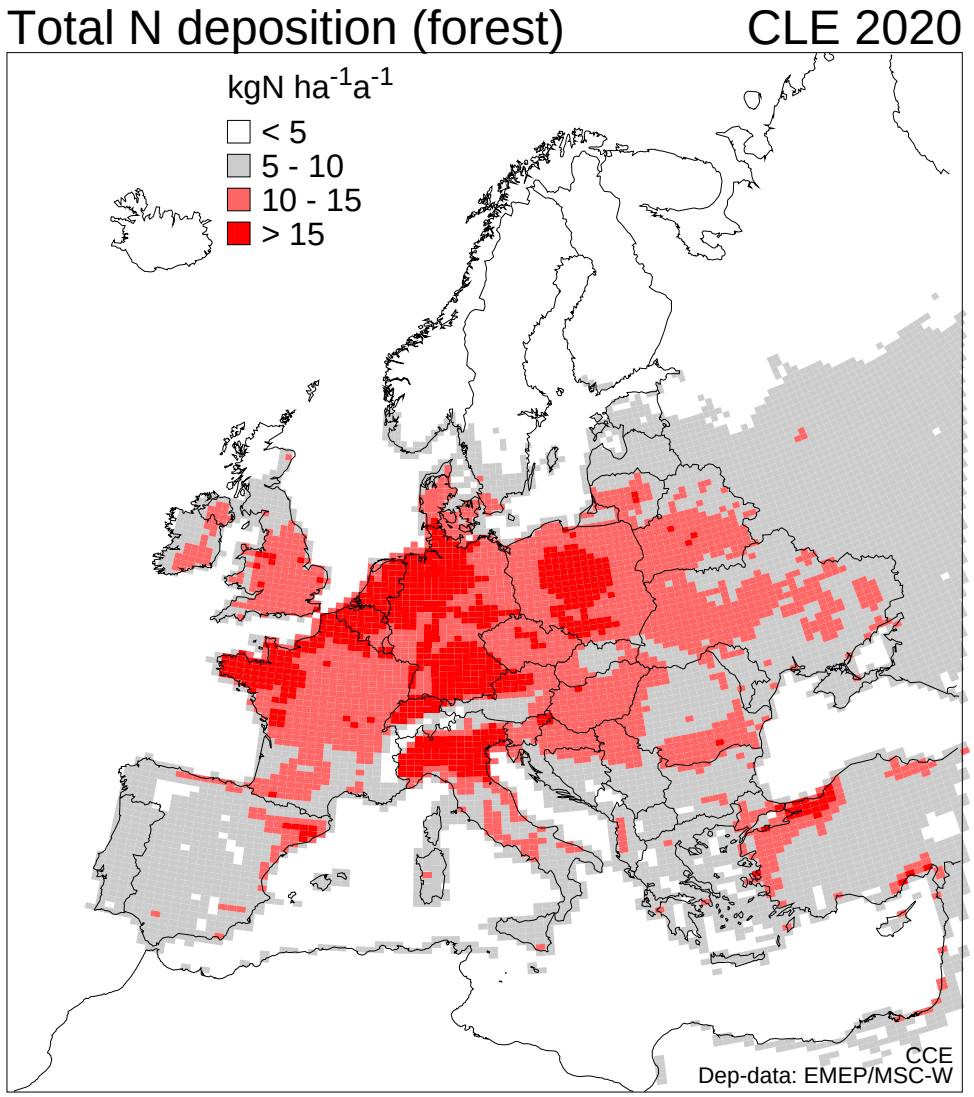


Will nitrogen deposition increase carbon sequestration?

Most wood production is in Northern Europe: nitrogen limited + low but increasing ozone damage

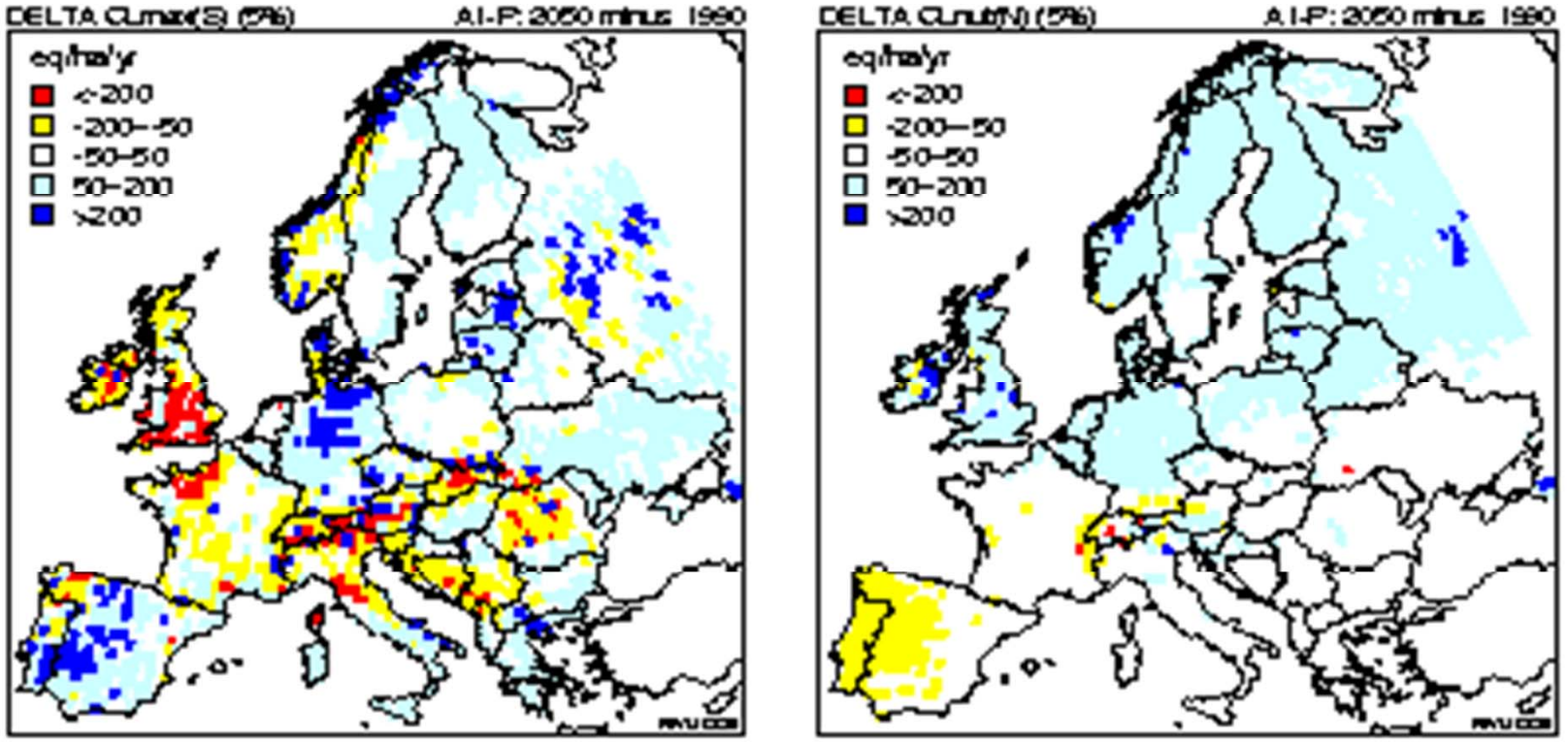
More than 50% of the European wood production is In Scandinavia.
Ozone reduction will increase forest growth, but can only be achieved with NOx reduction, which will reduce forest growth.

Regional differences in effectiveness of combined ozone & nitrogen policies



Future climate

Species move north .. other rainfall patterns .. other critical loads

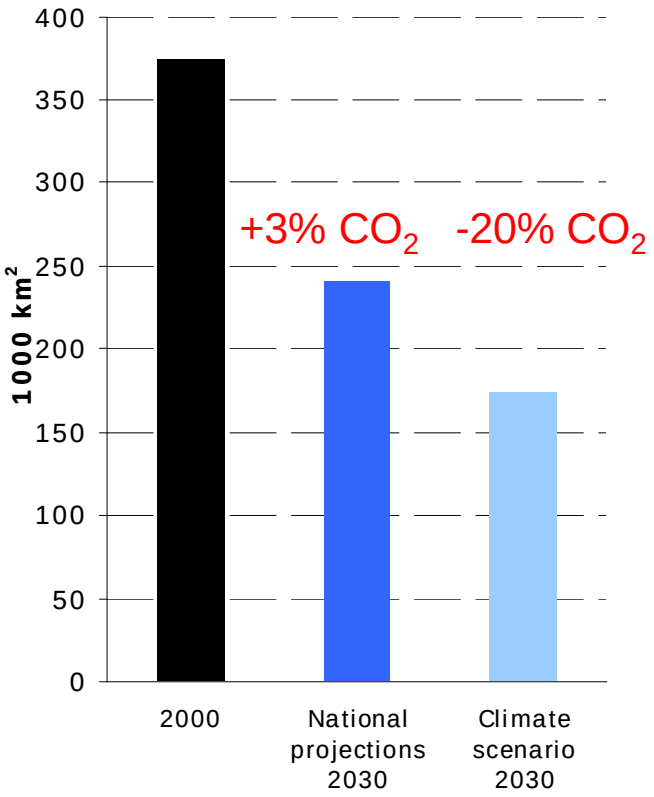


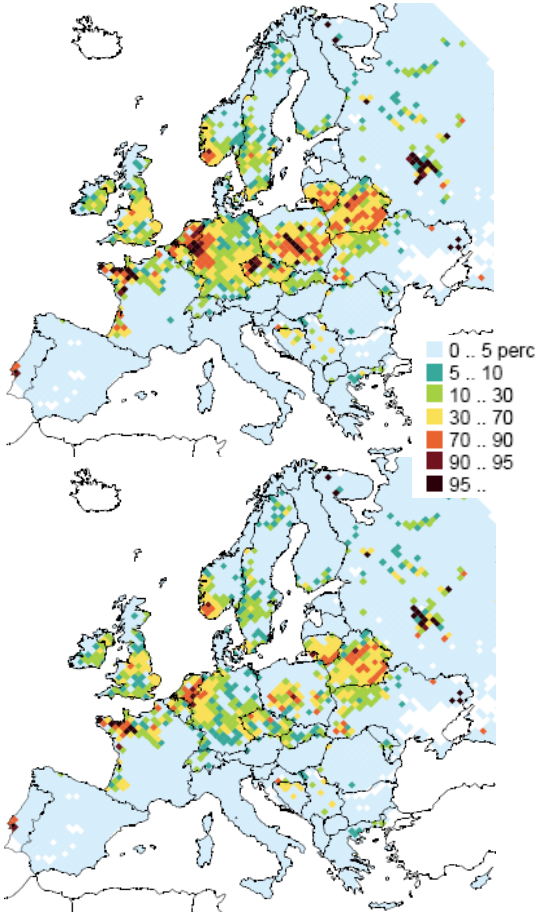
EU Airclim study
2002

Co-benefits of GHG mitigation on forest acidification in Europe

Source: GAINS-Europe

Forest area with acid deposition above the critical load

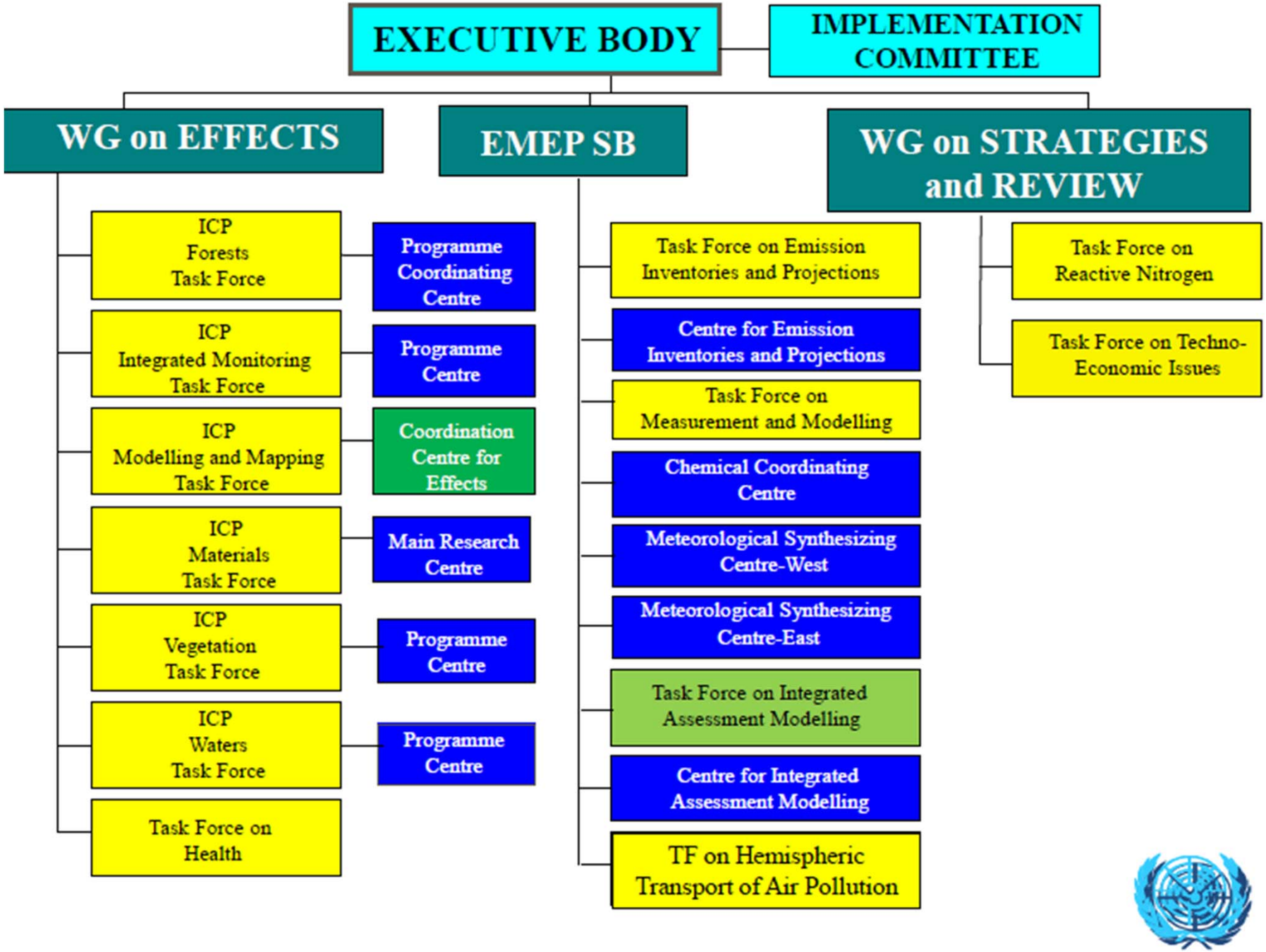




National energy projections +3% CO_2 in 2020

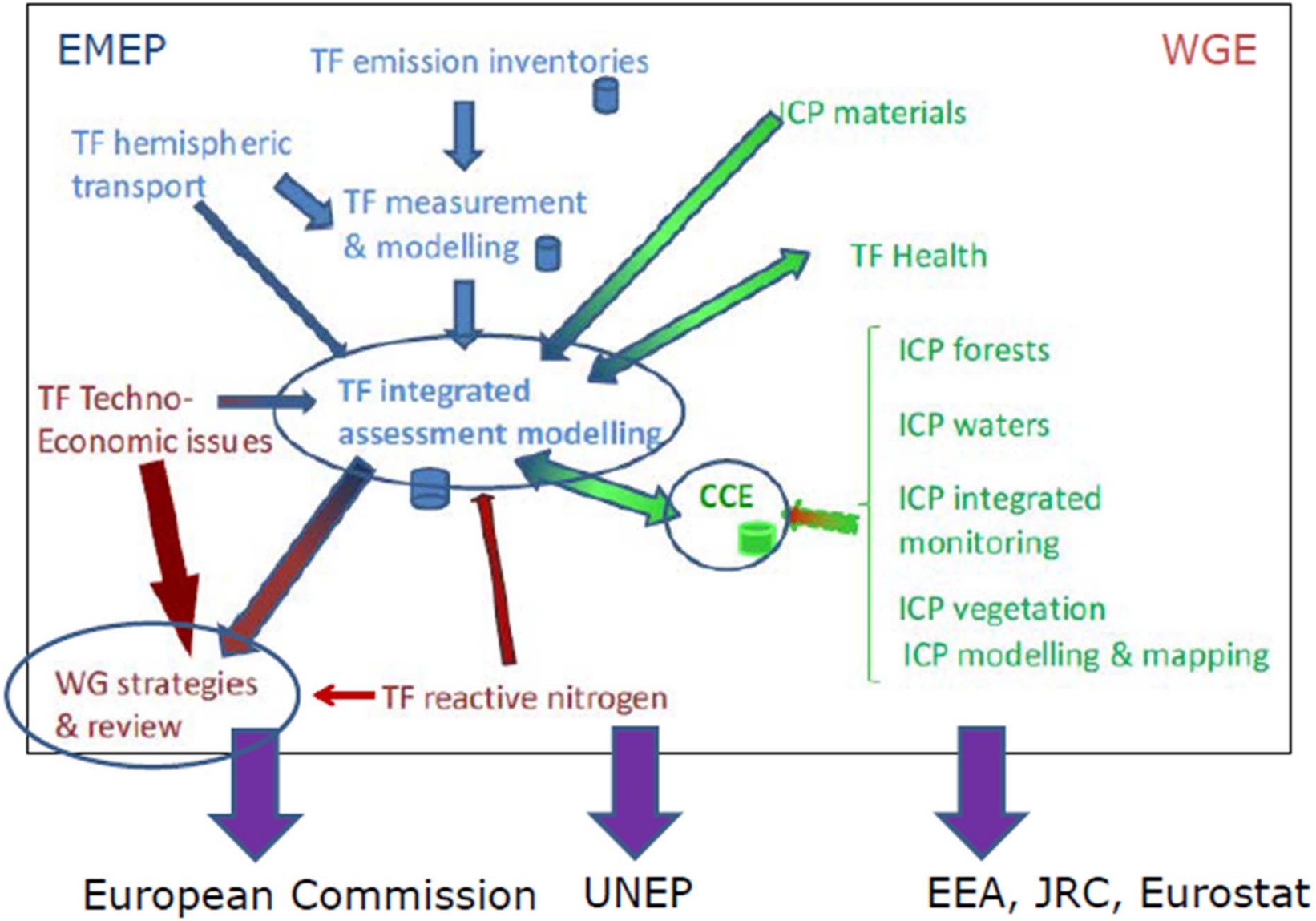
Climate scenario -20% CO_2 in 2020

http://gains.iiasa.ac.at


EXECUTIVE BODY
IMPLEMENTATION COMMITTEE
WG on EFFECTS
EMEP SB
WG on STRATEGIES and REVIEW
ICP Forests Task Force
Programme Coordinating Centre
ICP Integrated Monitoring Task Force
Programme Centre
ICP Modelling and Mapping Task Force
Coordination Centre for Effects
ICP Materials Task Force
Main Research Centre
ICP Vegetation Task Force
Programme Centre
ICP Waters Task Force
Programme Centre
Task Force on Health
Task Force on Emission Inventories and Projections
Centre for Emission Inventories and Projections
Task Force on Measurement and Modelling
Chemical Coordinating Centre
Meteorological Synthesizing Centre-West
Meteorological Synthesizing Centre-East
Task Force on Integrated Assessment Modelling
Centre for Integrated Assessment Modelling
TF on Hemispheric Transport of Air Pollution
Task Force on Reactive Nitrogen
Task Force on Techno-Economic Issues

Air Convention - actual information flows

(adapted from AC Le Gall)



The future of the mapping and modelling network:

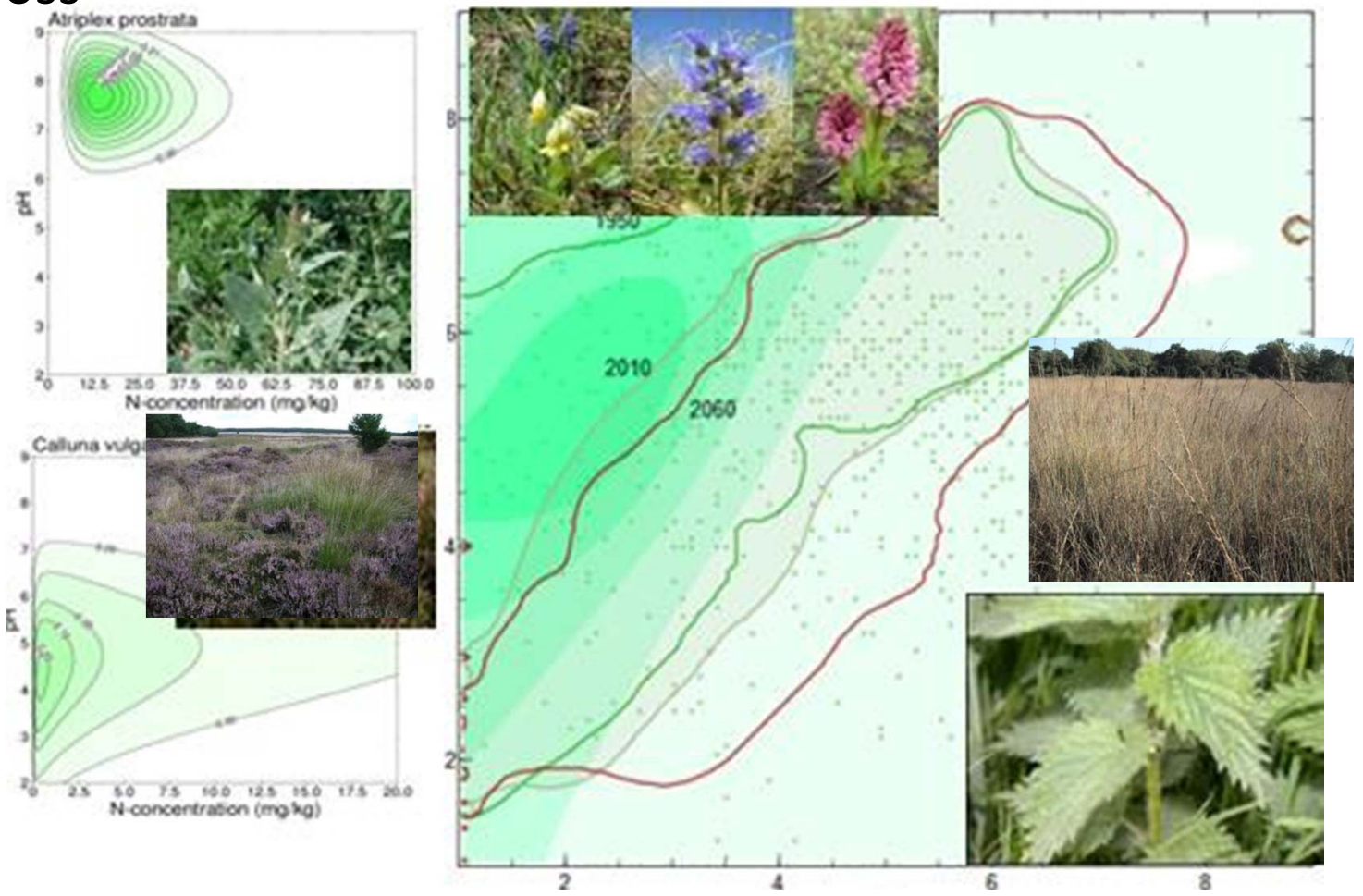
Biodiversity = core

Towards a "WHO" for nature

CLRTAP, EC, JRC, EEA, Eurostat, UNEP, OECD, CBD all need info on dose-response relationships and critical levels in order to include biodiversity in their policy support

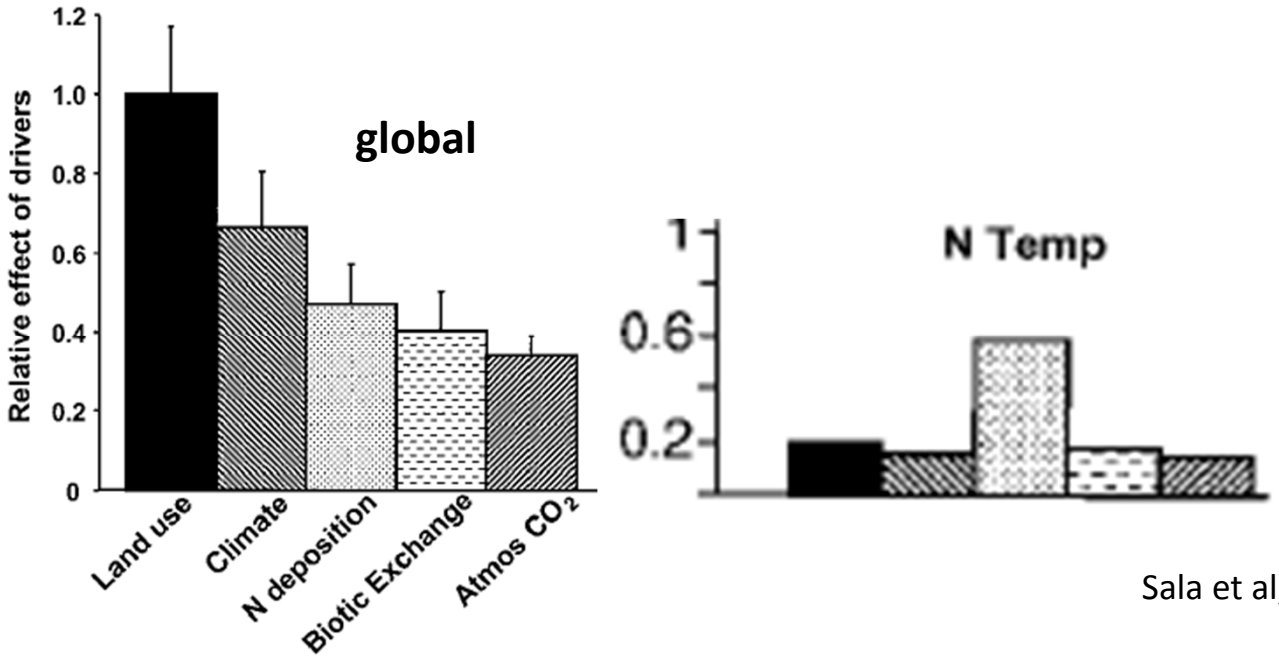
Short term challenges

1. Ensure that biodiversity data are made ready for use by CIAM
2. Continue to meet regularly ….. Joint workshops with CBD, MAES, …
3. Continue to develop convincing presentation methods for biodiversity loss



Long term strategy

- Develop approach for assessing multiple stress factors:
  nitrogen + ozone + drought + temperature + CO_2 + exotic species + exploitation of natural land + ….
- Link with different concepts …. from ecosystem services to planetary boundaries
- Acquire a broader group of customers/financers …. beyond CLRTAP



Sala et al, 2000, Science 287

Biodiversity

It is not just about **rare species** in nearby nature areas or the **value of ecosystem services**, but

to maintain the **stability** of the global ecosystem and the resilience of life on earth

Thank you !