

Water4All – European scale experience of integrated approaches to land use, surface and groundwaters

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Introduction

- Water4All is a 3 year project funded by the Interreg IIIB North Sea Region programme.
- It aims, through the sharing between partners of their extensive experience in implementing land-use change & stakeholder engagement, to:
- Integrate water quality protection & management into the context of local and regional land use planning;
- Relate the objectives and outcomes to the implementation of the Water Framework Directive.

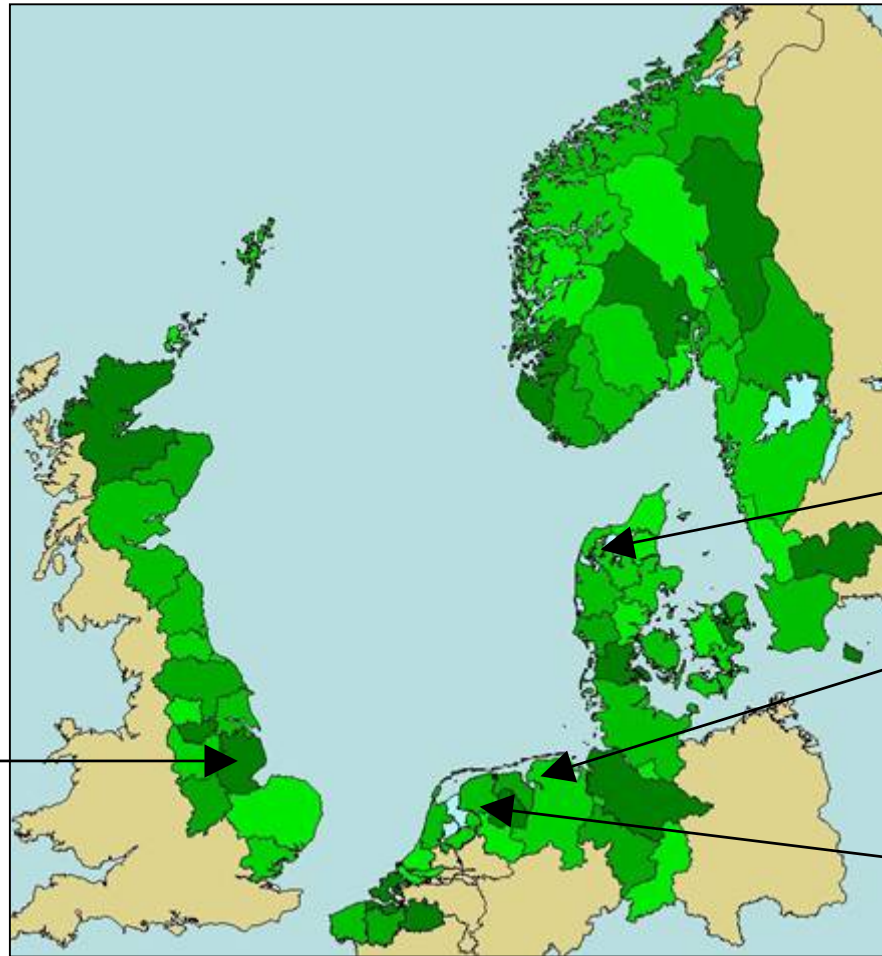
Project Methods



- Individual Country Projects
- Transnational Seminars
- Expert Workshops
- Traineeships
- Web site: www.water4all.com

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Project Partners



River Slea,
Lincolnshire

Aalborg,
North Jutland

Thülsfelde,
Weser-Ems

River Hunze,
Drenthe




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Partner Projects

- **Denmark: Aalborg Municipality**

 In an agriculturally contaminated water catchment area, investigate the influence of lower grazing pressure and different types of land-use on the quality of groundwater.

- **The Netherlands: Provincie Drenthe**

 In the catchment of the river Hunze, intensively used arable land will be changed into wetlands in order to reduce nitrate leaching and improve the ecological quality of the neighbouring landscape.

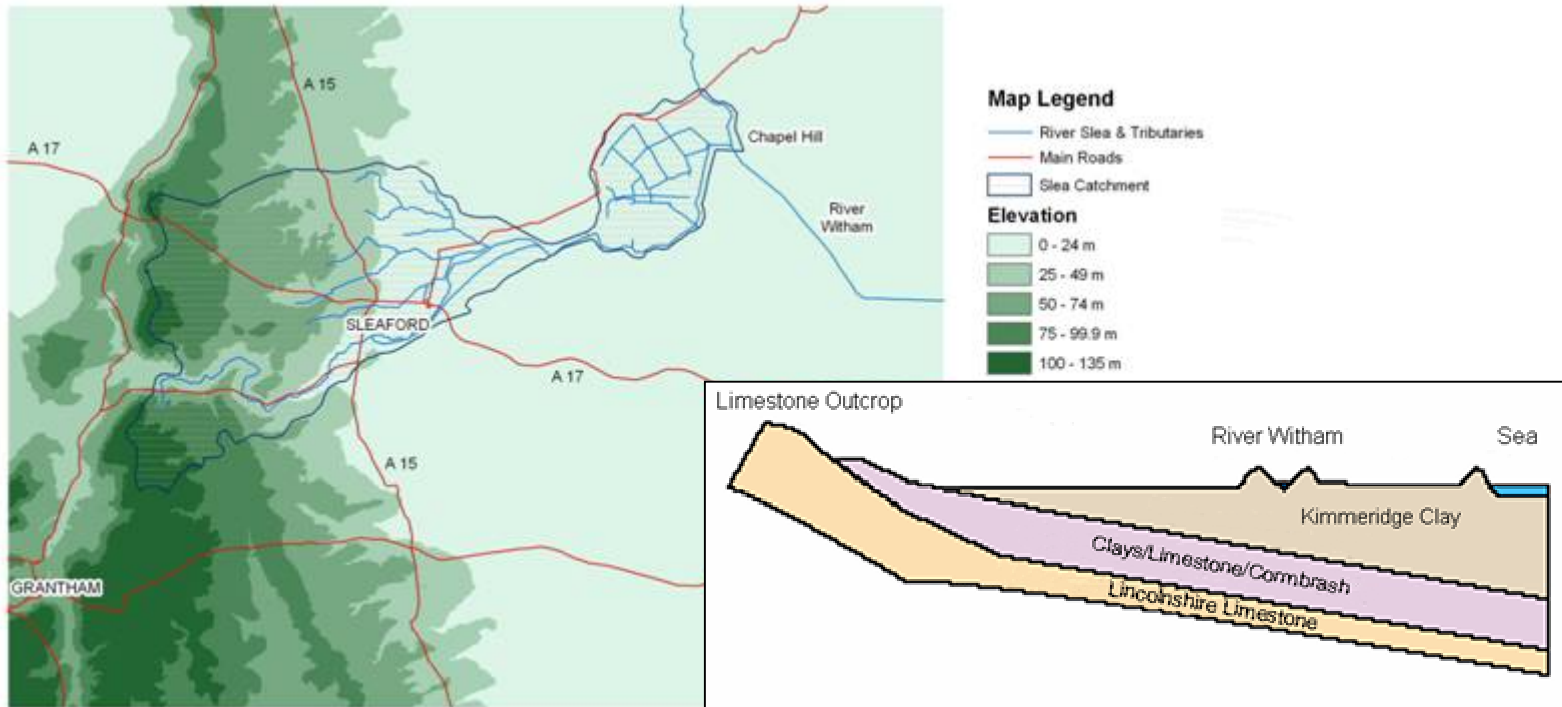
- **Germany: District of Weser-Ems & the Water Board of Oldenburg and Ostfriesland (OOWV)**

 In the water protection area of Thülsfelde, evaluate scientific investigations and practical experiences of differing land-uses in order to draw up a handbook of best practice.

UK: The Environment Agency



- Investigate the scope for, and implications of, using land use measures for water quality management in an example catchment - the River Slea in Lincolnshire.



Project Goals



- Evaluate possible future patterns of land use and predict the consequences of these for nitrate levels in groundwater and the associated river system.
- Determine the land use changes needed to achieve a sustainable system (e.g. 'good status').
- Identify and evaluate how these changes could be achieved and how they would affect the socio-economic structure of the local community.

Innovative Solutions to Diffuse Pollution in Lower Saxony - The Success of Co-operative Agreements

- Characteristics of Lower Saxony
- Strategies, Measures and Costs
- Success Stories
- Conclusions and Outlook

Characteristics of Lower Saxony

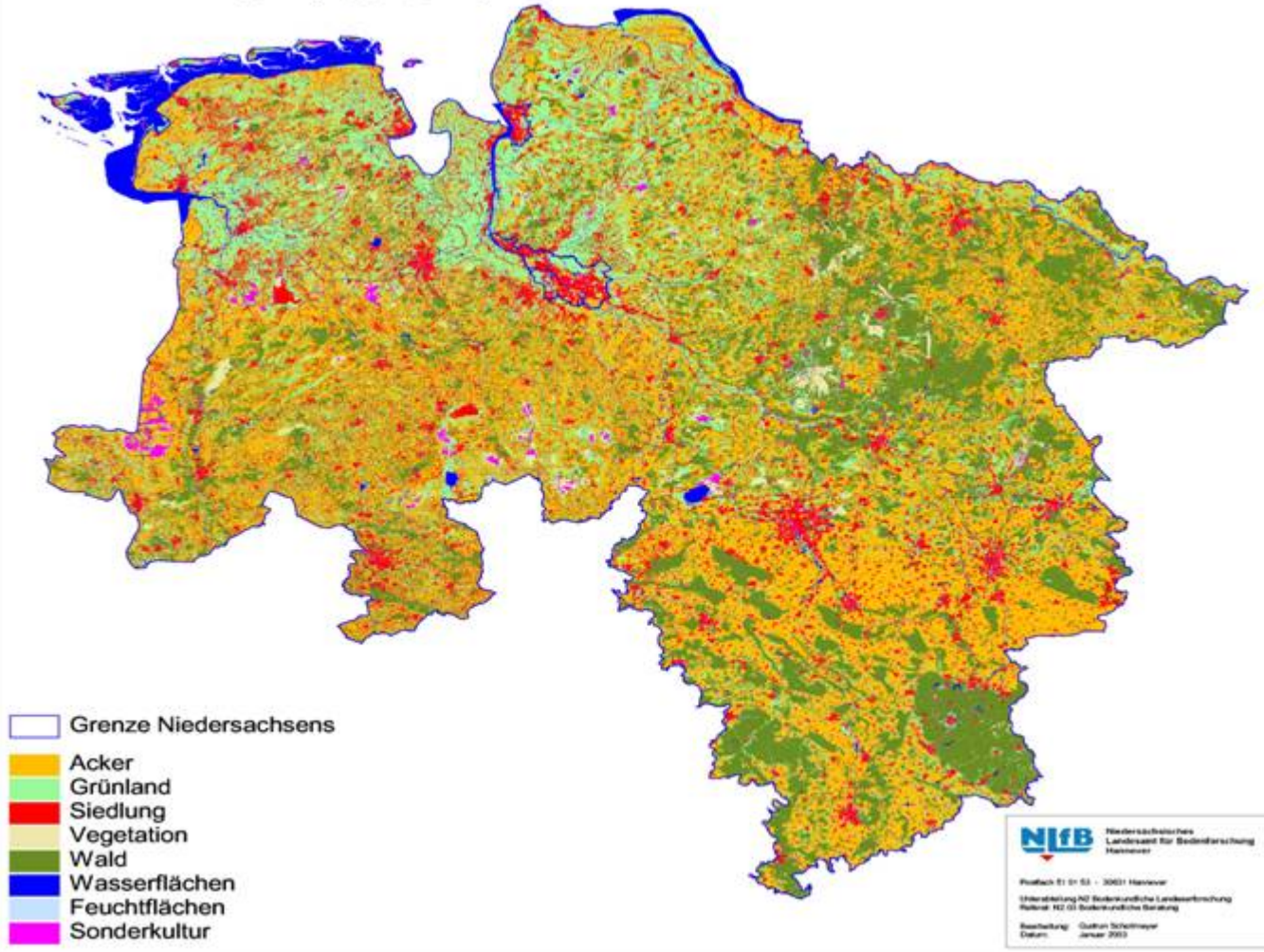
Total area	48.000 km ²
Forest	10.700 km ² (23%)
Agricultural use	30.500 km ² (63%)
Arable land	19.200 km ² (63%)
Pasture	11.300 km ² (37%)
63.000 Farmers	

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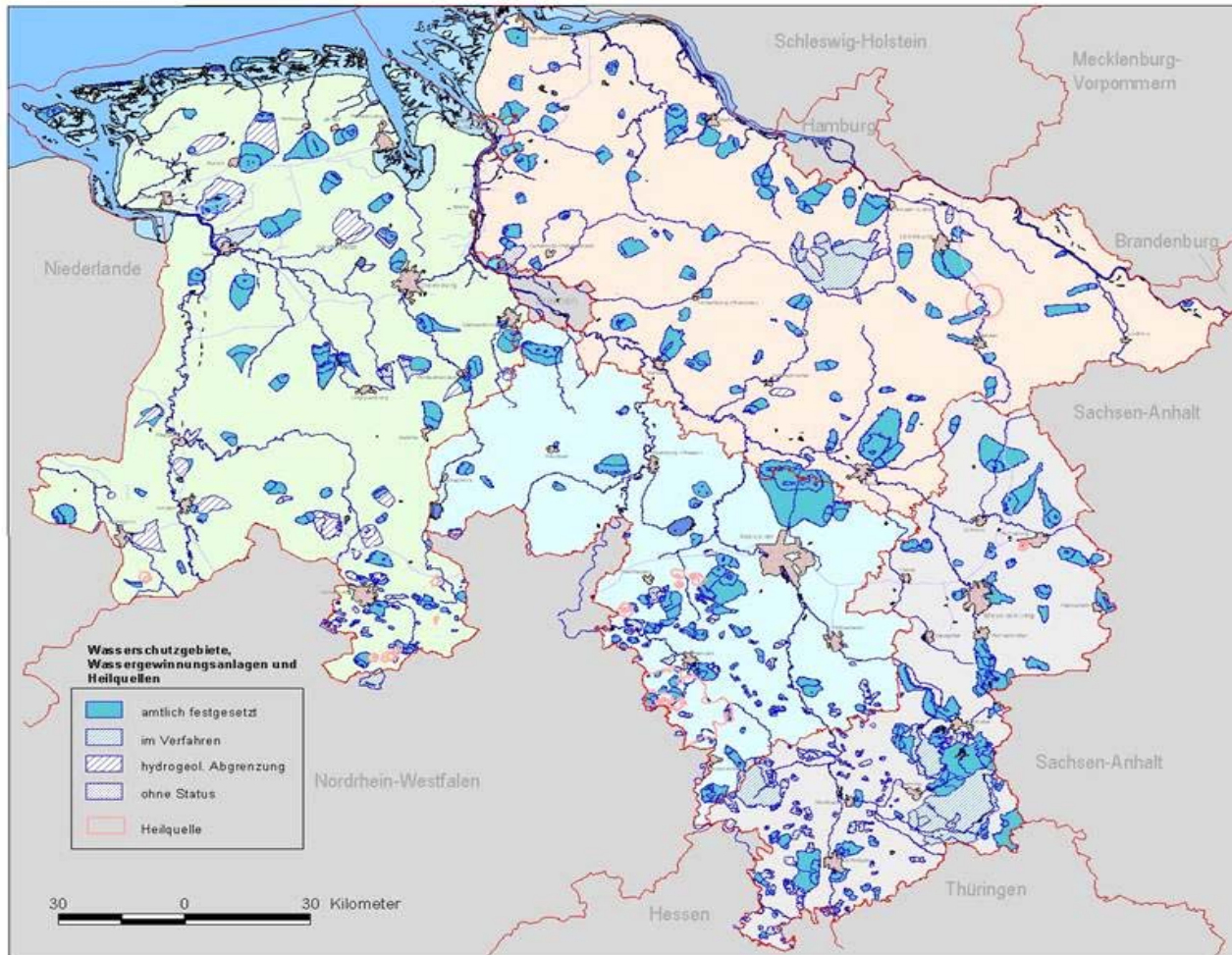
Land Use in Lower Saxony



ATKIS-Nutzungen (aggregiert)



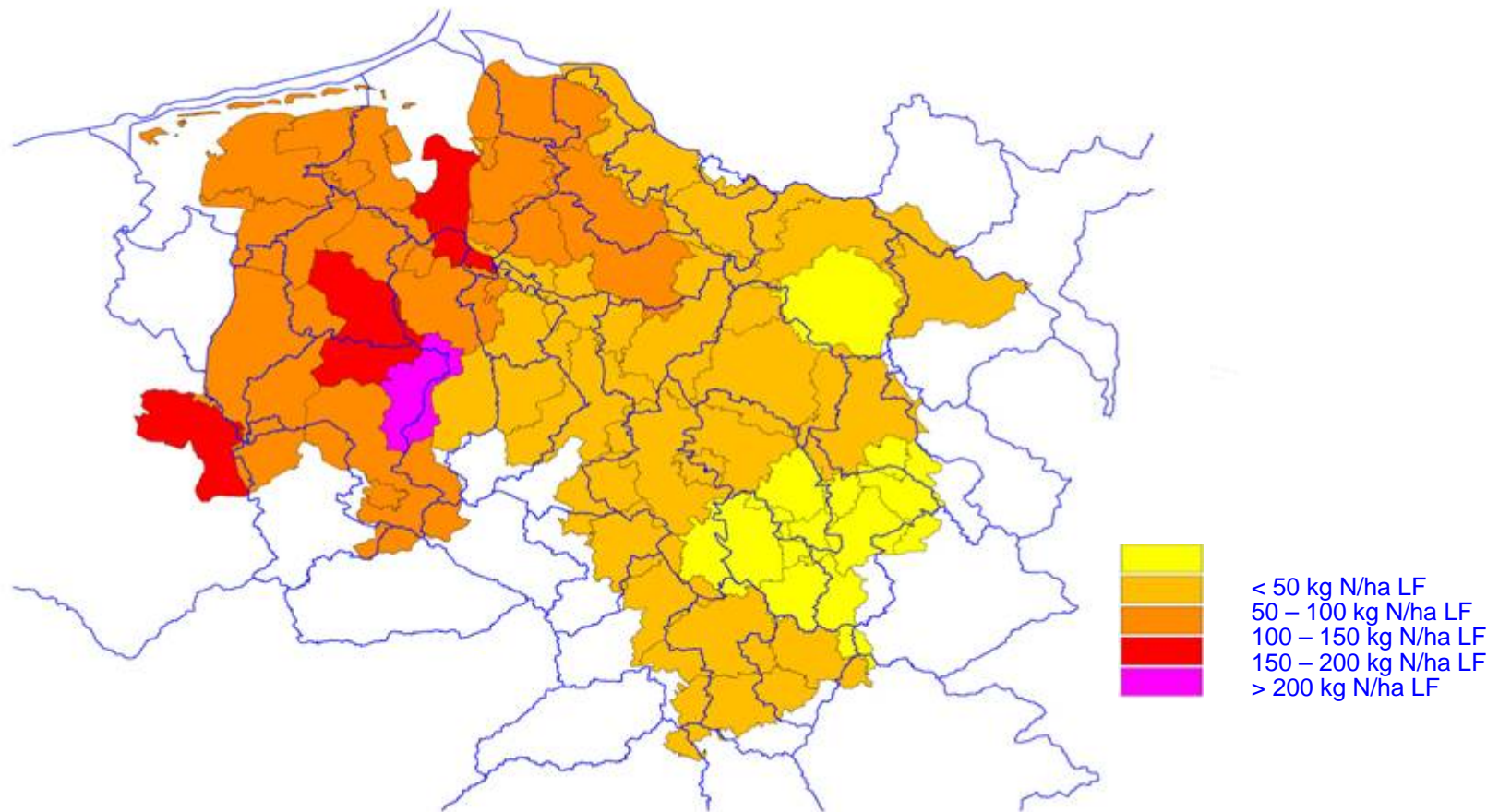
Water Catchments in Lower Saxony



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Nitrogen Surplus - Nitrogen Balances at a County-Level



Strategies, Measures and Costs



The legal framework

- 1992 Introduction of water abstraction charge
(40 % for groundwater protection)
- 1993 Decree of co-operation
- 1998 Priority Programme

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The Priority Programme

1998 Priority Programme

- Directive for the distribution of the „w. a. ch.“
- 3 Categories (A, B, C)
 - (A) protection necessary 4,3 %
 - (B) improvement necessary 85,8 %
 - (C) remediation necessary 9,8 %

Co-operation in Lower Saxony



Stakeholders

- **District Government for Water Management**
 - **Local Water Supplier**
 - **Agricultural Authority (Chamber of Agriculture)**
 - **Farmers Spokesman**
 - **Advisory Service (chamber of agriculture, private office)**
- **Statewide 115 Co-operatives –
300,000 ha, 6000 Farmers**

The Advisory Service



General tasks

- ***Individual voluntary consulting service*** for agriculture, forestry and market gardening
- **Negotiation of *Voluntary Agreements*** to implement measures of groundwater protection

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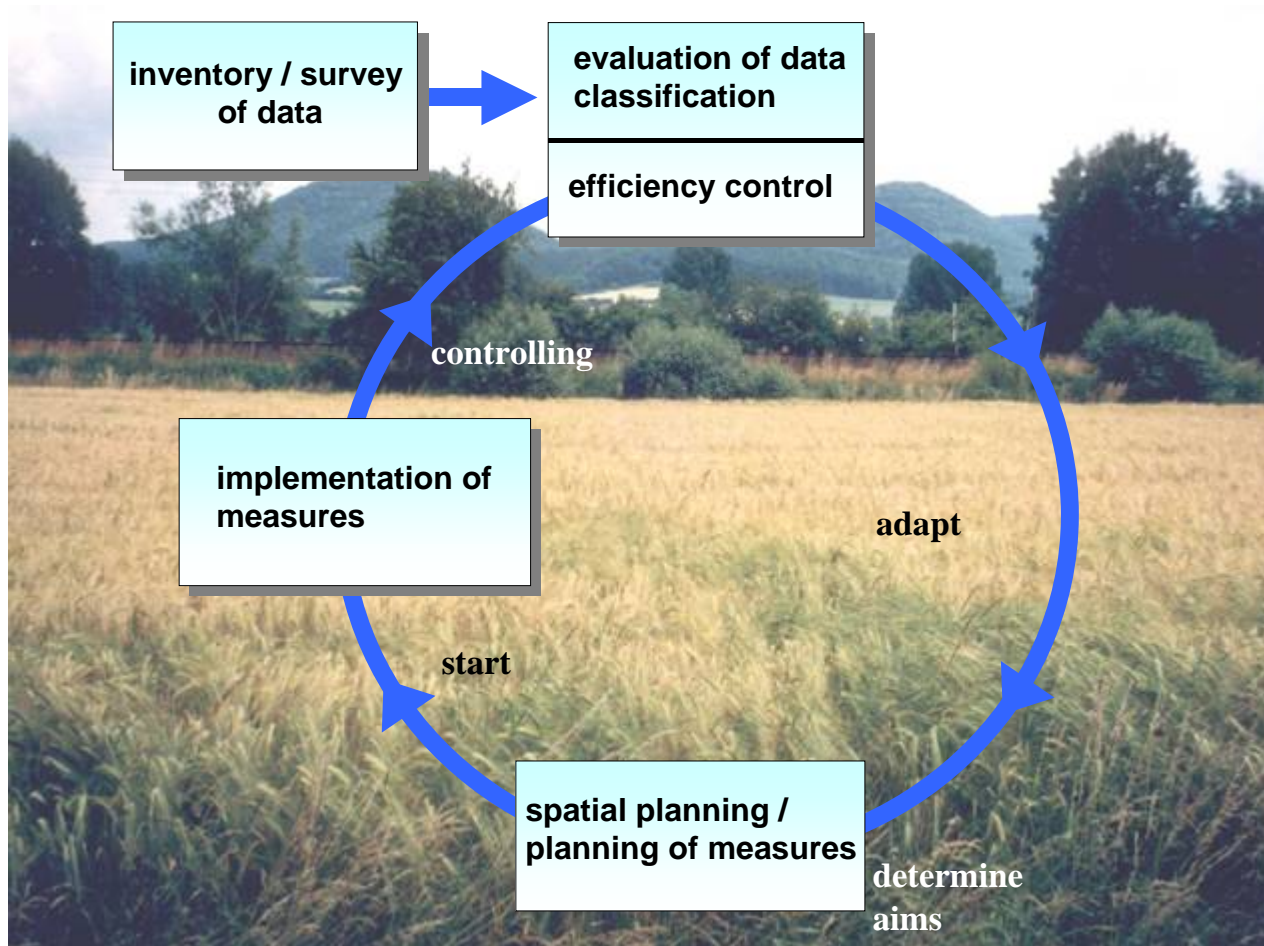
Expenditure on Groundwater Protection



- Appr. 20 Mio. € p. a.
- 1/3 *Advisory Service*
- 2/3 *Voluntary Agreements*

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The Groundwater Protection Cycle



Efficiency Control - Zone Related Methods



Zones	Methods	Results	Suitability
	balancing	balance of nutrients	recognition of contamination causes
root zone	soil sampling for NO ₃ + NH ₄ in late fall	kg mineral-N/ha after mineralization, before leaching	potential nitrate loss by leaching
drainage zone	deep soil sampling, layer-specific	depth-gradient of concentration	pre-control of quality of groundwater replenishment
groundwater surface	groundwater surface probe shallow measuring points	quality of recent groundwater	quality control of groundwater replenishment
top groundwater zone	multilevel measuring points	depth-gradient of groundwater quality	quality control of groundwater replenishment over several years
main aquifer with well	well catchment measuring point	groundwater quality in deeper aquifers	early recognition of changing groundwater quality
	raw water analysis		current quality control
	testing of drains and discharge systems	parcel or catchment specific concentrations	indication for quality of groundwater replenishment

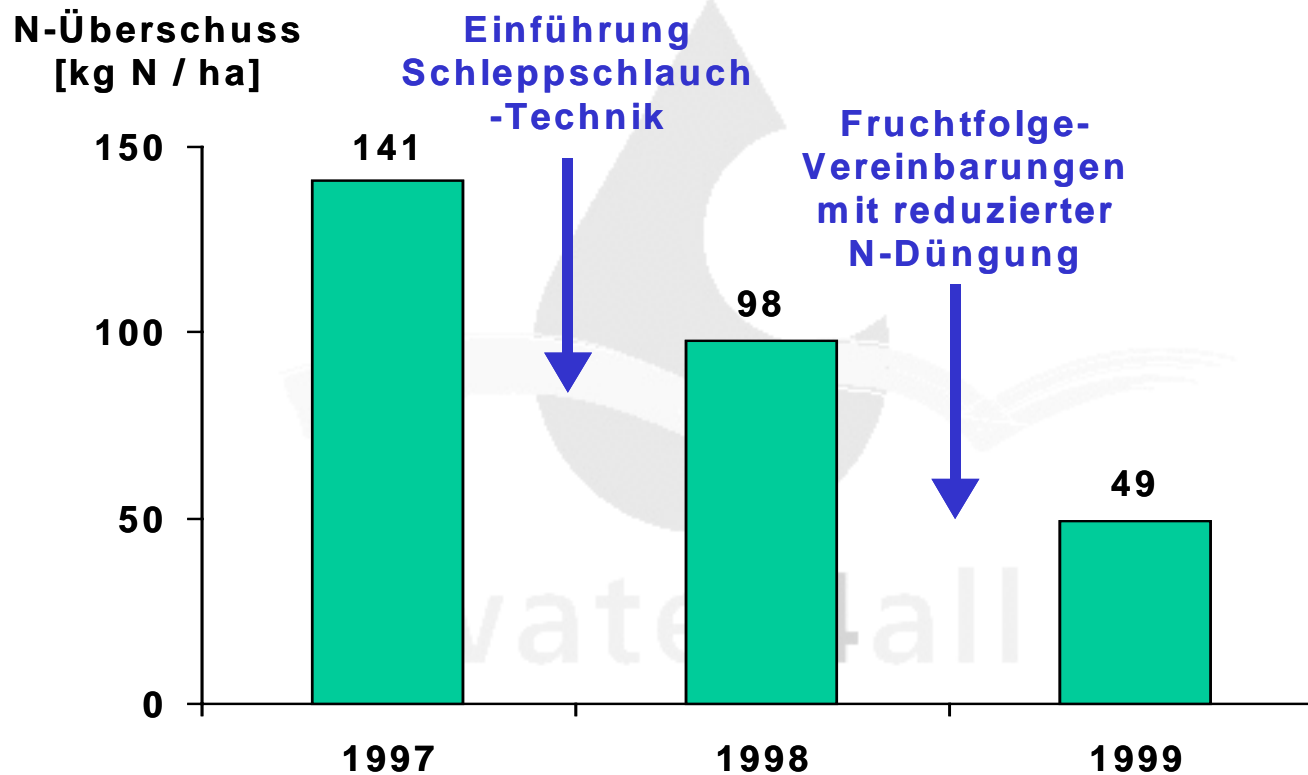
Pilot Projects

Support by brochures and guidelines

- Guidebook for the advisory service
- Methods for assessing the results
- Methods for optimising the assignment of priorities
- Data management - state-wide platform
- Land use management

Success Stories...

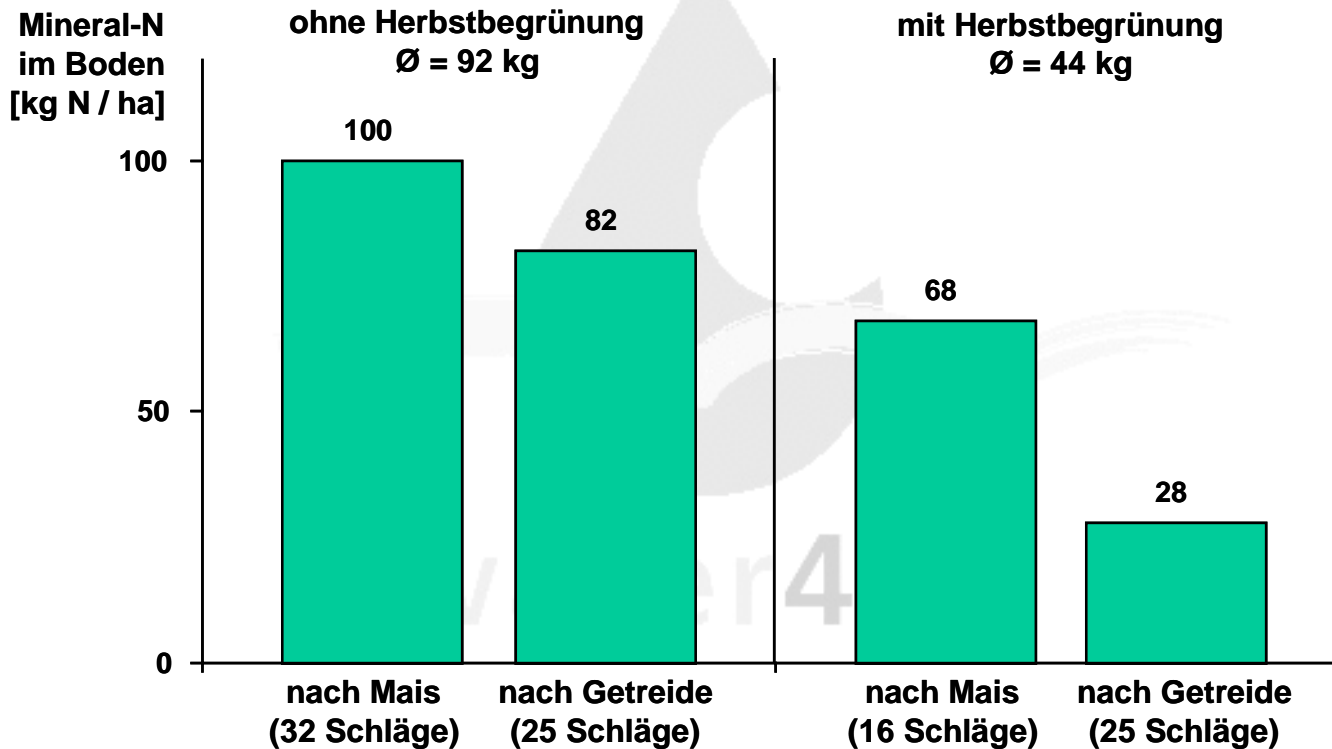
...(1) N-Balance - Reduction of Nitrogen



Quelle: Geries Ingenieure Göttingen

Success Stories ...

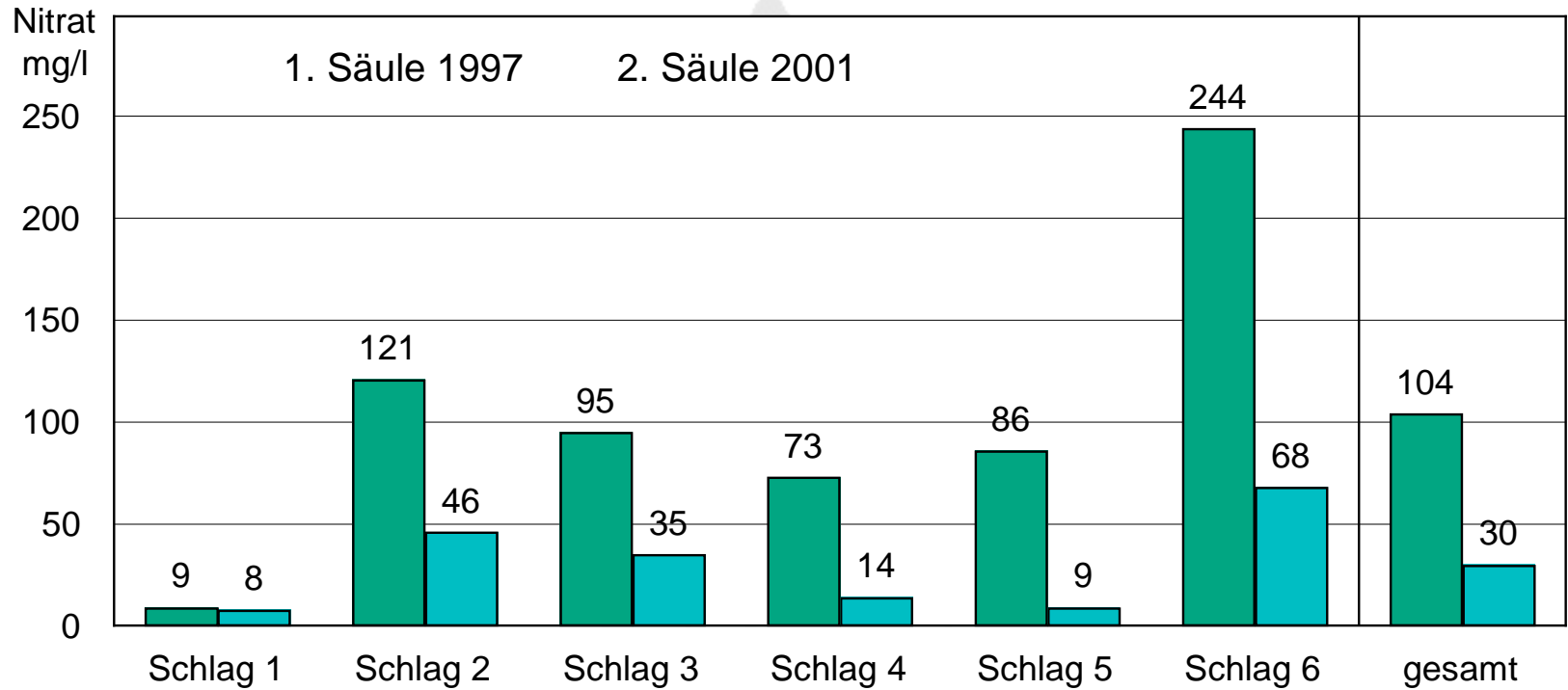
...(2) in Soil Samples - Reduction of Mineral N



Quelle: INGUS Hannover / WBV Osterholz-Scharmbeck, swb Norwia

Success Stories...

... (3) in Seepage Water



Quelle: LWK Hannover / WSG Liebenau II (Harzwasserwerke GmbH)

Conclusions and Outlook



- ***Reduction of nitrogen*** through the co-operative approach in Lower Saxony
- The success is based on a ***catalogue of efficient measures***
- The efficiency control is implemented with a ***useful set of methods***
- The instruments are very well suited to ***site-specific goals*** and the available funds
- Generation of a ***state-wide comparable database***
- ***Forward looking strategies*** in accordance with the requirements of the ***EU Water Framework Directive***