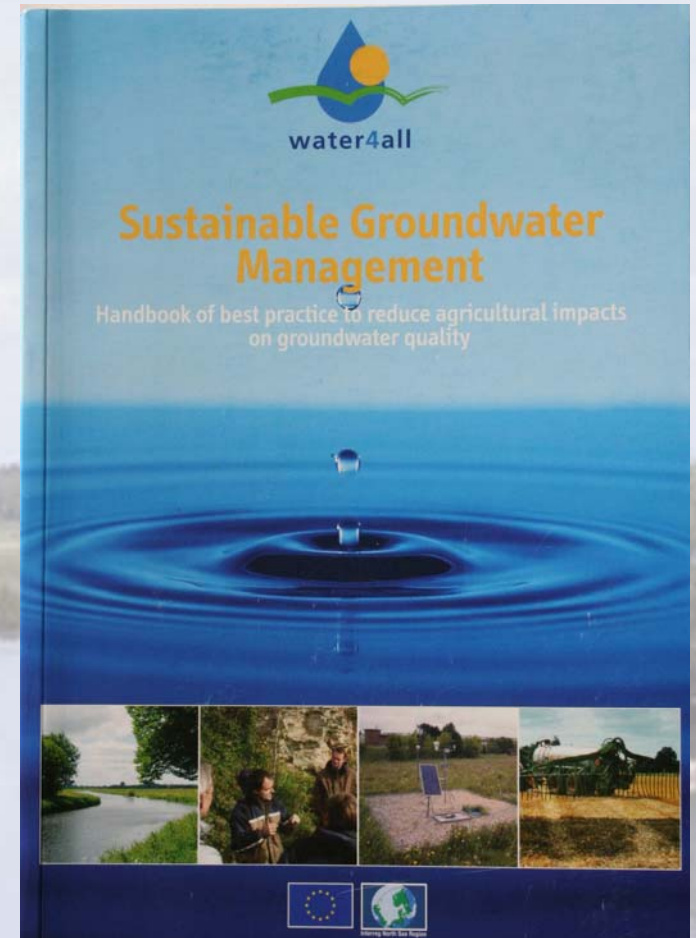


# The Water4All Handbook of Sustainable Water Management

[www.water4all.com](http://www.water4all.com)



**Bob Harris**  
Environment Agency





# Purpose

- Improve (ground)water quality by preventing the continuing contamination of groundwater;
- Integrate (ground)water protection in the context of spatial planning and the implementation of the Water Framework Directive;
- Develop a **Guidance Handbook** through the amalgamation of experiences/results of small-scale implementation schemes and other measures.
- For use by “catchment managers” in preparing strategic approaches **at the local scale** to managing agricultural diffuse pollution.

# Overall structure



## 7-point strategy:

- Understand the problem in your area;
- Develop a “package” of measures focused on the high risk areas
- Combine activities to maximise “win-wins”;
- Communicate and negotiate.... with farmers & others;
- Set up Catchment management stakeholder group(s) and a development plan;
- Monitor and report;
- State benefits, revise process and measures.

*an iterative process*

A large, dark blue, curved arrow on the right side of the slide, pointing upwards from the bottom towards the top. The text 'an iterative process' is written vertically along the inner curve of the arrow.



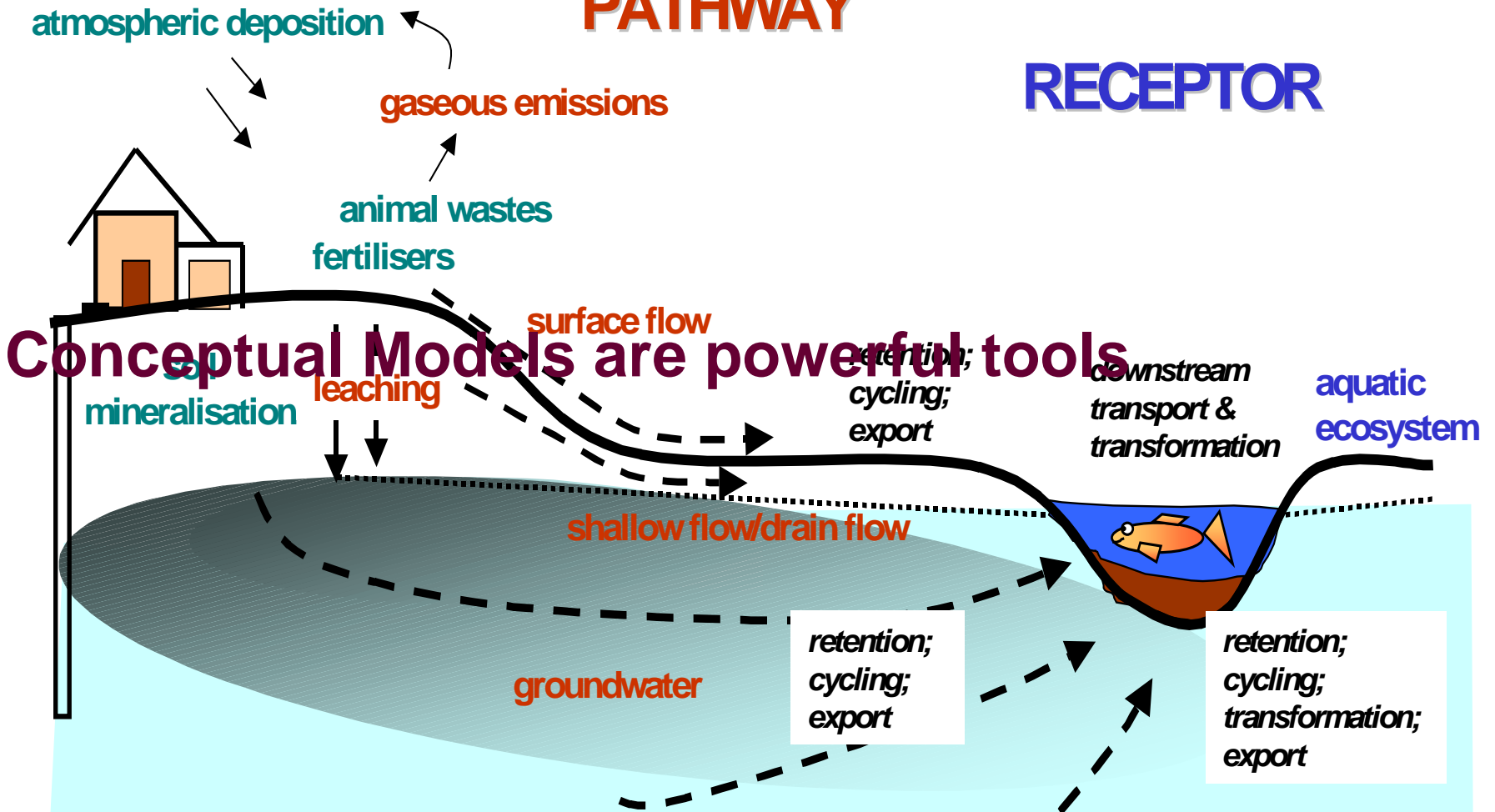
**Management solutions should not be introduced until the problem is understood** - through a systemic analysis of the catchment

- **Basic data collection needs:**
  - Physical characteristics of catchment
  - What and where are the major sources of pollution?
  - Have the sources affected the water quality/ecosystem & how?
  - What are the critical pathways from source to receptor?
  - How is the land and water being managed?
- *An holistic understanding of the system is essential to develop **risk-based land and water management solutions.***

# SOURCE

# PATHWAY

# RECEPTOR



Pollutant linkages demonstrating the **source-pathway-receptor** paradigm of risk-based groundwater management

# Hierarchy for taking action



**An analysis of the critical pollutant linkages allows the Management Solutions to be better evaluated.**

**There is a hierarchy:**

- 1. Remove/minimise the source**
- 2. Cut/intercept the pathway**
- 3. Protect/remove the receptor**

**For nitrates most of Europe has focused on source control... whilst the UK has adopted a reverse order**

# A spectrum of measures contributing to groundwater protection

- Legislation European to Regional; Statutory codes of practice etc
- Integrated Spatial Planning Controls
- Non-Legislative Measures/Tools: Voluntary codes; best practice guidance; Co-operative agreements
- Indirect influences - fiscal controls, subsidies, taxation etc
- Education/training and social influences



*Hard controls*



*Soft controls*



# Co-operation model for Lower Saxony

# Selected measures to protect groundwater



Matrix of groundwater protection measures compiled from the experience of the four partner countries (total = 51)

<b>Categories of measures</b>	<b>Sub-category of measures</b>	<b>Compensated</b>	<b>Non-compensated</b>
<b>Information &amp; advice</b>	<b>Passive information</b>		<b>3</b>
	<b>Active information</b>		<b>5</b>
<b>Co-operation &amp; voluntary agreements (change of farming practice)</b>	<b>National agri-environmental schemes</b>	<b>3</b>	
	<b>Local/regional voluntary agreements</b>	<b>6</b>	
<b>Planning &amp; controlling instruments</b>	<b>Technical &amp; scientific solutions</b>		<b>5</b>
	<b>Changing land use activities</b>	<b>9</b>	
<b>Legal instruments</b>	<b>EU level</b>		<b>-</b>
	<b>National level</b>		<b>16</b>
	<b>Regional/local level</b>		<b>4</b>

# **Selected measures expanded in the Annex giving details of:**



**Country**  
**Institution**  
**Definition**  
**Field of impact**  
**Constraints**  
**Availability**  
**Efficiency**  
**Time period**  
**Compliance**  
**Costs**  
**Results**  
**Remarks**

# Examples of measures



**Compensated, national agri-environmental scheme, cooperative agreement**

**B.I.2 Nitrate Sensitive Area Scheme, UK**

**Non-compensated, national, legal (regulatory) instrument**

**D.II.4 Nitrate Vulnerable Zones, UK**

**Compensated, changing land use, planning and controlling instruments**

**C.II.2 Afforestation in Denmark**

**C.II.5 Organic farming in Germany**

# Case studies demonstrating the synergy of combined measures



- **Drastrup Pilot Project, DK**
- **Voluntary approaches, UK**
- **Hunze Valley Project, NL**
- **Water Protection Area Thülsfelde, Lower Saxony, D**

**Further details in appendices on:**

***Perspectives of afforestation services, the afforestation of formerly agricultural land, Weser-Ems voluntary agreements***

# Key requirements for success



- Achieving significant co-operation between stakeholders - joining interests of water supply; agricultural land management; land drainage; and biodiversity enhancement, together with spatial planning;
- The use of a combination of measures and incentives to address source control rather than end of pipe treatment;
- Getting close to local communities - the real stakeholders; developing public awareness and understanding.



***“Every catchment has its own approach”***

***“Important to provide focus on the socio-economic drivers of groundwater protection in order to deliver sustainable solutions”***

# Acknowledgements



- Handbook co-ordinated by **Kirsten Klaassen & Christina Aue (D)**
- Contributions from **Onno Seitz (D), Auke Kooistra, Nico van der Moot (NL), Jon Greaves (UK), Per Groenvald, Lars Delft Mortenson (DK)**
- UK project undertaken and input to whole project by **Kevin Hiscock and Andrew Lovett** of University of East Anglia

and.....

download from [www.water4all.com](http://www.water4all.com)

