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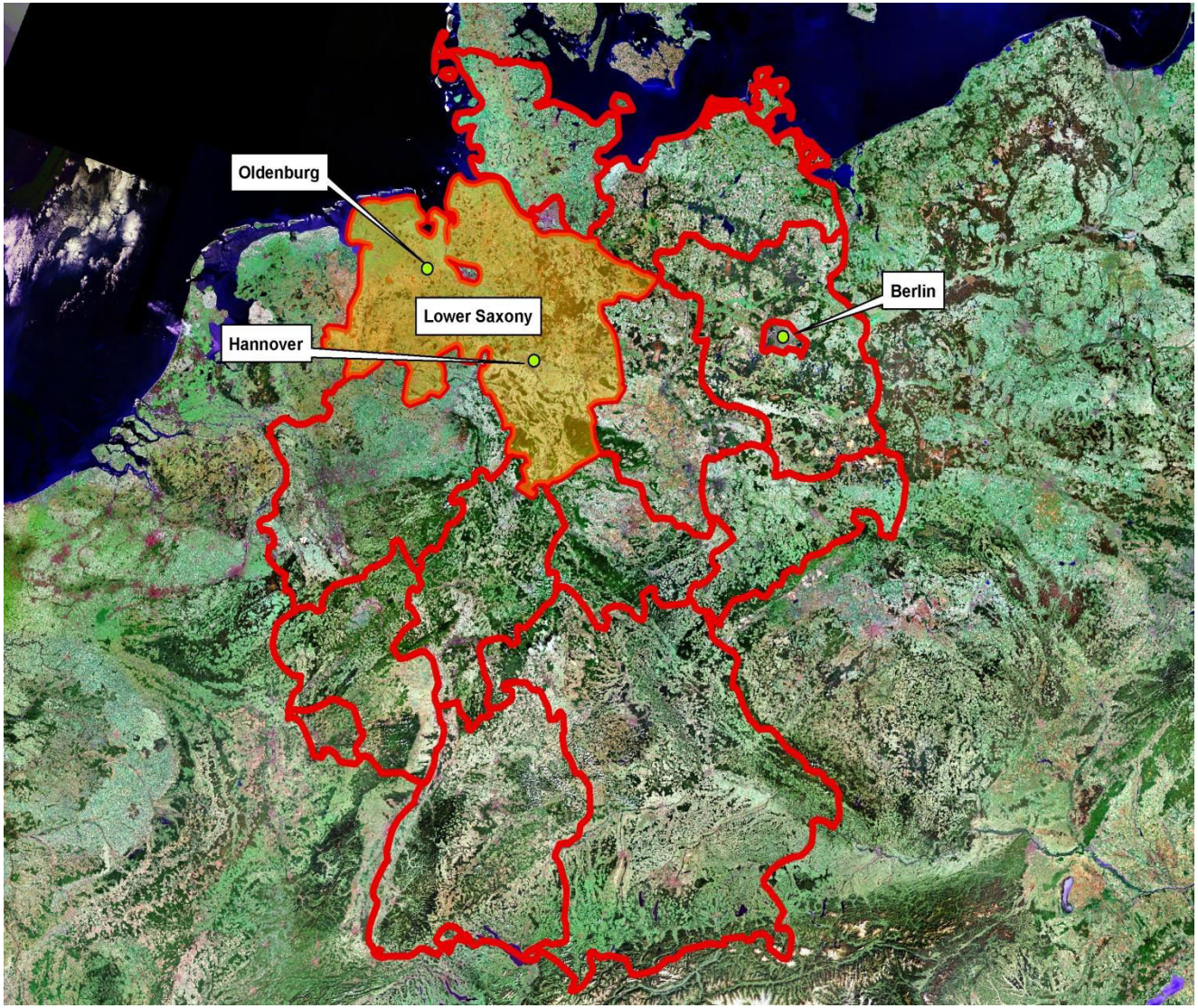
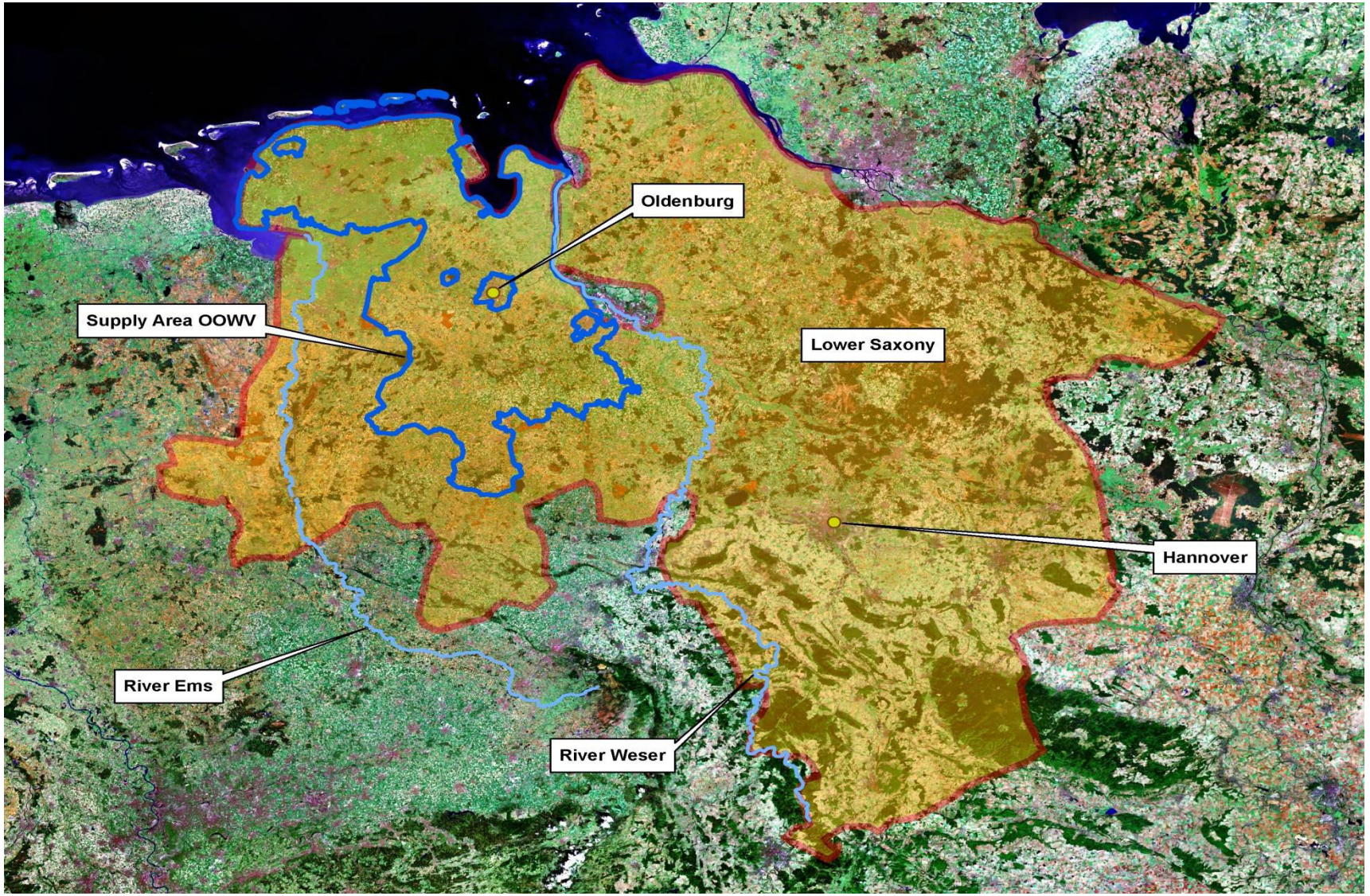
OOWV

Dr. Christina Aue

Challenges for water suppliers and government regarding impact of agricultural landuse

Report from Lower Saxony, Germany


Oldenburg
Lower Saxony
Hannover
Berlin


Oldenburg
Supply Area OOWV
Lower Saxony
Hannover
River Ems
River Weser

Water Board of Oldenburg and East Frisia (OOWV)

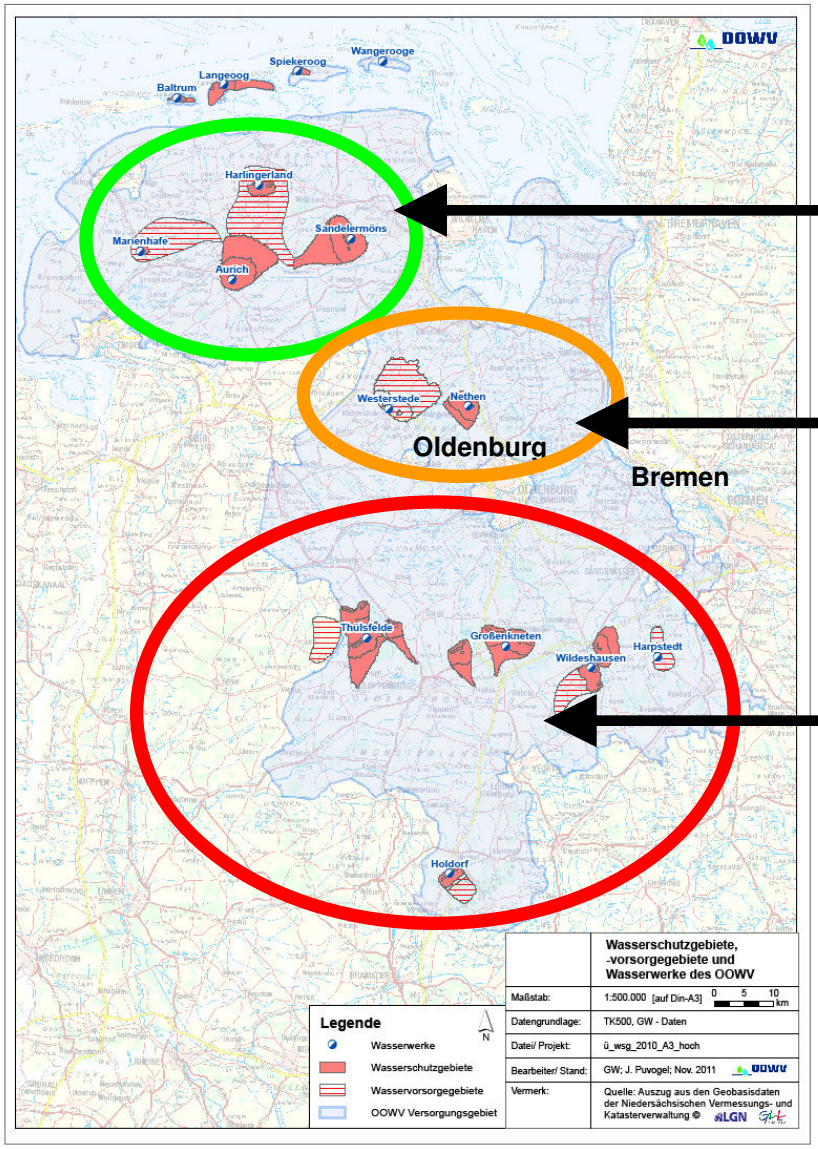
Drinking water	**since 1948**
Investments 2012	**15 Mio. €**
Waste water treatment	**seit 1999**
Investments 2012	**14 Mio. €**
Clients	**ca. 1,1 Mio.**
Staff	**653**

OOWV-Trinkwasserversorgung — **15 Waterworks**

OOWV-Abwasserentsorgung — **46 Treatment Plants**

Further tasks: Urban Drainage (City of Oldenburg), Public Information, European Project Cooperation

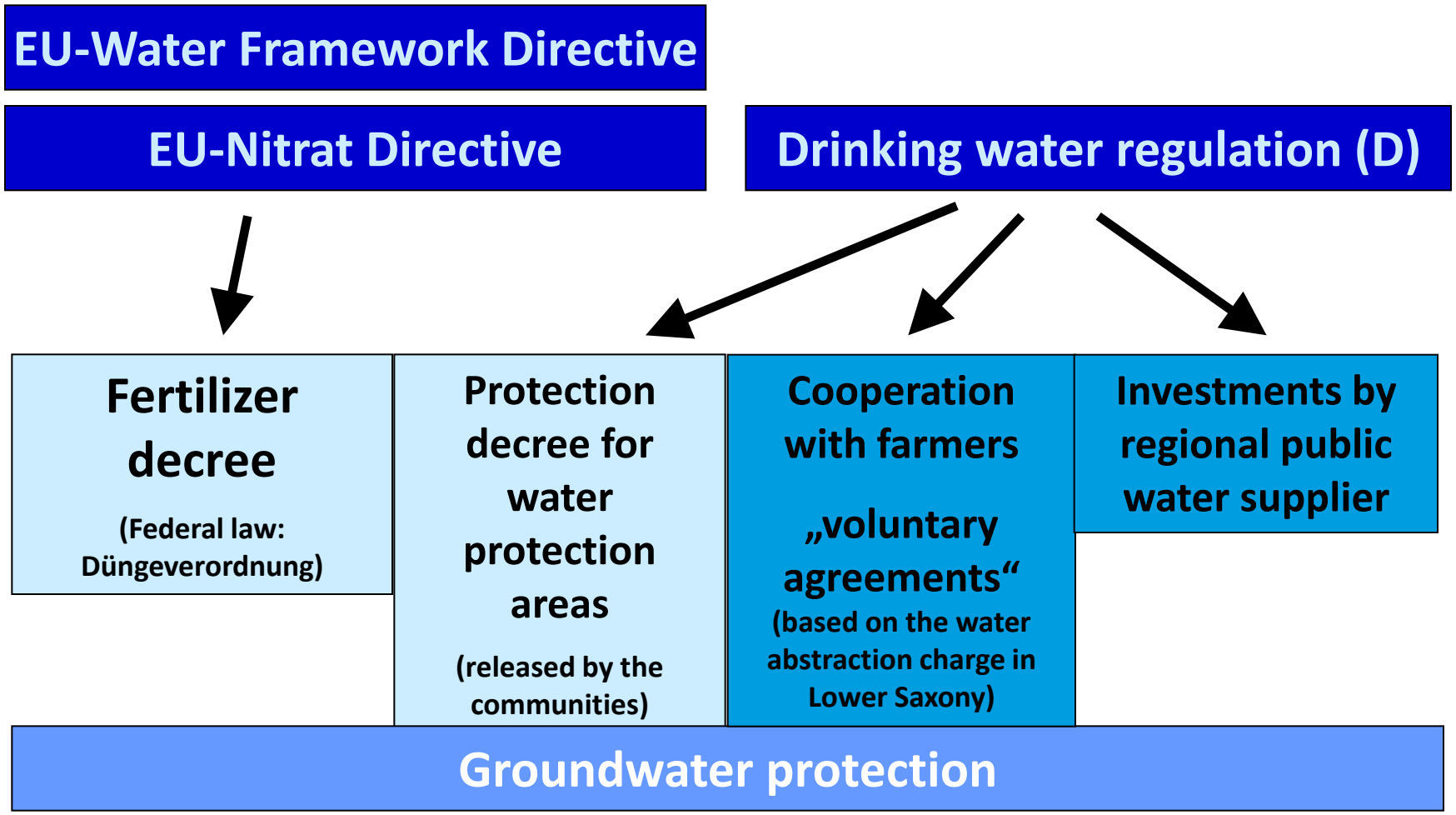
Protection of the resource „groundwater“ by geology



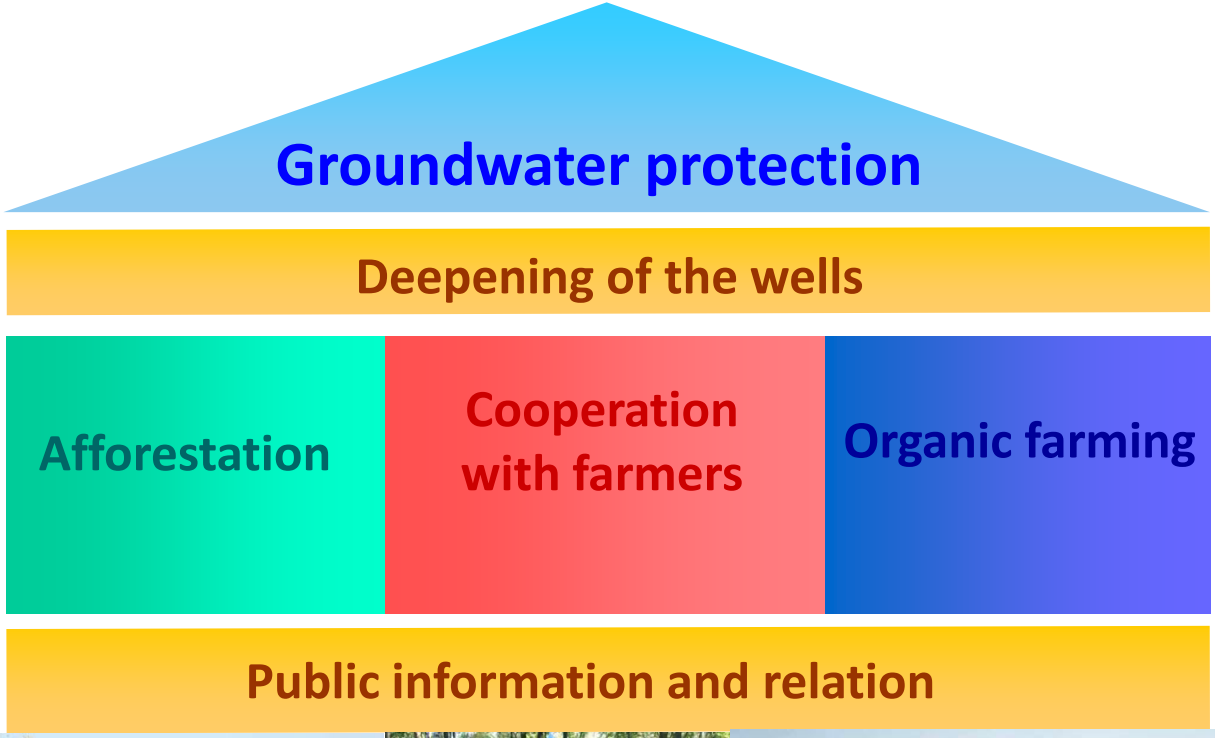
Groundwater main source for drinking water

- deep aquifers covered by clay and loam
- clay layers broken with geological features
- vulnerable sandy aquifers

Protection of the resource „groundwater“



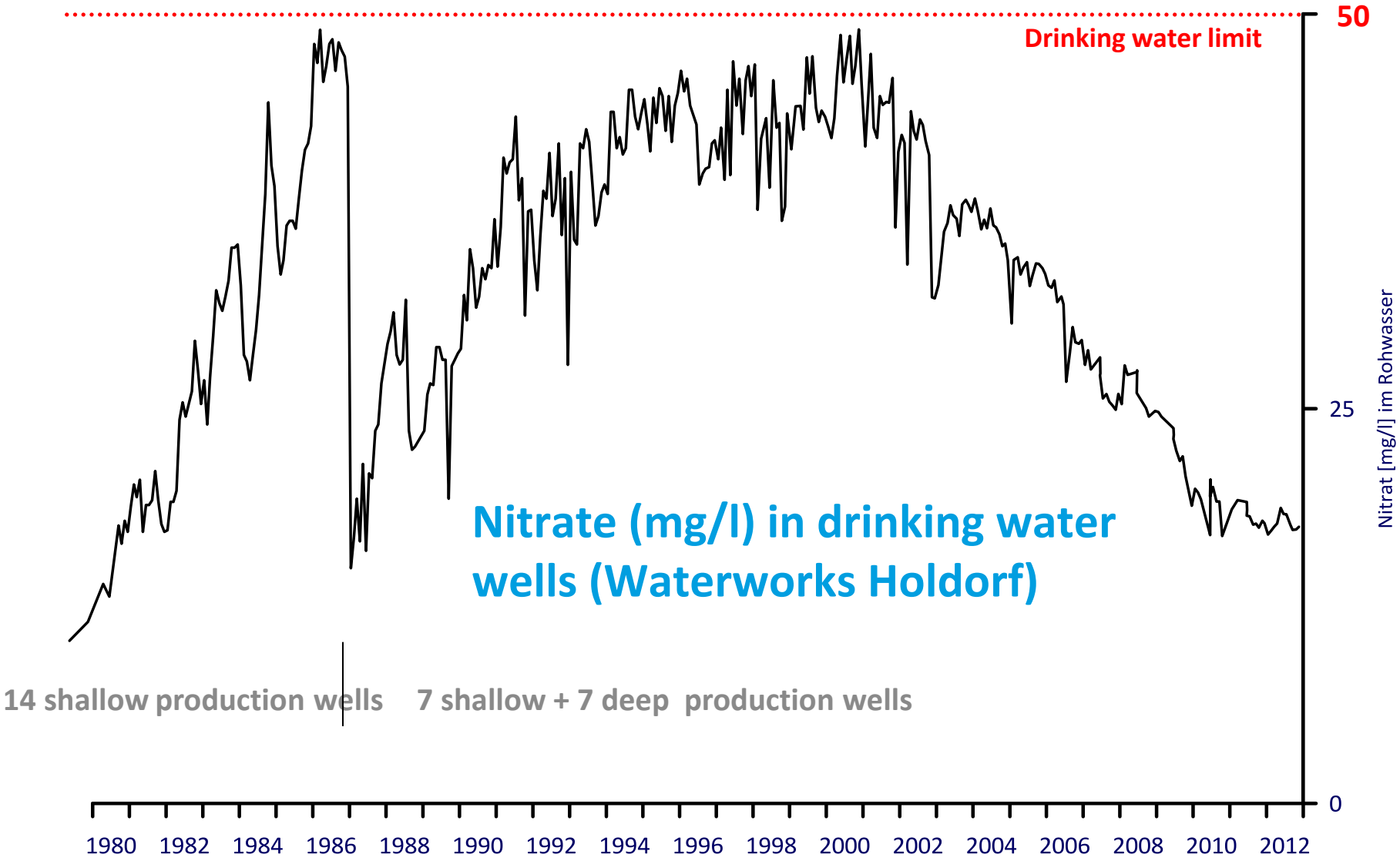
Groundwater protection programme by the regional water supplier OOWV



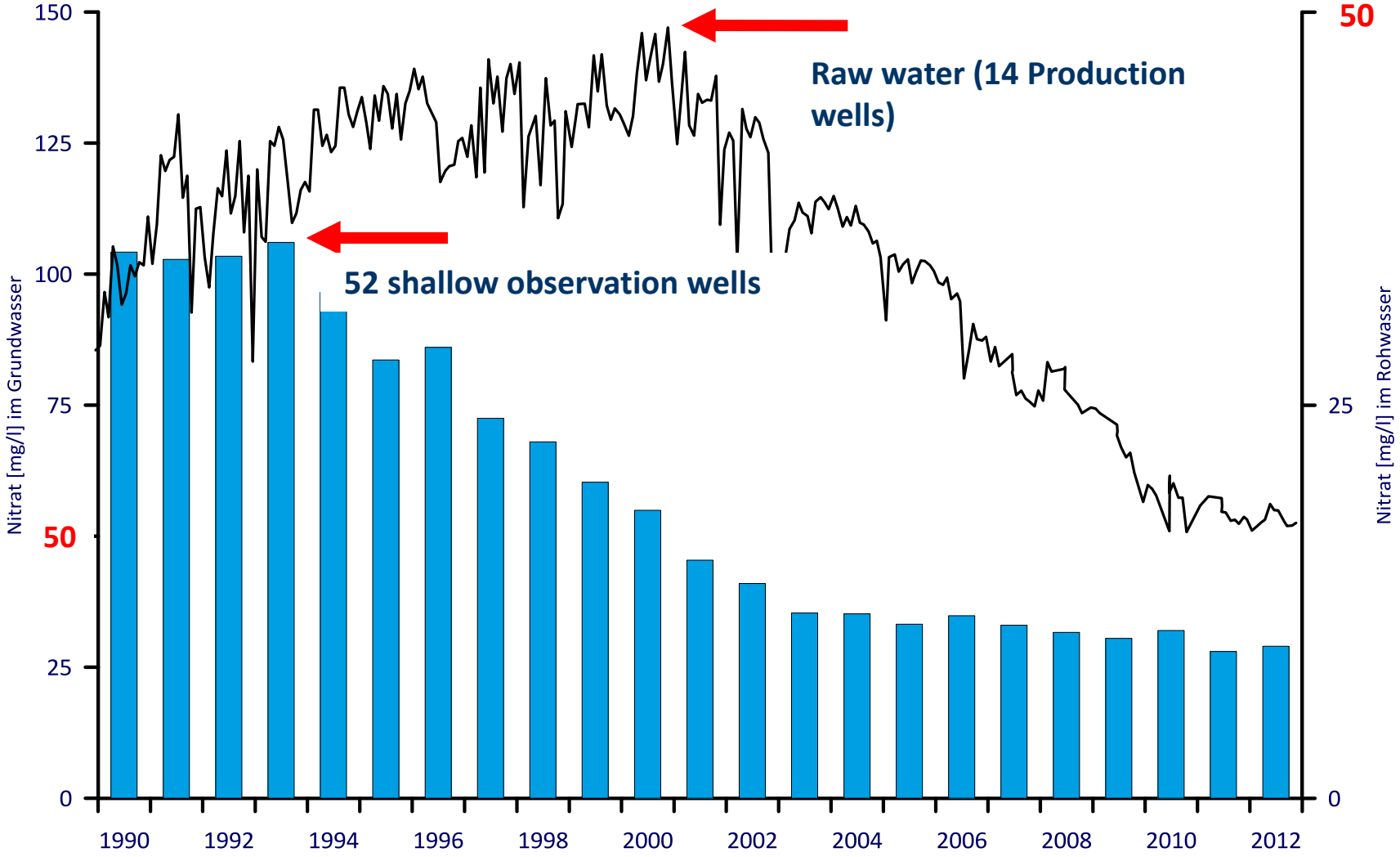
Groundwater protection (OOWV) Organic farming

- Less nitrogen
- No pesticides

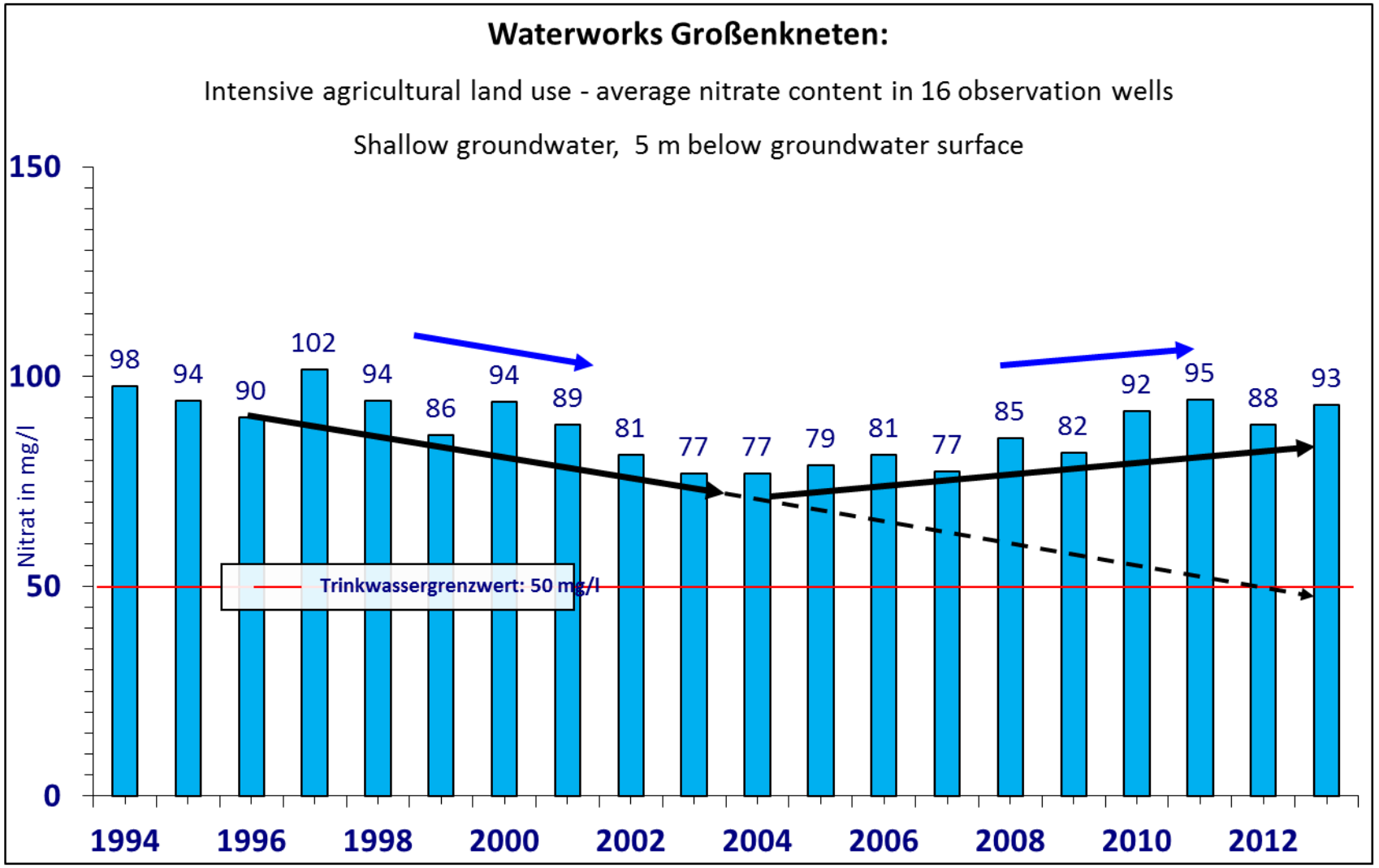
Groundwater protection by deepening the wells



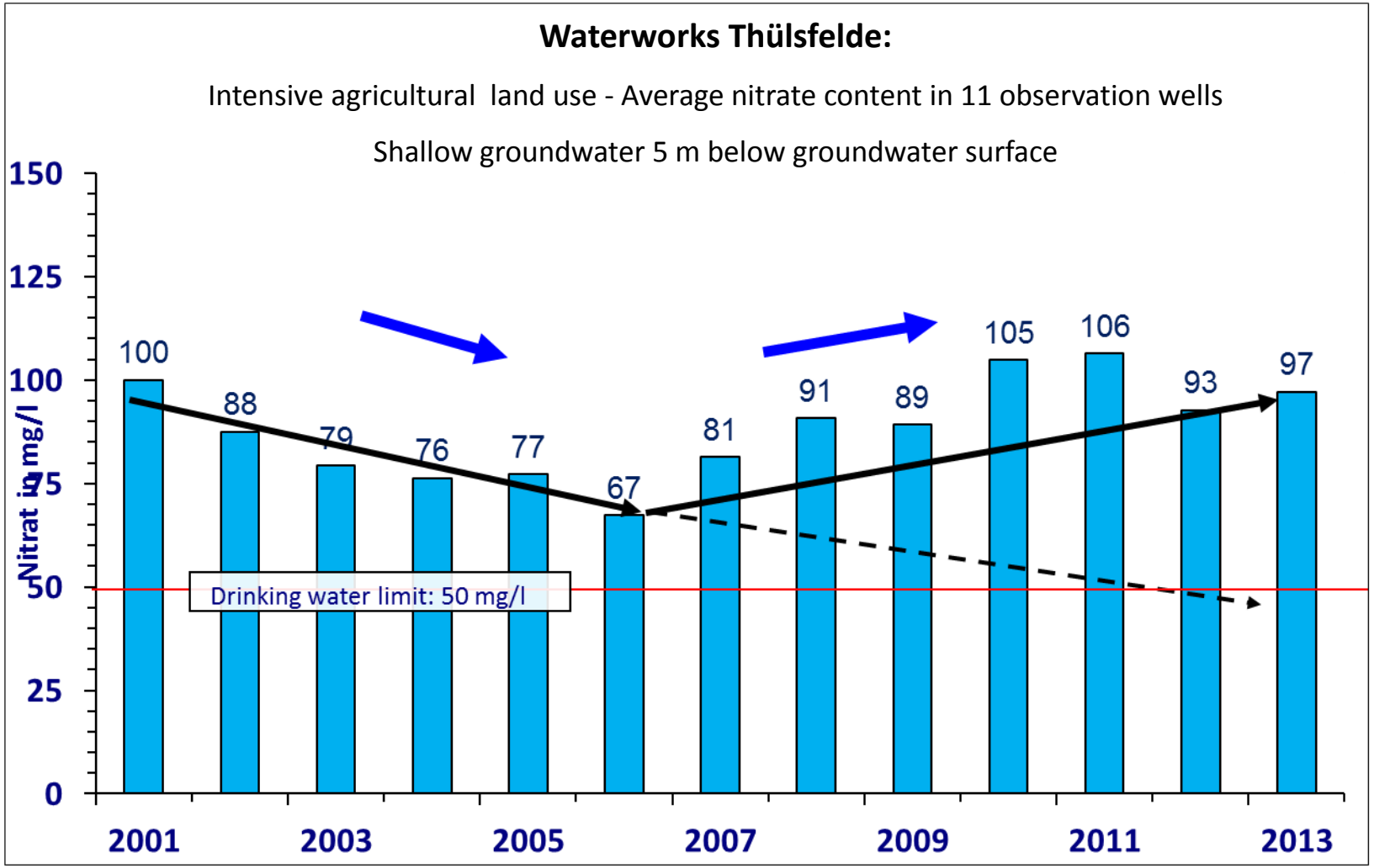
Development of nitrate concentration in groundwater (water winning area - waterworks Holdorf)



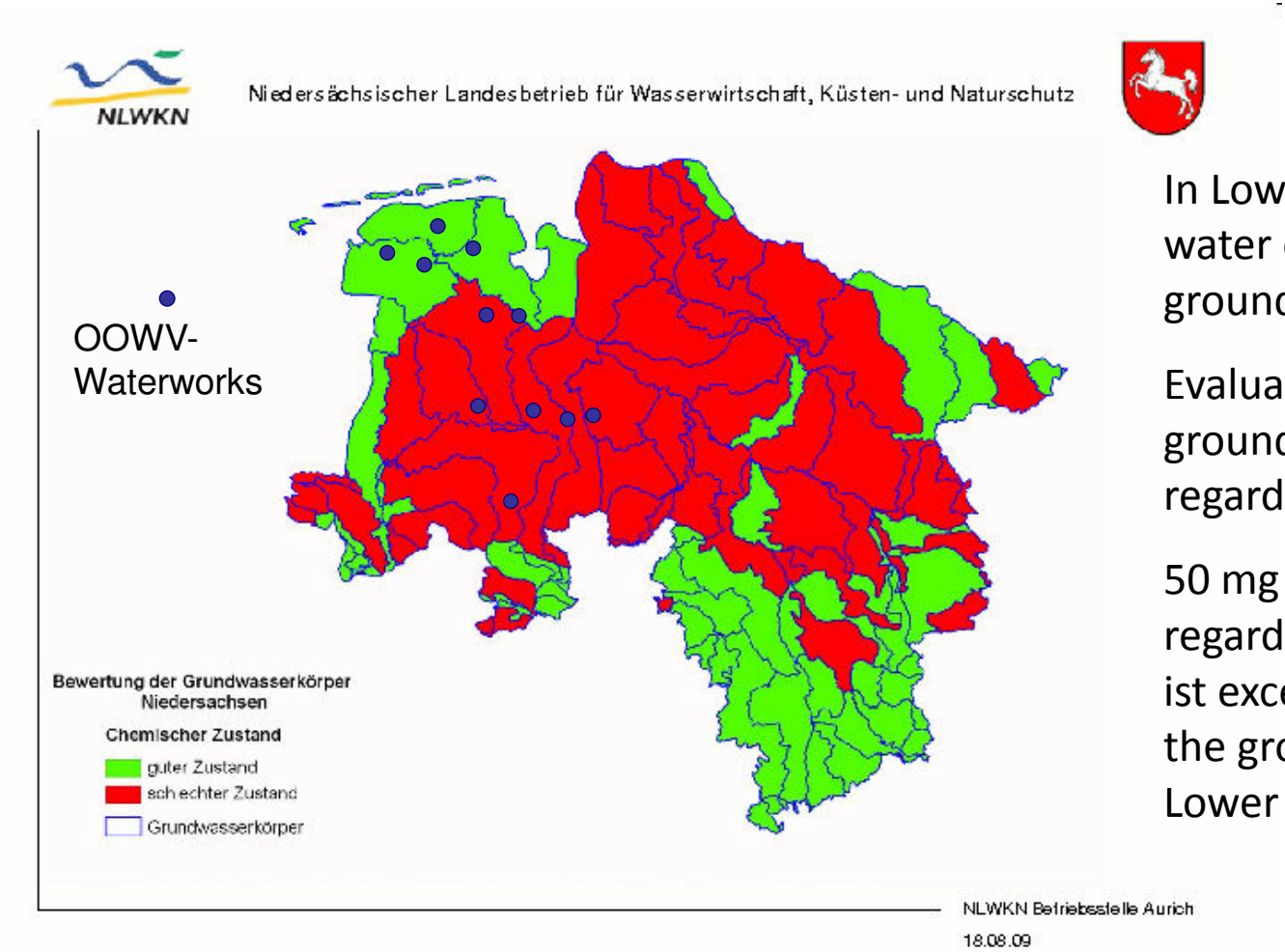
Groundwater quality in water winning areas



Goundwater quality in water winning areas



Groundwater quality in Lower Saxony



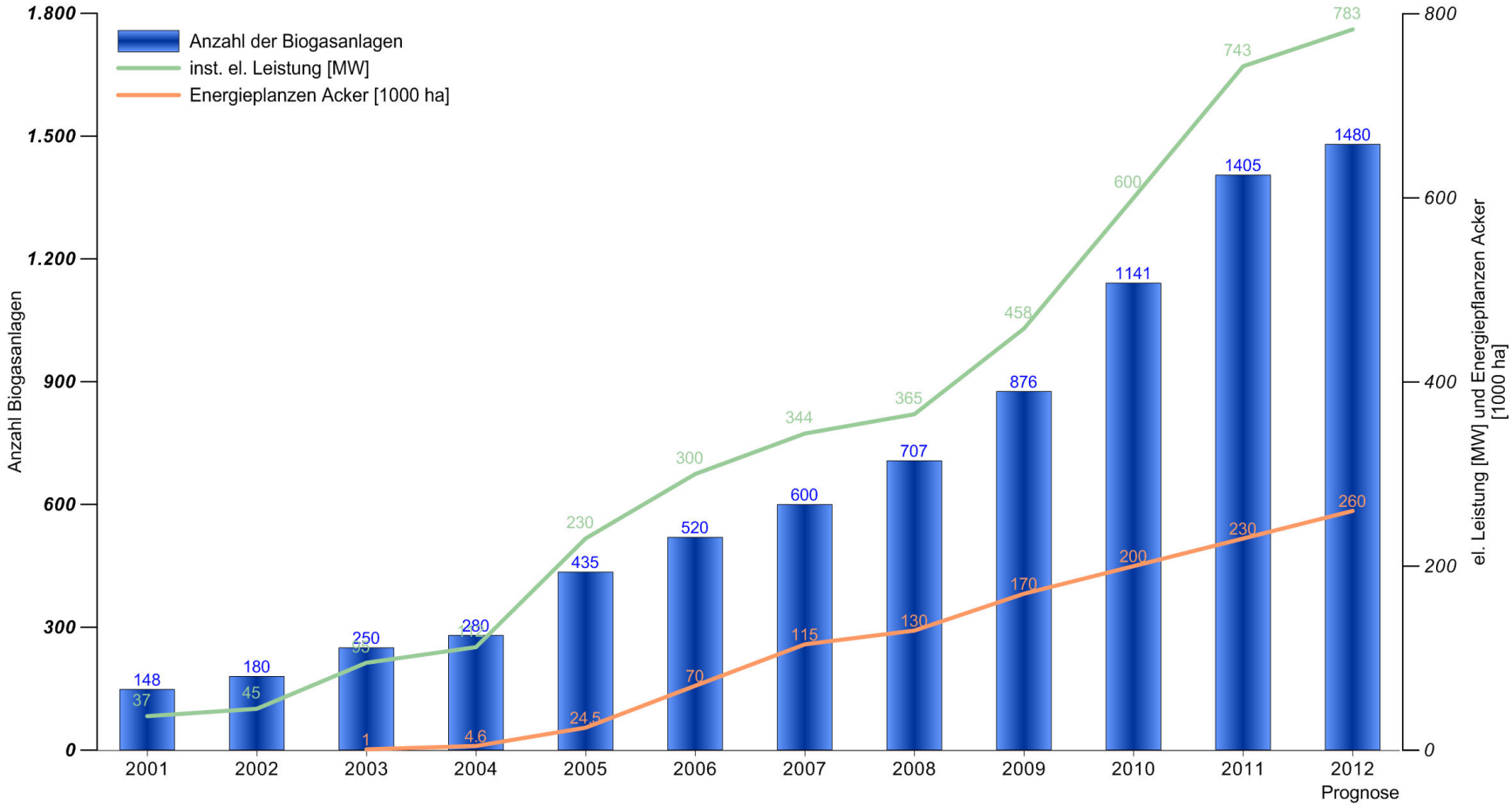
In Lower Saxony drinking water comes mainly grom groundwater.

Evaluation of the groundwater quality regarding EU-WFD:

50 mg /l Nitrat limit regarding drinking water ist exceeded in 60 % of the groundwater bodies in Lower Saxony

A new actor has come on the scene - biomass digesters

Development of biogas in Lower Saxony

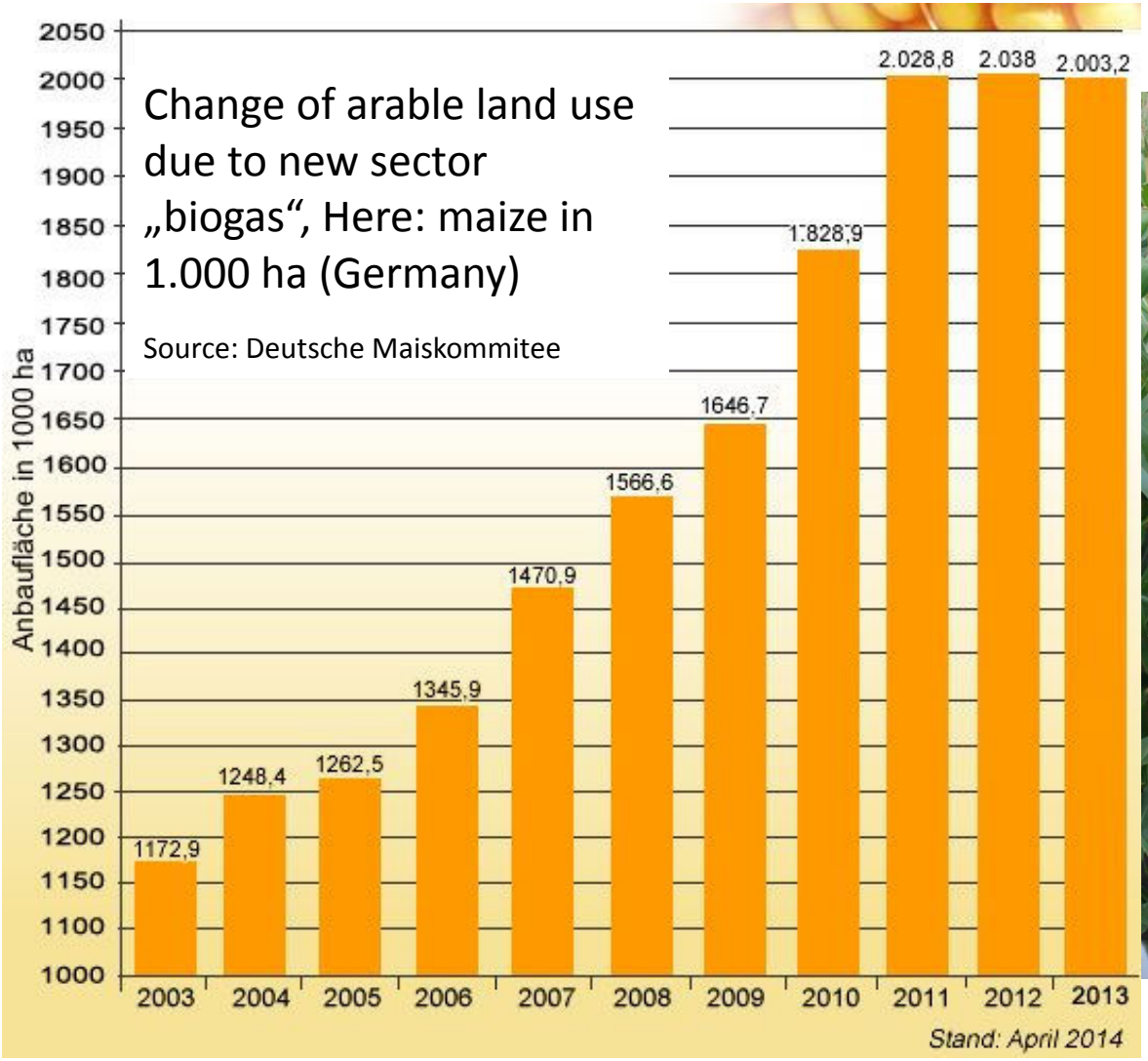


Quelle: MU Niedersachsen, ML Niedersachsen, Landesamt für Statistik, Darstellung OOWV

Changes in land use due to biogas (Germany)

Change of arable land use due to new sector „biogas“, Here: maize in 1.000 ha (Germany)

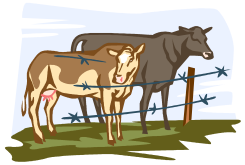
Source: Deutsche Maiskommitee



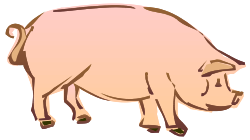
Globalization of food production

Annually ca. 2,4 Mio. t fodder imported to Germany
↓ (Soja, wheat, barley, maize, sunflower- , palmkernelextraction, a.s.o.)

* 2,6 Mio.



* 10,8 Mio.



* 103 Mio.

- 1.457 Biogasplants in Lower Saxony

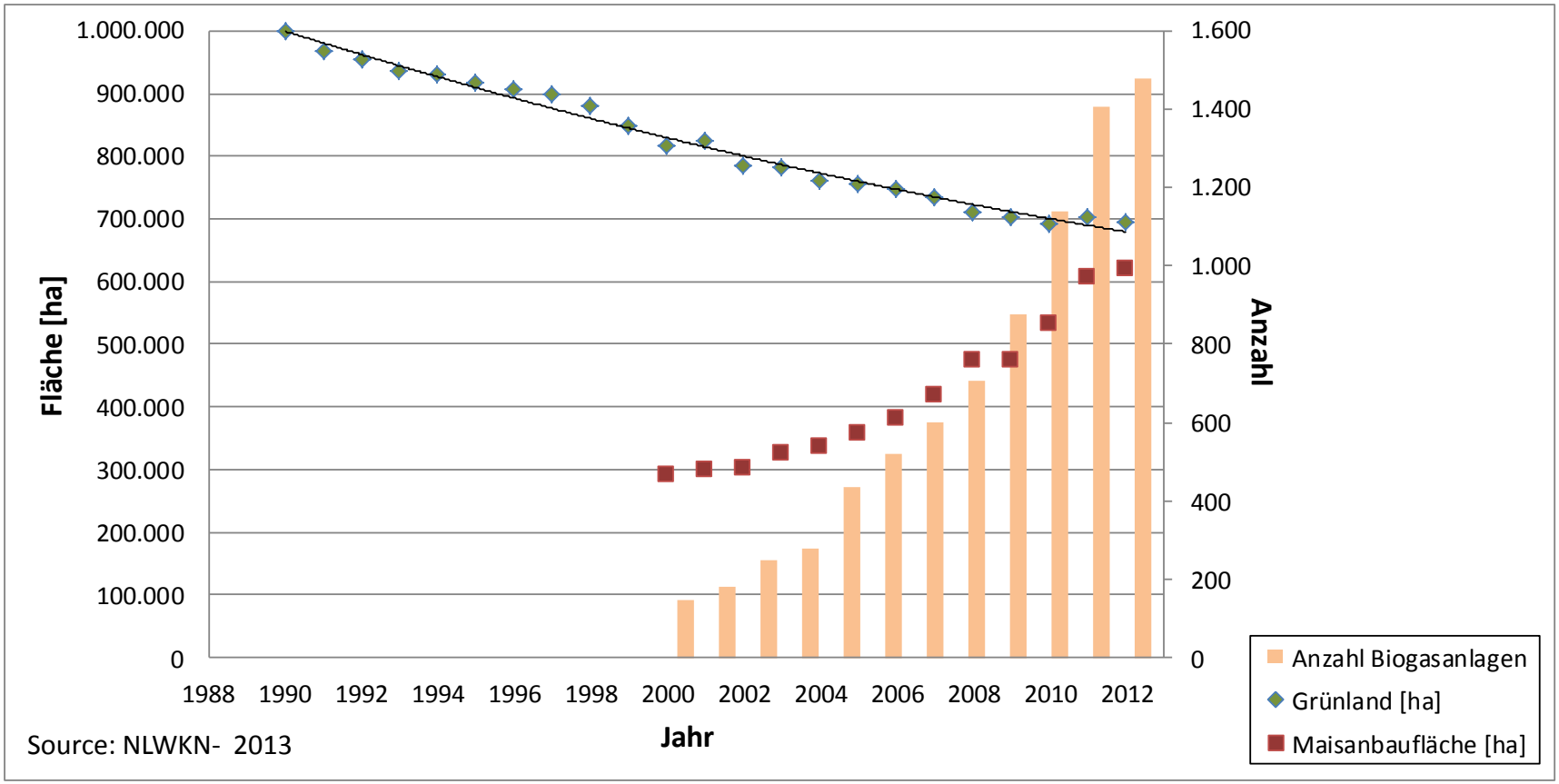
38,7 Mio. t liquid manure

8,1 Mio. t solid manure

9,9 Mio. t manure from biogasplants
(calculated input of maize)

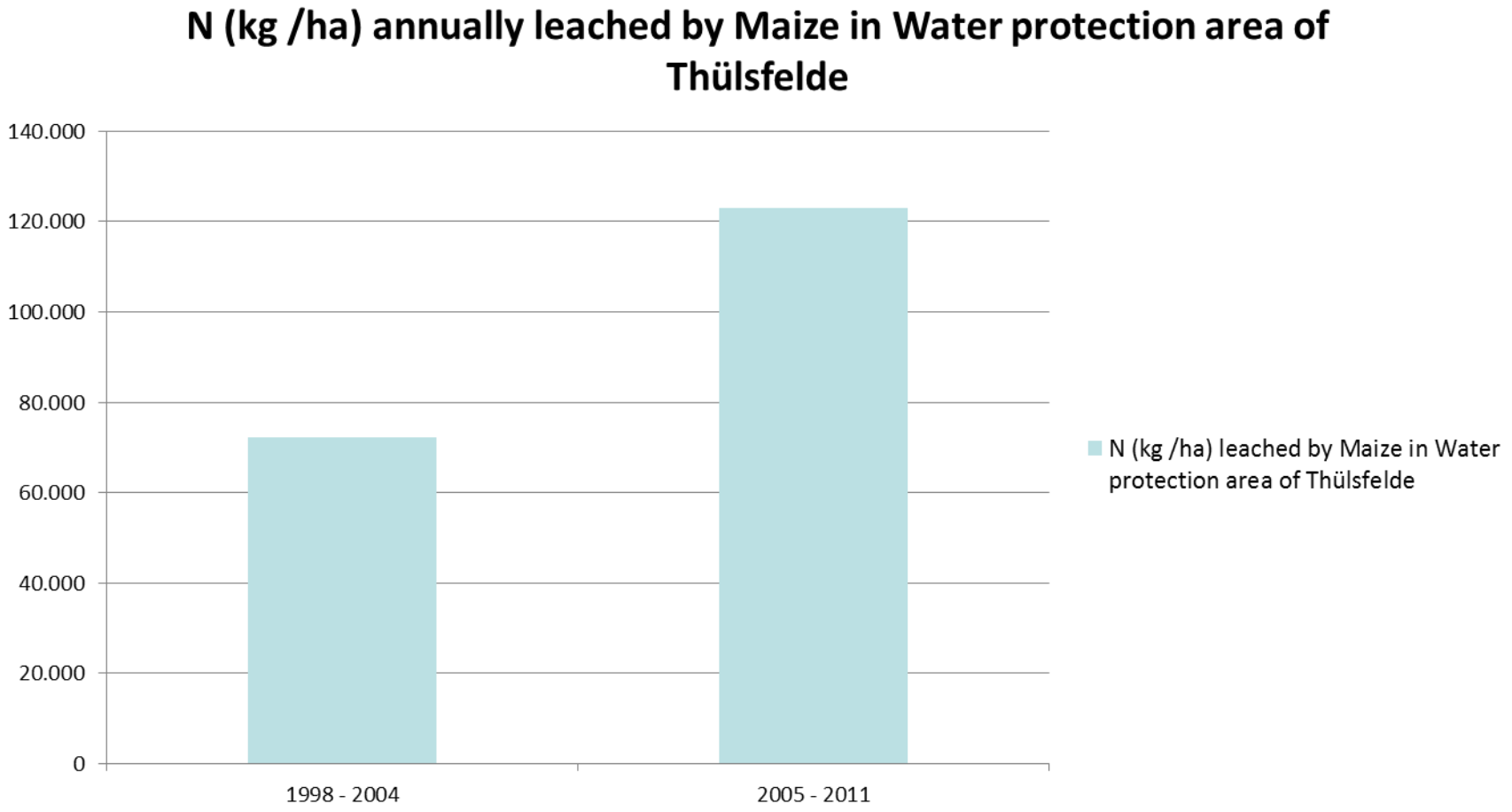
Source: LWK- Nährstoffbericht, 2013

Additional side effect: Ploughing of grassland (Lower Saxony)



- Increasing numbers of bioenergy plants in Lower Saxony
- Loss of grassland in Lower Saxony (in WWA: 34.000 ha seit 1990)
- Increasing ha of maize (in WWA: 20.000 ha von 2005 bis 2010)
- Increasing animal density (counties of Cloppenburg and Vechta > 4 Livestockunits/ha)

Consequence of biogas-production in water protection area



Challenges for Lower Saxony to reach the aims of the EU-WFD

- **Rising amounts of organic manure**
  - **animal husbandry ongoing growing sector**
  - **bioenergy plants**

- **Further aspects**
  - **ploughing of grassland (nitrogen and carbon release)**
  - **Higher percentages of maize on arable land due to demand of bioenergy plants**
  - **Rising values for residual nitrogen in autum in soil, leached out towards groundwater**

Challenges regarding ecosystem levels

Levels within the ecosystem	Evaluation parameters	Existing legal targets	Values in WPA Grossenkneten
Landuse	Landuse: for example % fallow plots , % maize, % forest	no	> 31% of maize
Soil	kg Nmin/ ha (soil sample 0-90 cm) in autumn to evaluate the efficiency of the appllied measures	no	> 90 kg N/ha
Percolating water (unsaturated zone)	Nitrate concentration under agricultural landuse	no	> 133 mg/l NO_3
Shallow Groundwater	Nitrate concentration in observation wells (mg Nitrat /l, ug Pestizide/l, ug Metabolite of Pesitzide/l)	< 50 mg Nitrate /l (EU - WFD)*	> 50 mg/l Nitrate
Deep Groundwater, Location of the wells	Nitrate concentration in production wells (mg Nitrat /l, ug Pesticide/l, ug Metabolite of Pesticide/l)	< 50 mg Nitrate /l (Drinking water act)	6 mg/l Nitrate

„Missing links“: Existing legal framework for agricultural production is either not defining targets ↑, or not appropriate to respond to the pressure already there

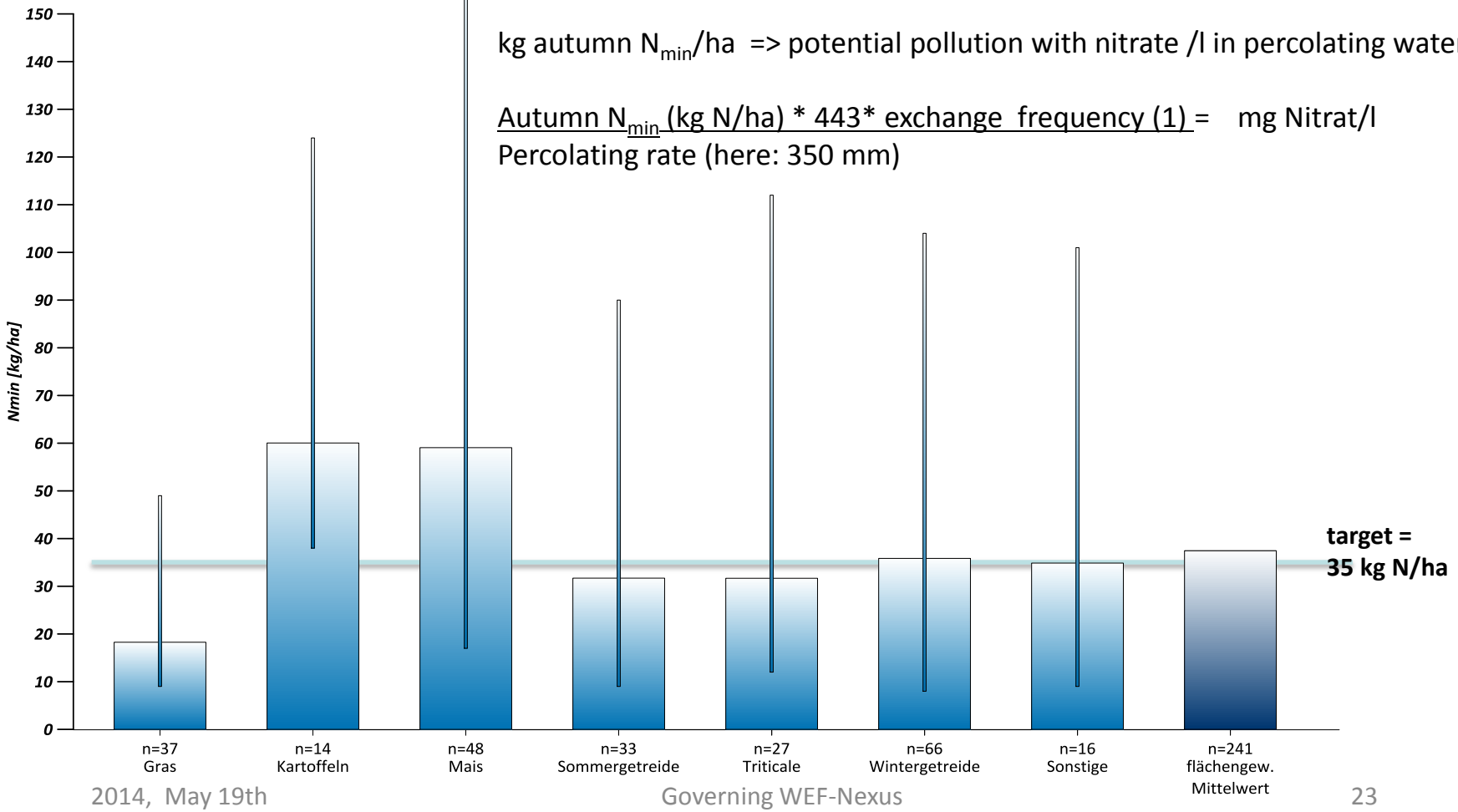
Making groundwater protection suitable for future

→ **Urgent need for an effective amendment of the German Fertilizer law in 2014/15 :**

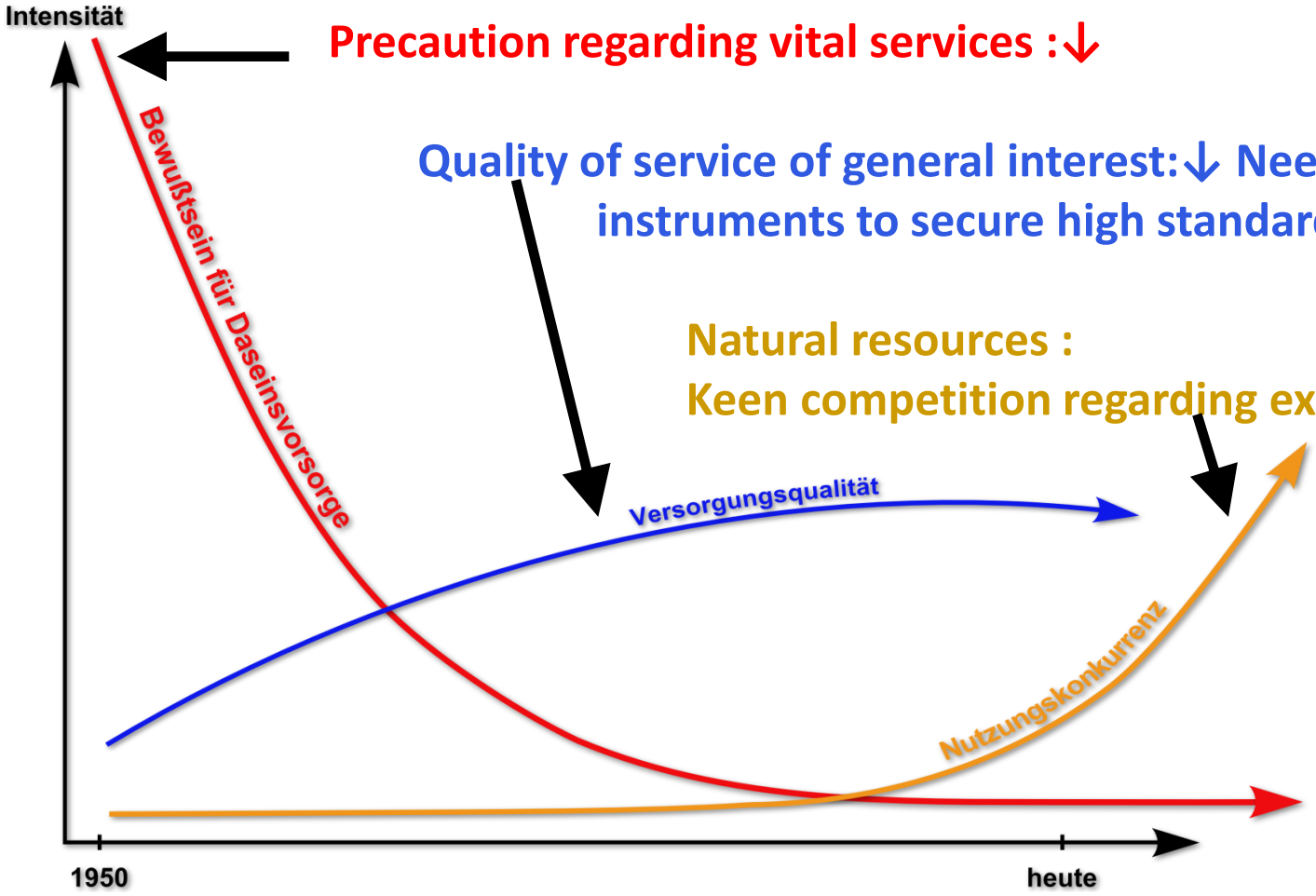
- **Inclusion of biogas slurry (N coming from plants) into the 170 kg N/ha limit for N from organic manure**
- **Obligation towards planning manuring**
- **Less reductions by considering the effectivness of N in organic fertilizers**
- **Improved methods to calculate the nutrient balance on farm level**
- **Effective systems to calculate and controll the needed export of manure from farm**
- **Longer closing time for spraying slurry**
- **Effective controlling system and sanctions**
- **Cheap and easy parameters for monitoring schemes**

Monitoring success

Results in residual nitrogen (kg N/ha/ 90 cm soil) in autumn on plots owned by OOWV 241 samples from arable land with contract to the farmer (2013)



Less precaution due to changing priorities



Graphik: OOWV

Strong drivers anticipating groundwater protection

EU targets / „Kyoto“: “CO_2-Reduction“→National Action plan 2020 (D)

- **13,2 % of transport energy from energy crops**
- **30 % of electricity from renewable energy**
- **14 % of heating energy from renewable energy**

+ shortage of fuel/ gasoline
+ market for new technologiess
+ rising prices at food/land markets
+ rising demand on water rights

Support of environmental schemes

€

Water

€, €, €, €…

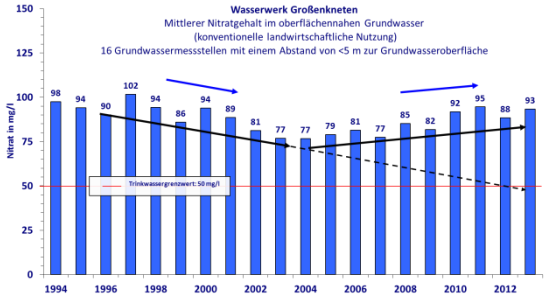
Support of renewable energy

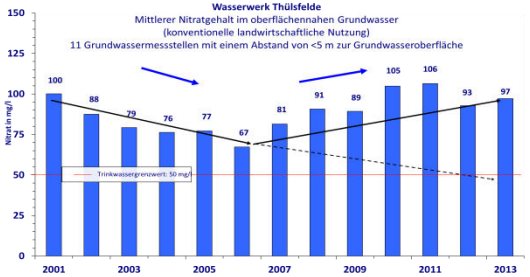
Conclusion

In the last 25 years our customers had to pay approximately 100 Million € for groundwater protection measures!

And still the nitrate concentration has an upward trend in our water protection areas!!

Now we demand a sharper administrative law!!!





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Vielen Dank für Ihre Aufmerksamkeit.