

Risk Assessment and Groundwater Monitoring

Dutch Experiences

Closing conference – 14 June 2007

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History of European water legislation

- **Quality standards for “selected waters”**
 - 1975 Drinking Water Directive (75/440/EEC)
 - 1976 Bathing Water Directive (76/160/EEC)
 - 1976 Dangerous Substances Directive (76/464/EEC)
 - 1980 Drinking Water Directive (80/778/EEC)
- **Addressing pollution at the source**
 - 1991 Urban Waste Water Directive (91/271/EEC)
 - 1991 Nitrates Pollution Directive (91/676/EEC)
 - 1998 Revised Drinking Water Directive (98/83/EC)
- **Integrated approach of water protection**
 - 2000 Water Framework Directive (2000/60/EC)

Water Framework Directive

- Article 4. Environmental objectives
 - For surface water
 - For groundwater
 - For protected areas
- Article 10. The combined approach for point and diffuse sources
- Article 11. Programme of measures
- Article 16. Strategies against pollution of water
 - Not defined in definitions
 - Articles 10 + 11 → responsibilities of Member states
 - Article 16 → responsibility of European Commission

Aim of the WFD

- Article 1. The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater
 - **Environmental Quality standards**
 - **Measures to reduce the input**
 - **Point sources**
 - **Diffuse sources**

Environmental quality standards

- Article 2. Definitions.
- Environmental quality standard means the concentration of a particular pollutant or group of pollutants in water, sediment or biota which should not be exceeded in order to protect human health and the environment.
 - **Presently only proposed for water**
 - **Sediment is difficult to determine**
 - **Biota is not recommended**

Measures

- Article 2. Definitions.
- Combined approach means the control of discharges and emissions into surface waters according to the approach set out in Article 10.
 - **control of pollution at the source through the setting of emission limit values**
 - **environmental quality standards.**

Priority substances – Environmental Quality Standards

- **Responsibility of EC**
 - **Priority substances**
 - **Priority hazardous substances**
 - **Substances from 76/464/EEC**
 - **Proposal of measures at EC level**
- **Responsibility of Member States**
 - **Non-priority substances**
 - **River basin relevant substances (River Rhine, about 15 substances)**
 - **Other relevant substances**
 - **Implementation of measures**

Article 16

- 16.6 and 16.7. The Commission shall submit proposals of controls and environmental quality standards for the priority substances
- If there is no Community proposal six years after the entry into force of the first list of priority substances:
 - **Member States shall establish environmental quality standards for these substances for all surface waters affected by discharges of those substances, and controls on the principal sources of such discharges, based, inter alia, on consideration of all technical reduction options.**

- 23 december 2006

Water Framework directive (2000/60/EC)

- One directive on priority substances amending annex X
 - **DECISION No 2455/2001/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC**
- Two daughter directives
 - One on environmental quality standards and measures for surface water
 - One on groundwater protection

DECISION No 2455/2001/EC

- 33 priority substances
- Of which 25 substances priority hazardous
 - Number of old pesticides e.g. alachlor, atrazine, chlorpyrifos, isoproturon
 - Short-chained chlorinated paraffins
 - PAHs
 - Lead, nickel, mercury, cadmium
- Other substances to be decided by Member States

Daughter directive surface water

- Daughter directive on environmental quality standards and emission controls in the field of water policy
 - **Proposal Environmental Quality Standards for Priority substances**

Daughter directive groundwater

- Daughter directive on the protection of groundwater against pollution
 - **Environmental quality standards by EC for limited number of substances**
 - **Threshold values within the member states**

Selection of substances - origines

- Original list of 76/464
 - Dutch legislation from december 2004
- Monitoring data
 - Measured or not
 - Higher than previous Dutch standards
- Indicated as relevant by drinking water companies
- Substances from other European legislations
 - Regulation 850/2004/EC

Selection of substances - which?

- Dutch list is now final
- Substances selected for 76/464, Dutch legislation December 2004
 - About 120 substances
- Negative list:
 - Priority list of substances
 - River basin relevant substances
 - Selected in river basin commissions

Selection directive 76/464/EEC

- Lead to Ministerial directive in december 2004
 - Measurements for 120 substances in 2002
 - When not detected and detection limit < EQS → not relevant
 - When present → relevant
- Problems
 - No measurements
 - Measured, and not detected but detection limit > EQS
 - Relevance through other criteria
 - Emission data
 - Production data
 - Use data

Selection of substances - which?

- Substances from regulation 850/2004/EC (POPs)
 - 12 – 15 substances (mainly old pesticides)
 - Dicofol
 - Mirex
 - Chlordane
- 'Forgotten' substances RIZA (monitoring)
 - 29 substances (mainly industrial)
 - Dimethylnaphthalene
 - 2,6-Di-tert-butyl-4-methylphenol (BHT)
 - Dibutylphthalate

Selection of substances - which?

- Relevant for drinking water (RIWA)
 - 15 substances (industrial and pesticides)
 - Bromochloromethane
 - Dibromochloromethane
 - Glyphosate
 - Propazine
- Substances from E-PRTR regulation (166/2006/EC)
 - 2 substances (industrial)
 - Ethylene oxide
 - Nonylphenol ethoxylates

Selection of substances – next step: prioritisation

- Grouped by chemical characteristics
 - Makes EQS derivation easier
- Date of previous EQS
 - 1993 - 2004
- Measured in past or not and present in surface water?
 - Yes/No
- Measurements above previous EQS
 - No/Yes and how much above
- Availability of past toxicity data
 - Numerous or not

Present selection

- 1. Fos-pesticides (7 subst.)
 - Azinphos-methyl
 - Cumaphos
- 2. Thion-pesticides (5 subst.)
 - Parathion-ethyl
 - Malathion
- 3. Chlor-pesticides (7 subst.)
 - Chlordecone
 - Heptachlor
- 4. xxx-pesticides (6 subst.)
 - Carbendazim
 - Primicarb

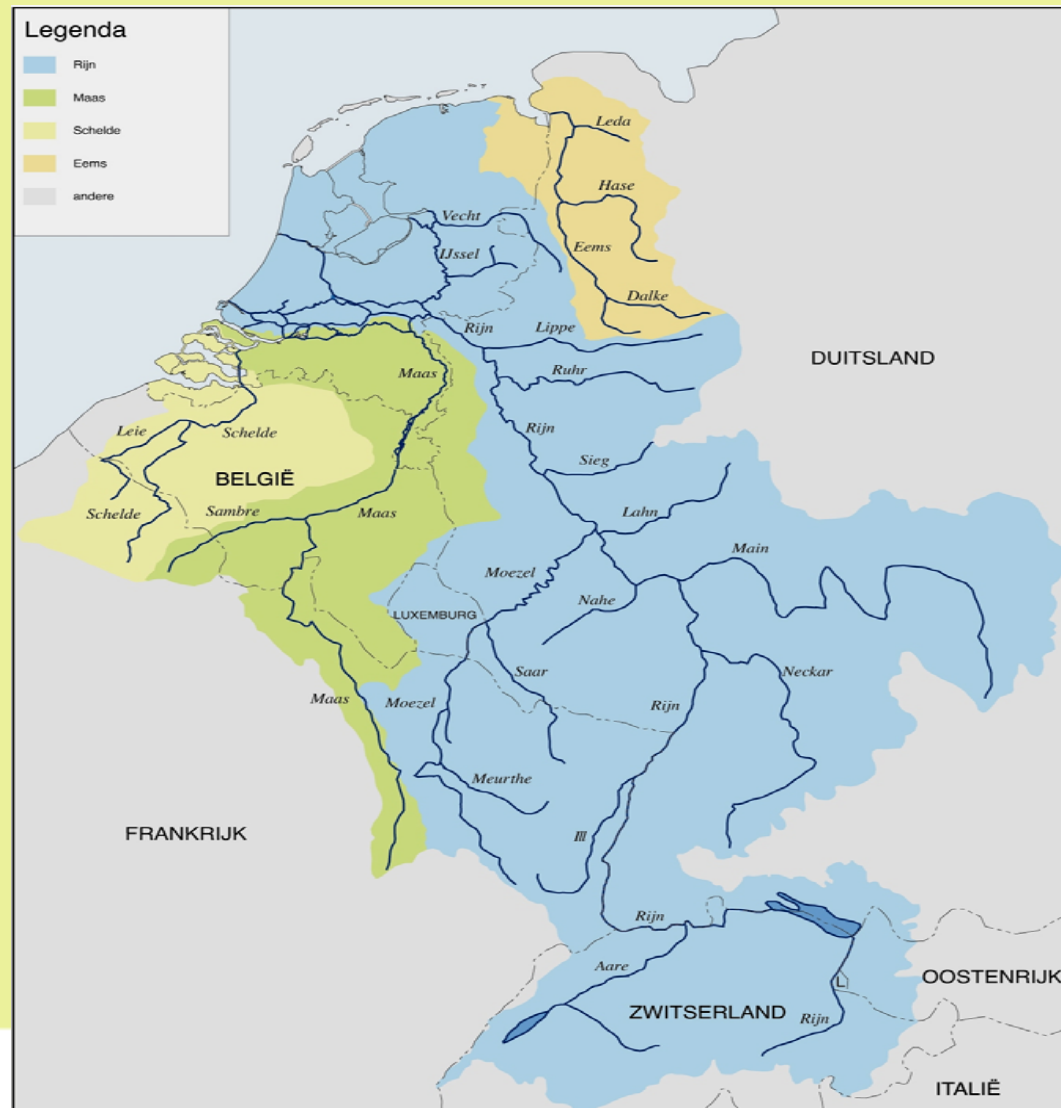
Present selection

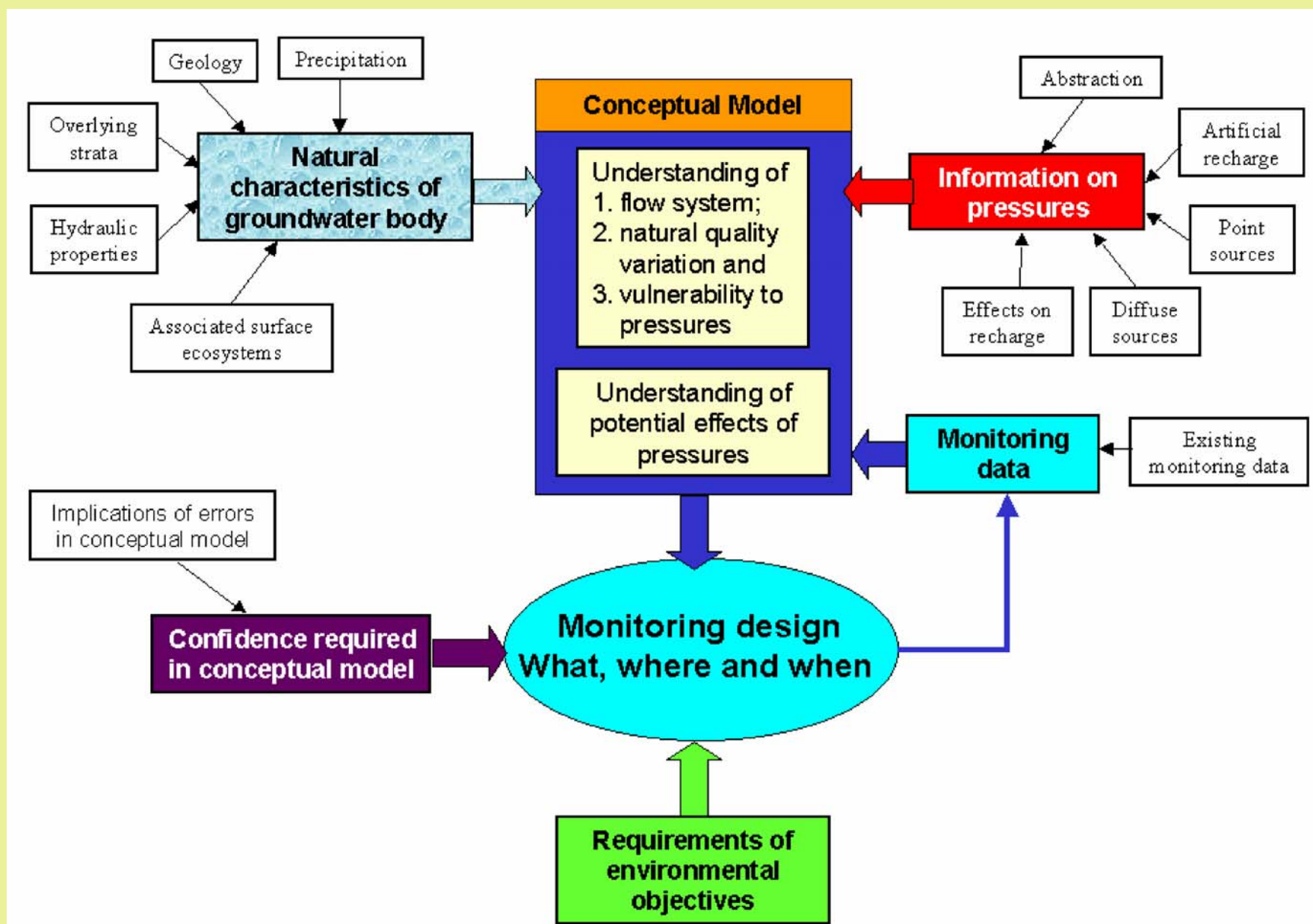
- 5. Industrial substances (8 subst.)
 - Monochlorobenzene
 - Monochlorotoluene
- 6. Tin-pesticides (5 subst.)
- 7. Chlorophenol substances (3 subst.)

Derivation of environmental quality standards

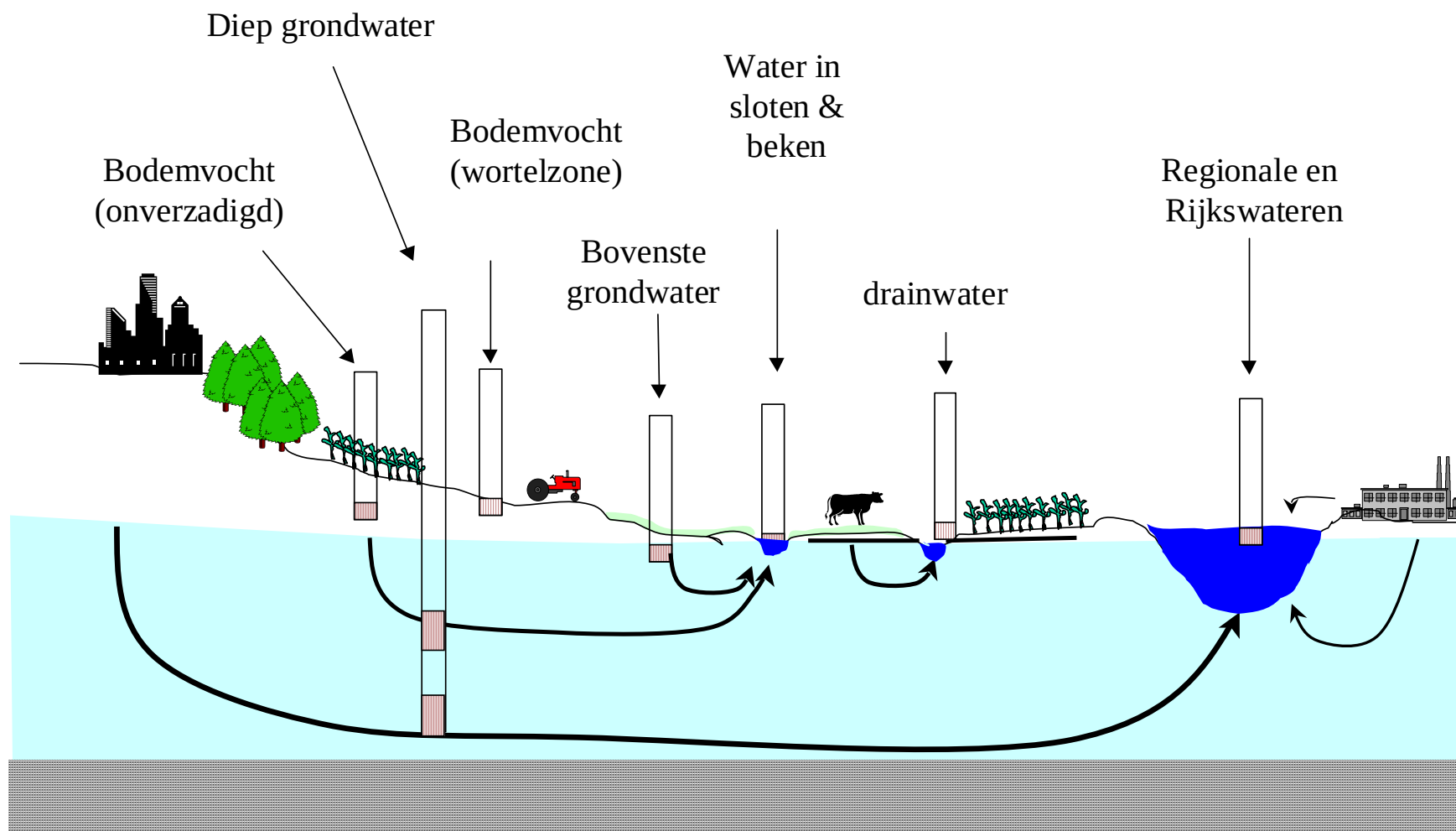
- Fraunhofer document
 - Ecotoxicity (toxicity tests)
 - Drinking water route
 - Fish consumption
- Cooperation with Germany (and UK)

Monitoring Groundwater Quality and Quantity



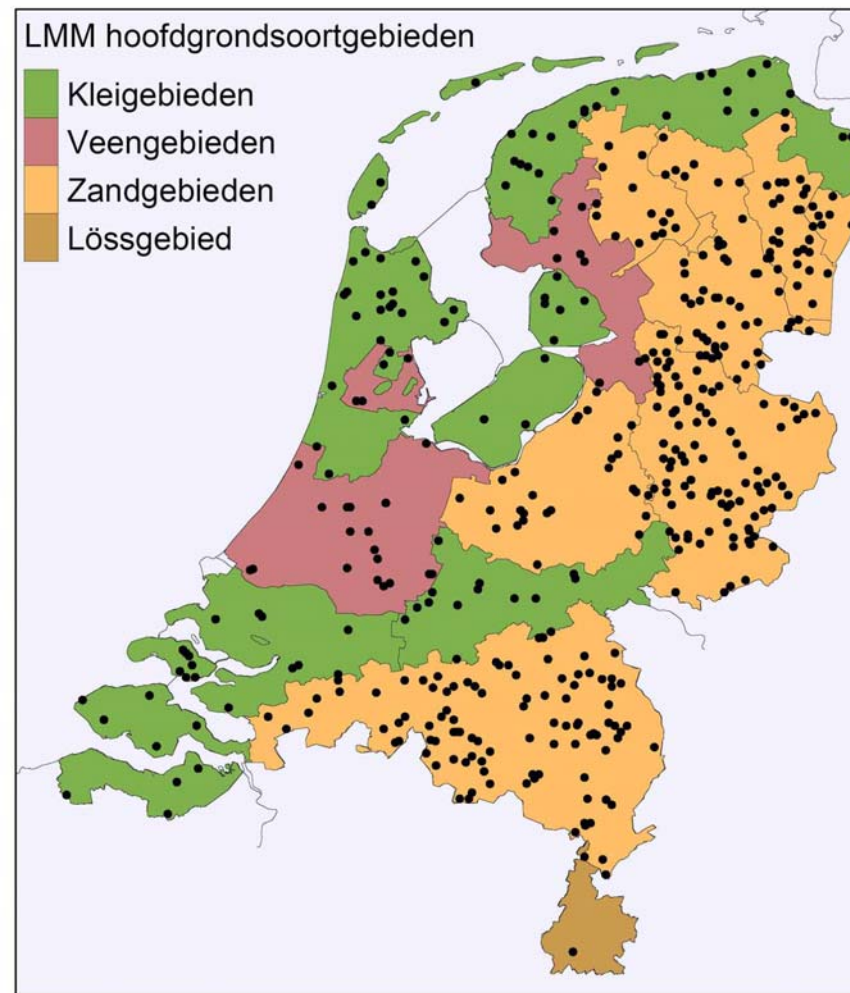


Waterkwaliteitsmonitor



National Monitoring Programme for effectiveness of the Minerals Policy

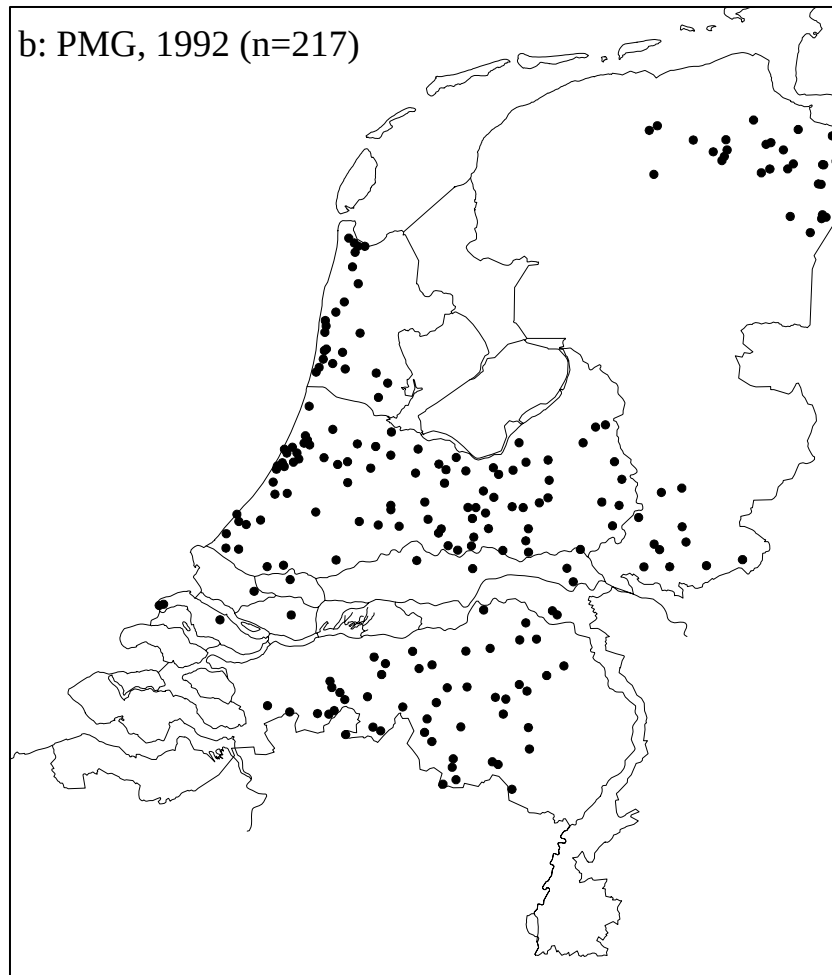
LMM locaties 1992-2002



a: LMG, 1992 (n=310)



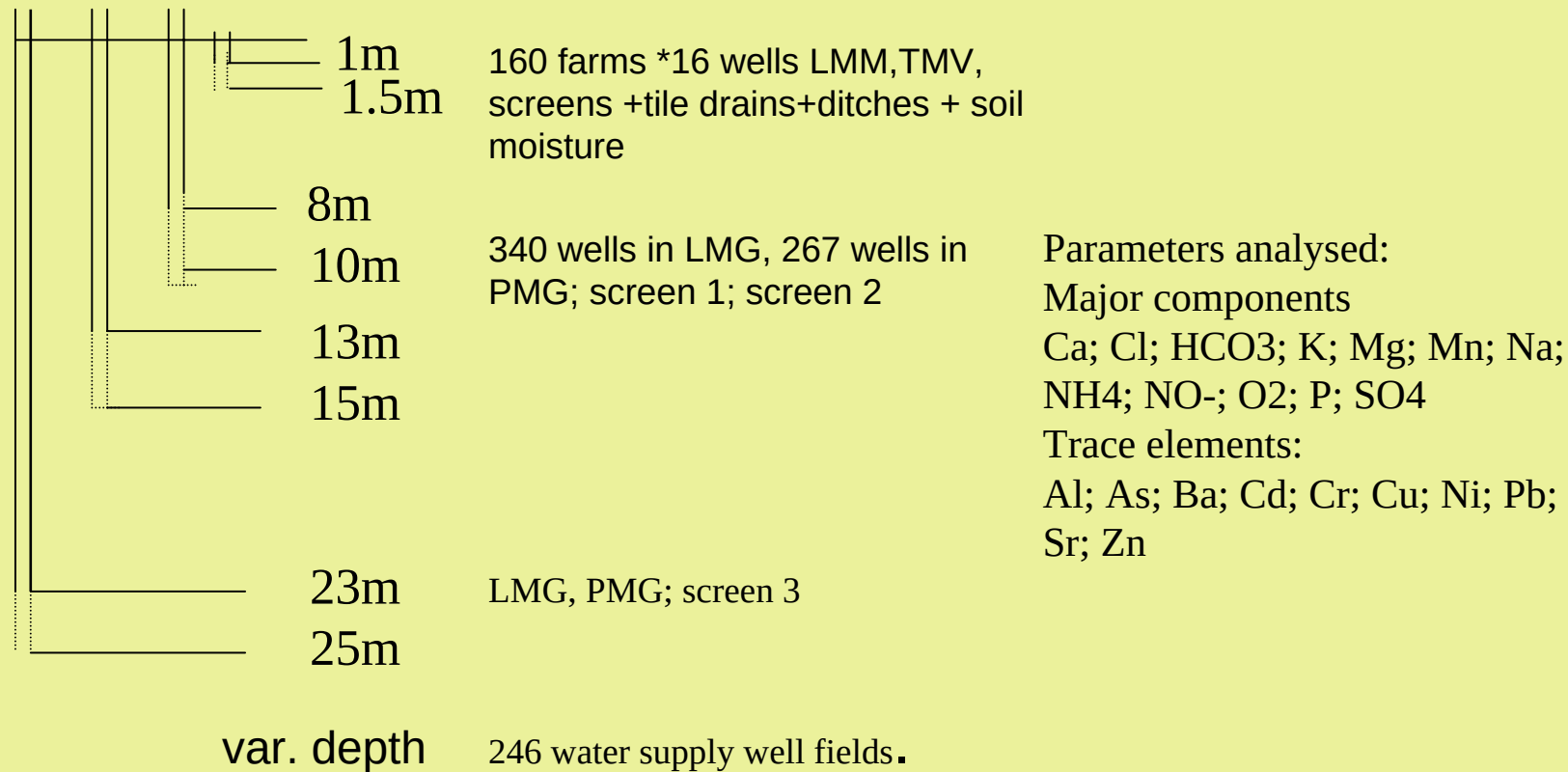
b: PMG, 1992 (n=217)



Groundwater quality monitoring networks

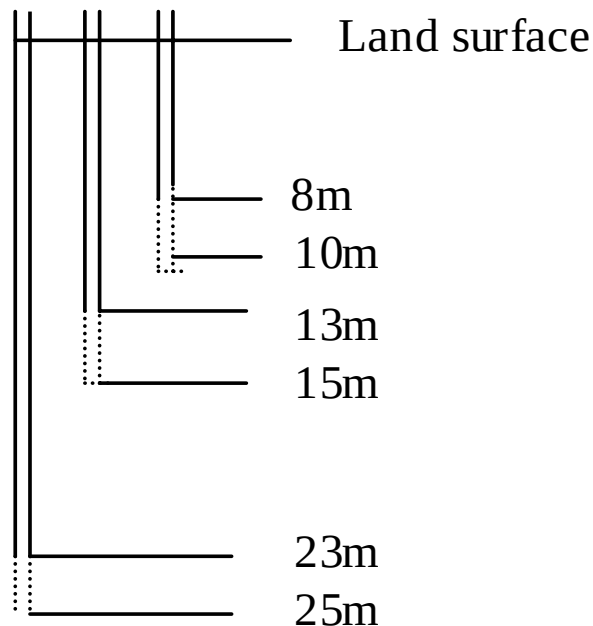
- National and provincial monitoring systems at varying levels in the soil; groundwater quality characterisation

Land surface



LMG network

groundwater quality monitoring



In the field:

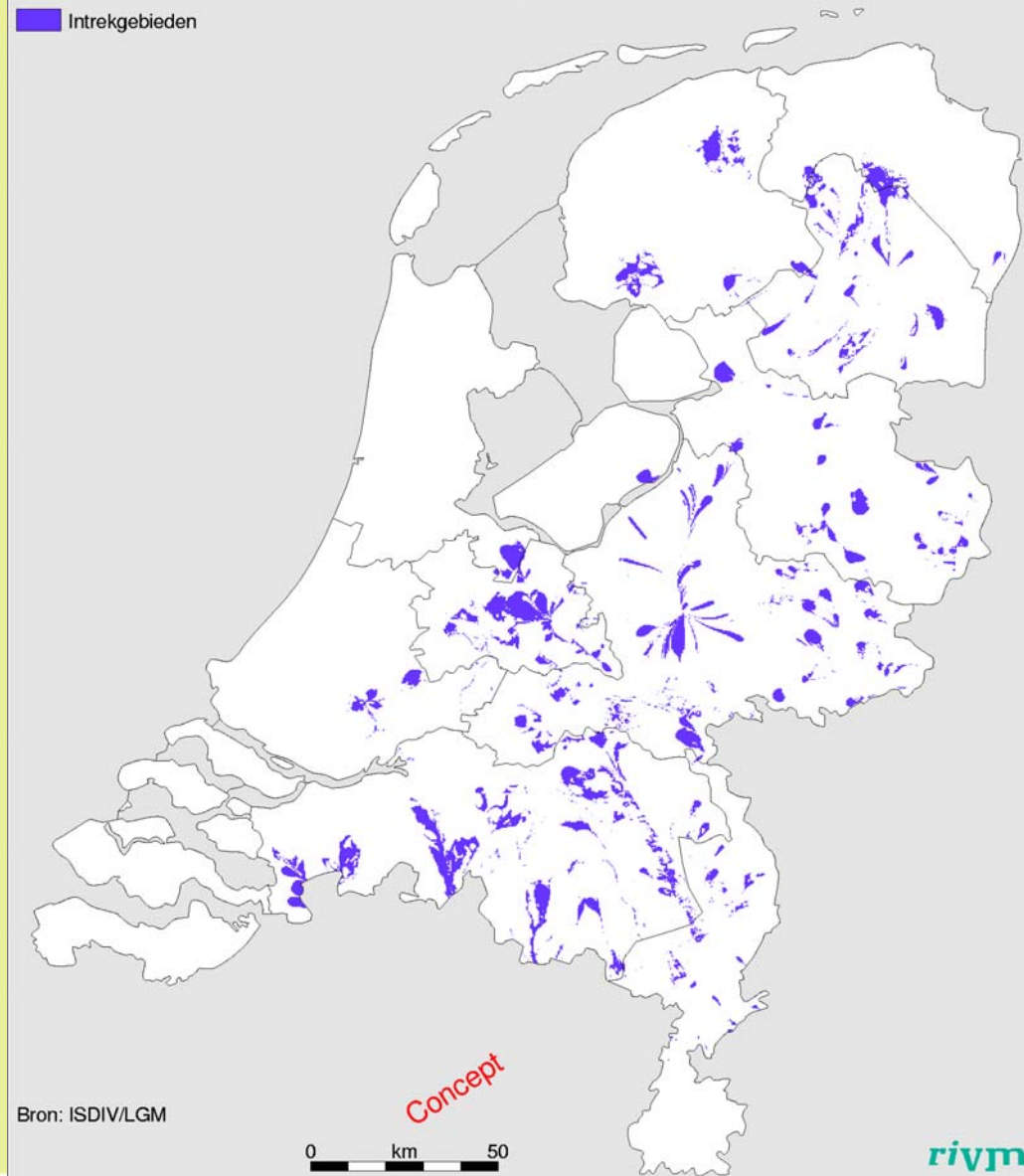
- pH, temp., redox-potential, conductivity, O_2 , HCO_3^-

In the laboratory:

- macro components: Ca^{2+} ; Cl^- ; HCO_3^- ; K^+ ; Mg^{2+} ; Mn ; Na^+ ; NH_4^+ ; NO_3^- ; O_2 ; P ; SO_4^{2-}
- Trace elements: Al ; As ; Ba ; Cd ; Cr ; Cu ; Ni ; Pb ; Sr ; Zn

Important:
Take account of
Groundwater Flows

Intrekgebieden 2001

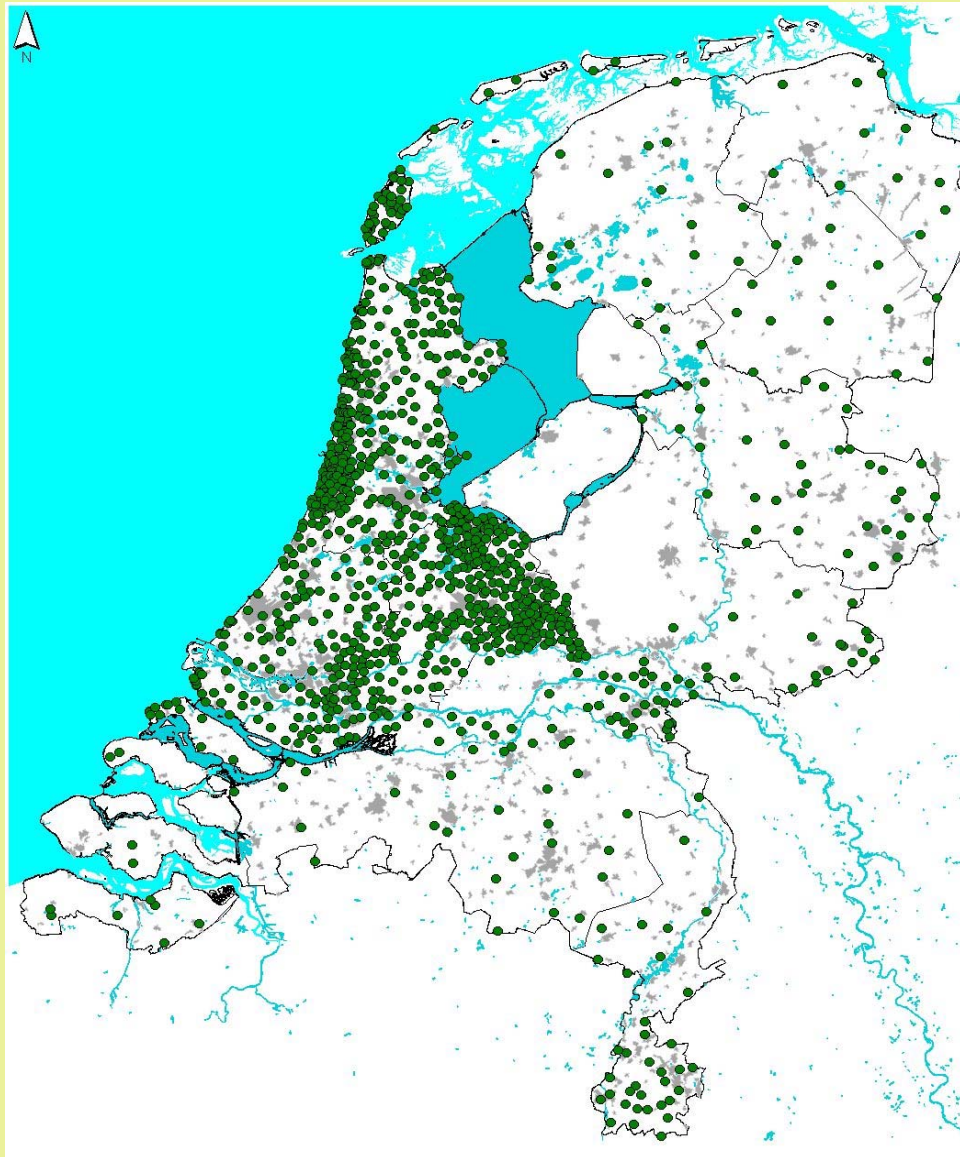


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Monitoring Groundwater Quantity



Salt water intrusion



Discussion

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