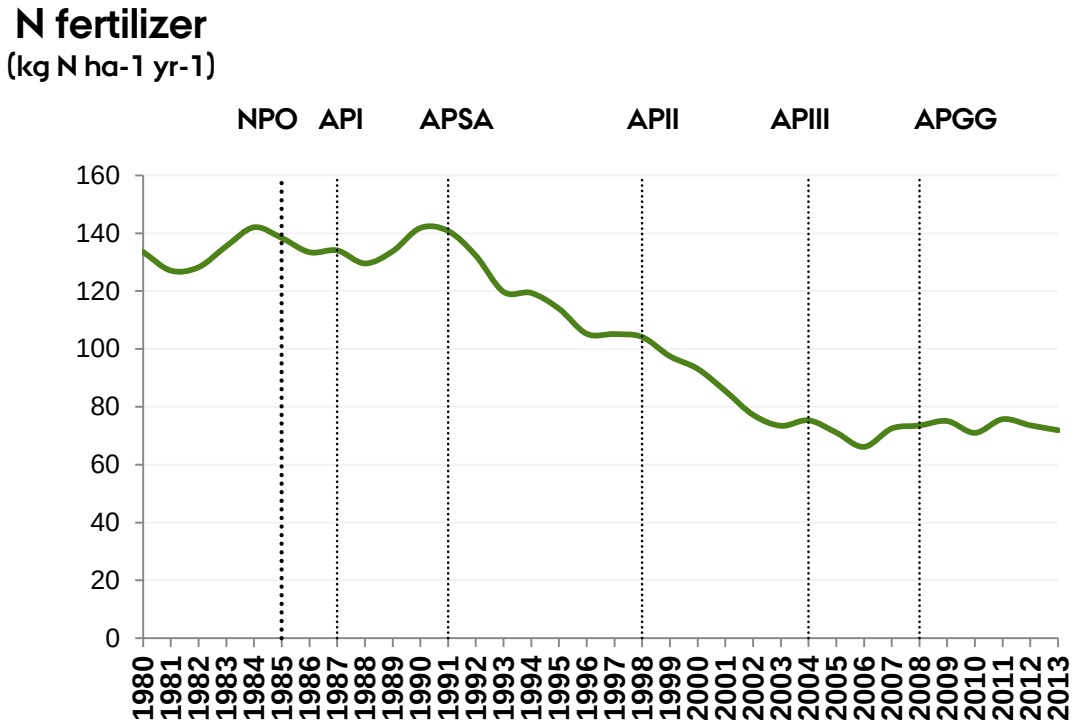
Evaluation of the N effect of the Danish action plans: 25 years results of monitoring

GITTE BLICHER-MATHIESEN, JØRGEN WINDOLF, HENRIK TORNBJERG, BRIAN KRONVANG, & JAKOB CARSTENSEN
Department of Bioscience, Aarhus University, Denmark

BIRGITTE HANSEN, & LÆRKE THORLING
Geological Survey of Denmark and Greenland – GEUS, Denmark

AARHUS
UNIVERSITY
DEPARTMENT OF BIOSCIENCE

The Danish environmental Action plans 1989-2013



Mitigation measures:

Implementation of a N-quota system

Increased utilization of nitrogen in manure

Manure storage capacity

Spreading techniques

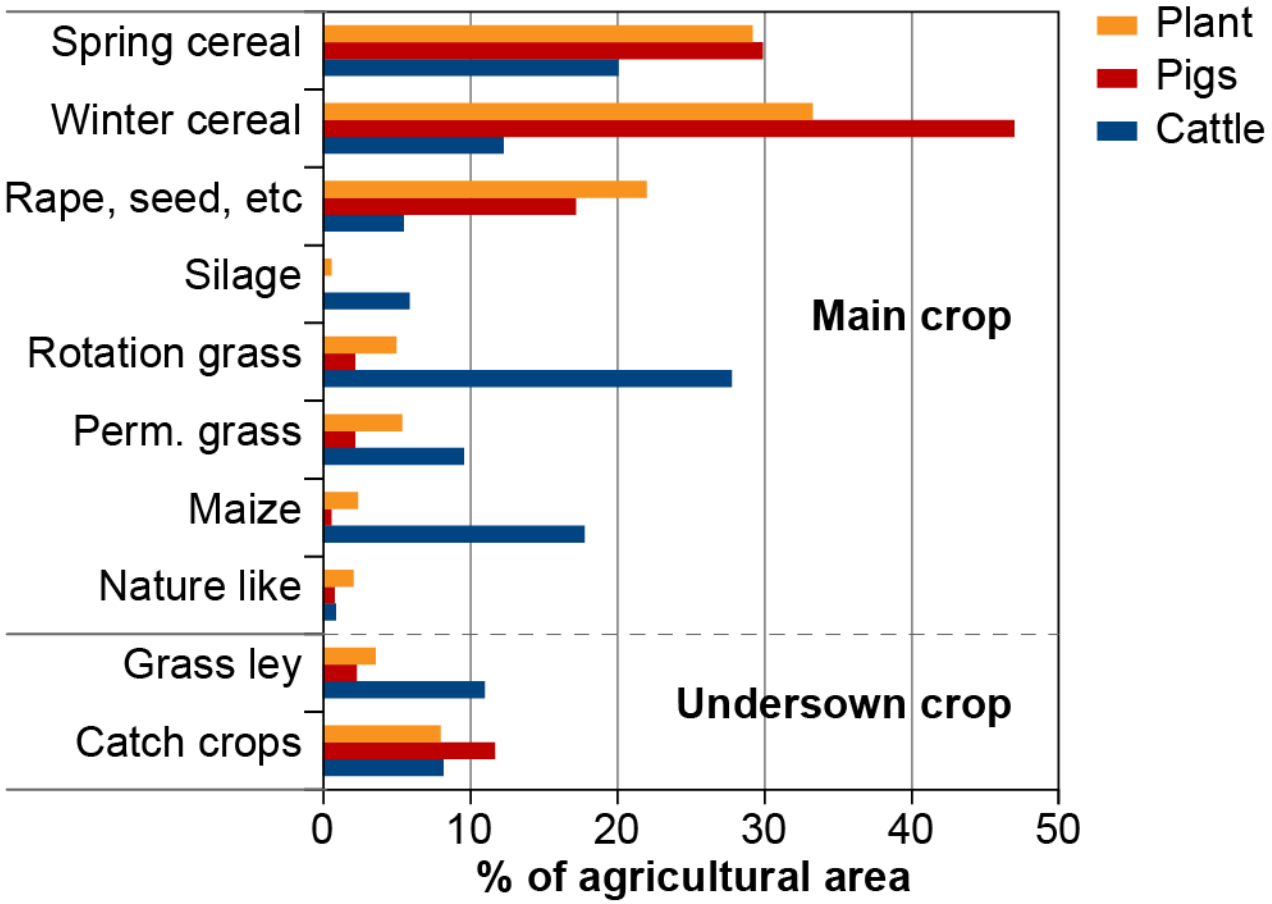
Increased use of catch crops

Wetlands, afforestation, buffer strips, organic farming

- **Board political will to act**
- **Establishment of a comprehensive nation-wide monitoring program for the aquatic environment in 1989**

Danish crop cover on different farm types

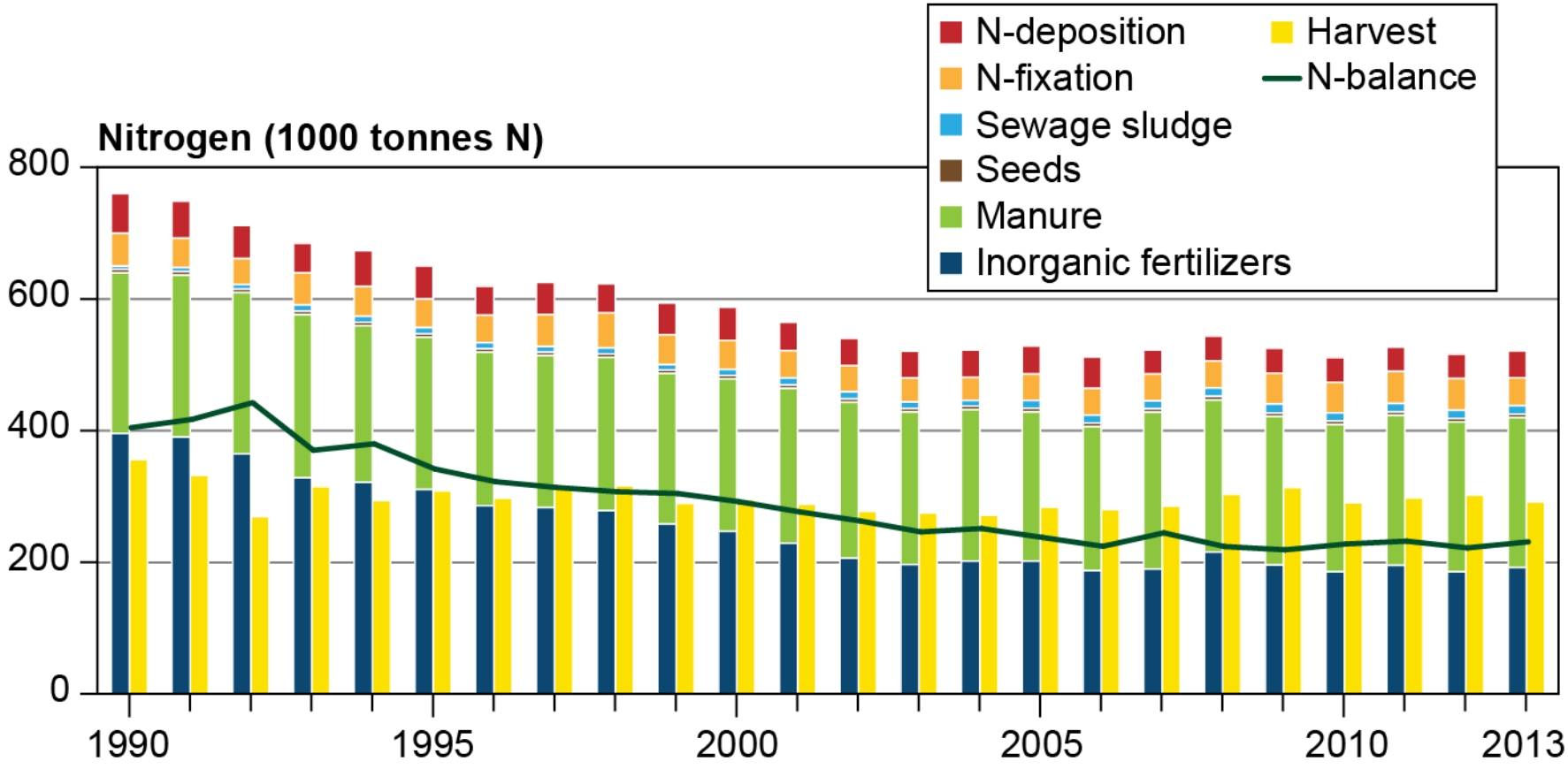
Total agricultural area is 2,671,000 ha
Covers 62 % of the national territory



Field balances and leaching

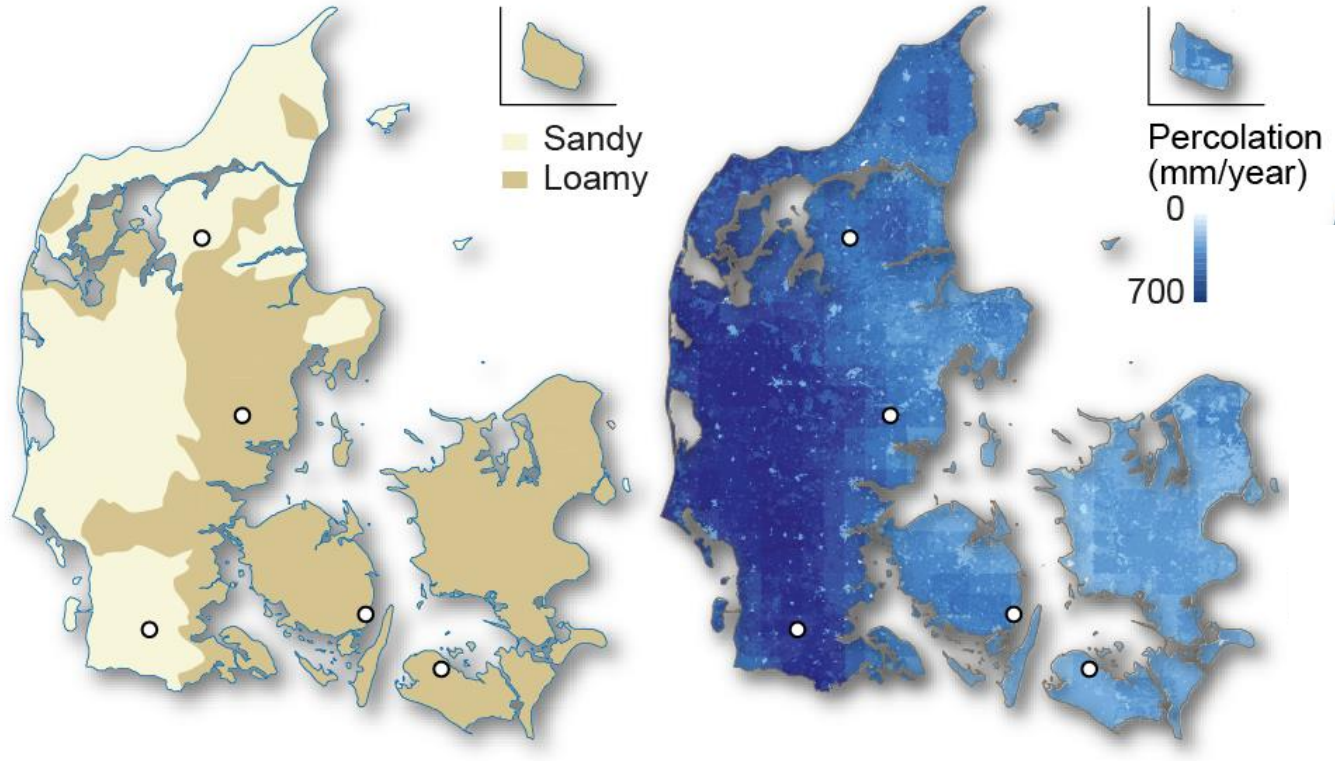
Danish field balances for nitrogen

Reduction of 43 pct. in the field balance 1990-2013



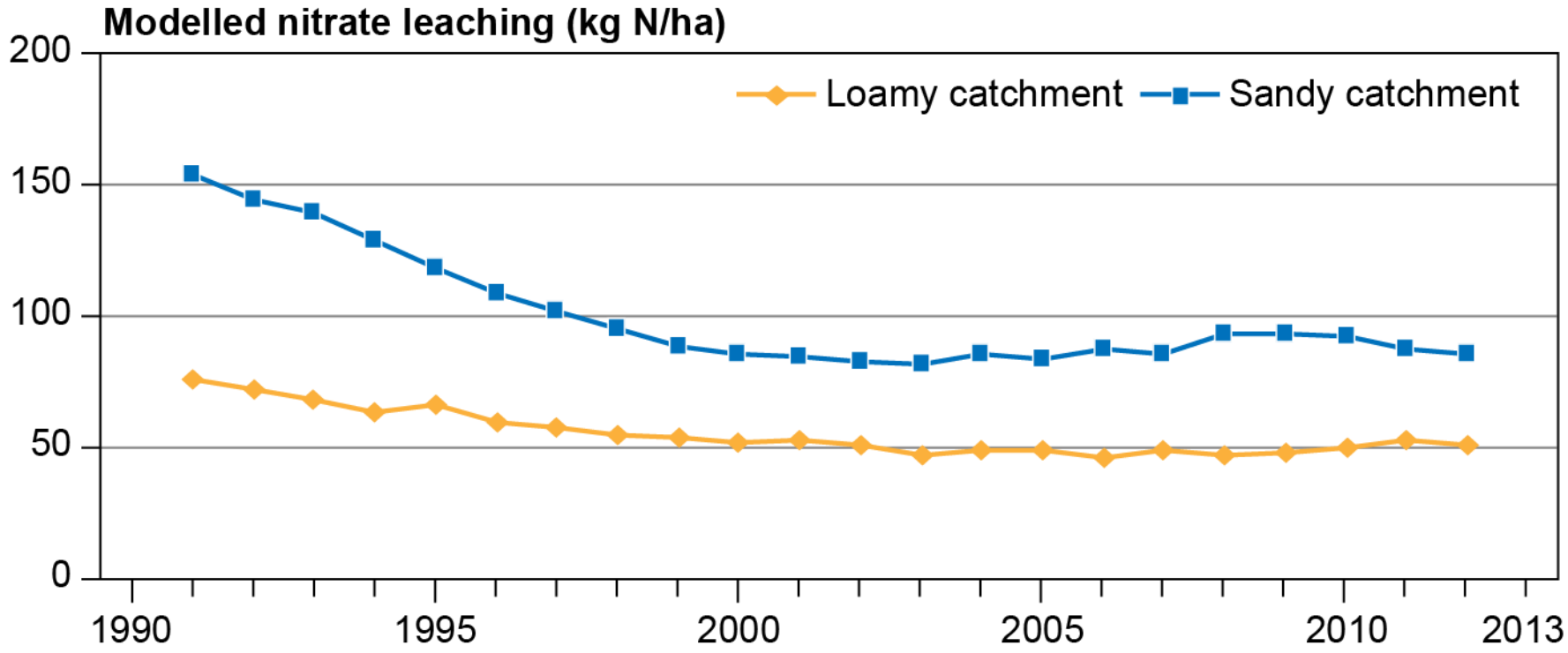
Agricultural catchment monitoring sites

in Denmark (five agricultural catchments)



Modelled nitrate leaching
in five agricultural catchments

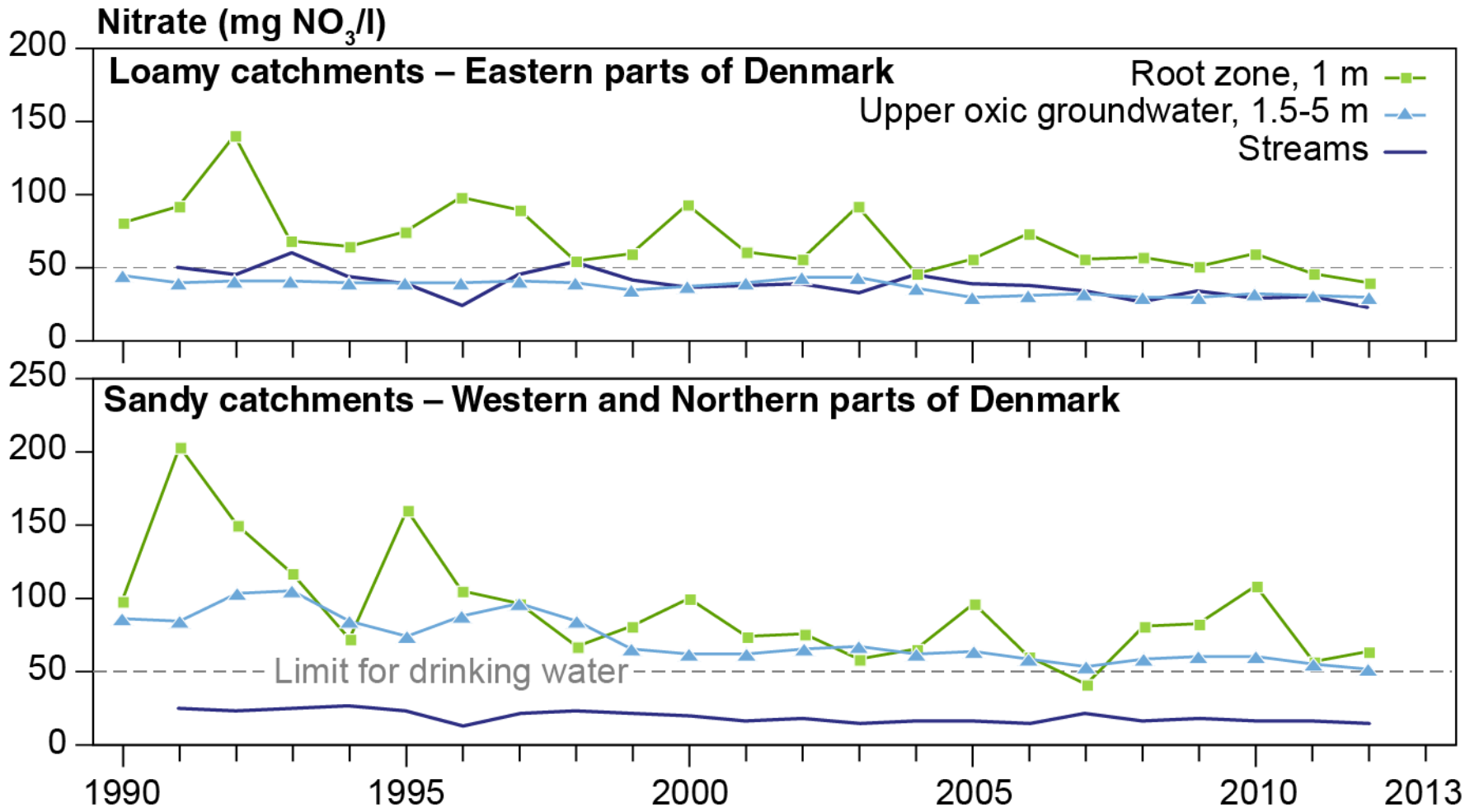
Reduction of 30-46 pct. from 1990-2013



Measured nitrate concentrations

in five agricultural catchments

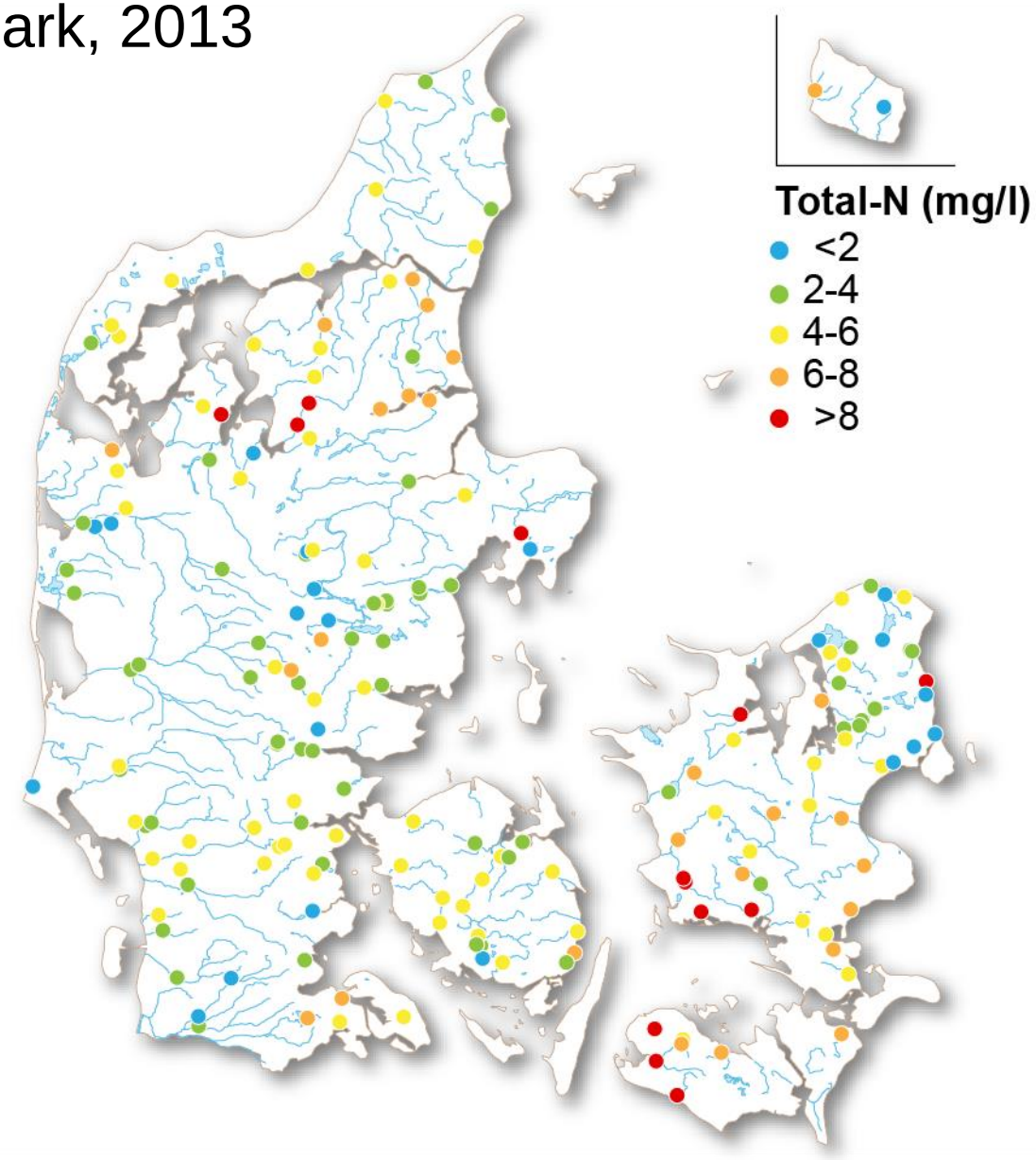
Reduction of 23-48 pct. from 1990-2013



Surface waters

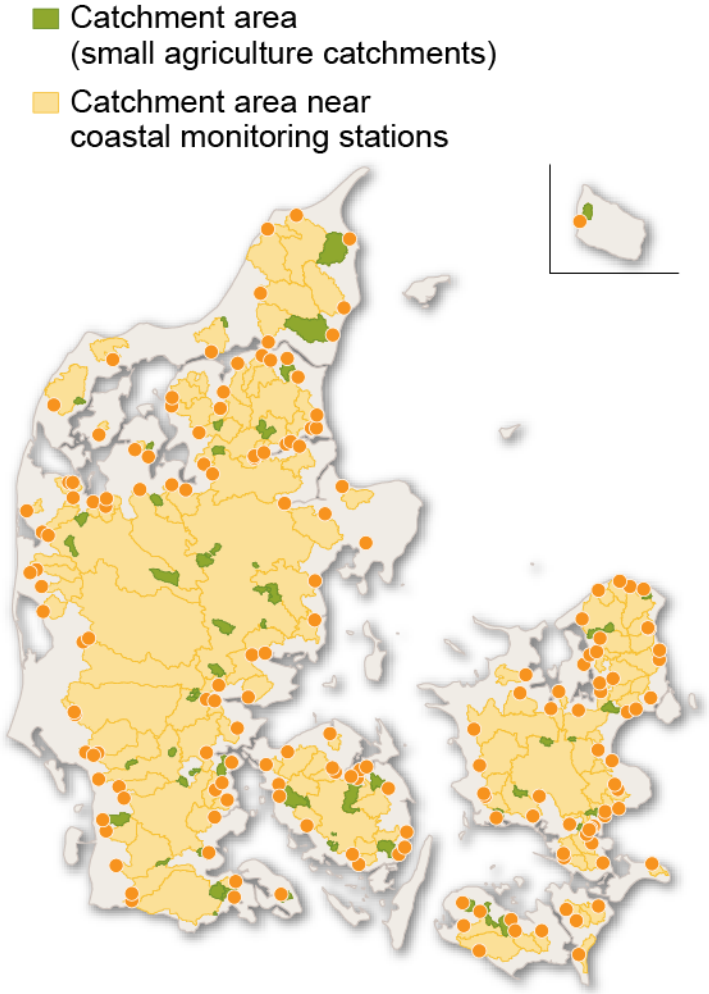
Regional variation in concentrations of total N

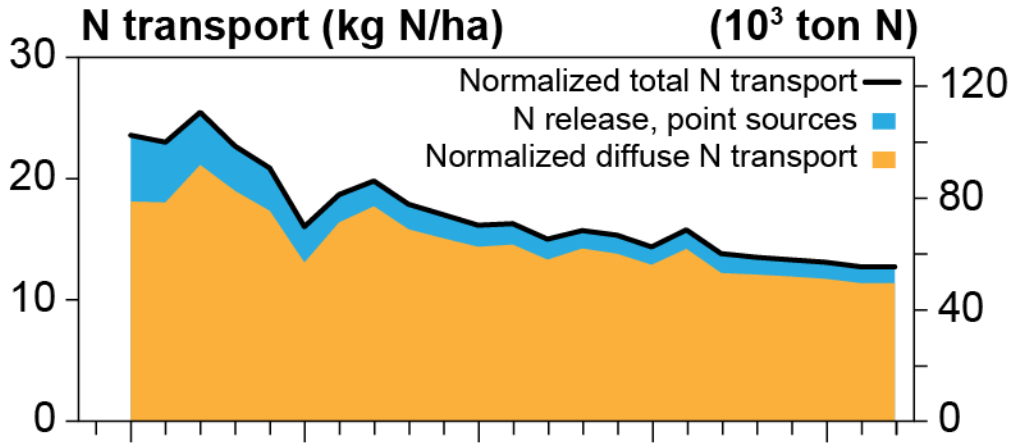
in rivers in Denmark, 2013

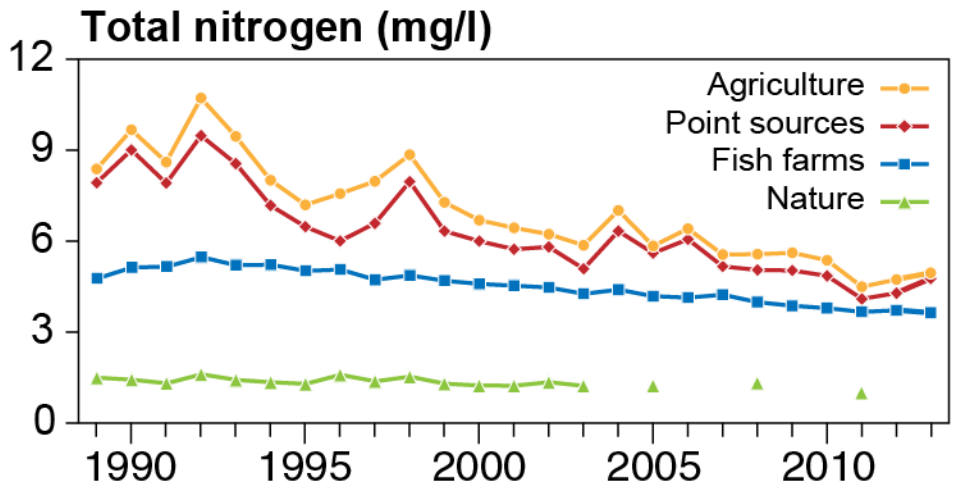


Nitrogen load to coastal and open waters

Reduction of 43 pct. from 1990-2013



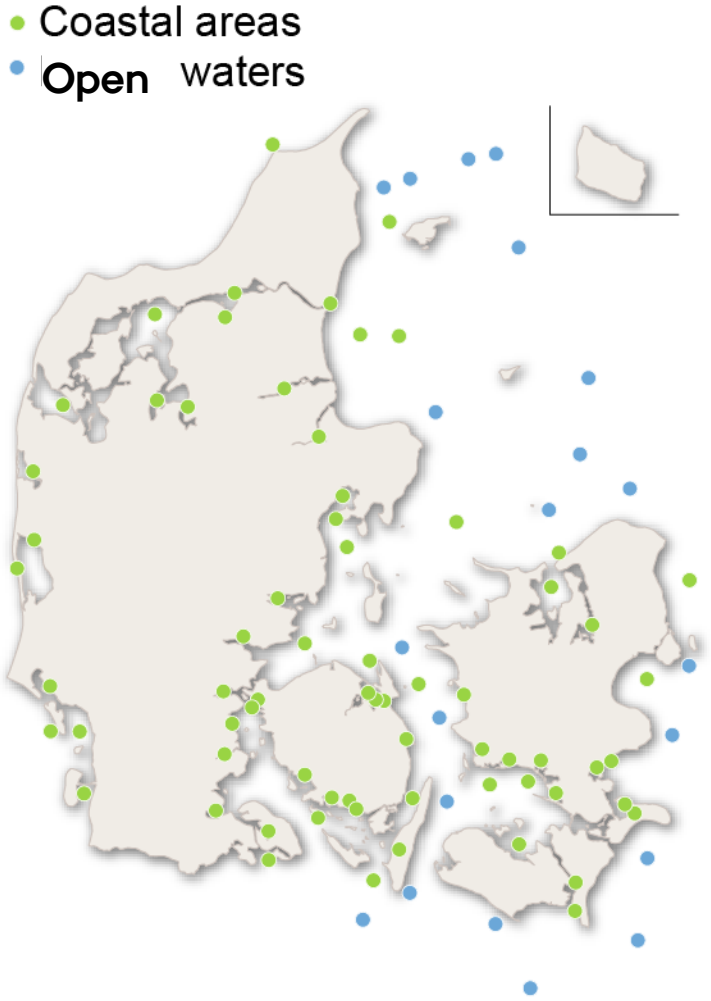


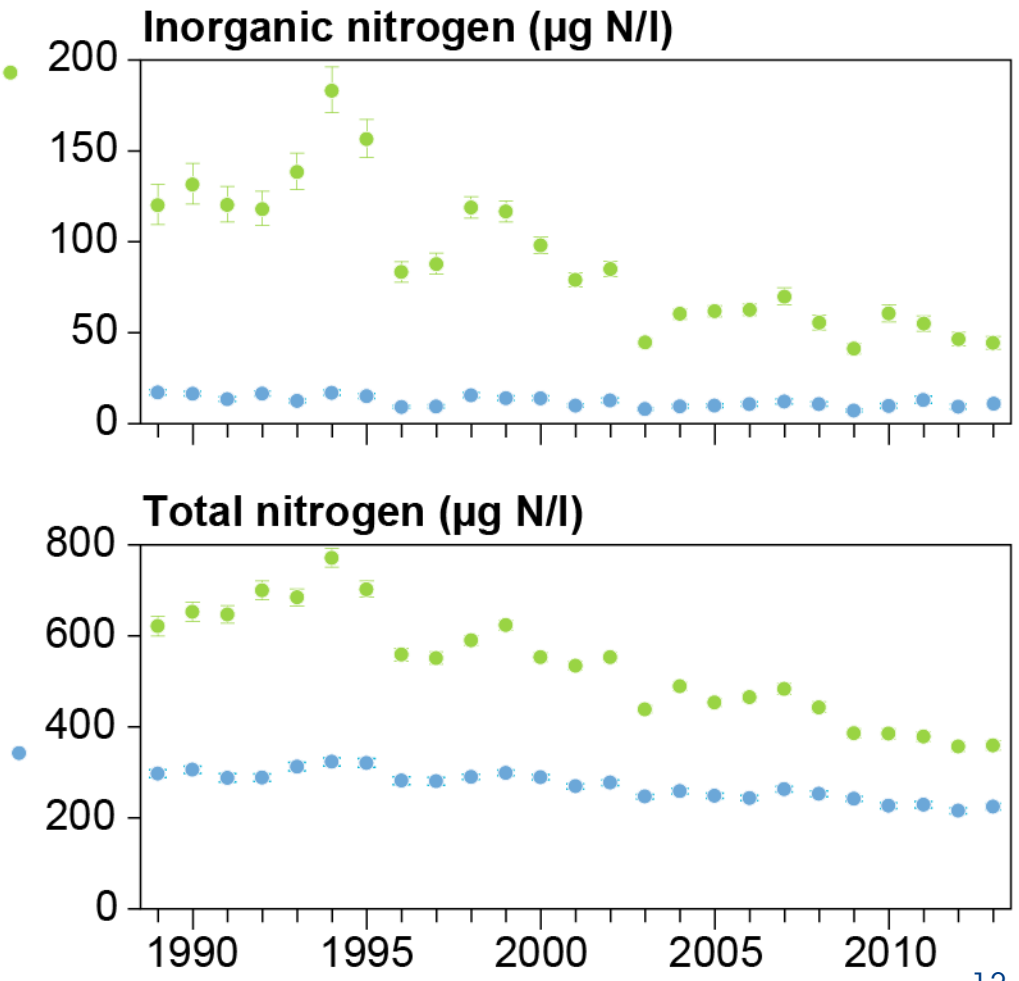


Nitrogen concentrations

in near coastal and open waters

Reduction of 50 pct. from 1995-2013 in coastal areas



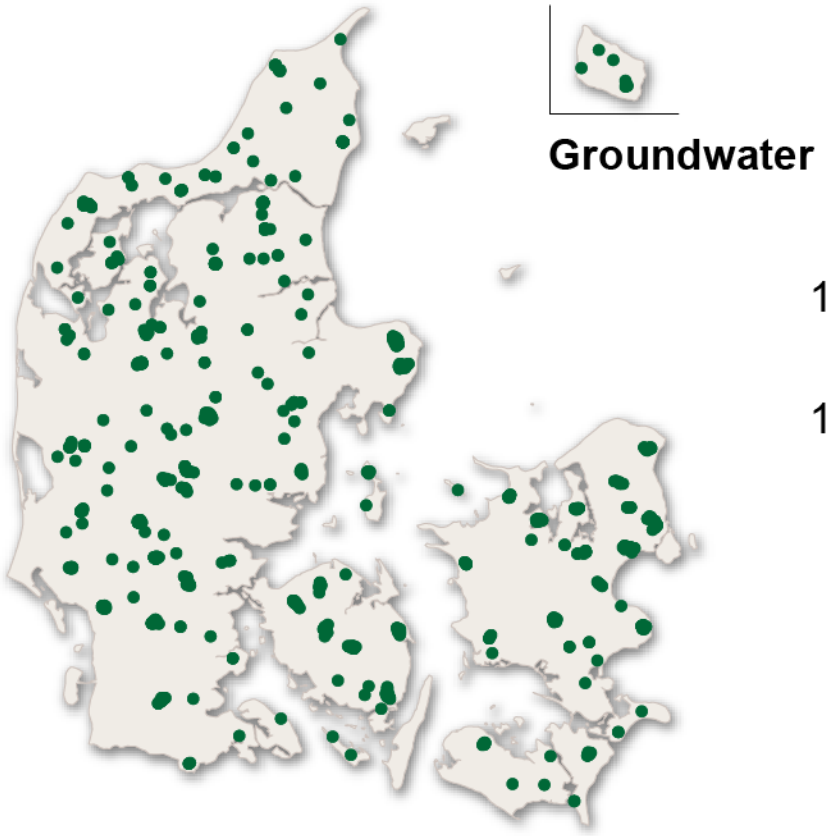


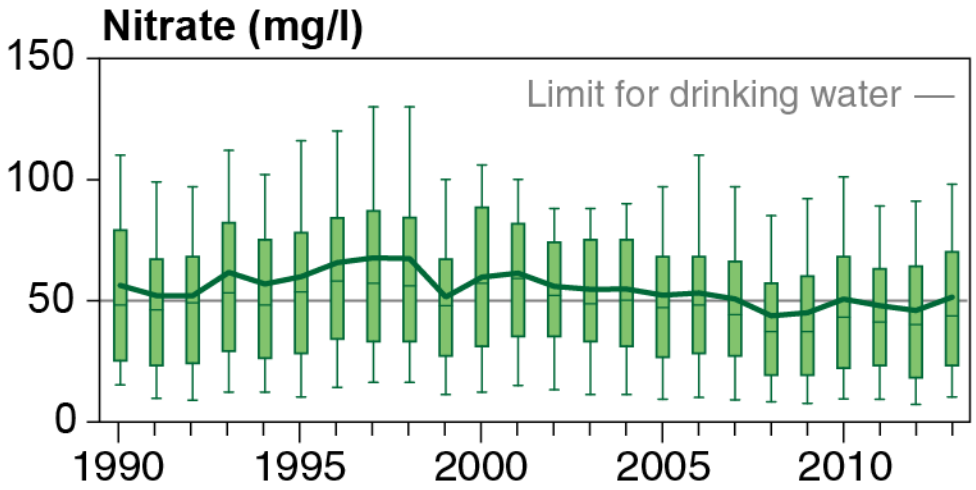
Groundwater

Groundwater

Nitrate concentration in monitored wells (3-100 meter below surface)

Reduction of 40 pct. from 1980-2000 in oxic groundwater





Abstract #151, Hansen et al., Thursday 10:45-11:00

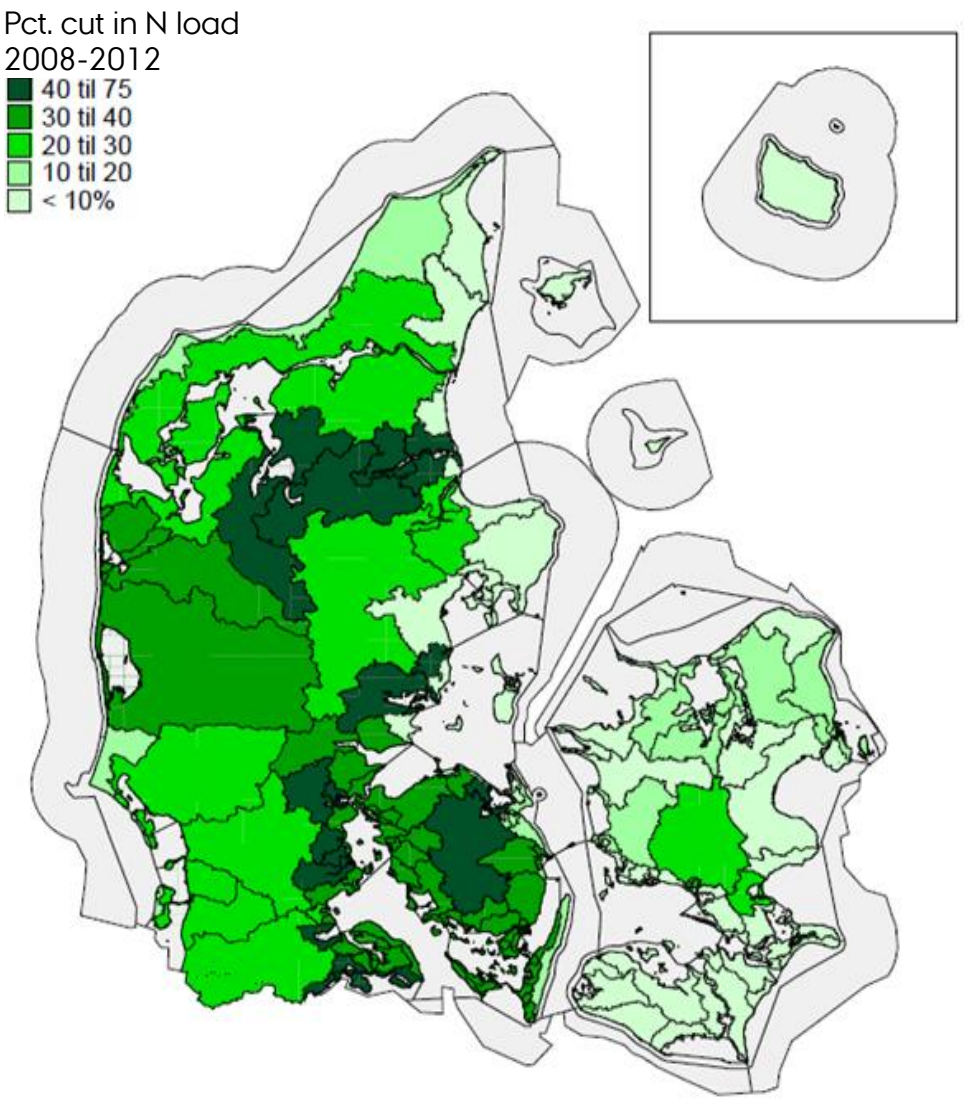
Conclusions

Trends 1990-2013

- N field balance national level: 43 pct.
- Modelled nitrate leaching in agricultural catchments: 30-46 pct.
- NO_3-conc in oxic groundwater (1980-2000): 40 pct.
- Diffuse N load to coastal and open waters: 43 pct.
- N concentration in near coastal waters: 50 pct.

New agenda to fulfil WRD

Plan for cut in N load to coastal areas



Local action plans for groundwater protection is carried out in nitrate vulnerable abstraction areas

So far 40 % of oxic groundwater is above 50 mg/l nitrate in 2013

New right-wing parliament wants to implement:

- No mandatory buffer strips
- No cut in fertilizer – back to best economic level – add 92.000 tons N
- No further catch crops

Less national N regulation

More spatial differentiated N regulation with target measures


Thank you for your attention