

Measuring nitrogen leaching in fields of commercial growers

Enhancement of growers awareness to reduce nutrient leaching: option or Utopia
EUVRIN Workshop Bleiswijk, 14 September 2018, Janjo de Haan



Speed limits and nitrogen limits

Speed limits

- Stakes:
 - Fast to your destination
 - Safety
 - Environment



Nitrogen limits

- Stakes
 - Optimal crop yield & quality
 - Environment
 - Natural resources

Speed limits and nitrogen limits



Growing vegetables is as driving....



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

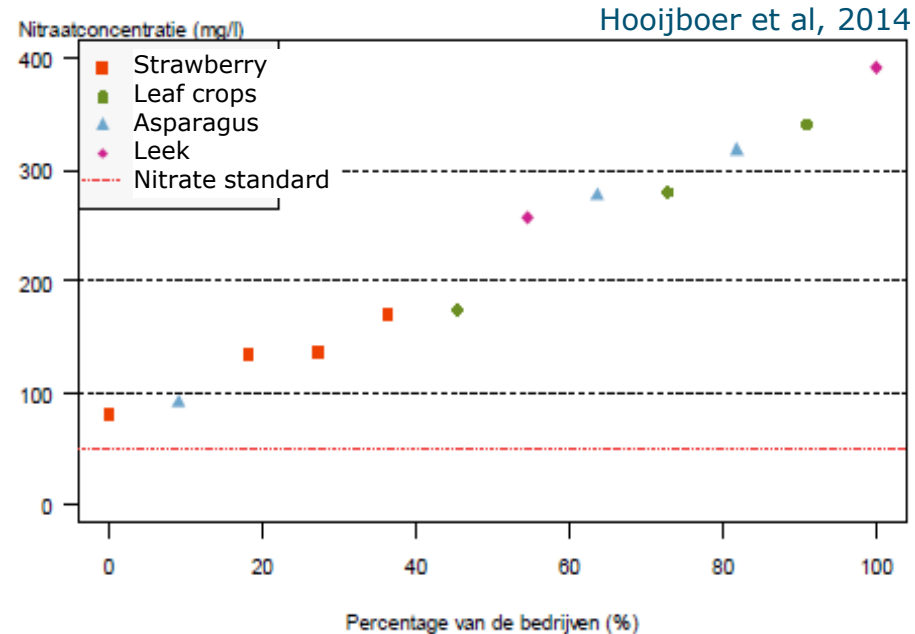
Application norms lower than advice

Limited awareness among farmers

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

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- Available data outdated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



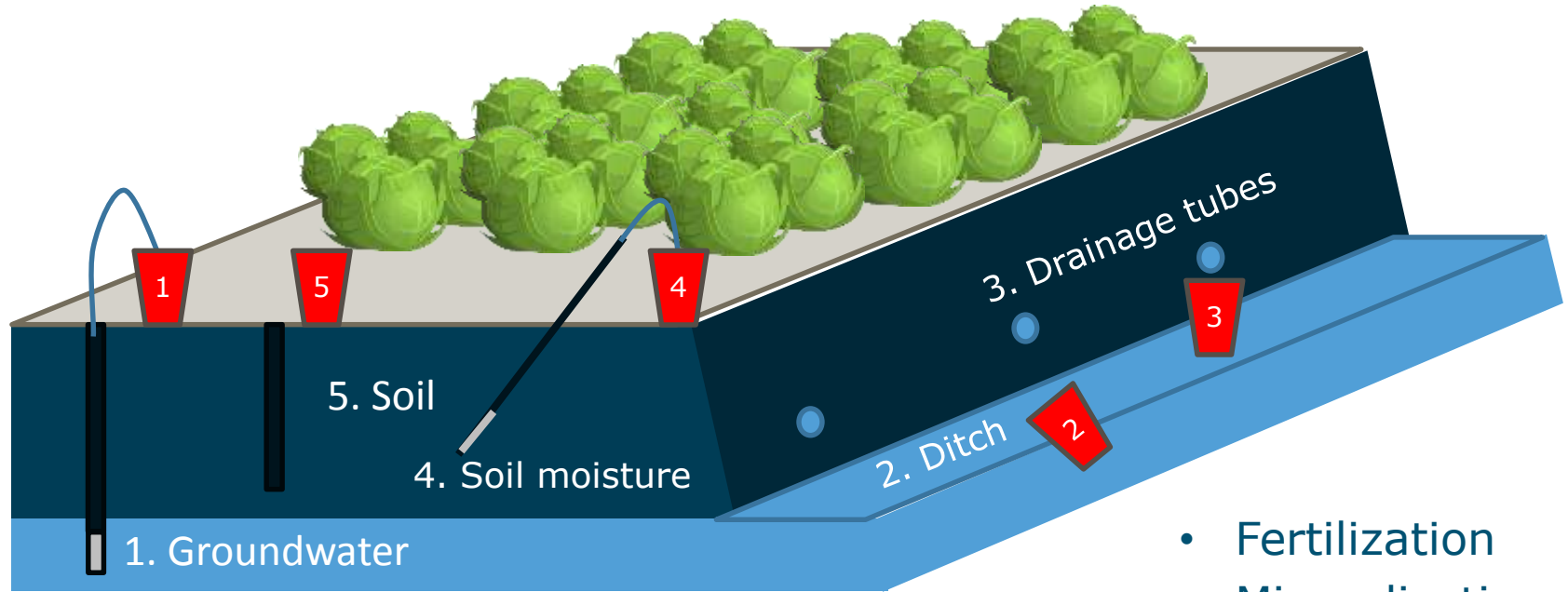
Need for more data

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

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



Options to measure



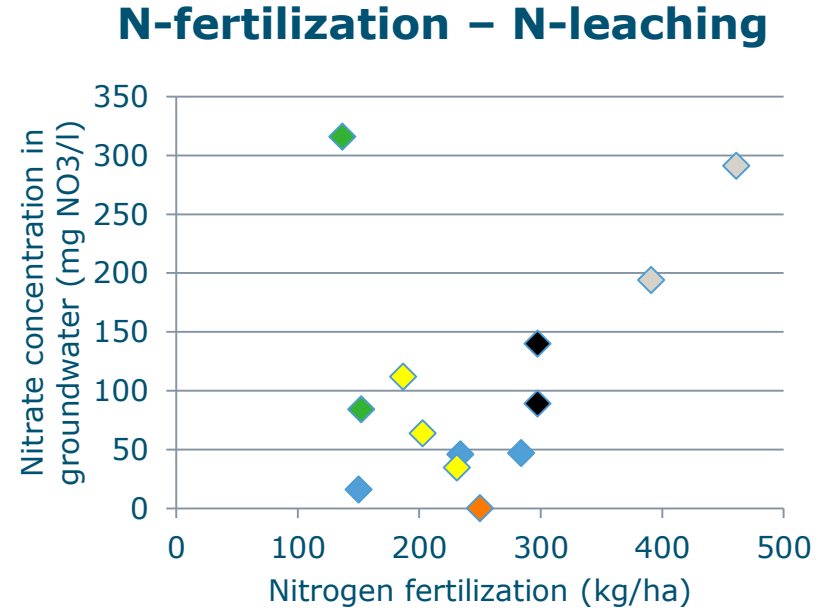
- Fertilization
- Mineralization
- Deposition
- Gaseous losses

New monitoring in vegetables 2017-2020

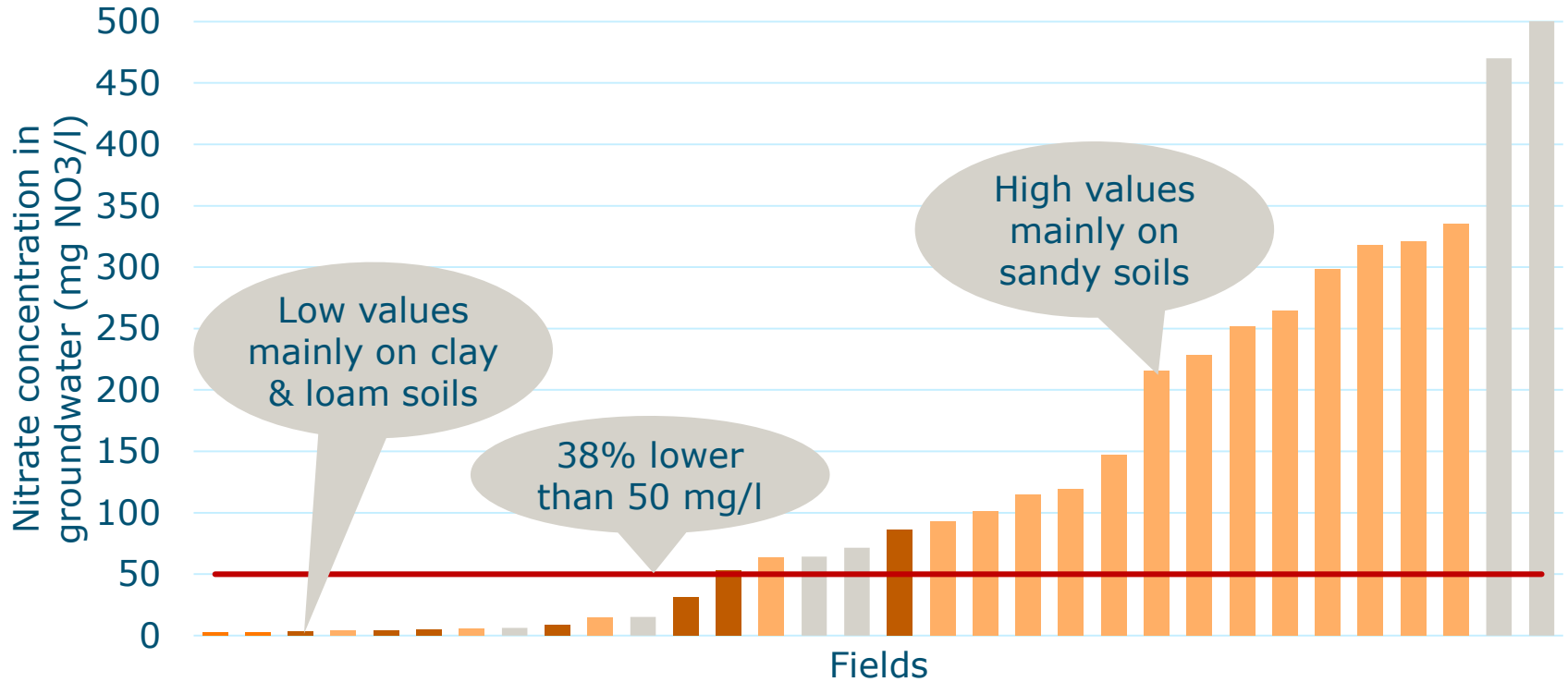
- Simple:
 - On field level instead of farm level, focus on leek and cabbage
 - Measurements with Nitracheck equipment (no lab analysis)
- Quality:
 - Sufficient amount of farms: 30 in most important vegetable regions
 - Pilot 2017 + Three years 2018-2020
 - Focus on groundwater
 - Connection with crop, 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

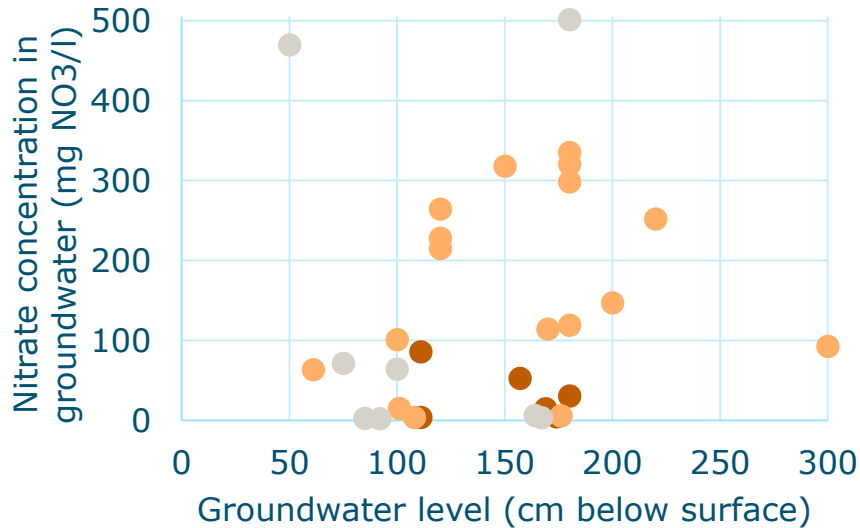
- 38% nitrate concentration lower than 50 mg/l
- Nitratecheck is sufficient in quality
- Groundwater >3m not possible to measure
- Direct effect on farm management
 - Crop residue management



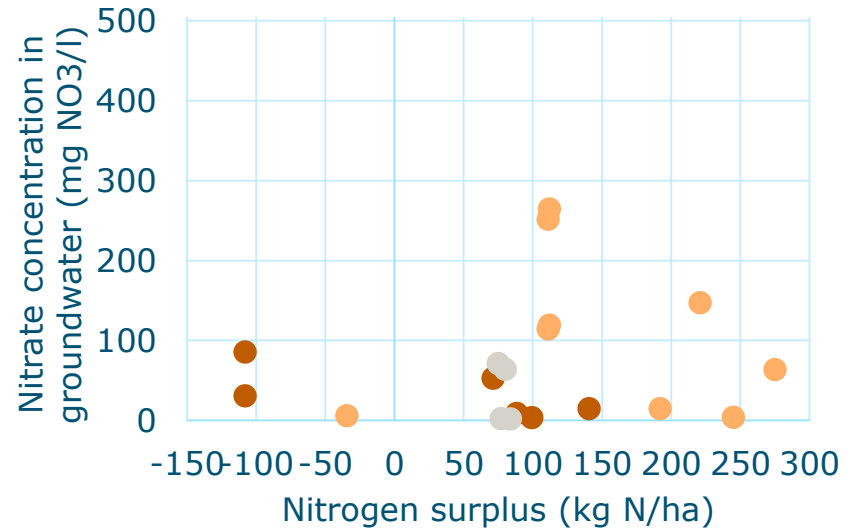
Nitrate concentrations in groundwater 2018



Relation nitrate concentration in groundwater and groundwater level and nitrogen surplus



● clay ● sand ● not specified



● clay ● sand ● not specified


Explanations for high nitrate leaching

- Deep groundwater table
- Sandy 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:

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

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

