Measuring nitrogen leaching in fields of commercial growers

Enhancement of growers awareness to reduce nutrient leaching: option or Utopia

IHC, Istanbul, 13 August 2018, Janjo de Haan

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The playing field: nitrogen management in field vegetables

High risk on nitrate leaching in vegetable crops

- High nitrogen surplus
- A lot of crop residues
- Harvest in full growth
- Low efficiency and high demand

Strict manure policy
Application norms lower than advice

Limited awareness among farmers

- Nitrate leaching not visible for farmers as their problem
- Nutrient management gets limited attention

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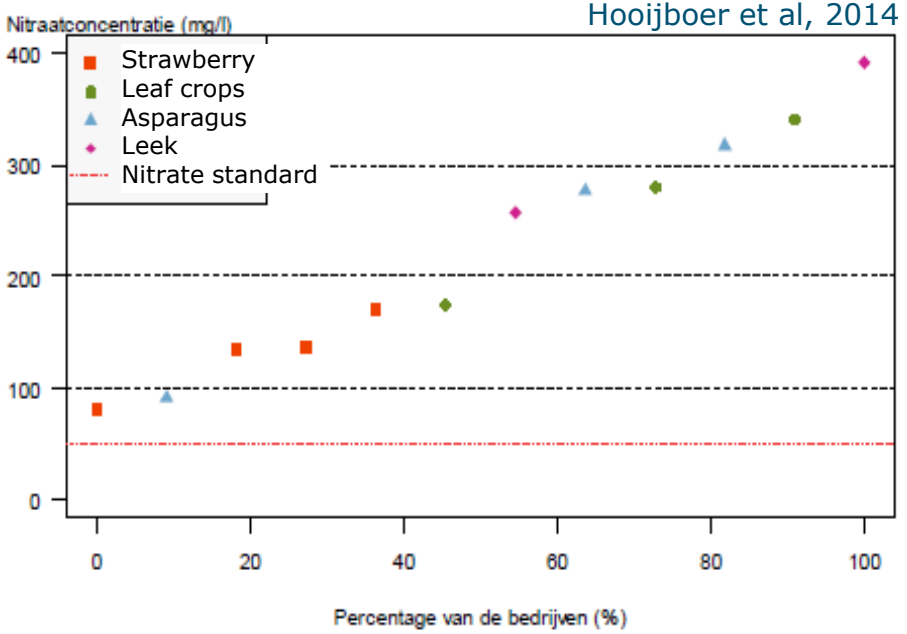
Monitoring nitrogen leaching in vegetables limited

- National monitoring network in dairy and arable farming
- Available data outdated
  - Farming for a future 2001-2003, 10 farms
  - RIVM 2007-2010 Scouting field vegetables on sandy soil, 12 farms

Hooijboer et al, 2014



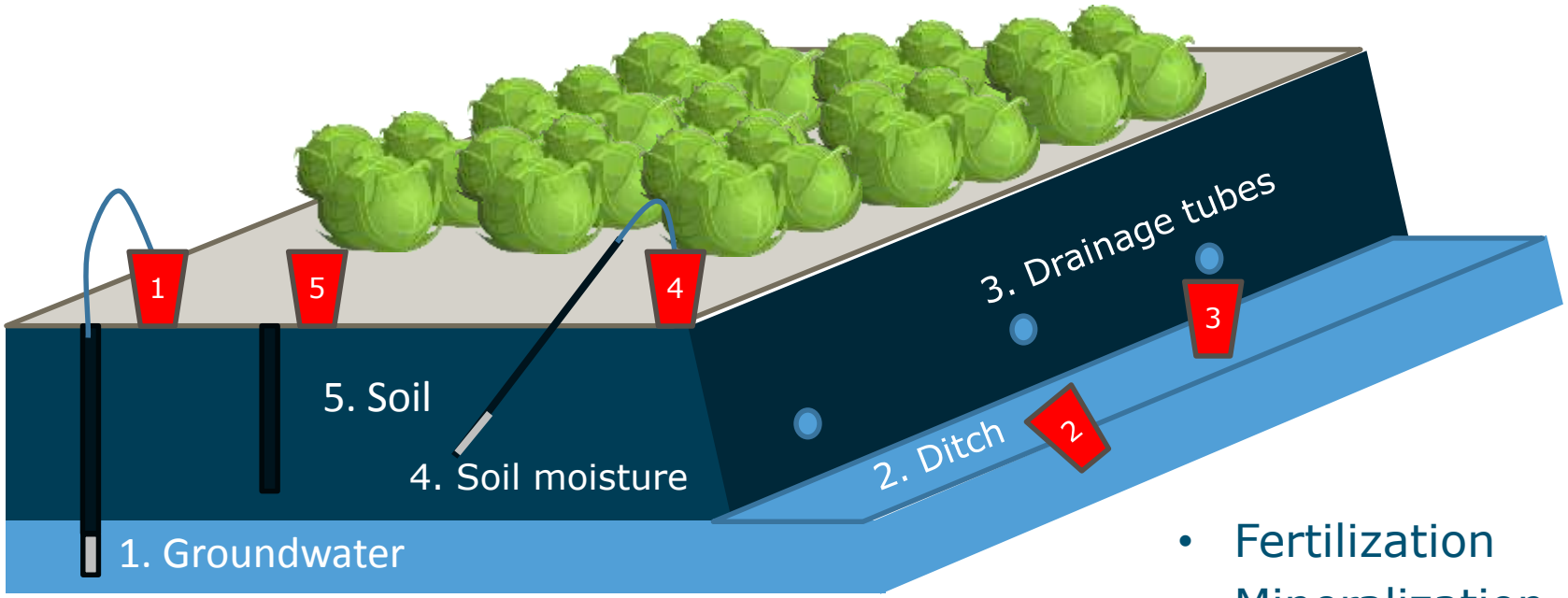
Need for more data

- To feed the discussion with data
  - To underpin and improve nutrient policies
  - To increase support of nutrient policies

Bron: RIVM.

- For the farmer
  - To get insight in nitrogen management
  - To increase awareness
  - To take measures to improve nitrogen efficiency

Options to measure



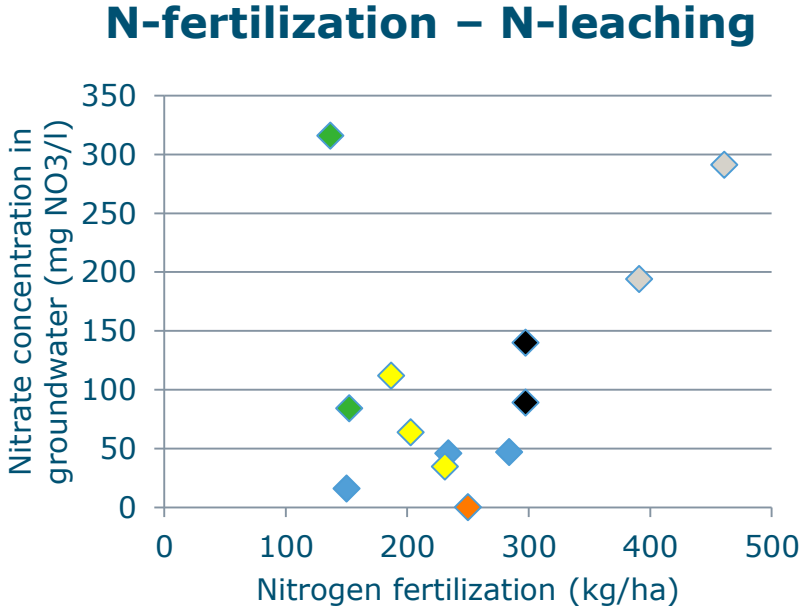
- Fertilization
- Mineralization
- Deposition
- Gasseous losses

New monitoring in vegetables 2017-2020

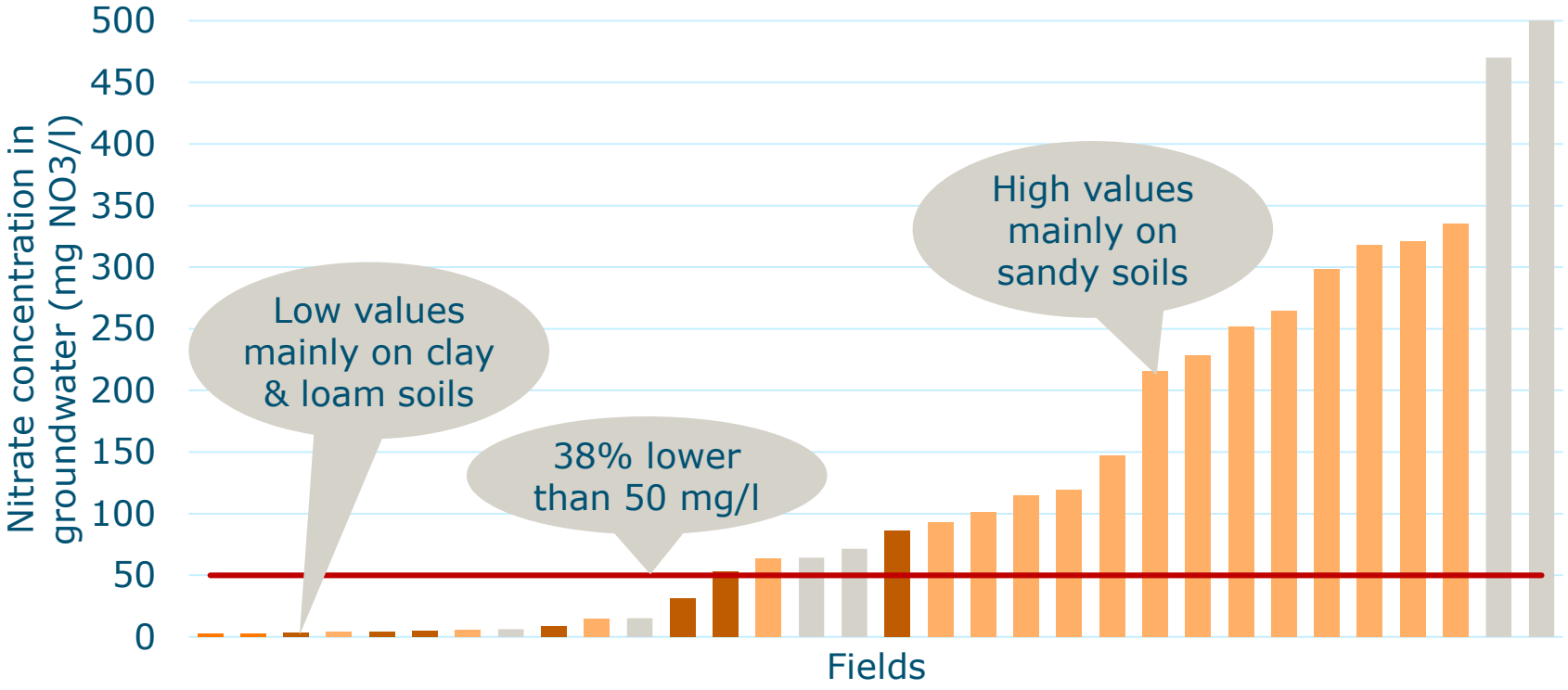
- Simple:
  - On field level instead of farm level, focus on leek and cabbage
  - Measurements with Nitracheck equipment (no lab analysis)
- Quality:
  - Sufficient large: 30 farms in most important vegetable regions
  - Pilot 2017 + Three years 2018-2020
  - Focus on groundwater
  - Connection with crop, fertilization, soil type, groundwater
- Cooperation: WUR, RIVM, LTO, Ministries, Provinces & Water boards
- Communication and knowledge transfer:
  - Share results with farmers and give advice
- Try to build up simple system for measurements by farmers themselves

Results pilot 2017 at 13 leek parcels

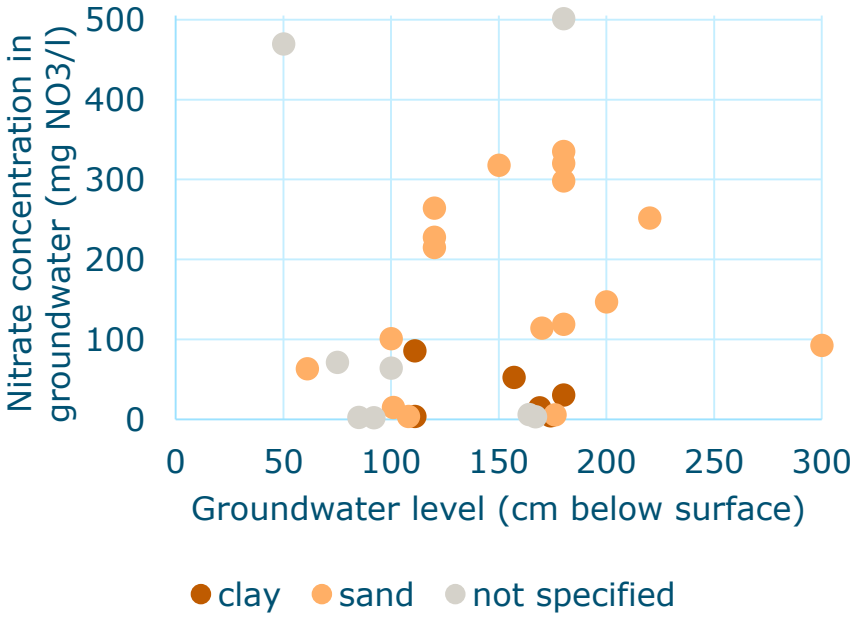
- 38% nitrate concentration lower than 50 mg/l
- Nitracheck is sufficient in quality
- Groundwater >3m not possible to measure
- Direct effect on farm management
    - Crop residue management

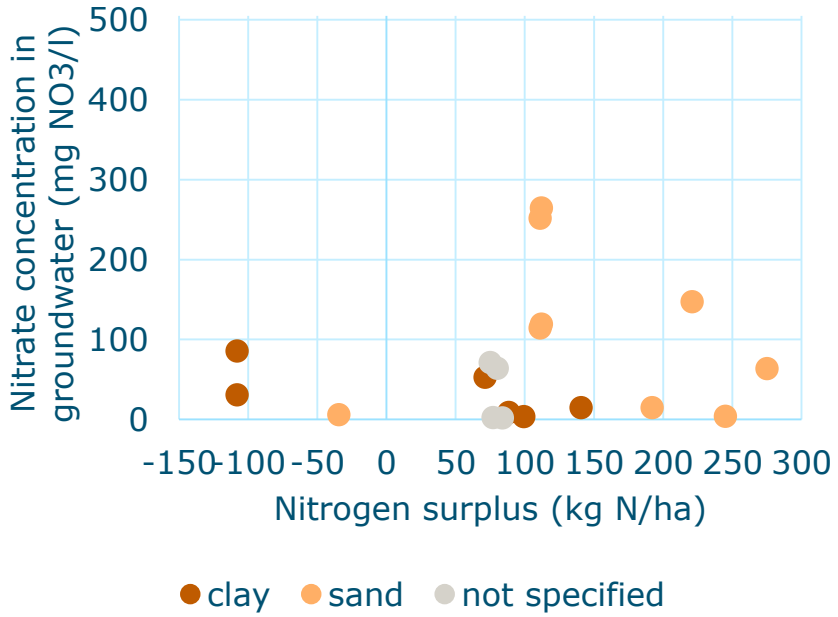


Nitrate concentrations in groundwater 2018



Relation nitrate concentration in groundwater and groundwater level and nitrogen surplus





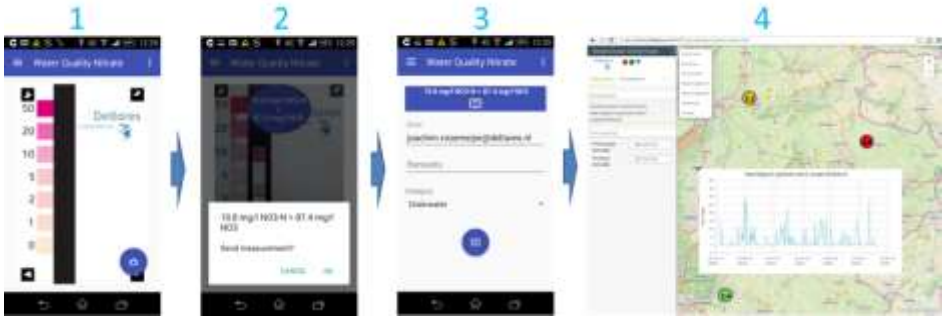
Explanations for high nitrate leaching

- Deep groundwater table
- Soil type
- No harvest of crop
- High fertilization level
- Late fertilization
- Not accounting for nitrogen in soil profile at start of crop
- Not accounting for nitrogen from preceding crop residues

Nitrate leaching measurements by farmers?

Is possible:

- Less expensive and difficult as it seems
  - Simple equipment
  - Nitracheck or Nitrate app
- Limited accuracy is sufficient



But:

- Training necessary
  - Choice what and where to measure can be difficult
- Interpretation and advice is necessary
- Data on crop management need to be available
- Not all equipment available at the farm

To conclude

- More data on nitrate leaching in vegetables is needed
    - To improve policy
    - To raise awareness of and action by farmers
- Measurements should be combined with management data
    - For right interpretation
    - To advice farmers to increase nitrogen efficiency
- Farmers should be able to measure nitrate concentrations in groundwater themselves (or with little aid)

Thank you for your attention