

Nitrates Directive compliance checking for nitrate in groundwater in the Netherlands

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Key issue

Where do we check compliance.



Nitrates Directive compliance checking for nitrate

Content

1. Background
2. Research
3. Findings : Science & Policy interface



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Background

1. Hydrology
2. Monitoring
3. Groundwater quality
4. EU legislation



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Hydrology



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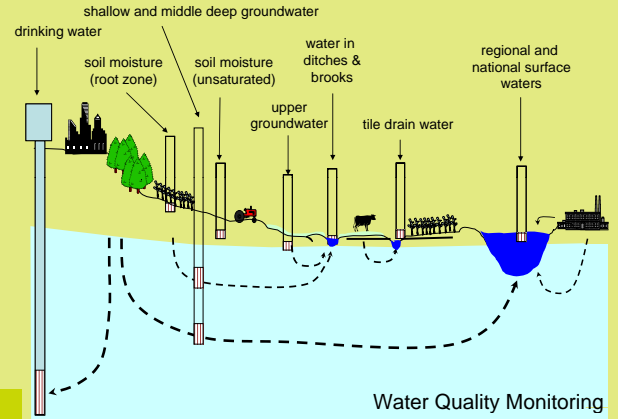
Background

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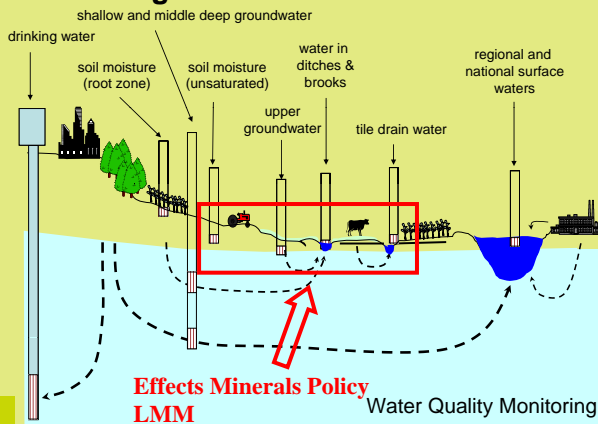
Monitoring



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Monitoring



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Monitoring

Monitoring effect in the upper one meter of groundwater
But checking compliance.....??

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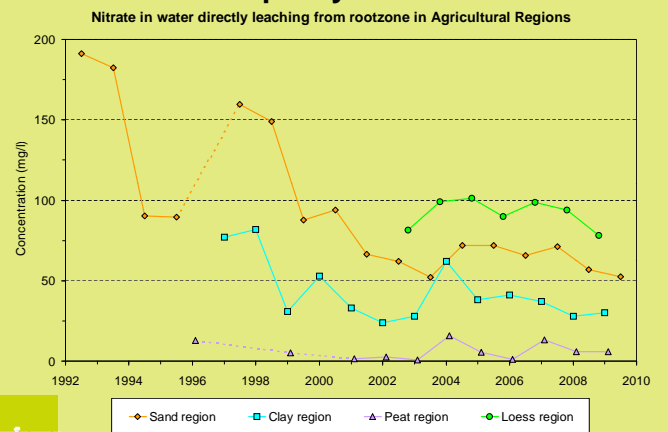
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Groundwater quality

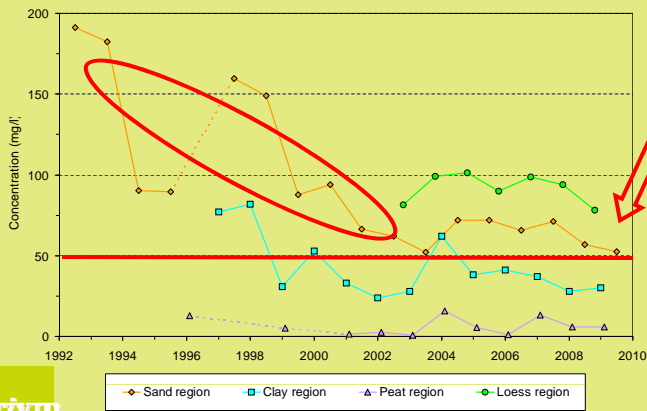


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Groundwater quality

Nitrate in water directly leaching from rootzone in Agricultural Regions



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EU legislation

- Application standard N should lead to compliance with the target value of 50 mg l⁻¹ nitrate in groundwater.
- Room for interpretation where compliance should be checked. Which depth? at field, farm, regional, national level?

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EU legislation

Draft guideline:

*“Both shallow and deep groundwater should be included in the monitoring network For example, both the upper and lower parts of the aquifer that are connected to the soil should be sampled, as the upper parts (**the first five metres of the saturated zone**) will tend to respond quickest to changes in agricultural practice, ...”.*

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Background

- Take additional measures?
- or
- Change the level depth at which threshold level of 50 mg l⁻¹ nitrate in groundwater should be reached

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Research

1. Question
2. Approach
3. Results

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Question

Policy question:

- Is there an *environmentally sound* way to change the compliance checking level for nitrate in groundwater?

Boundary conditions:

- Sandy soils
- Upper 5 meters of groundwater
- Include surface water

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Research

1. Question
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Approach

- Consortium
- 8 years of research



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Approach

- Field testing (RIVM)
- Lab testing (Alterra/WUR/TNO)
- Modelling (Alterra/Deltares)
- Workshops
- Stakeholder meetings
- International reviews



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Research

1. Question
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Results

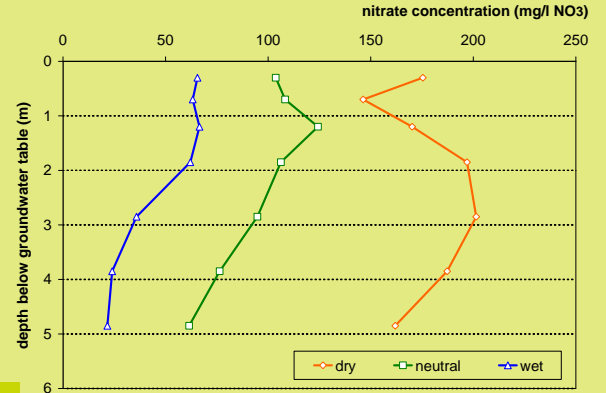
Consistent

1. Change with depth
2. Effect surface water

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Change with depth

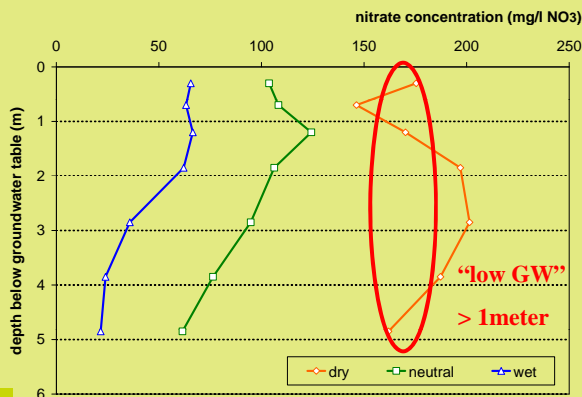


85 wells, 10 dairy farms, 3 years

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Change with depth

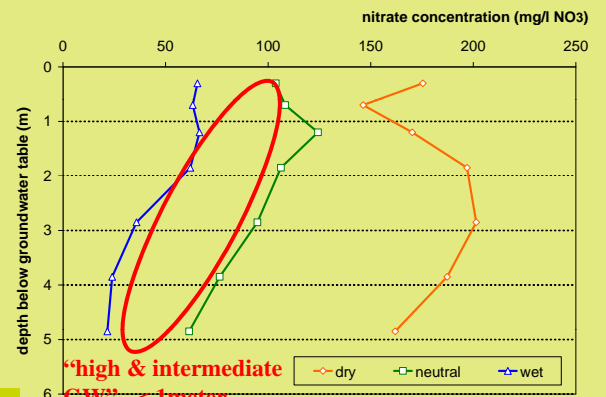


85 wells, 10 dairy farms, 3 years

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Change with depth

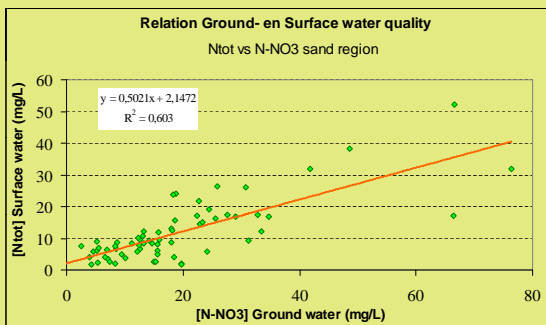


85 wells, 10 dairy farms, 3 years

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Effect surface water



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Results

- Sandy soils with low groundwater tables no decrease
- Sandy soils with high & intermediate groundwater tables decrease with depth but.....

a higher nitrate upper groundwater leads to higher nitrogen emission to surface water.

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Nitrates Directive compliance checking for nitrate

Results

Is there an *environmentally sound* way to change the compliance checking level for nitrate in groundwater?

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Translate

Essential to translate policy problems into scientific questions. Do not answer a policy question!

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Cooperation

Essential to Cooperate. Complex policy problems require teamwork, often scientific consensus.



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International perspective

International reviewing helps. Keep on networking!

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Thank you for your attention