



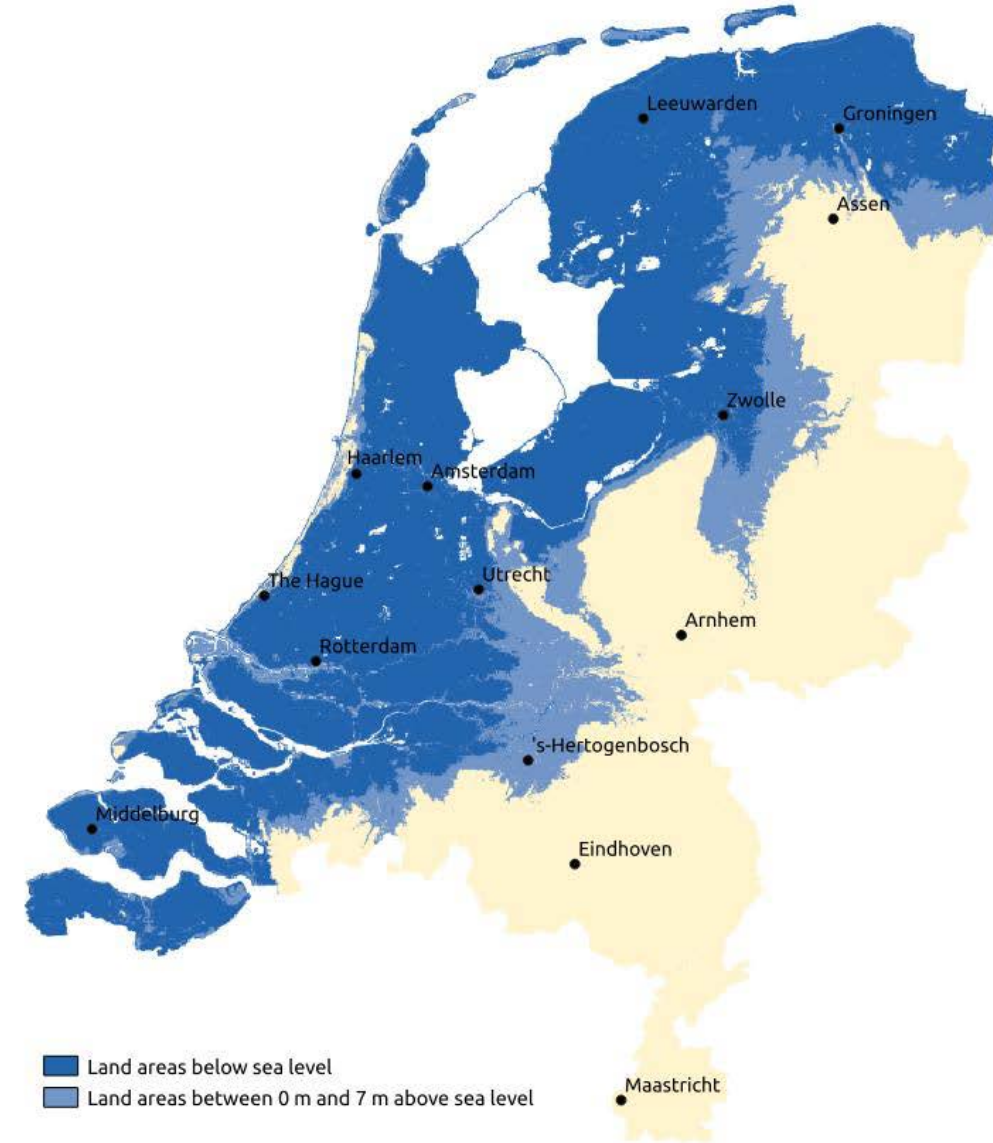
The rocky road towards water quality ambitions: experiences from the Netherlands

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- › #241



Water in the Netherlands

- > Low lying delta
- > Struggle against water
- > Reclaimed land (*polders*)
- > Net precipitation ~300 mm/y
- > Shift in extremes





But also...

- Densely populated ($>530/\text{km}^2$)
- Multiple use of land- and water
- Intensive agriculture and industry
- Legacies from the past
- Effects climate change
- *Challenges for water quality*



EU Water Framework Directive (2000/60/EC)

- › *Water as a heritage*
- › Overarching umbrella
- › River basin approach
- › Obligation of result

Objectives:

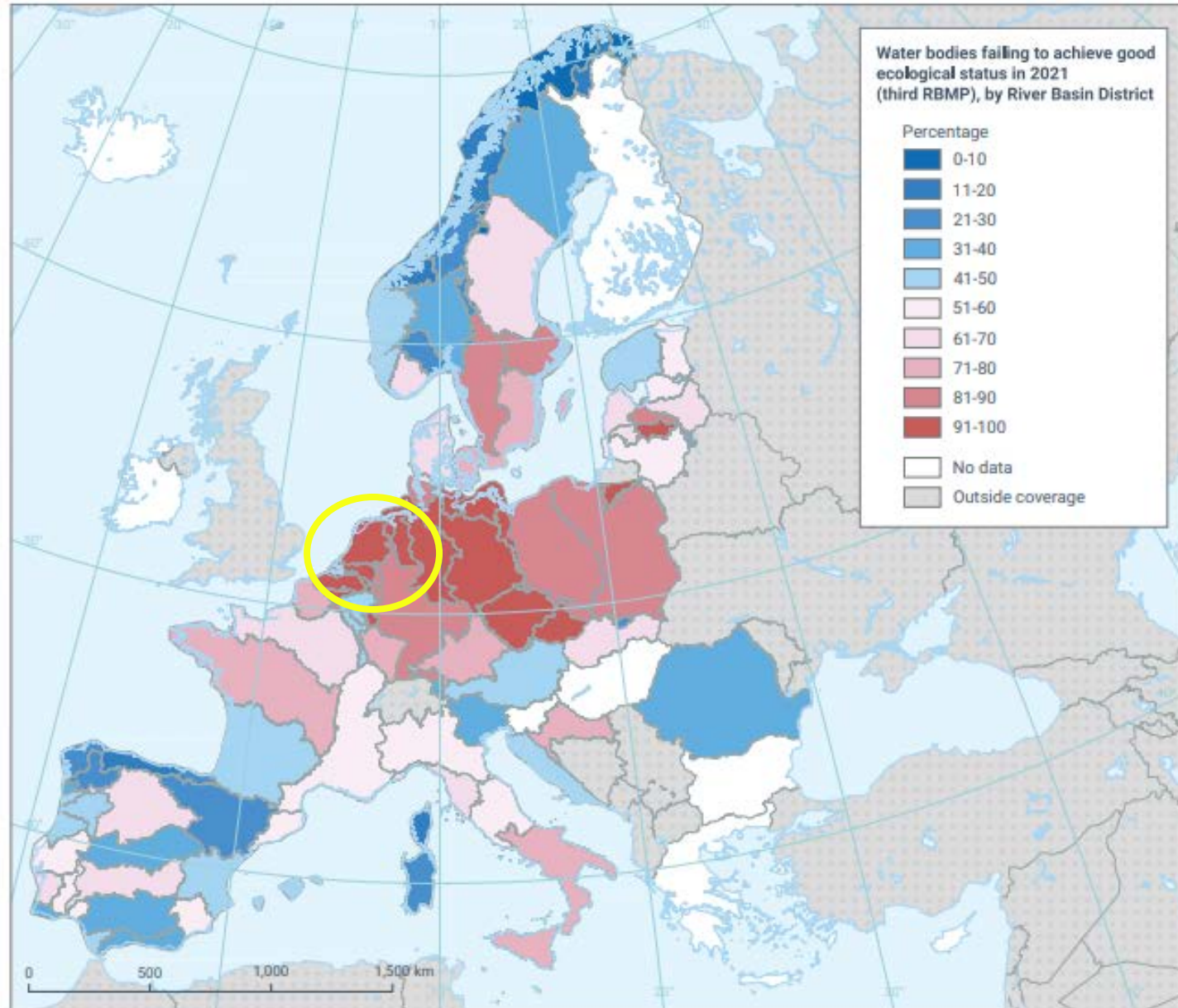
- Good ecological status,
- Good chemical status,
- Other usages





NL in Europe

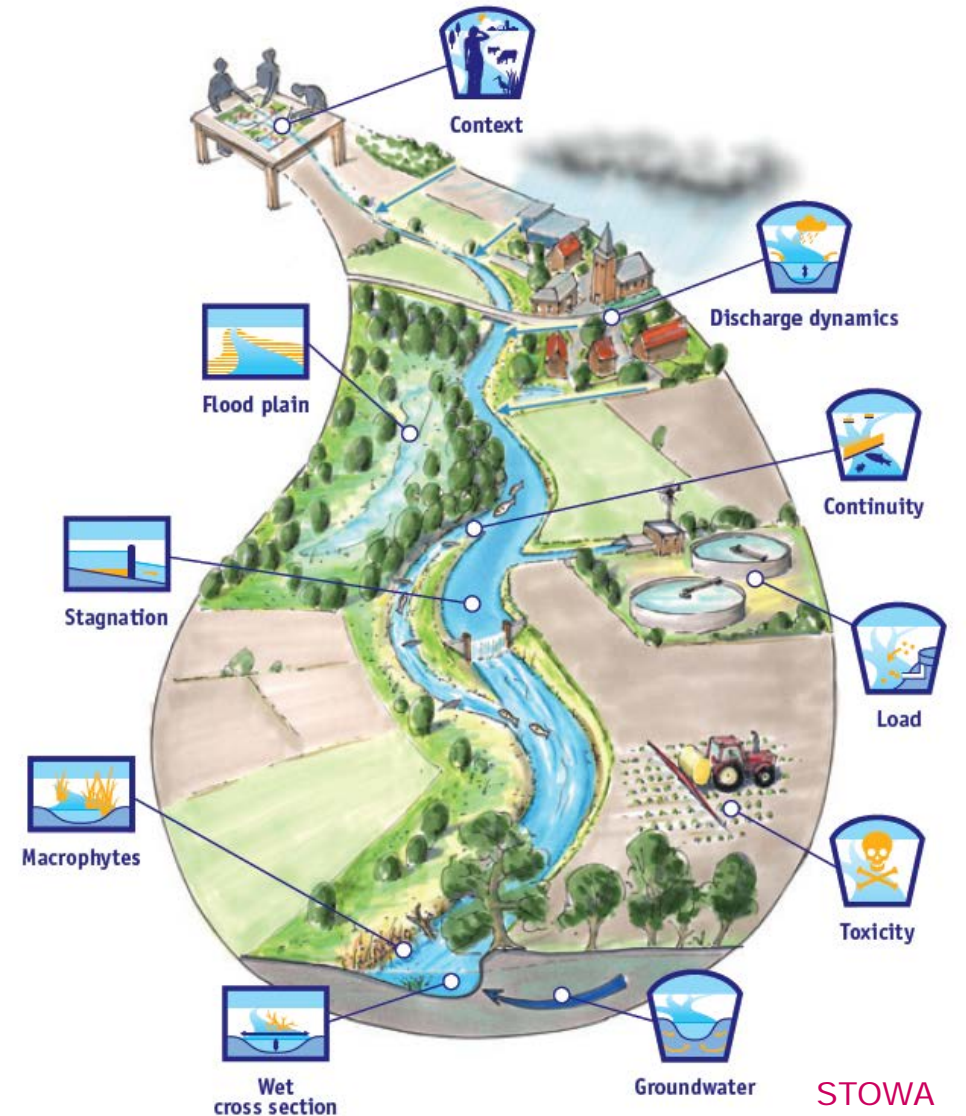
- > Ecological Status in 2021
- > *From:*
EEA (2024) Europe's state of water 2024





Ecological objectives

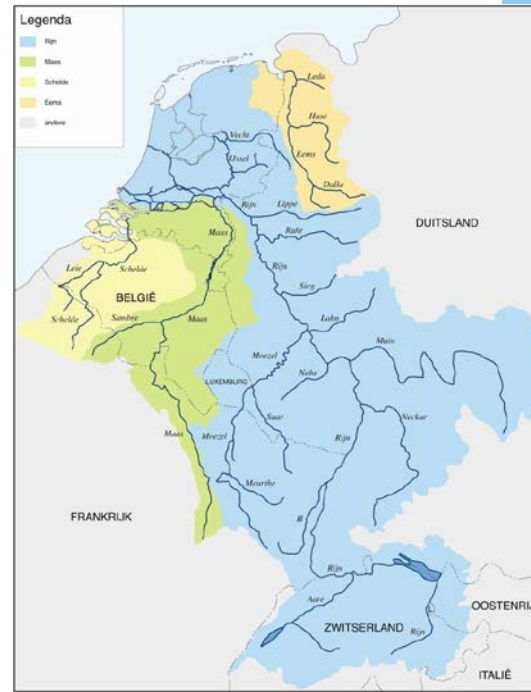
- System based approach
- Ecological key factors to achieve a good ecological status, related to:
 - Hydromorphology
 - Nutrients (N, P, Cl)
 - Toxic substances





Characteristics water system NL

- Delta of 4 basins
- Extensive landscaping (polders)
- Sand, clay and peat soils
- East west dominant flow



Soil map of the Netherlands: high grounds with wind-borne sand deposits drain into low-lying grounds with Holocene deposits.



Main pressures on water quality NL

- › Nutrients
 - › Toxic pressures:
 - point sources (WWTTPs and industry),
 - diffuse sources,
 - legacy effects
 - › Modifications water system
- Upcoming:
- › Emerging contaminants
 - › Invasive species
 - › Climate change



Mode of implementation EU law

Netherlands

- › EU legal framework leading
- › No additional provisions
- › Implementation into existing national law

Other MS

- › Similar
- › Level of ambition differs
- › Similar choice to implement in existing frameworks

Differences between MS in: level of decentralisation, institutional settings, but also pressures and characteristics water system



NL Legal framework



Environmental Management Act

- Integrative act for environment (land and water)



Drinking Water Act

- Safe drinking water and sources



Minerals Act

- Farm practices



Plant Protection Products and Biocides Act

- Admission and use PPPs

Implementation in sectoral policy domains,
Challenges cross-sectoral objectives water quality



Actors and stakeholders

- > Riparian authorities
- > National authority
- > Provinces
- > Water authorities (regional/national)
- > Municipalities
- > Variety of stakeholders

Different actors needed for different key factors



Example key factors

Load
(nutrients)

Bufferzone
(overflow)

EU

National
authority

Regional
water
authority

Province

Municipality

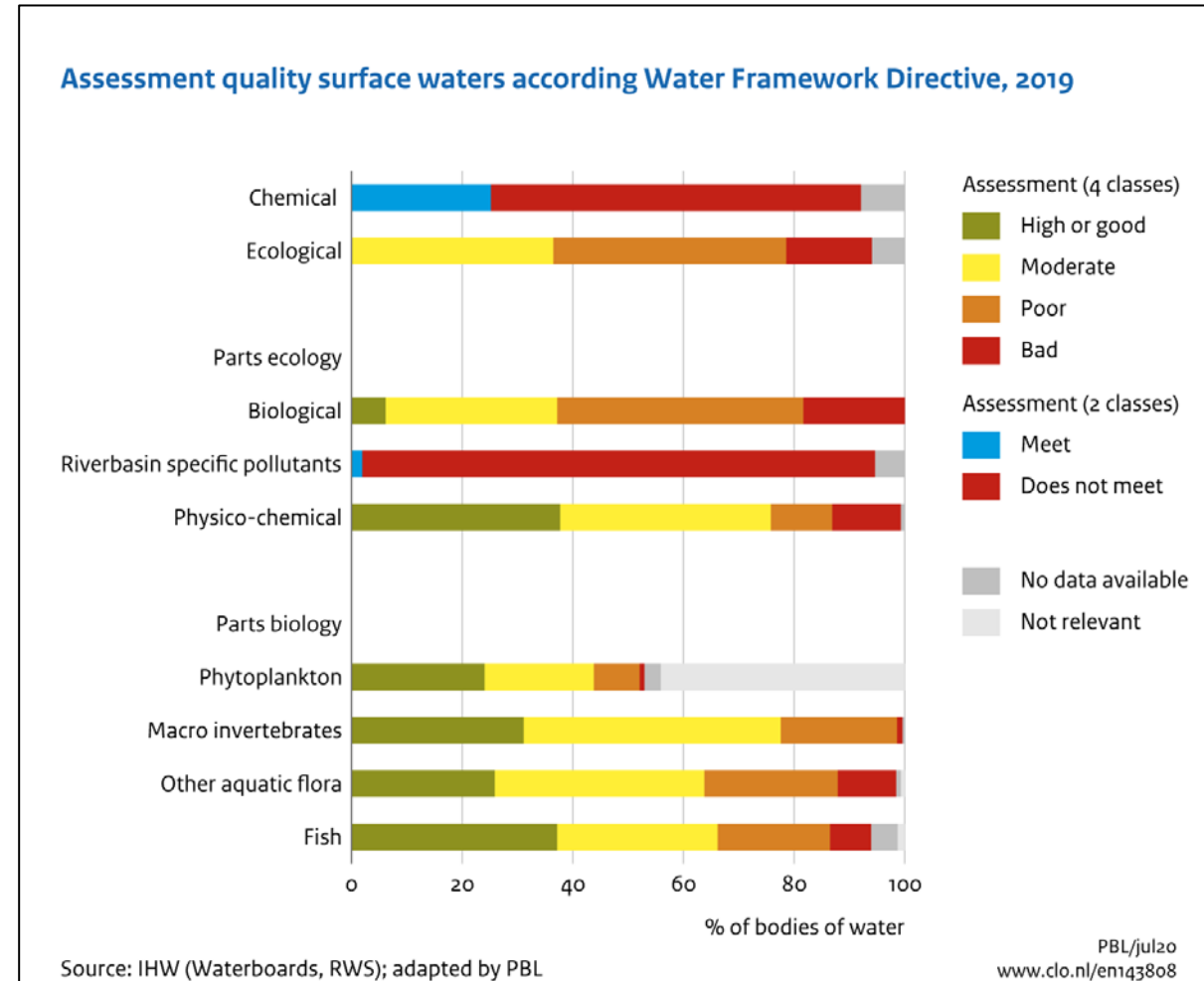
Regional
water
authority

Province



Results so far

- > Capacity
- > Collaboration
- > Measures: hydromorphology and WWTPs (N,P)
- > Limited reduction toxicity
- > Stagnating emissions agriculture
- > Compliance 2027?





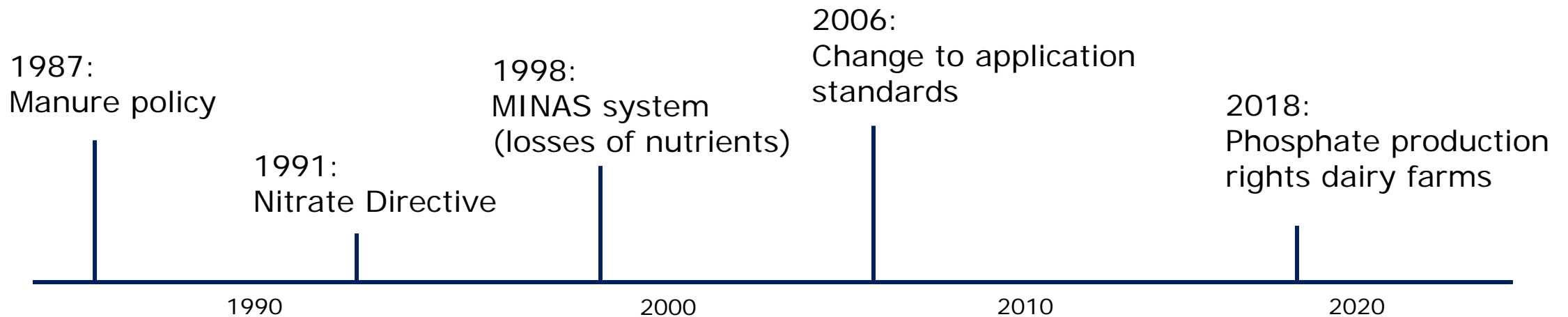
Challenges towards WFD compliance

- › Insufficient public support, failing to choose
- › Diffuse responsibilities
- › Cross-sectoral collaboration and engagement
- › Means: money, people, time
- › Knowledge (e.g. system's response)



Nitrates Directive: What and how?

- Implemented in 1991, as of 2000 integral part of overarching WFD
- Aim: Reduce/prevent pollution from nitrates from agricultural sources to protect drinking water sources and prevent eutrophication of surface waters

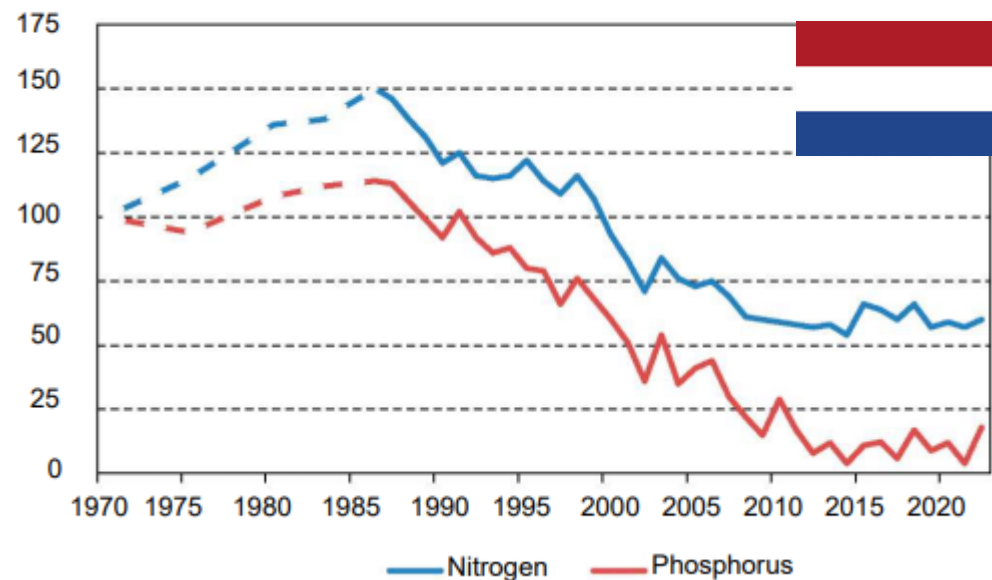




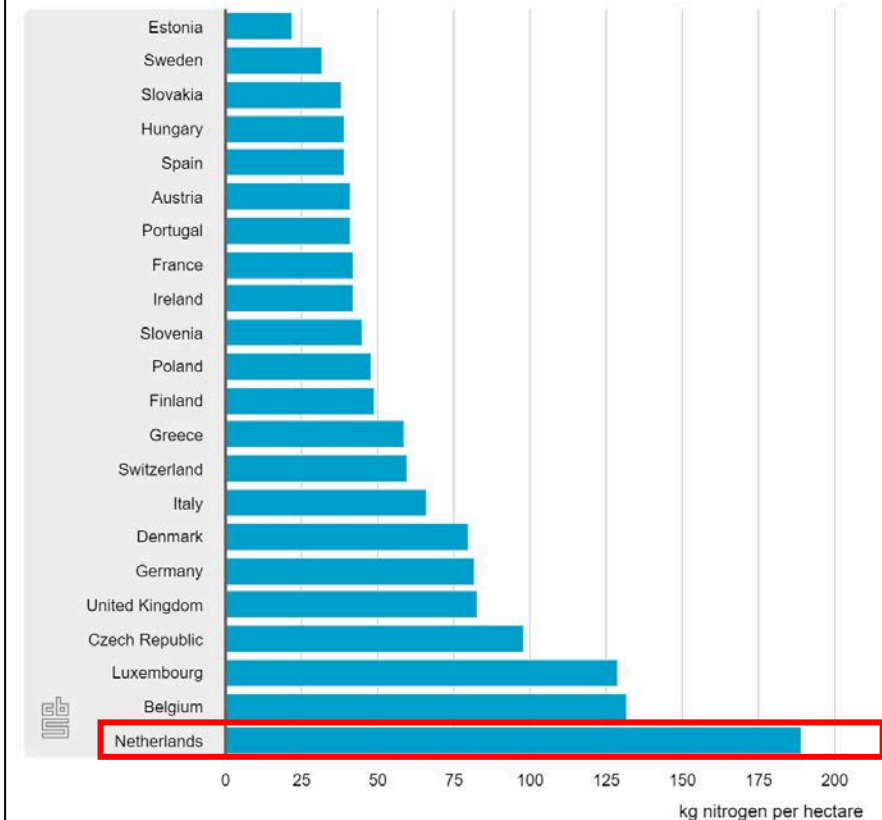
Agriculture in NL

- > High intensity of agriculture in NL
- > Large decrease in N surplus in 1990's and 2000's
 - Due to regulation and innovation

Nutrient surplus in agriculture (1970 = 100)



Nitrogen surplus to soil - 2015



Source: OECD



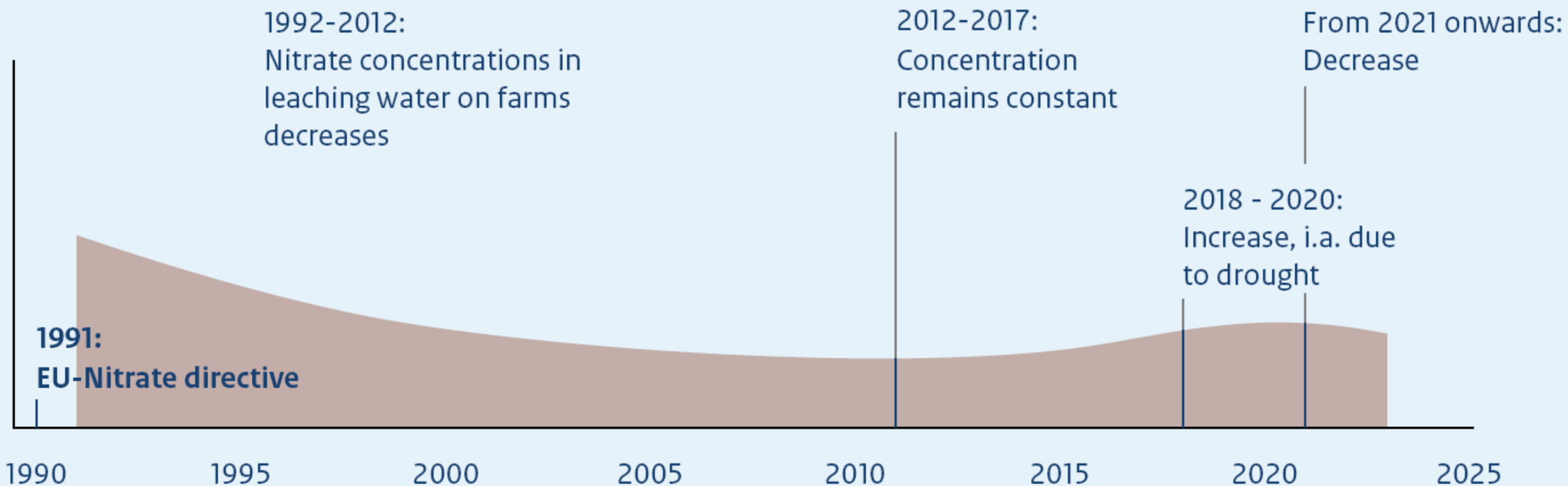
Nitrates Directive: Implementation NL

- › Restriction of manure/fertilizer application
- › Application standards
- › Manure production quota

- › Recently (7th nitrate action programme)
 - Mandatory catch and break crops
 - Buffer strips
 - Regional (voluntary) projects

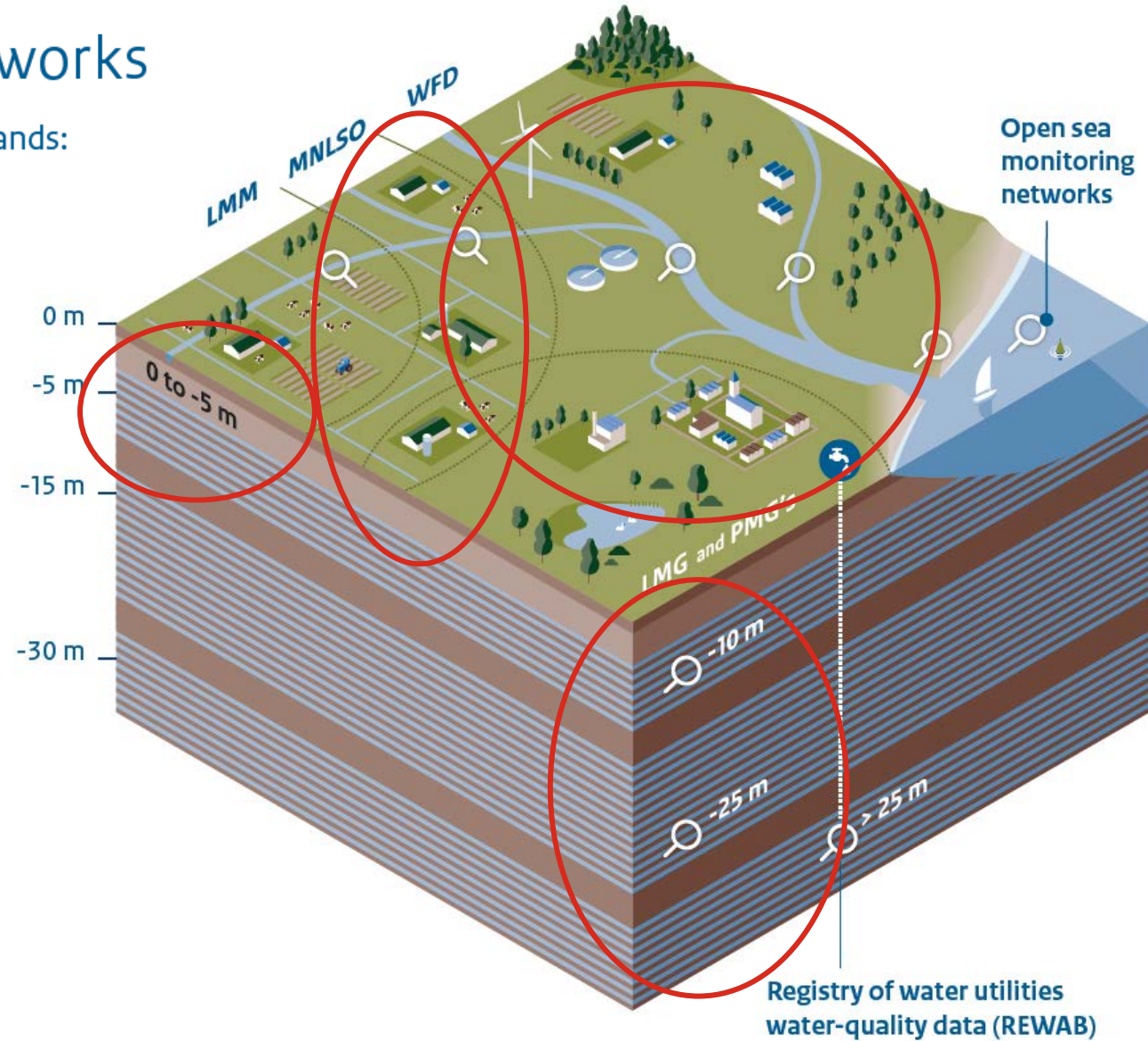


Effect of ND policy on water quality



Water quality monitoring networks

There are diverse monitoring networks in the Netherlands:



National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

Agricultural practices and water quality in the Netherlands: status (2020-2023) and trends (1992-2023)

The 2024 Nitrate Report with the results of the monitoring of the effects of the EU Nitrates Directive Action Programmes

RIVM-report 2024-0209

Claessens et al., 2025



Minerals Policy Monitoring Programme (LMM)

- › Water quality and agricultural practices on ±450 farms
- › Random sample of Dutch agriculture
- › Water leaching from the root zone
- › Farm level water sampling

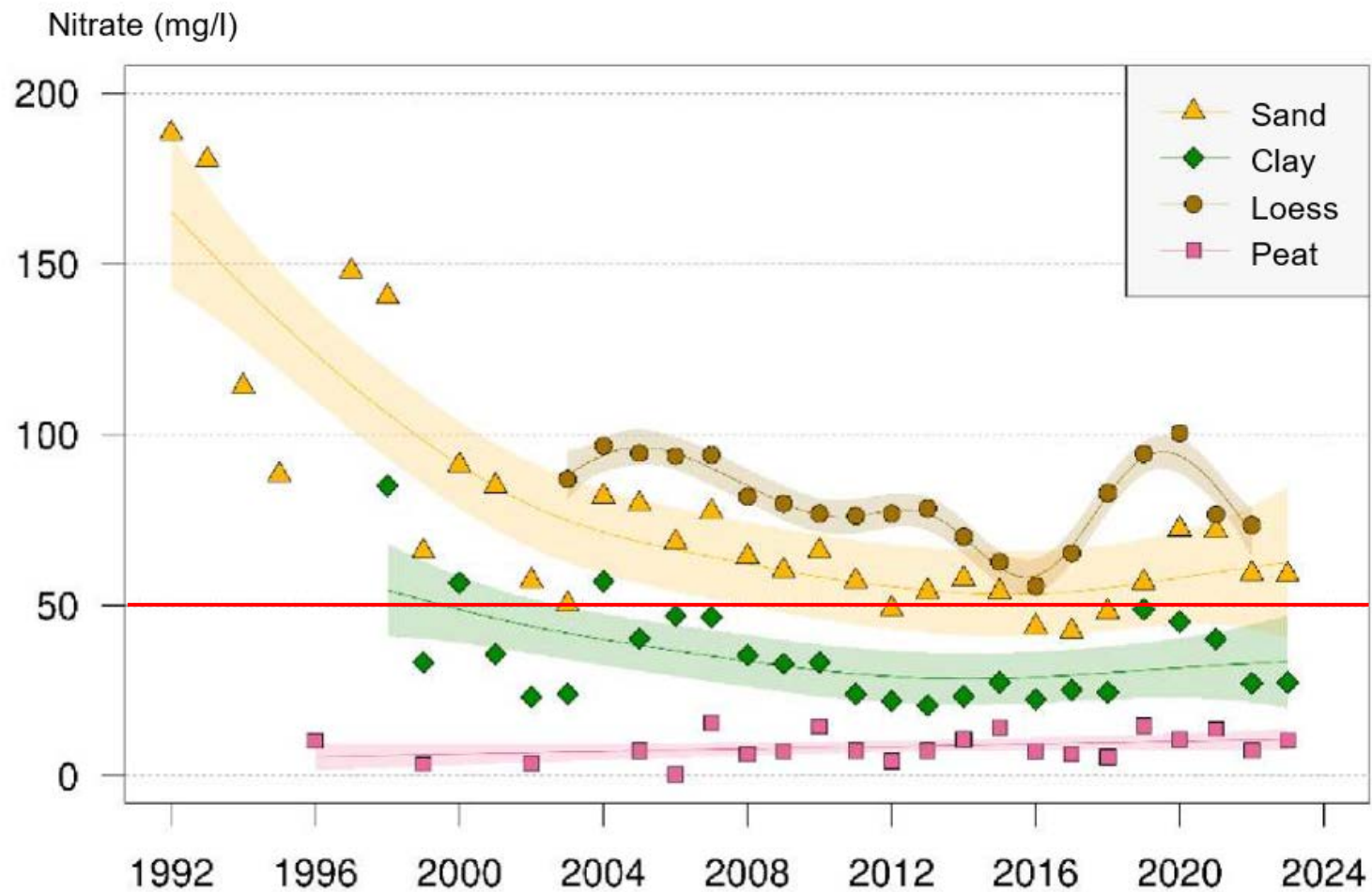
Main aim:

To monitor the state and trend of the water quality and agricultural practice to evaluate effects of agricultural policy





Results LMM, initial decrease but stagnation



Legend

- Clay region
- Loess region
- Peat region
- Sand region

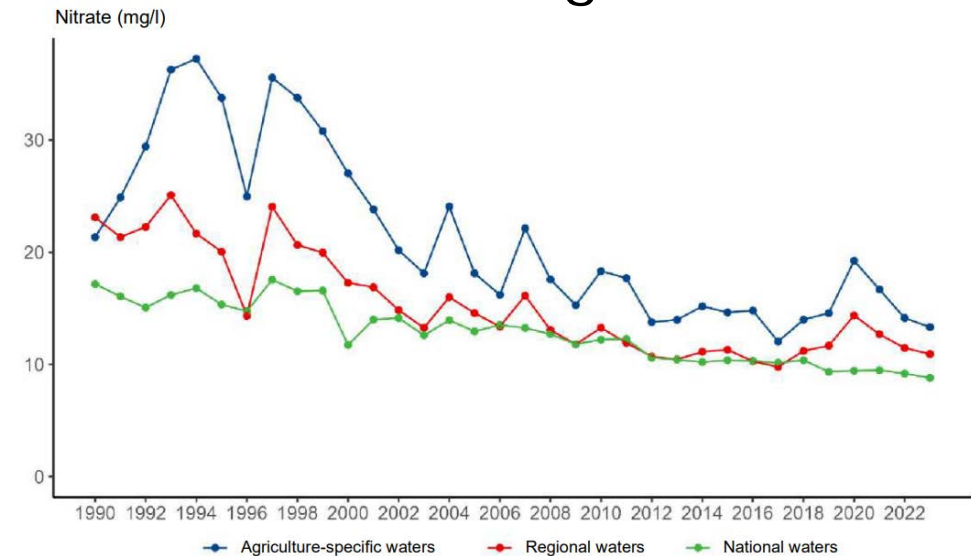




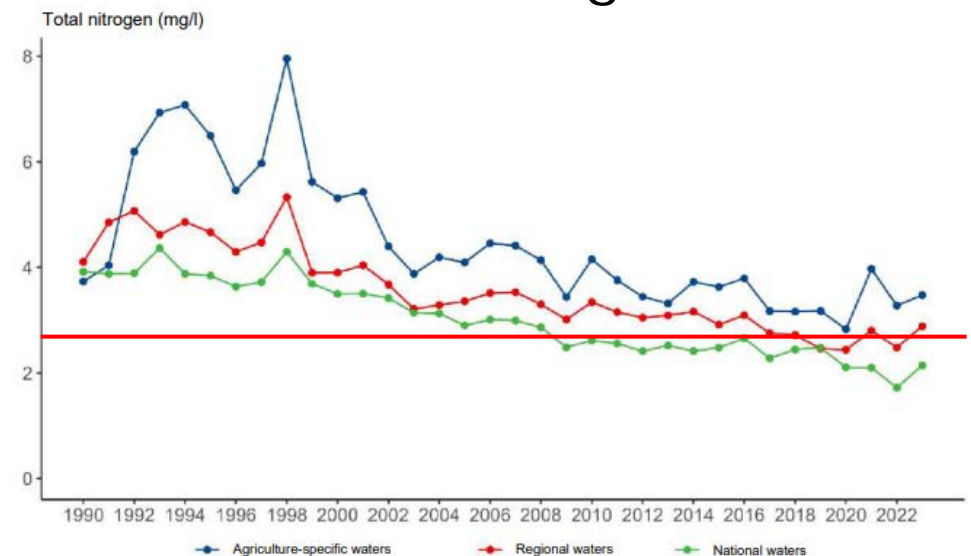
What about surface water?

- > Traditionally less focus on surface water from ND
- > Mismatch standard of 50 mg/l nitrate vs ecological objectives (WFD)
- > Winter versus summer

Winter average nitrate



Summer average total-N





What about surface water?

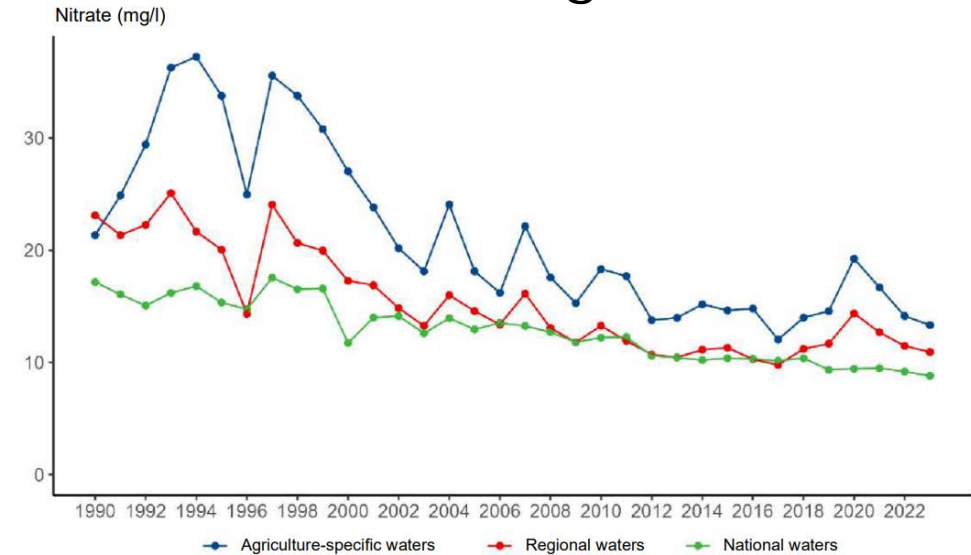
Agriculture-specific waters

Regional waters

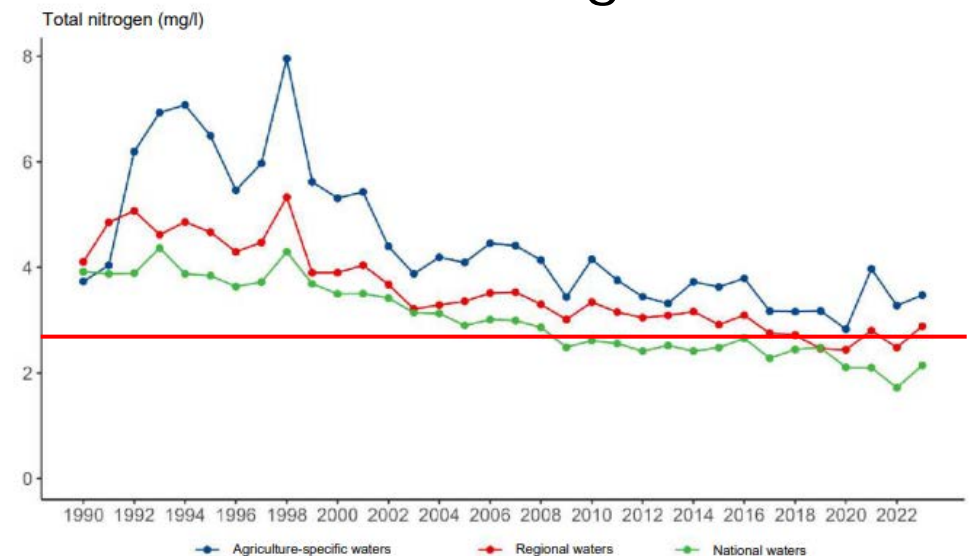
National waters

> Winter versus summer

Winter average nitrate



Summer average total-N





Challenges towards compliance ND (1/2)

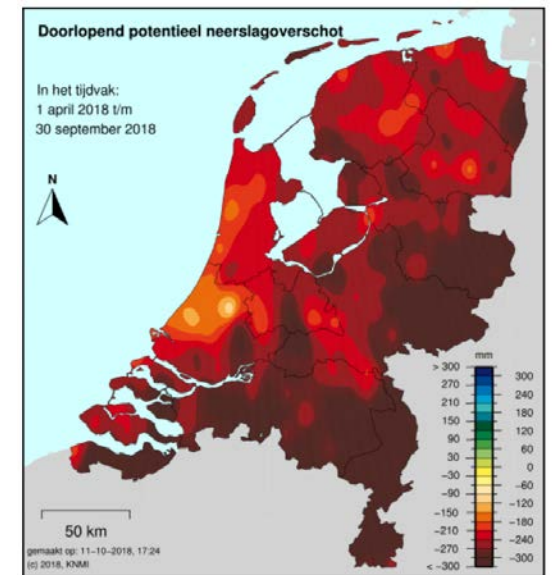
- > Policy:
 - New manure policy aims to differentiate, but also reduce rules
 - Current policy not enough to achieve goals of ND and WFD

- > EU:
 - Revision of ND (ongoing)



Challenges towards compliance ND (2/2)

- > Water-soil system
 - Effect climate change
 - Local conditions matter
- > Spatial + temporal scale of standard of 50 mg/l nitrate?



Drought in 2018



Ongoing initiatives

- › WFD Impulse Programme
- › Regional programmes for Water, Climate and Nature
- › Research *(funded by STOWA)*:
 - Administrative-legal building blocks for increasing effectiveness (special session S2)
 - Effect based monitoring ecology
- › Nutrients: Development 8th Action Programme Nitrate



Thanks for your attention

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