Ministry of Agriculture, Nature and Food Quality of the Netherlands

Monitoring water quality – nitrates

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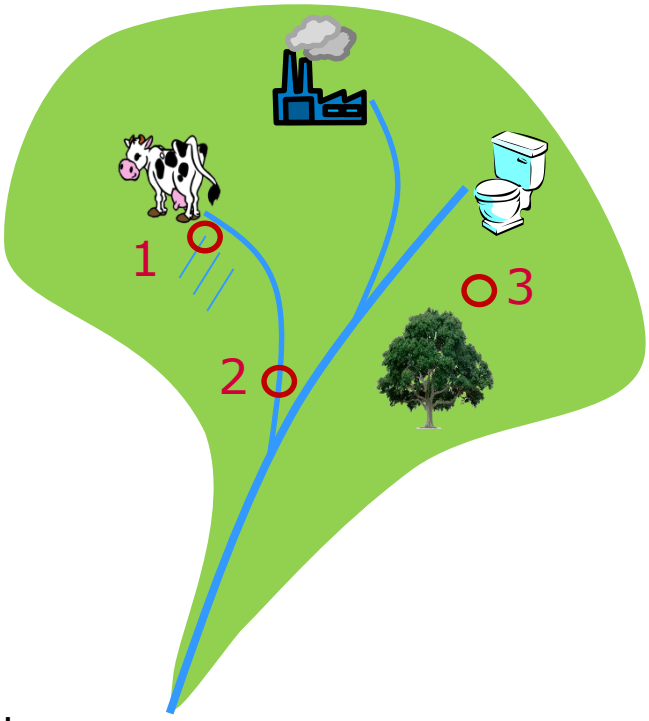
With special thanks to Dico Fraters and Annemieke van der Wal of the National Institute of Public Health and the Environment

Three water quality monitoring networks

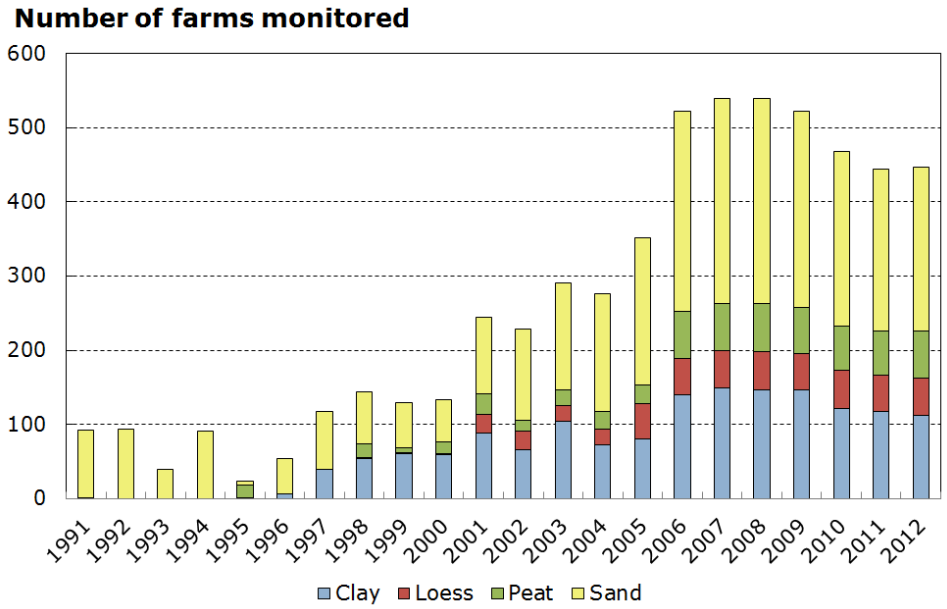
1. Minerals Policy Monitoring Programme (LMM):
   ±450 commercial farms, both on-farm surface water (ditches) and water leaching from the rootzone

2. Monitoring Network for Nutrients in Agriculture Specific Headwaters (MNLSO):
   99 surface water locations of Dutch Water Boards with ≥10 year record. Only agricultural influenced headwaters

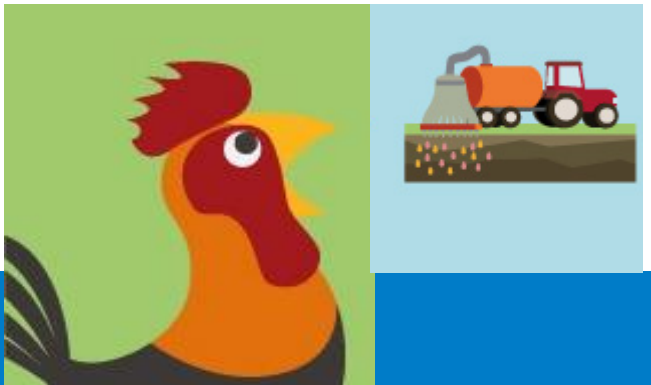
3. National Groundwater Quality Monitoring Network (LMG):
   ±350 dedicated monitoring wells with screens at 10, 15, 25m bsl. Agricultural, natural and urban areas



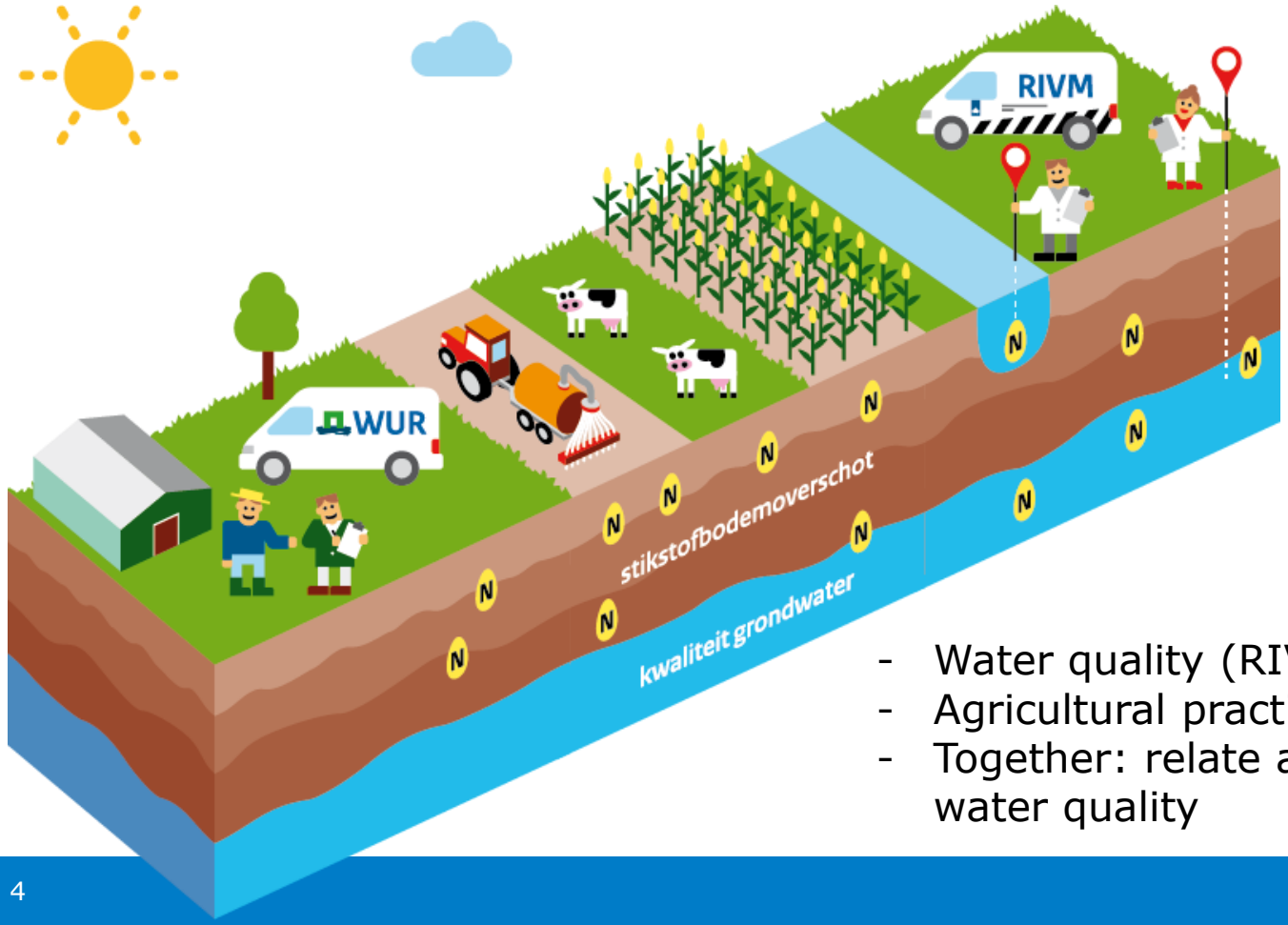
Set up of Minerals Policy Monitoring Program



- Established in 1992
- Objective:
  Assessing the effects of National and European mineral policies on water quality
- Program for monitoring agricultural practice and water quality on farms
- Combined effort of National Institute for Public Health and the Environment (RIVM) and Wageningen Economic Research (WEcR)

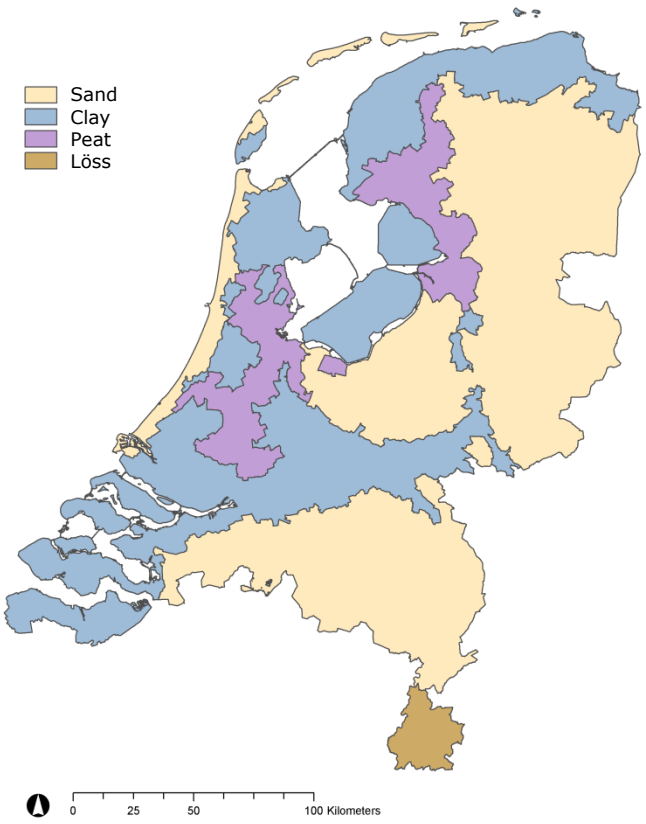


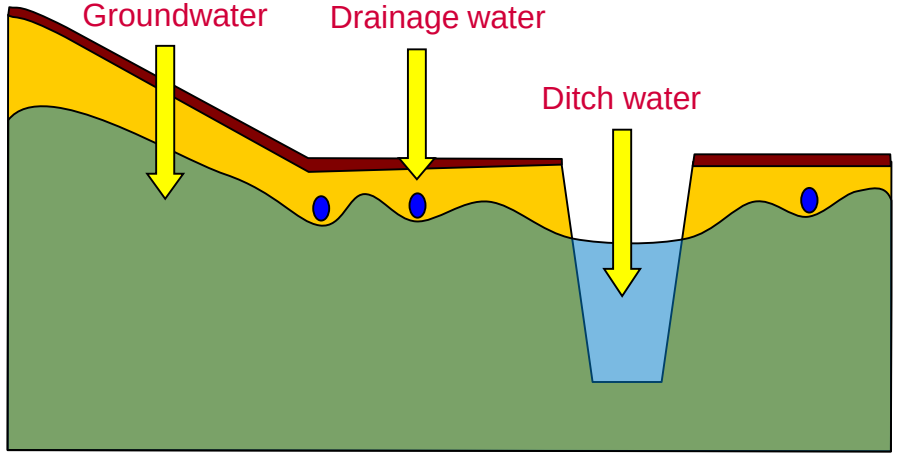
Who does what in LMM



- Water quality (RIVM)
- Agricultural practise (WEcR)
- Together: relate agricultral practise to water quality

Set up of Minerals Policy Monitoring Program





- Four regions: sand, clay, peat and loess
- Four farm types: dairy, arable, industrial farms and other
- Four water types: Groundwater, soil moisture, drainage water, ditch water

Set up of Minerals Policy Monitoring Program

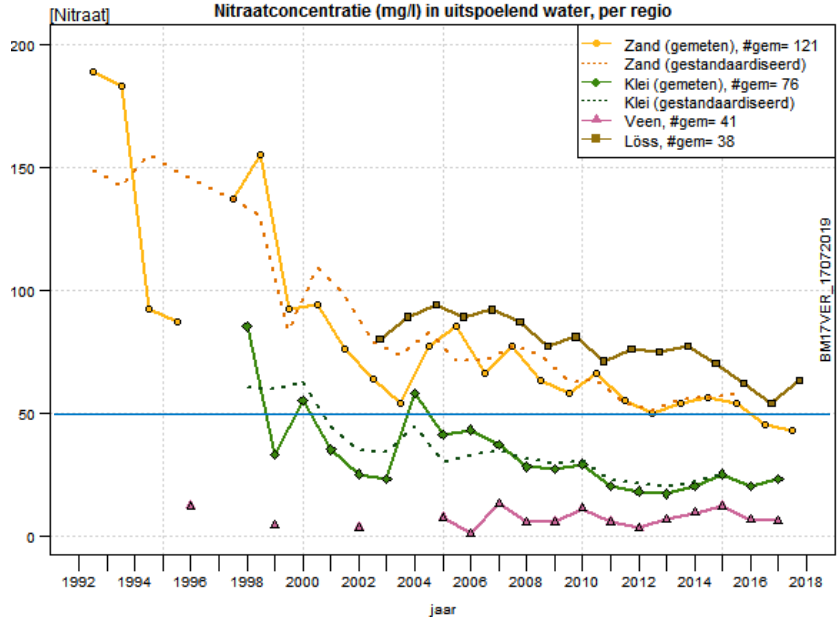
- Depending on region and water type 1 to up to 9 times per year sampling
- Depending on region sampling in winter and/or summer
- 16 groundwater points per farm – 2 mixed samples
- Up to 2 types of ditches, 4 ditches per type – 1 mixed sample per ditch type
- 16 drainage tubes per farm – 1 mixed sample

- Amount of sampling points independent of size
- Minimum size farm 10 ha

Results LMM

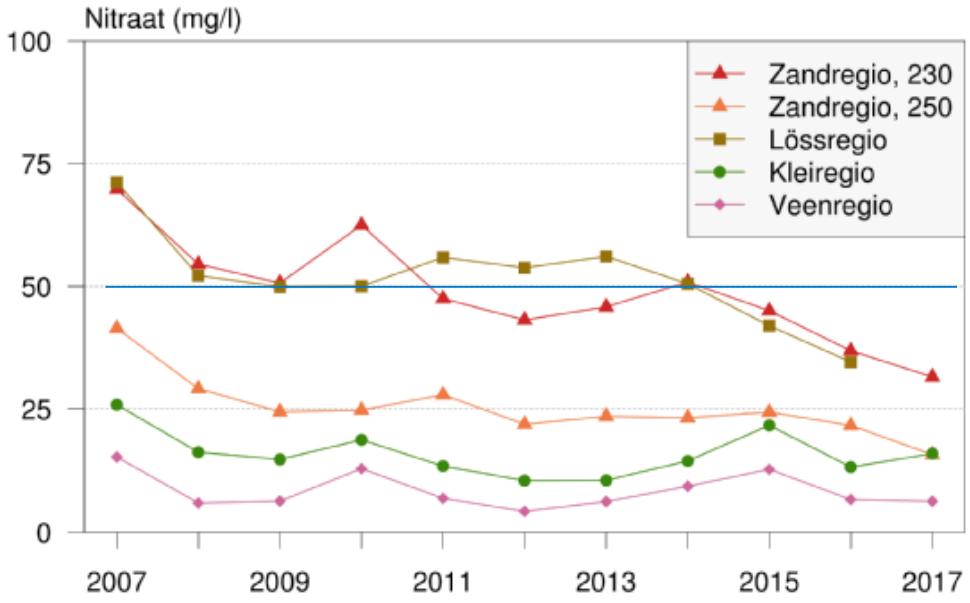
- Nitrate concentrations decreased strongly since beginning measurement, last years more stable
- Derogation monitoring network (only derogation farms) lower nitrate concentrations that Evaluation monitor (all farm types included)

Evaluation monitoring network



Yellow = sand, green = clay, purple = peat, brown = loess

Derogation monitoring network

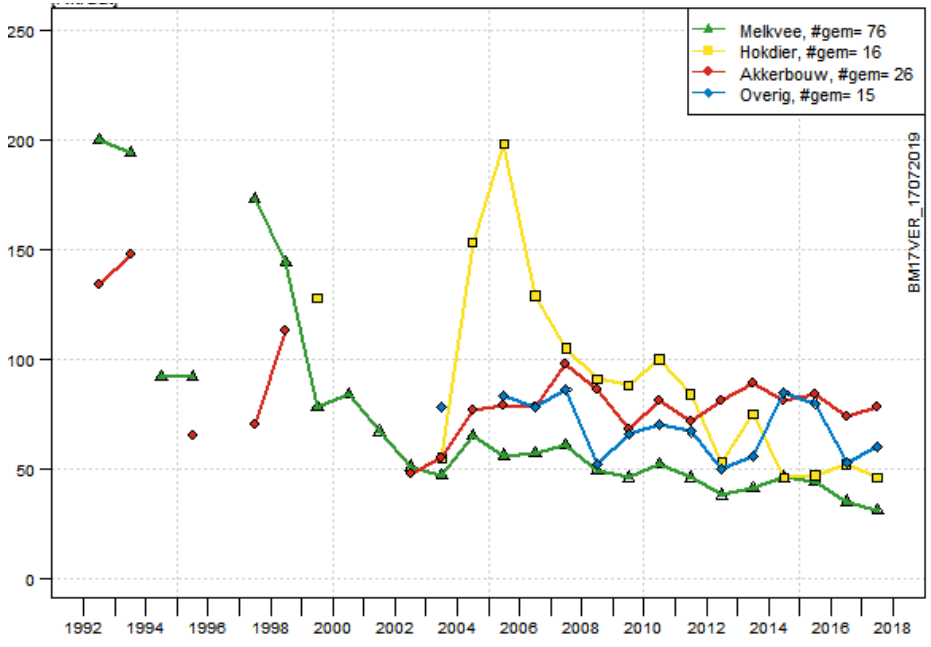


Red = sand 230, orange = sand 250, brown = loess, green = clay, purple = peat

Results LMM

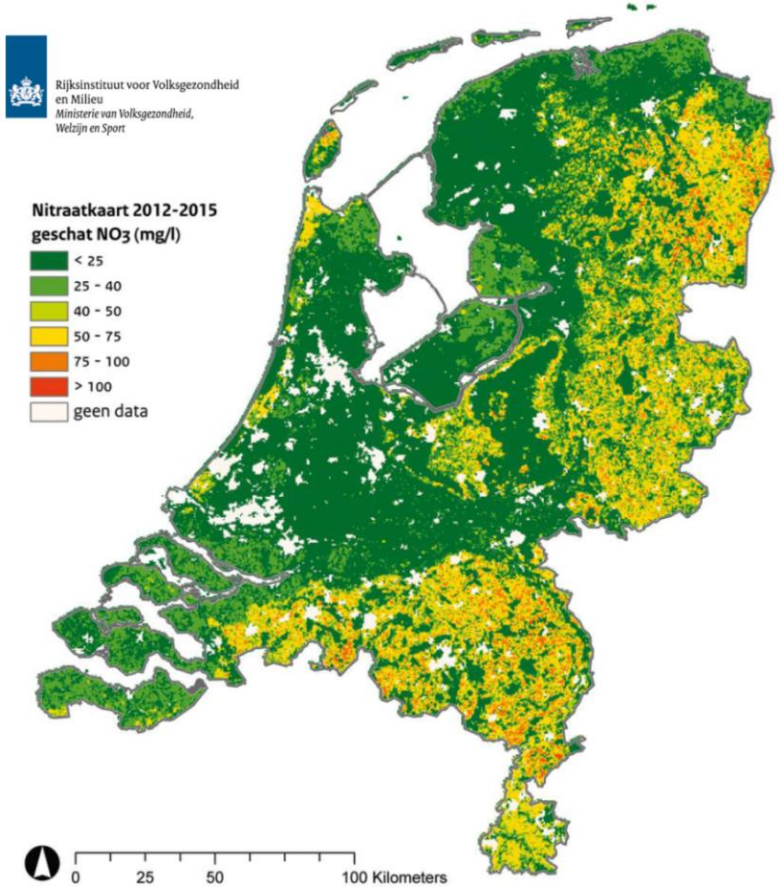
- Regionally large differences: effect of soil type and ground water level
- Farm type has a strong effect: arable high concentrations, dairy low

Nitrate concentration in sand region



Green = Dairy, yellow = industrial, red = arable, blue = other

Modelled nitrate concentration




Thanks for listening
Futher questions?