



HAL
open science

Research Report No 1 INNOVATIVE INSTRUMENTS AND INSTITUTIONS IN IMPLEMENTING THE WATER FRAMEWORK DIRECTIVE; INCEPTION REPORT

E. Mostert, S. Junier, D. Ridder, E. Interwies, Gabrielle Bouleau, P. Bots, A.
Richard-Ferroudji, P. Maurel, G. Abrami, S. Richard, et al.

► **To cite this version:**

E. Mostert, S. Junier, D. Ridder, E. Interwies, Gabrielle Bouleau, et al.. Research Report No 1 INNOVATIVE INSTRUMENTS AND INSTITUTIONS IN IMPLEMENTING THE WATER FRAMEWORK DIRECTIVE; INCEPTION REPORT. [Research Report] irstea. 2009, pp.78. hal-02592480

HAL Id: hal-02592480

<https://hal.inrae.fr/hal-02592480>

Submitted on 15 May 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Research Report No 1
INNOVATIVE INSTRUMENTS AND INSTITUTIONS IN
IMPLEMENTING THE WATER FRAMEWORK DIRECTIVE;
INCEPTION REPORT
Submitted 8 January 2009

This report was prepared within the framework of the IWRM-NET Funding Initiative. While reasonable care has been taken in preparing this publication to ensure that information is appropriate and valid, it has to be considered that the views, conclusions and recommendations expressed herein are those of the authors and do not necessarily reflect the views of the IWRM-NET or the respective Funding bodies involved.

The intent of the research reports is to provide relevant information and to stimulate discussion by those having an interest in integrated water resource management (IWRM). The results and conclusions of all reports produced under the IWRM-Net Funding Initiative will be disseminated across the network to the appropriate audience (river basin managers, policy-makers, research funding bodies, universities, industries, and other stakeholders at all levels), and put on the general IWRM-Net website (<http://www.iwrn-net.eu>).

This publication is copyrighted, but wide dissemination is encouraged. Requests and inquiries concerning reproduction and rights should be addressed to the IWRM-Net Project Manager:

Natacha Amorsi
 Office International de l'Eau
 15 Rue Edouard Chamberland
 87065 Limoges Cedex FRANCE
 Tel : 33 (0) 555 11 47 88
 Fax : 33 (0) 555 11 47 48

Prepared by the Joint Project Consortium consisting of

Co-funded by

Erik Mostert (editor) and Sandra J. Junier, Delft University of Technology	Rijkswaterstaat Waterdienst
Dagmar Ridder and Eduard Interwies, Seecon	PTKA
Gabrielle Bouleau, Pieter Bots (now TU Delft), Pierre Maurel, Audrey Richard, and Géraldine Abrami, Cemagref	MEEDDAT
Flavie Cernesson and Sophie Richard, Engref	MEEDDAT

In submitting this report, the researcher's have agreed to IWRM-NET publishing this material in its edited form. ERA-NET IWRM-NET is funded by the ERA-NET Scheme under the 6th Framework Programme General Directorate for Research in the European Commission (Contract number: ERAC-CT-2005-026025).

Summary for Decision-Makers

Headline Summary Message

This inception report of the i-Five project presents the research that is planned in the project. Central in project is the evaluation of innovative instruments and institutions (i-3's) for implementing the Water framework directive (2000/60/EC; WFD). Moreover, the “transplantability” and adaptability of the i-3's for other contexts will be analyzed. In France, the implementation of the WFD in the Thau basin will be studied. Interesting aspects of this implementation process include collaboration between the water sector and land-use planning sector and the cooperation between the authorities and different research projects. In Germany, three “area cooperations” in the Weser basin will be evaluated, which are novel ways for organizing public participation. In addition, the issue of financing and coordination between governance scales will be analysed. In the Netherlands, the implementation of the WFD Explorer in the Dutch part of the Meuse basin and in particular the area of the waterboard Brabantse Delta will be evaluated. The WFD Explorer is a decision support system for the implementing the WFD. The project will result in a “Quick scan” method. This method will show the potentials as well as the potential obstacles of the different i-3's, and will help decision-makers to adopt or adapt the i-3 to their own context or to develop their own “home-grown” i-3.

What the report is about and why the work is important

This inception report of the i-Five project presents the three cases (chapter 3) that will be studied and how they will be analysed (chapter 4 and 5). Moreover, the inception report presents and assesses the WFD itself (chapter 2). In addition, this inception report presents the expected results – the Quick scan method - and the dissemination and training strategy of the project (chapter 6). The report concludes with an extensive glossary of key terms, acronyms and abbreviations related to the WFD and to the six themes, including references to the articles of the WFD and to scientific literature (Appendix 5).

The report will be of interest to everybody who is or wants to be involved in the i-Five project and to everybody interested in i-3's for implementing the WFD. The chapter on the WFD, arguably the most important and the most “difficult” European water directive of the past decade, will be of interest to everybody who is interested in a factual and detailed overview of the WFD and an analysis of the main implementation issues.

Aims and objectives

The aim of the i-Five project is to support the implementation of the WFD by promoting the trans-boundary exchange of experiences, by broadening the range of methods and tools available to water managers, and by helping water managers to develop the best approach for their own circumstances. The aim of the inception report is to inform the stakeholders on the planned research and to serve as a basis for discussing on the research plans.

Interaction with stakeholders plays a central role in the i-Five project. These include the authorities responsible for implementing the WFD at the local, grassroots level, as well as other stakeholders involved in the implementation. We believe that involving stakeholders actively in research increases the relevance of the research for them and enhances the uptake of the results in practice. In order to reach stakeholders that are not involved in the case studies, we will also organize training and under-

take other dissemination activities, such as publishing in professional journals and newsletters and giving presentations at conferences for practitioners.

Key findings

The i-Five project has officially started on 1 September 2008 and will be completed in October 2010. Hence, most results of the i-Five project will become available later. However, the literature study undertaken for this report has already resulted in eight key findings:

1. The implementation of the WFD revolves around two activities: the specification of the environmental objectives and the development and implementation of measures for reaching these objectives. Hence, these two activities will be central in the i-Five project. (Chapter 2)

2. Ultimately, the objectives have to be specified and measures have to be developed for individual water bodies. The local, grassroots level will therefore play a large role in the implementation process. This raises a number of questions concerning the “appropriation” of the WFD at the local level, such as: What are the local interests related to the WFD? How is the WFD interpreted and used locally? and: What instruments or institutions are crafted or modified locally to meet the requirements of the WFD? (Section 4.6)

3. How water is managed locally can have a significant impact on upstream and downstream water bodies. Hence, the WFD cannot be implemented exclusively at the local level: an overarching view at the basin level is required as well. Yet, information at the local level should not be lost since this is usually much more detailed and has a much broader scope than the aggregated knowledge available at higher levels. Hence, a practical and effective “moving between scales” is needed. (Section 4.3)

4. Similarly, “moving between sectors” is needed. The scope of the WFD is much broader than the water sector. Implementing the WFD may require action in the field of nature protection, agricultural policy and land-use planning. (Section 4.4)

5. Moving between scales and between sectors is complicated by the requirement to develop a cost-effective set of measures. Measures at different scales and in different sectors need to be compared in a transparent way in order to find the “cheapest” set of measures for reaching the environmental objectives. Yet, financing possibilities at the different scales and in different sectors differ. (Cf. section 4.3)

6. Moreover, the implementation process needs to involve all interested parties. Not only is this legally required (WFD, art. 14), it is also a practical requirement. Among other things, public participation can improve the implementation of decisions, increase legitimacy and prevent litigation and (costly) delays. Yet, public participation does not always realize its potential. Much attention needs to be paid to the design and management of the participation process. (Section 4.5)

7. The implementation of the WFD requires a lot of expertise on different measures and their impact on the water status. There are different approaches to inserting expertise into practice, but it is not a straightforward process. Issues that need to be addressed include how to deal with uncertainty, how to integrate local knowledge and expert knowledge, and how to communicate expertise and foster trust in the expertise. (Section 4.7)

8. Implementing the WFD will require institutional changes in order to allow moving between scales and sectors, improve financing possibilities, etc. To start with, the i-Five project will chart the institutional

changes that have already been taken for implementing the WFD and identify the different approaches that are followed. (Section 4.2)

The eight key findings have been translated into six central themes for conducting and analyzing the three i-Five case studies: 1) institutional structure and changes for implementing the WFD; 2) coordination across scales; 3) integration of sectors; 4) public participation; 5) “appropriation” of the WFD at the local level; and 6) the role of expertise.

Implications for stakeholders

The eight key findings presented above constitute eight key issues that need to be addressed in the current planning cycle for implementing the WFD (until 2009), in preparing for the second cycle (2012-2015), and in evaluating the implementation process. The key findings thus have an agenda setting function. The analyses that are contained in this inception report do not constitute ready-made solution, but they can stimulate reflection and thereby help the stakeholders to develop their own solutions.

The i-3's studied in the i-Five project are meant to address the eight key issues (albeit with different emphases). As the i-Five project progresses, more detailed information will become available on their characteristics and requirements, the context in which they have been developed and their effectiveness in that context. This will shed more light on their transferability and adaptability to other contexts and in this way help stakeholders to develop their own solutions for their own problems and context.

Contents

Summary for Decision-Makers	II
Contents	V
1 Introduction	1
1.1 The i-Five project and its subject matter	1
1.2 Planning	3
1.3 Reading guide.....	3
2 The challenges of the Water Framework Directive	5
2.1 Background.....	5
2.2 Outline.....	6
2.3 Implementation	13
2.4 Challenges	16
3 Three examples of innovative instruments and institutions.....	18
3.1 “Area cooperation” in the Weser basin.....	18
3.2 Implementing the WFD in the Thau basin.....	22
3.3 The Meuse and the WFD explorer	24
4 Framework for analysis.....	27
4.1 A theme-based approach	27
4.2 Institutional structure and changes for implementing the WFD	29
4.3 Coordination across scales	30
4.4 Integration of sectors	33
4.5 Public participation.....	35
4.6 “Appropriation” of the WFD at the local level	42
4.7 Role of expertise.....	44
5 Research design and involvement of stakeholders.....	51
5.1 Research design.....	51
5.2 Involvement of stakeholders in the research.....	52
6 Expected results, dissemination and training	53
6.1 Quick scan method.....	53
6.2 Training and capacity building.....	53
6.3 Publications and presentations.....	54
6.4 Website	55
References	56
Acknowledgements	61
Appendices.....	62
1. List of maps.....	62
2. List of tables	62
3. List of figures	62
4. Glossary of key terms, acronyms and abbreviations.....	63
5. Long-list of themes developed at Montpellier workshop, unprocessed version, 23-24 October 2008.....	63
6. How the current inception report implements the project proposal	71

1 Introduction

This chapter introduces the i-Five project and the current report, the inception report of the i-Five project. First, however, the main issue that the i-Five project will address is introduced: the implementation of the European Water Framework Directive.

1.1 The i-Five project and its subject matter

The European Water Framework Directive (2000/60/EC; WFD) is one of the most important, and perhaps the most important European water directive of the past ten years. At its core is the requirement for EU Member States to achieve a “good water status” by 2015, using a system of participatory river basin management. Implementing the WFD, however, is no easy task. Achieving a good water status requires action in different policy sectors – not only water management, but also nature protection, agriculture and many others – and at different levels – European, national, river basin, sub catchment, local, etc. This in turn requires a lot of coordination and collaboration. Moreover, implementing the WFD requires a lot of information and technical expertise on for instance the effects of measures on the water status. And finally, the WFD explicitly requires that the Member States “encourage the active involvement of all interested parties” in the implementation of the WFD (art. 14).

The i-Five project aims to support the implementation of the WFD by promoting the trans-boundary exchange of experiences, by broadening the range of methods and tools available to water managers, and by helping water managers to develop the best approach for their own circumstances. The project analyses ongoing WFD implementation processes in which innovative instruments and institutions (i-3's) are used. I-3's can be designed purposely, they can emerge locally without being purposely designed, and they may have been designed or developed elsewhere and transplanted in the local situation. Since i-3's may perform quite differently in different contexts, they will be evaluated within the national contexts in which they have been applied. Particular attention will be paid to the possibility to ‘transplant’ the i-3 under study to other national contexts. The project will result in a “Quick Scan” method that will allow practitioners to assess whether a particular i-3 could be adapted to their context and to develop their own, tailor-made i-3.

The project focuses on i-3's for setting environmental objectives and developing measures to be included in the river basin management plans. It will analyse the institutional context in which the i-3 has been applied; the process of developing and applying the i-3, including the involvement of the public and technical experts; the performance and effects of the i-3; and the implementation requirements of each i-3 in terms of for instance data availability and costs. The project is based on three case studies of i-3's in selected regions in France (the Thau basin), Germany (the Lower Weser) and The Netherlands (Brabantse Delta, part of the Meuse basin). The three case studies will be conducted using a common analytical framework that centres around six central themes.

Moreover, the project will apply an action research methodology. Water managers and other stakeholders participate in the research and will co-decide on its focus. Central to the research is learning by all stakeholders. The researchers will support the learning process by contributing recent insights from literature and enhancing reflection on action, and report about the learning process and the outcomes, both in academic journals and journals directed at practitioners. The results will facilitate the development and transfer of innovations in WFD implementation.

The i-Five project is largely funded by IWRM-NET, first Joint Call for Research on IWRM “Towards Effective River Basin Plans”. It addresses in particular the theme “Water Governance” and the outputs “investigate the right territory for water management”, “interconnecting the different administrative scales”; “techniques for efficient setting of objectives”; “techniques to integrate expert judgement, multi-disciplinary scientific knowledge and stakeholders’ involvement”; and “decision-support tools” (Call for research proposals; Pilot Common Call, p. 4). The aim of i-Five is to support the development of the second-generation river basin management plans according to the WFD in the years 2012-2015. To achieve this, the i-Five project brings together scientific and management disciplines and compares experiences from different European countries and involves practitioners (idem, p. 2-3). This will result in the “Quick Scan” method discussed above.

The i-Five project consists of a number of Work packages (Fig. 1). The current inception report is the result of WP1 and presents the Framework for Analysis that will be used in the i-Five project.

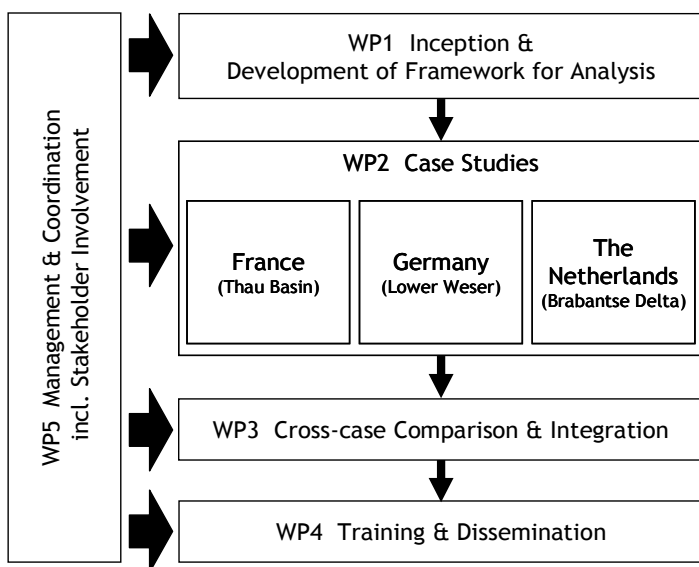


Fig 1: Work packages and workflow of the i-Five project

1.2 Planning

The i-Five project has officially started on 1 September 2008 and will run for two years, until 31 August 2010. However, since the Dutch team had to hire additional personnel, who finally started work on 1 January 2009, the Dutch case study will run until 31 October 2010. The French team got the approval of the French funding agency in October 20, 2008, and consequently the French part of the work will run until 20 October 2010. The draft Dutch and French case study results will be available in time for cross-case comparison and integration.

The planning of the project is simple. WP1 - inception phase - ran from September until January 2009 and resulted in the current inception report. This report will be discussed at the first international meeting with stakeholders, which will be held in Hannover on 21 and 22 January 2009.

Preparations for WP2 - case studies - have already been undertaken, but the real work will start at end of January, after the Hannover meeting. The first case study results will be presented at the second international stakeholder meeting, which will be held in Paris on 3-4 September 2009. Most of the case studies will be ready by January 2010, when the third international stakeholder meeting is organized in Delft.

Work on WP3 - cross-case comparison and integration (development of quick scan method) - will start at the Paris meeting in September 2009. Preliminary results will be ready in June 2010, when an i-Five session will be organized at a larger international meeting or piggybacked to such a meeting (to be decided later).

Work on WP4 - training and dissemination - will be concentrated in the final months of the project, from June 2010 onwards. This period will also be used for finalizing WP2 and WP3.

WP5 – management and coordination – is an ongoing activity.

The four international meetings, when (draft) results have to be ready and international comparisons can be made, constitute the “anchor points” for project planning. The three national teams will make more detailed planning for their own work to ensure that they can deliver the (draft) results in time. As part of the national processes, several national workshops will be organized. The character and timing of these meetings will differ from country to country because the processes that are studied have different dynamics, because the methods used differ somewhat and because of the different needs and possibilities of the stakeholders involved. Throughout the whole project the national teams will have close contact with their national stakeholders and discuss progress on a regular basis.

Table 1 (next page) present the planning in a chronological order.

1.3 Reading guide

The current inception report first presents the Water Framework Directive (WFD) in some detail and identifies four key challenges for European water management (chapter 2). Next, it presents the three case studies that form the core of the i-Five project (chapter 3). These case studies will be conducted and analyzed using a common analytical framework that centres around six themes, which are presented in chapter 4. Chapter 5 gives more details

September 2008 – January 2009	Inception phase - internal kickoff meeting Cemagref 23-24 October
21-22 January 2009	First international stakeholder meeting in Hannover – discussion inception report and plans for research
January 2009 – September 2009	Start case study research
3-4 September 2009	Second international stakeholder meeting in Paris – first results case studies ready, start of cross-case comparison and development of ideas for quick-scan method
September 2009 - January 2010	Continuation of case study research
January 2010	Draft results case studies ready, discussion on cross-case comparison and quick-scan method
January 2010 - June 2010	Completion case studies, cross-case comparison, development of draft quick-scan method.
June 2010	Fourth international meeting – presentation of cross-case comparison and quick-scan method
June 2010 – August (October) 2010	Finalization of research, training and dissemination
Ongoing	Management and coordination
Nationally	More detailed planning of national meetings and research activities, in cooperation with the stakeholders involved.

Table 1: Project planning

on the research design that will be used and the involvement of stakeholders in the research. Chapter 6 gives details on the expected results and the training and dissemination activities that are foreseen. The appendices contain lists of figures and tables; a glossary of key terms, acronyms and abbreviations; and some more details on the original project proposal.

An important note on terminology

Terms are used differently in different languages and in different disciplines and may have different meanings and connotations. As a general rule, the i-Five project uses terms in a broad sense. If a more narrow sense is meant, this is indicated by adding an adjective or an explanatory phrase or by using a different term with a more narrow sense.

For example, the term **stakeholder** is used in this report to refer to all persons, groups or organizations with an interest or “stake” in an issue, either because they may be affected by the issue or because they may have some influence on its outcome. This includes authorities, experts, the “general public” and organized interest groups. If we want to refer specifically to organized interest groups, we will add the adjective “organized”. Similarly, the term **public** refers to all non-governmental stakeholders. If we refer specifically to the “general public”, we will add the adjective “general.”

Terms that may cause confusion are explained the first time they appear. In addition, the reader can consult the Glossary in the Appendix and on the project web-site (www.i-five.eu).

2 The challenges of the Water Framework Directive

This chapter introduces the European Water Framework Directive. It discusses the background of the directive, its purpose, the river basin management process prescribed by the directive and the legal status of its objectives. Moreover, it discusses the legal and policy aspects of implementing the directive. The chapter concludes by listing four challenges for the implementation process:

- a) Cooperation between different policy sectors, government levels and countries and between government and the public*
- b) Organizing for this cooperation, e.g. setting up new coordination structures and agreeing on procedures*
- c) The production and use of a large amount of information on for instance the water status and the effects of specific measures*
- d) The scientific, legal and political uncertainties surrounding the WFD.*

2.1 Background

The history of the Water Framework Directive (2000/60/EC; WFD) goes back to 1994. In that year the European Commission published a proposal for a directive on ecological water quality (COM/93/0680 DEF). The Commission saw this directive as the completion of the system of water directives, but some Member States saw the proposed directive as yet another directive on top of the many, not well-coordinated directives (see Table 2, next page). The Environmental Council – the environmental ministers of the EU Member States – decided in December 1995 that a Water Framework Directive should be drafted instead (RBA Centre TU Delft & WL | delft hydraulics, 1997).

Fourteen months later, a proposal for a WFD was ready. The proposal was, however, not accepted without further discussion. Several member states were not happy with the requirements to establish supranational river basin authorities and to recover the costs for water services. In the ensuing negotiations these points were either taken out of the proposal or toned down. Another controversial point was the status of the environmental objectives: should they be binding or not? The Environmental Council, representing the member states that would have to implement the directive, wanted a less ambitious directive, whereas the European Parliament wanted a more ambitious one. Meanwhile, the Treaty of Amsterdam entered into force on 1 May 1999, which changed the decision-making procedure on environmental directives. Since the Council and the Parliament could not agree, a conciliation procedure had to be started (art. 250 and 251 EC Treaty), and only in October 2000 agreement could be reached. The WFD was finally published on 22 December 2000 and entered into force on that date (Kaika & Page, 2003; Page & Kaika, 2003).

Framework:

- Water Framework Directive (2000/60/EG) and daughter directive (Groundwater directive, 2006/118/EC)
- Flood risk directive (2007/60/EC)
- Marine strategy framework directive (2008/56/EC)

Functions of water:

- Fish water (2006/44/EC; until December 2013)
- Shellfish water (2006/113/EC; until December 2013)
- Bathing water (2006/7/EC, replaced 76/160/EEC)

Specific substances:

- Dangerous substances directive (2006/11/EC) and daughter directives (Mercury: 82/176/EEC and 84/156/EEC; Cadmium: 83/513/EEC; Hexachlorocyclohexane: 84/491/EEC; DDT, pentachloro-phenol and carbontetrachloride: 86/280/EEC)
- Groundwater (80/68/EEC; until December 2013)

Sources:

- Urban wastewater directive (91/271/EEC)
- Pesticides (91/414/EEC)
- Nitrate (91/676/EEC)
- IPPC (integrated pollution prevention and control; 2008/1/EC)

Other relevant directives (selection):

- Drinking water (98/83/EC)
- Birds directive ((79/409/EEC)
- Habitat directive (92/43/EEC)
- EIA directive and Strategic environmental assessment directive (85/337/EEC, 2001/42/EC)
- Post-Seveso directive (82/501/EEC)
- Environmental information (2003/4/EC)

Table 2: Most important European water directives

The text of the WFD shows that it is a compromise. Although it contains many detailed rules, it is quite vague on several crucial points and there are some inconsistencies in the text. This may be explained partly by the fact that the WFD tries to combine regulatory, traditional policy analytical, economic and participatory approaches that are not always easy to combine in practice (see for instance Steyaert & Ollivier, 2007 and footnote 6). Another explanation is that in practice it is easier to agree on an ambiguous text than on a very transparent text because everybody can read in an ambiguous text what he or she prefers (Eisenberg, 1984). On top of that, many compromises were reached under time pressure and were not checked fully for consistency with other parts of the directive.

2.2 Outline

2.2.1 Purpose

The WFD does not replace all existing water directives, but aims to offer a framework for the management of all European groundwater and surface water, including “transitional waters” and a strip of one nautical mile of coastal waters. The purpose of the WFD is to (art. 1):

- Prevent the further deterioration of aquatic ecosystems and terrestrial ecosystems and wetlands that directly depend on the aquatic ecosystems
- Promote sustainable water use
- Progressively reduce discharges of “priority substances” and cease or phase out discharges of “priority hazardous substances”
- Prevent further pollution of groundwater
- Contribute to mitigating the effects of floods and droughts

The environmental objectives from art. 4 are of central importance. These objectives are to prevent the deterioration of the “water status”, achieving a “good water status” by 2015, and reduce pollution. “Good surface water status” refers to the status of a surface water body when both its chemical status and its ecological status are good or better (art. 2 point 20). The chemical status is good if the water meets the European standards from the daughter directives of the dangerous substances directive (Annex IX WFD) and new water quality standards for the “priority substances” and “priority hazardous substances” (see section 2.3.3). The ecological status is good if it deviates only slightly from the natural conditions (Annex V, table 1.2). The ecological status is defined not only in terms of biological elements – flora and fauna -, but also in terms of the hydromorphological elements that support the biological elements, such as the hydrological regime and water depth, and in terms of the chemical and physico-chemical elements supporting the biological elements, such as water temperature, nutrient concentrations and pollution by priority substances and other substances (Annex V point 1).¹

“Good groundwater status” means both a “good chemical status” and a “good quantitative status” or better (art. 2 point 20). The chemical status of a groundwater body is good if a) it does not show the effects of saline or other intrusions; b) it meets new European standards that have to be agreed upon; and c) it does not result in failure to reach the environmental objectives of associated surface water bodies (Annex V point 2.3.2, art. 17). The quantitative status is good if a) average annual abstractions do not exceed recharge; b) the status of associated surface waters does not deteriorate and the environmental objectives for these surface waters can be reached; c) no significant damage is done to terrestrial ecosystems that depend directly on the groundwater body; and d) the flow direction is not changed in such a way that saltwater intrusions or other intrusions occur (Annex V point 2.1.2).

In protected areas, such as areas protected under the Birds- and Habitat directive, the specific standards and objectives from these directives apply as well. If more than one objective relates to a specific water body, the strictest objective applies (art. 4 par. 2).

¹ Hence, not only “chemical status”, but also “ecological status” includes water quality aspects. Priority substances, including priority hazardous substances, figure in the definition of both. However, it has been agreed under the Common Implementation Strategy (CIS) that, once environmental quality standards have been adopted at Community-level for the priority substances (see WFD art. 16, see section 2.3.3), the concentrations of these substances will be taken into account in the classification of surface water chemical status only and not in the classification of ecological status. This does not affect the overall classification of a water body because for good surface water status, both ecological and chemical status must be good. If any of the biological quality elements are found to be showing adverse effects from exposure to priority substances, these effects must be taken into account when classifying ecological status/potential (CIS, 2003, p. 12). Strictly speaking, the CIS approach conflicts with the letter of the WFD, but it does not result in a lower level of environmental protection.

The definitions of “good water status” need to be applied to the specific water bodies. Moreover, some surface water bodies can be designated as “artificial or heavily modified”, resulting in somewhat lower objectives. The WFD defines artificial water bodies as “a body of water created by human activity” (art. 2 point 8), and “heavily modified water body” as a surface water body that “as a result of physical alterations by human activity is substantially changed in character” (art. 2 point 9). Yet, such water bodies can only be designated as artificial or heavily modified if a number of additional conditions are met. First, the hydromorphological changes that would be necessary to achieve a good ecological status should have significant adverse effects on “the wider environment” or a number of human uses, such as navigation or recreation, flood protection and “other equally important sustainable human development activities”.² Moreover, it should be impossible to achieve these objectives by other means that are technically feasible and not disproportionately expensive. Finally, the designation as artificial or heavily modified needs to be explained in the river basin management plan (see below). The ecological objective of such water bodies is not a “good ecological status”, but “good ecological potential”. This is the same as a good ecological status, but considering the effects of its artificial or heavily modified character (art. 4 par. 3, Annex V point 1.2.5).

Apart from this, the 2015 deadline may be extended by maximally 12 years³ and lower objectives may be set. The conditions for this are similar to those for designating water bodies as artificial or heavily modified: technical feasibility, disproportionate costs and explanation in the river basin management plan (art. 4 par. 4 (extending deadlines) and par. 5 (lower objectives)).⁴ Under very strict conditions temporary deterioration is allowed (art. 4 par. 6). Finally, Member States are not in breach of the WFD if failure to achieve a good status or potential is the result of new modifications of a surface water body that are of “overriding public interest” and/ or result in benefits for “human health, (...) the maintenance of human safety or (...) sustainable development” that outweigh the benefits of achieving a good status or potential (art. 4 par. 7).

² According to the CIS guidance document no. 4, p. 21, this condition would not be relevant for designation as an artificial water bodies, but it is unclear why not. (Common Implementation Strategy Working Group 2.2, 2003)

³ Even longer “in cases where the natural conditions are such that the objectives cannot be achieved within this period” (art. 4 par. 4, point c).

⁴ This is a simplification: there are further conditions as well (see art. 4). At the water directors meeting of 16 and 17 June the issue was discussed whether “affordability” can be a reason for extending deadlines or setting lower objectives, but no agreement could be reached on this. The two main “remaining open points” were the following (Water Directors, 2008, p.5):

“Public budget constraints. Most Water Directors indicated that constraints of the public budget may be used as a reason for extending the deadline as there are limits to the available budget for water management. The Commission indicated that in its view the adoption of the Water Framework Directive by the Council and the European Parliament entails obligations for Member States to make available the necessary means for its implementation.

Role of affordability in Article 4(5). For some Water Directors affordability could play a role in setting less stringent objectives, as both Article 4(4) and 4(5) use the same terminology ‘disproportionately expensive’. They indicated that in practice affordability arguments may be used less frequently in Article 4(5) than in Article 4(4). Some other Water Directors argued that affordability cannot be used as an argument for setting less stringent objectives as the context of ‘disproportionate expenses’ is different in 4(5) from the context in Article 4(4) as it concerns setting lower objectives permanently (subject to revision every 6-years). These Water Directors consider that application of this provision requires it to be set out clearly that the costs outweigh the benefits of achieving the targets.”

2.2.2 River basin management planning

It can be argued that the WFD revolves around three key activities:

- The specification of the environmental objectives
- The assessment of the current situation and the prediction of the future situation if no additional measures are taken
- The development and implementation of a programme of measures to achieve the environmental objectives

These activities are undertaken in the seven following steps. Unless otherwise indicated, deadlines refer to 22 December of that year:

2003: Preparation

Ultimately in 2003 Member States had to identify their river basins and assign them to “River basin districts”. These river basin districts consist of one or more river basins and also include transitional waters, one nautical mile of coastal waters and groundwater bodies. In case of international River basins Member States should identify their basins in cooperation with the other basin states. In addition, Member States have to ensure “the appropriate administrative arrangements” for implementing the WFD in their territory, including the identification of the appropriate “competent authority” and the necessary legislative changes (art. 3 and 24).

The “appropriate administrative arrangements” may need to be reviewed again before 26 November 2009 as a result of the new Flood risk directive (FRD; 2007/60/EC). The implementation of this directive should be coordinated with the implementation of the WFD (art. 9 FRD). With some exemptions,⁵ use has to be made of the arrangements made for implementing the WFD (art. 3 FRD).

2004: Analyses and the register of protected areas

Ultimately in 2004 three analyses had to be ready: an analysis of the characteristics of each river basin district, a review of the impact of human activity, and an economic analysis of water use (art. 5). The analysis of the characteristics of each river basin district includes the identification of the different water bodies, the determination of their “type” (e.g. lowland river with catchment area between 10 and 100 km², calcareous, in the Mediterranean region), and the establishment of “reference conditions” for each type of water body (Annex II). The reference conditions are the natural or near-natural conditions of the specific type of water body and form the basis for determining the “good ecological status”, which is defined as slight deviation from the natural conditions (Annex V). The purpose of the economic analysis is to facilitate the application of art. 9 on cost recovery and pricing policy (see below) and the selection of the most cost-effective sets of measures for reaching the environmental objectives (Annex III, point b). In addition, the economic analysis can provide input for the review of human impact. Also in 2004 a register of protected areas should be established (art. 6).

2006: Monitoring operational

Ultimately in 2006 the Member States should operate a monitoring system according to the requirements of the WFD (art. 8, Annex V).

⁵ There are currently discussions on a potential directive regarding water scarcity and droughts.

2006-2009: River basin management planning

Ultimately in 2006 a timetable and work programme for producing the river basin management plan, including a statement of the consultation measures to be taken, should be published. One year later an interim overview of the significant water management issues should be published. Again one year later at the latest, in 2008, the draft river basin management plan should be published, which should be adopted by the latest in 2009. After publication of the work programme, the interim overview and the draft river basin management plan, the public should get the opportunity to comment on these documents during at least six months (art. 13 and 14).

The river basin management plan can be seen as a summary and justification of river basin management that is undertaken. It contains the summaries of the different analyses and various maps and describes the environmental objectives for the different water bodies. This includes the justification of designating water bodies as artificial or heavily modified, of extending deadlines and of setting lower objectives (Table 3). For each national river basin district one river basin management plan needs to be written. In international river basin districts the Member States in that basin have to aim for one international river basin management plan, and failing to do so, they have to write river basin management plans for the national parts of the district and coordinate these plans (art. 13).

1. General description, including maps	8. Register of more detailed programmes and plans
2. Overview of significant pressures and impacts	9. Summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence
3. List and maps of protected areas	10. List of competent authorities
4. Map of monitoring networks and results	11. Contact points and procedures to obtain more information
5. List of environmental objectives	
6. Summary economic analysis	
7. Summary programme(s) of measures	

Table 3: Contents river basin management plan (Annex VII)

In addition, a programme of measures should be produced for each national river basin district and for each national part of an international river basin district. The programme of measures can be seen as the pivot of the river basin management system of the WFD. It translates the different analyses and the environmental objectives into concrete measures, including “basic measures” that are required under existing directives and “supplementary measures” for achieving the environmental objectives (art. 11, Annex VI; Table 4, next page). Moreover, the programme of measures needs to be based on an assessment of what the most cost-effective set of measures is for reaching the objectives (Annex III, point b).⁶ The programme of measures does not have to be a specific document: the WFD just requires that the summary needs to be put in the river basin management plan (art. 10, Annex VII). Moreover, the WFD requires that in international river basin districts the different national programmes of measures are coordinated (art. 3 par. 4).

⁶ The basic measures need to be part of the programme of measures in any case, whether cost-effective or not. Here is an example of possible tension between the regulatory and the economic approach.

<p>Basic measures:</p> <ul style="list-style-type: none"> • Measures required under existing directives • Economic measures • Regulation of: water abstractions, impoundment, groundwater recharge, point- and diffuse pollution and measures with respect to hydromorphology • Prohibition of direct emissions of pollutants into the groundwater • Measures with respect to priority substances • Measures with respect to accidental pollution 	<p>Supplementary measures for achieving the environmental objectives, which may include:</p> <ul style="list-style-type: none"> • Legislative and administrative instruments • Economic and fiscal instruments • Negotiated agreements • Emission controls • Codes of good practices • Restoration of wetland areas • Abstraction controls • Demand management • Etc.
---	--

Table 4: Programme of measures (art. 11, Annex VI)

2010: Cost recovery and pricing policies

Ultimately in 2010 Member States have to “take account of the principle of recovery of the costs of water services, including environmental and resource costs” and “ensure (...) an adequate contribution of the different water uses to the recovery of the costs of water service (...)” In addition, Member States have to ensure that by 2010 “water pricing policies provide adequate incentives for users to use water resources efficiently (...)” In doing so, Member States “may (...) have regard to the social, environmental and economic effects (...)” (art. 9).

2012: Implementation

Ultimately in 2012 the programme of measures should be operational (art. 11).

2015: Environmental objectives reached

If no use is made of the possibility to extend deadlines, the environmental objectives of the WFD need to have been reached by 2015.

In 2012 a second planning cycle starts, in 2018 a third, etc. These cycles start with the publication of a time table and work programme for producing the revised river basin management plan. One year later an interim overview of the significant water management issues should be published, together with the updated art. 5 analyses. The next year the draft revised river basin management plan should be published, and one year later the plan should be adopted.

Throughout these processes, Member States have to “encourage the active involvement of all interested parties” (art. 14). The WFD does not define “active involvement”, but it is clear that this is not the same as consultation and that it implies an active instead of a reactive role of the public in the management process (Drafting Group, 2002; Ridder, Mostert, & Wolters, 2005). The active involvement required under art. 14 WFD has to be coordinated with the active involvement required under the Flood risk directive (art. 9 and 10 FRD).

2.2.3 The legal status of the environmental objectives and their applicability

A key question concerning the WFD is the legal status of the environmental objectives. During the negotiations that led to the WFD, the environmental movement lobbied for legally binding objectives. This also implied that the objectives had to be specified in some detail (see the present Annex V; Kaika et al., 2003; Page et al., 2003). The representatives of the Member States, however, were against legally binding objectives since they foresaw problems in the implementation phase. Art. 4 of the WFD contains the compromise that was reached, and can be read as follows:

- Preventing deterioration is formulated as a legally binding requirement (Member States "shall implement the necessary measures to prevent the deterioration...") with few possibilities for exemption (art. 4 par. 6 and 7 and preamble 32).
- The good water status or "potential" is formulated as a requirement to take action and not as a binding objective (Member States have to take action "with the aim of" achieving a good status; see also preamble 26: Member States should "aim to achieve" the objective of at least good water status).⁷ However, if monitoring or other data indicate that the environmental objectives are unlikely to be achieved, the Member State shall ensure that the causes are investigated and the necessary measures are taken to achieve the objectives (art. 11 par. 5).
- In protected areas "Member States shall achieve compliance with any standards and objectives" at the latest in 2015 ("unless otherwise specified in the Community legislation under which the individual protected areas have been established"; art. 4 par. 1, c). This is formulated as a strictly binding objective.⁸

Another issue is to which waters the WFD applies: all European water or only the "water bodies"? Art. 2, point 10, defines a "body of surface water" as "a discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, a transitional water or a stretch of coastal water." Annex II further interprets "significant element of surface water". Rivers, for instance, can be characterized on the basis of their catchment area: 10-100 km², 100-1000 km², 1000-10,000 km² and more than 10,000 km² (Annex II, 1.2.1). Consequently, rivers and tributaries with a catchment smaller than 10 km² do not have to be identified as a water body. For lakes the lower boundary is 0.5 km² (Annex II, 1.2.2). "Body of groundwater" is defined as "a distinct volume of groundwater within an aquifer or aquifers" (art. 2 point 12).

The environmental objectives refer, with one exception, to water bodies and not to all waters. This follows from the definition of "surface water status" and "groundwater status" in art. 2, point 17 and 19. The only exception is the objective to reduce pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous

⁷ In the French translation of the WFD, however, the requirement is much more binding: "les États membres protègent, améliorent et restaurant ... afin de parvenir à un bon état des eaux de surface."

⁸ Art. 4 par. 1, c, probably does not preclude the extension of deadlines for reaching a "good water status" or "potential" or the possibility of designating water bodies as artificial or heavily modified and setting lower objectives. Art. 4 par. 1, c, refers implicitly to art. 4 par. 1, a and b, which in turn refer to the possibilities to extend deadlines, designate water bodies as artificial or heavily modified and set lower objectives (Syncera Water B.V. et al., 2005).

substances. The same applies to protected areas. The specific standards and objectives set under the Community legislation establishing the individual protected areas apply to all waters in the protected area.

Member States that want to minimize their efforts may therefore not only set the environmental objectives as low as possible and make maximum use of the different exemptions from art. 4, but they may also identify as few water bodies as possible. Moreover, they may monitor and report as little as possible and focus all their efforts on achieving the environmental objectives at the monitoring points and not elsewhere. Besides not benefitting the environment, this is also a very risky strategy. The WFD is not transparent enough to see clearly the absolute minimum that is required, but if Member States make a mistake in this, they may end up paying very huge fines. This will be further explained in the next section.

2.3 Implementation

2.3.1 *Implementation in general*

The implementation of European Directives takes place in two steps: the transposition in national law and the application in practice. If a directive has been transposed correctly, the national legislation still needs to be applied correctly and if national legal provisions allow for different interpretations, as they often do, an interpretation has to be chosen that is compatible with the directive. The latter approach may remedy lacking or incorrect transposition up to a certain point. Moreover, some provisions from a directive may have to be applied even when they have not been transposed correctly into national law. These are the “directly binding provisions”: provisions that are precise and leave little discretion to Member States or set strict limits to their discretion. Examples include specific emission standards and the basic measures from the programmes of measures (Rijswick, 2008).

The European Commission controls the implementation of directives. If the Commission is of the opinion that a Member State has not implemented a directive correctly, the Commission can start an infringement procedure. This starts with a formal notice asking the Member State to submit its “observations” before a certain date (usually two months), and can finish, years later, in a (second) judgement of the European Court of Justice in Strasbourg condemning the Member States to pay a fine and/ or a penalty for each day that the directive is not implemented correctly (art. 226 and 228 EC Treaty). The Commission is not obliged to start or continue an infringement procedure in the case of suspected implementation problems, but nonetheless there are currently some 500 ongoing infringement procedures in the environmental field only (one-fifth of the total), and it is not uncommon that, concerning a specific directive, the Commission starts procedures against the majority of Member States (European Commission, 2007).⁹

Up to now, the European Commission has initiated infringement procedures against a number of member states regarding for instance the transposition of the central “water services” definition and its application. While this process is still ongoing, it can be expected

⁹ In addition, Member States can bring a case before the Court, after first bringing the matter before the Commission, who has to issue an opinion within three months (art. 227 EC Treaty). This is, however, very rare.

that a larger number of procedures will be considered by the Commission after the submission of the first RBMP.

The Commission has some additional roles specifically concerning the WFD. At the request of a Member State, the Commission may facilitate the assignment of international river basins to an international river basin district and the establishment of coordinated programmes of measures in such districts (art. 3 par. 3 and 4). In addition, Member States may report issues that they cannot solve on their own to the Commission, who then has to respond within six weeks time (art. 12). For instance, Member States may not be able to achieve a good water status because of water pollution in upstream countries or because of the use of pesticides that have been permitted at EU level.

2.3.2 The Common Implementation Strategy

In May 2001, the European Commission and the European water directors (highest civil servants of the Member States in the water field) agreed on a Common Implementation Strategy (CIS) for the WFD. The goal of the CIS is to develop a “common understanding and approach” towards implementing the WFD, with a specific focus on the methodological and technical-scientific aspects of the WFD. This approach is quite novel in the history of European environmental law transposition and aims to reduce conflicts between the Commission and the member states in an early stage by developing a common understanding even before formal submission of reports is required. This approach is to a large extent linked to the negative experiences with the implementation of the Habitat directive (92/43/EEC).

A key activity in the CIS is the development of so-called guidance documents (Table 5). According to the disclaimer of these documents, the guidance documents “should be regarded as presenting an informal consensus position on best practice agreed by all partners. These include the European Commission, Member States, third countries and sometimes other stakeholders, such as the World Wide fund for Nature). “However”, the disclaimers continues, “the document does not necessarily represent the official, formal position of any of the partners” and “the views of the European Commission.” Nonetheless, the guidance documents may influence not only the implementation of the WFD, but also its legal interpretation.

1: Economics - WATECO	10. Reference conditions inland waters
2: Identification of water bodies	11. Planning process
3: Pressures and impacts - IMPRESS	12. Wetlands
4: Heavily modified water bodies - HMWB	13. Classification of ecological status
5: Characterization of coastal waters - COAST	14. Intercalibration process
6: Intercalibration	15. Groundwater monitoring
7: Monitoring	16. Groundwater in drinking water protected area
8: Public participation	17. Direct and indirect inputs in the light of the 2006/118/EC directive
9: GIS	

Table 5: European guidance documents produced in the Common Implementation Strategy for the WFD (forum.europa.eu.int/Public/irc/env/wfd/library)

In December 2006, the Water Directors agreed at their meeting in Finland to start a new CIS activity on water and climate change. "Climate change" is not mentioned a single time in the WFD, but it is relevant in different ways. Climate change may result in higher water temperatures, lower river discharges, higher concentrations of pollutants, more frequent floods and droughts (cf. art. 1), and ecological changes. At the CIS workshop on river basin management plans and climate change of 21 November 2007, the participants recommended to add a chapter on climate change in the first river basin management plans. This is, however, not binding. In addition, surveillance monitoring as requires by the WFD (Annex V) could include the effects of climate change and every six years the definition of „good ecological status/ potential“ could be reviewed. At the same time, climate change could be used as an “excuse” for not reaching the environmental objectives. At the moment a guidance document on climate change is being prepared (CIS, 2008).

2.3.3 European follow-up legislation

In addition to the development of guidance documents, a number of legislative activities have been undertaken at the European level concerning chemical pollution. According to art. 16, the European Parliament and the Council have to adopt specific measures against pollution of water presenting a significant risk to or via the aquatic environment, aiming at the progressive reduction of discharges, emissions and losses of “priority substances” and the cessation or phasing out of “priority hazardous substances”. The first step has been the adoption on 20 November 2001 of a list with thirty-three priority substances, including fourteen “priority hazardous substances” (Decision 2455/2001/EC, Annex X WFD, cf. art. 16 par. 2-5). Almost six years later, on 17 July 2006, the Commission came with a proposal for water quality standards for these substances (COM(2006) 397 final), which is still under discussion. The Commission has not yet (December 2008) submitted a proposal to reduce, cease or phase out emissions. This proposal should identify a “cost effective” and “proportionate” combination of product and process controls (art. 16 par. 6). As long as no measures have been agreed upon at the European level, the Member States themselves have to take action (art. 16 par. 8).

In addition, the European Parliament and the Council have to take measures to prevent and control pollution of groundwater, aiming at the achievement of a “good groundwater chemical status” (art. 17). The new Groundwater Directive (2006/118/EG) of 12 December 2006 gives criteria for assessing the chemical status of groundwater and trends in the concentrations of pollutants. This directive moreover complements the rules from the WFD on direct emissions into the groundwater. Annex I of the directive contains groundwater quality standards for pesticides and Annex II prescribes the procedure that Member States have to follow for setting water quality standards for a number of other substances, which have to be incorporated in the river basin management plans. In addition, the “old” Groundwater directive (80/68/EEC) is still in force until December 2013, which gives rules on emissions of “Black list” and “Grey list” substances.

Ultimately in 2012 and every six years thereafter, the Commission has to publish a report on the implementation of the WFD (art. 18), and ultimately in 2019 the Commission has to review the WFD and propose any necessary amendments to it (art. 19 par. 2).

Finally, the Flood risk directive (2007/60/EC; FRD) and the Marine Strategy Framework Directive (2008/56/EG; MSFD) have to be mentioned. The FRD deals with the assessment and management of flood risks and requires the establishment of preliminary flood risk assessment and, for areas with a significant flood risk, the preparation of flood risk and flood

hazard maps and the development of flood risk management plans. As discussed, the implementation of this directive has to be coordinated with the implementation of the WFD. The Marine Strategy Framework Directive complements the WFD with respect to marine waters where EU Member States have or exercise jurisdiction (art. 3 point 1 MSFD). Its outline is very comparable to that of the WFD - definition of good environmental status, six-yearly strategies and programmes of measures, etc. Moreover, the implementation will have to be coordinated with the implementation of the WFD because coastal waters fall under both directives (cf. art. 3 par. 1, point b MSFD), and because of land-based sources of pollution (cf. art. 6 par. 2 MSFD).

2.4 Challenges

The WFD poses difficult challenges to the Member States of the EU and especially to their water managers. First of all, implementing the WFD requires a lot of cooperation. Whereas the WFD aims to provide a framework for water management, it does not limit itself to the traditional water management tasks and has many links with other policy sectors, such as nature protection and agriculture. Moreover, it requires public participation, both legally (art. 14) and in order to improve management and secure the necessary support. In addition, the WFD requires collaboration across national boundaries and between government levels because at the moment different government levels are responsible for setting the objectives and implementing measures.

Secondly, Member States need to organize themselves for implementing the WFD. It is not enough to identify competent authorities since it is highly unlikely that any single authority is competent in all fields and on all issues that are relevant for implementing the WFD and possesses all the necessary information and funds. In addition, working structures need to be set up where the different authorities and possibly other stakeholders can cooperate effectively. Moreover, tasks and competencies need to be agreed upon and procedures need to be developed that are clear and flexible enough to cope with new developments.

Thirdly, implementing the WFD requires a lot of information on for instance the current water status and the effects of different potential measures. It is not sufficient that good analyses are made: in addition, the resulting information should be made available for and used in decision-making. Decision-making is ultimately political as it affects different interests in different ways. If, however, no scientific and technical expertise is used, environmental objectives may be agreed upon that cannot be reached, possibly resulting in problems with the European Commission and the European Court of Justice, or ineffective or inefficient measures may be taken, which will benefit no-one.

Finally, the implementation of the WFD faces a lot of uncertainties. First, there is a lot of scientific uncertainty concerning the effects of measures and consequently the objectives that can be achieved in 2015. This may result in less ambitious objectives. Secondly, there is a lot of legal uncertainty concerning the exact requirements of the WFD. Not every requirement is equally practical, but how to find out what will be accepted by the European Commission and how the European Court of Justice and national judges will interpret the WFD? Legal uncertainty concerning the requirements is especially problematic for Member States that want to do only what is required and nothing more. Member States may have political reasons for such a policy, and this brings us to the third type of uncertainty: politics. Usually, professional politicians are not involved in the day-to-day implementation of the WFD, but they still have to approve what their staff members have negotiated. Their staff members

should, of course, take their cue from their political superiors and keep them informed, but politicians have limited time and often different priorities. Moreover, the WFD may become suddenly a political issue, with large repercussions for the implementation process. Finally, the political superiors may change after elections and the new politicians may have different preferences and may want to change the old policy.

3 Three examples of innovative instruments and institutions

Different innovative instruments and institutions (i-3's) can help Member States to face the challenges posed by the Water Framework Directive. This chapter introduces the i-3's that will be studied in the i-Five project. These i-3's will be studied in their national and local context in order to assess their effectiveness and assess the potential use in other basins and countries. The three cases studied are 1) the "area cooperation" in the Weser basin in Lower Saxony, Germany; 2) the implementation of the WFD in the Thau basin, France; and 3) the use of the WFD explorer, a decision support system for setting environmental objectives and developing programmes of measures, in the Dutch part of the Meuse basin.

3.1 "Area cooperation" in the Weser basin

The German case study will be conducted in the river basin district of the Weser. In this case study, Seecon cooperates with the coordination office of the river basin district Weser (*Flussgebietsgemeinschaft/FGG Weser*). The case study focuses on the coordination area Weser, which forms the lower part of the river basin district. It is located in North-West Germany in Lower Saxony, one of the sixteen German *Länder* (federal states). In Germany, the implementation of the WFD is the responsibility of the *Länder*.

The case study will highlight the i-3 "area cooperations" (*Gebietskooperationen*, see below) as a means for direct stakeholder involvement and focuses on the interaction between scales in setting environmental objectives and selecting measures. It will assess the extent to which area cooperation as an instrument for active involvement of interest groups facilitates the WFD implementation process. More in particular, it will look at their role within the overall decision-making and the horizontal and vertical coordination that has to take place. Additionally, the German case study will evaluate the results of the recent initiative of setting up a *Wasseragentur* (water agency), which takes the French *Agence de l'Eau* as role model.

The area cooperations have been set up by the Ministry of Environment of Lower Saxony in autumn 2005 as a regional and direct form of active involvement (MU Niedersachsen, 2005). Twenty-eight have been set up, covering the whole of Lower Saxony. The area cooperations have been designed as long-term institutions with the aim of contributing to the implementation of the WFD in regard to surface waters. Geographically, they overlap in most cases with the "working areas" that have been defined as the lowest working level for implementing the WFD in Lower Saxony.



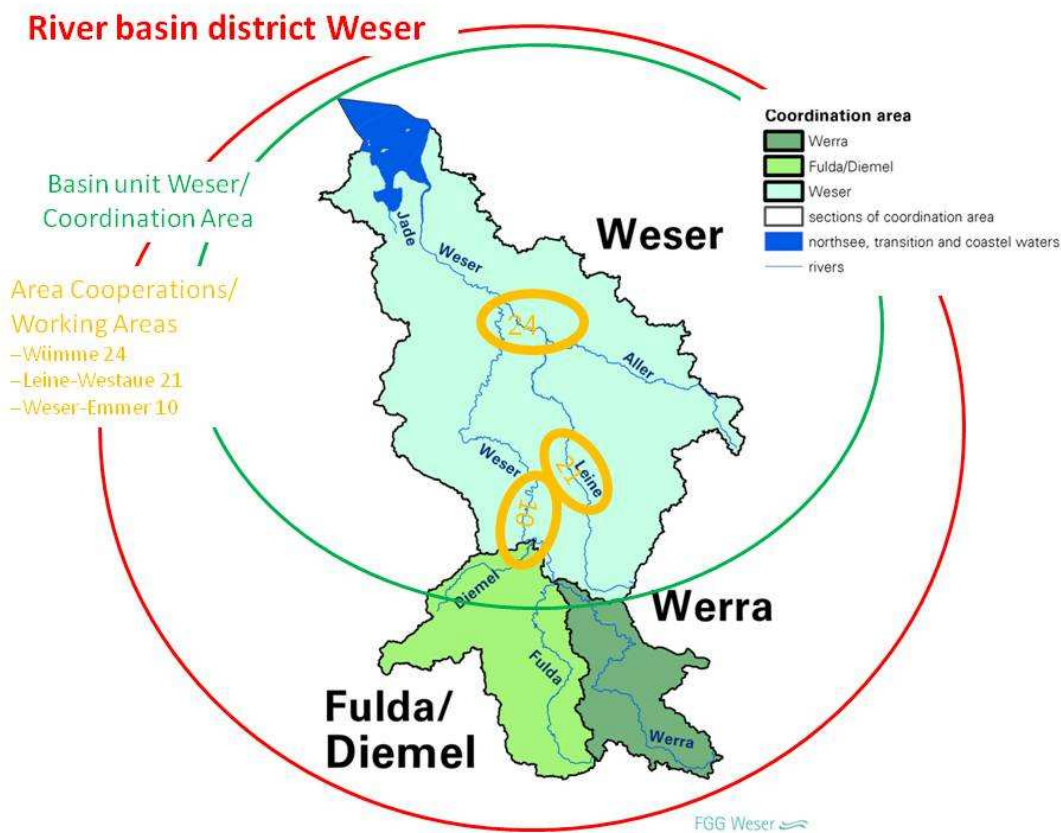
Map 1: The river basin district Weser (black line) and the border of Lower Saxony (thick red line)

The area cooperations consist of approximately 15 participants who represent different regional organizations, including water management, agriculture and nature conservation organizations. Accordingly, they meet to a large extent the criteria for active and direct stakeholder participation. Even though the official consultation process at the level of the river basin district, which started by the end of 2006, can also influence the implementation of the WFD, the most important discussions, and perhaps decisions, are expected to take place within these area cooperations (Kastens & Newig, 2008). This innovative means for

putting public participation into practice will serve as an entry point for analyzing the institutional set-up for implementing the WFD, including the integration of expert and stakeholder knowledge into decision making and the issue of vertical and horizontal coordination. Three area cooperations have been selected for more intensive investigation (see map 2):

- Weser-Emmer (Nr.10), belonging to the subbasin Obere Weser (Upper Weser)
- Leine-Westau (Nr.21), belonging to the subbasin Leine
- Wümme (Nr.24), belonging to the subbasin Mittlere Weser (Middle Weser)

All area cooperations are located in the basin district of the Weser (see Map 1 and 2). The district is impacted by high amounts of salt in the water due to potash mining; by high nutrient loads due to agricultural run-off and sewage; and by structural problems, such as reduced connectivity due to river development for power generation, shipping and agricultural purposes. Whereas salt discharge is only an issue for the Leine-Westau, the other two issues are present in all three cases. The area cooperations are meant to take such differences into account and support the development of specific and innovative measures for their region.



Map 2: The Weser river basin district, coordination areas and the three area cooperations studied in the German case study

The German case study will work along the lines of the inception report. Additionally, the focus of the German case study - in accordance with the stakeholders – will lie on the following questions:

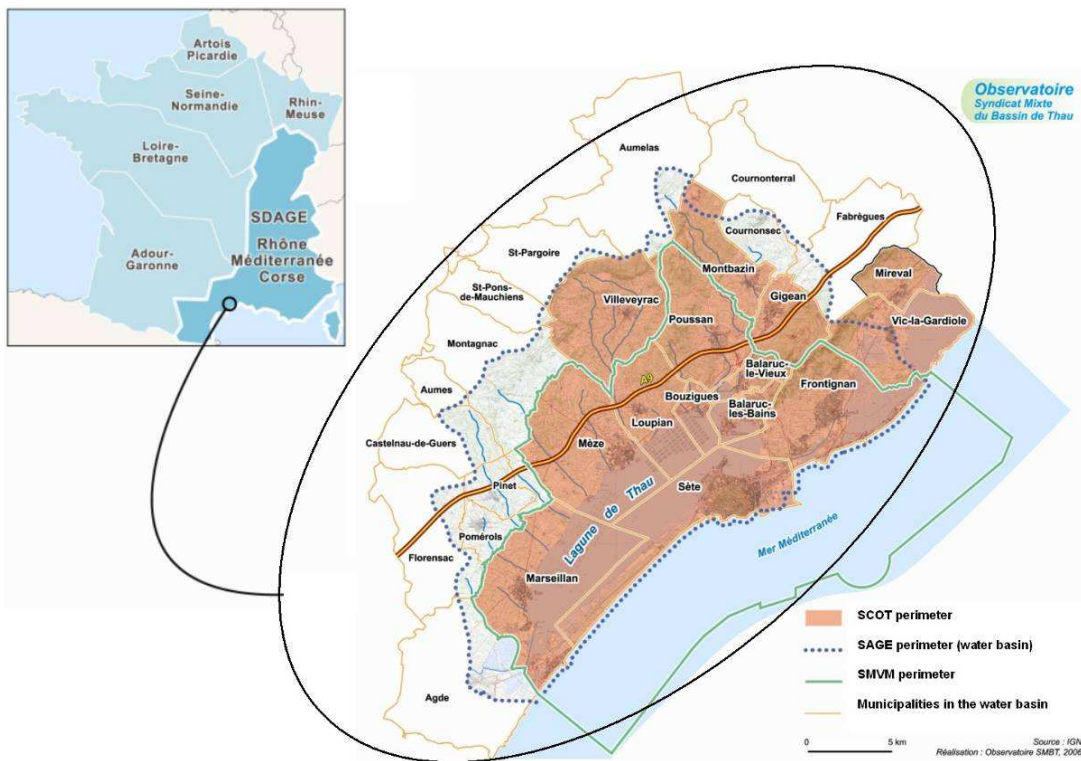
- How and under which conditions has the instrument of area cooperation been developed? What are its features?
- When and where are decisions made concerning the WFD implementation (especially concerning the planning of measures and public participation)?
- Which actors play a role at different times and levels?
- What are the necessities and conditions under which the process of selecting cost-effective combinations of measures could be optimized so that information/ knowledge available at the lower levels is integrated in planning at a higher level? What does it mean for the financial restrictions at all levels (role of the *Wasseragentur*)?
- To which extent can area cooperation be considered as an instrument of decentralized water management and as an instrument for the active involvement of stakeholders?
- Should the planning of measures at the level of area cooperations receive a more legally binding character? How much decentralization is feasible and what is reasonable?
- What would the financial implications of such a process be?
- How do the authorities and the participants value the contribution of area cooperations as an instrument for participation to the implementation of the WFD?
- How are the experiences with area cooperations and the *Wasseragentur* rated since their creation?
- Have any modifications made been made regarding the financial organization and decision-making processes in order to make the area cooperations operational and implement the WFD?
- Which contributions can the area cooperations make to the national and international level? How are interests groups included at higher levels?
- Are there special conditions which led to the establishment of area cooperations in Lower Saxony? Could area cooperations have been established in another federal state? What are the implications of area cooperations being or not being a unique instrument for Lower Saxony?
- Which preconditions are rated as most important for the area cooperations to become a success?

To these ends, the case study will include the following (action) research activities:

- A thorough analysis of the functioning of area cooperations within their organizational environment, looking especially at the institutional interplay. The analysis will use expert interviews and web-based questionnaires.
- SWOT analyses (Bradford, Duncan, & Tarcy, 2000) to obtain information on the functioning and potential of area cooperations and to a smaller extent also of the *Wasseragentur*. The SWOT analyses will be used in the context of a regional workshop for further knowledge elicitation.
- Taking into account the interests and needs of the cooperating partners, Seecon will offer methods and tools to support the further implementation of the WFD throughout the i-Five project period.

3.2 Implementing the WFD in the Thau basin

The French case study focuses on the involvement of the local water commission for the Thau Basin in the process of developing a water management plan (*Schéma d'Aménagement et de Gestion des Eaux – SAGE*) in conjunction with a spatial planning policy (*Schéma de Cohérence Territoriale – SCoT*). The Thau basin is located in the department Hérault in the south of France and is part of the river basin district Rhône-Méditerranée (map 3). The water management and land-use planning process in the Thau basin includes innovative instruments and institutions that aim to facilitate the collection, integration and transfer of knowledge within and across the commission's various working groups. The researchers from Cemagref will assess the extent to which this process is of help in implementing the WFD.



Map 3: Location of the Thau sub-basin in the Rhône-Méditerranée river basin district and the perimeter of the SCoT process

Three characteristics of the case study are of special interest for the i-Five project. First, the planning process at the scale of the sub-basin is driven by a local water commission, in which State representatives constitute only a minority, among local politicians and water users. Although in France the State is responsible for achieving the WFD objectives, it partly relies on local authorities to design, plan and implement measures. In this decentralized process, local political authorities are neither directly legally responsible for achieving the WFD objectives, nor do they fall under the direct authority of the State. Therefore, the power

game between the State services and the local authorities is worth studying to see how it provides leeway for local innovation and how costs will be shared.

Secondly, in the case study a land-use planning process is combined with a water management planning process. Although land-use patterns have a significant impact on water bodies, land-use planning issues such as new housing development and transportation are rarely addressed in water management plans, but rather taken as constraints for managing water in a technical way. The combined approach followed in the Thau basin implies that water has to be discussed in different political arenas.

Thirdly, because it is quite complex to discuss land-use planning and water management jointly, Cemagref and the local water commission have developed specific geographical tools to deal with this complexity. In the case study, the use of these tools in participatory meetings will be studied. Researchers will track innovative methods that emerge from this process to cope with complexity and uncertainty.

The aims of the French case study are the following:

- To exchange experiences, nationally and internationally, with implementing the WFD and using geographical information systems
- To propose joint land-use and water management planning as an innovative tool that can meaningfully support the implementation of the WFD
- To explore potential use(s) of the joint-planning process and the requirements for using it
- To support the implementation of the WFD until December 2009 and afterwards in (1) the Thau sub-basin, (2) the Rhône-Méditerranée basin, (3) France as a whole, (4) Germany and The Netherlands, and (5) other parts of the EU.

Guided by the i-Five Framework for Analysis, the study will seek to answer specific questions such as:

- How is water management in general and the implementation process for the WFD in particular organized, taking into account different geographical and administrative scales (France, the Rhône-Mediterranée Basin, the Thau lagoon)
- Why was the joint-process of planning possible in Thau?
- What were the key features of dealing with the additional complexity?
- What can we learn from the SAGE procedure for other areas outside of France, and what can we learn from the Thau case for areas inside and outside France?

The research will involve staff members of the Thau basin and other stakeholders closely. The research methods and activities include, among others:

- Three short workshops with the Commission and other stakeholders to discuss the integration of different research projects in the area (October 2008), preliminary research findings and experiences in Germany and in The Netherlands, and to draw lessons and conclusions
- Participatory observation of the joint planning process
- Interviews and conversations with individual stakeholders
- Literature study by the researchers from Cemagref
- Drafting publications in journals for practitioners and academics, if possible together with one or more of the stakeholders

Much research has been done in France on SAGE processes. Researchers will evaluate this literature in order to assess what can be learnt from it for cases outside France. On the Thau case, they will focus on the specificity of the joint-process of planning.

3.3 The Meuse and the WFD explorer

The Dutch case study will be the implementation of the WFD in the Dutch part of the Meuse basin and more specifically in the area of Waterboard Brabantse Delta (Map 4, next page). The case study will focus on the WFD Explorer, a decision support system (DSS) for setting environmental objectives and developing the programme of measures. The idea of the WFD Explorer is based on 'Toolkit', a DSS for selecting and evaluating flood protection measures for the Dutch part of the Rhine river (Schijndel, 2006). Users of the Explorer can select measures and get a first impression of the water status that can be achieved with these measures.

Within the Waterboard Brabantse Delta the experiences with the Explorer are positive, but its use in other parts of the Meuse basin is often more limited. Moreover, the Explorer has been used primarily by the technical staff and not, as originally envisaged, by the policy makers and other stakeholders. Moreover, there is a need to develop it further- or develop alternatives for using information in decision-making on objectives and measures. Information on the effects of measures on ecosystems is often missing or inaccurate, but water quality seems to be better developed. The Explorer comes with a "health warning" that states that the Explorer is really meant for exploration and not for detailed analysis, yet the output of the explorer – maps that indicate the water status – do not indicate levels of uncertainty. It takes a lot of time to apply the Explorer locally, time that is often not made available, but the benefits are large, and if the Explorer is not further developed, something else has to be used for incorporating ecological and water quality expertise in decision-making.

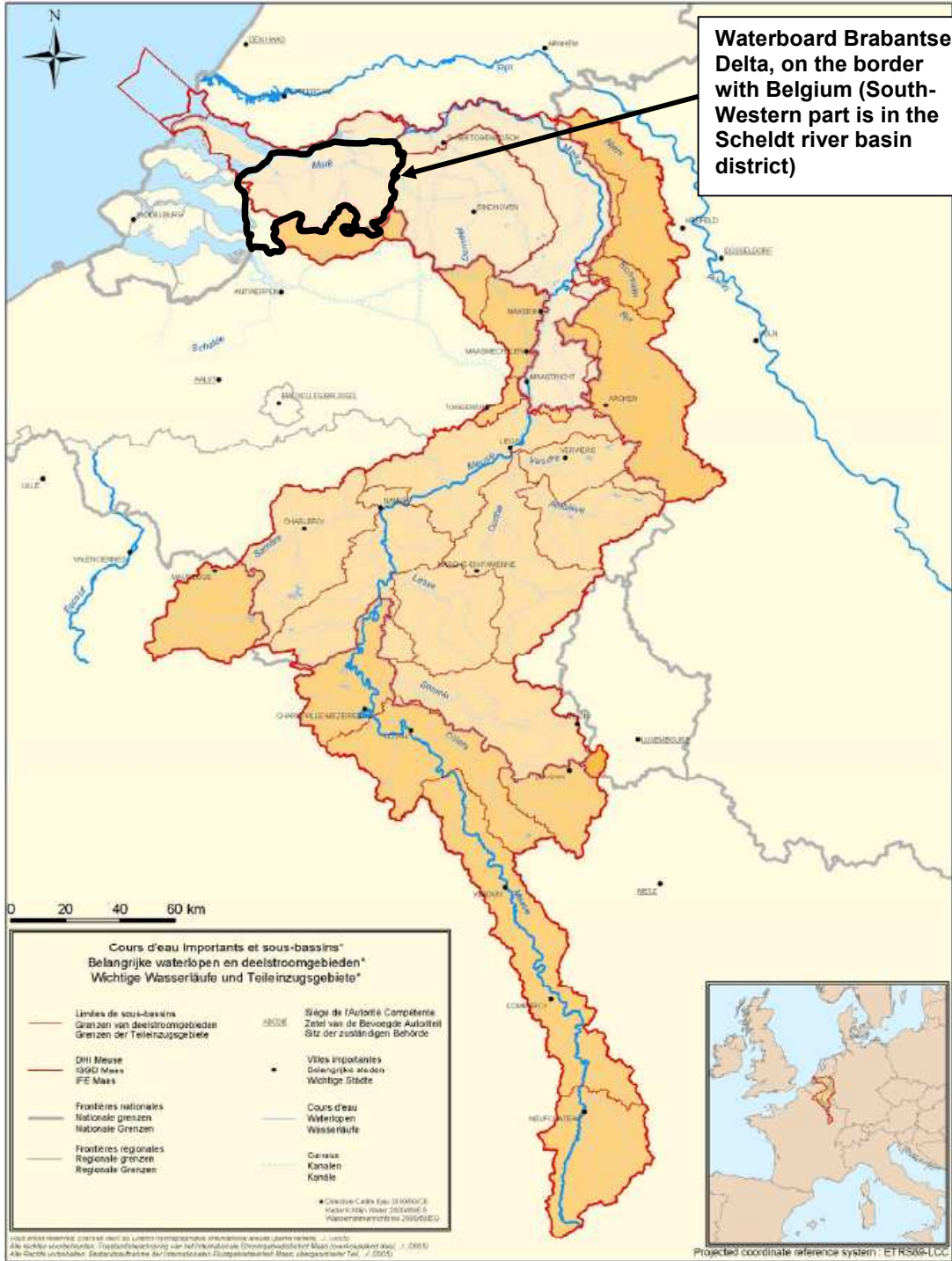
Taken together, there are more than enough reasons for evaluating the WFD Explorer. Together with the Explorer, the WFD implementation process, which the Explorer is meant to support, will be evaluated. Locally, an "area process" is organized in the Waterboard area, which is a bottom-up approach for setting environmental objectives and identifying measures. In this process the Waterboard cooperates with the local municipalities, the province, state agencies and other stakeholders to draft the environmental objectives and develop measures to reach these. In addition, cooperation takes place at the level of the Dutch part of the Meuse river basin district, at the national level, and at the international Meuse level. DSSs such as the WFD Explorer could potentially function as "boundary objects" (Wenger, 1998), linking different communities that work with the same system and providing a common focus for negotiations.

Finally, the issue of costs and financing will be discussed. Depending on the measures that will be chosen, specific stakeholders will have to pay more or less.

In the Dutch case study the development and use of the WFD Explorer in the Waterboard area will be compared with its use in other areas in and outside of the Meuse basin and with the Pegase model that is presently being discussed at the international Meuse level. The international character of the i-Five project puts the Dutch experiences in a broader light and allows an exchange of experiences with Germany and France. The aims of the Dutch case study are the following:

- To exchange experiences nationally and internationally with implementing the WFD and using decision support systems.
- To study the WFD Explorer as an innovative tool that could meaningfully support the implementation of the WFD.

District Hydrographique International de la Meuse : Carte hydrographique générale
 Internationaal Stroomgebiedsdistrict Maas : Hydrografische algemene kaart
 Internationale Flussgebietseinheit der Maas : Hydrographische Generalkarte



Map 4: The Meuse river basin district and the waterboard Brabantse Delta

To explore potential use(s) of the WFD Explorer as well as alternatives for the Explorer and the requirements for implementation.

- To support the implementation of the WFD until December 2009 and afterwards in (1) the Waterboard Brabantse Delta, (2) the Meuse basin, (3) The Netherlands as a whole, (4) Germany and France, and (5) other parts of the EU.

Guided by the i-Five Framework for Analysis, the study will address specific questions such as:

- How is water management in general and the implementation process for the WFD in particular organized, taking into account different geographical and administrative scales (The Netherlands, the international Meuse basin, the Dutch part of the Meuse Basin, the Province of North-Brabant, in which the Waterboard Brabantse Delta is located, and the area of Brabantse Delta)?
- How was the WFD Explorer used by Brabantse Delta and to what effect?
- Why was it used more than in other parts of The Netherlands?
- What can we learn from the experiences of Brabantse Delta for other areas outside of The Netherlands, but also within?

The research will actively involve staff members of Brabantse Delta and other stakeholders in the research. The research methods and activities include, among others:

- Three short workshops with the Waterboard and other stakeholders to discuss the direction of the research (September 2008), to discuss preliminary research findings, to discuss the experiences in France and Germany, and to draw lessons and conclusions.
- Participatory observation of the “area process”, especially where the WFD Explorer is used.
- Interviews and conversations with individual stakeholders.
- Literature study by the researchers from RBA, TU Delft.
- Drafting publications in journals for practitioners and academics, if possible together with one or more of the stakeholders.

The researchers aim to support learning by the stakeholders instead of merely drawing conclusions themselves. This is why the stakeholders are involved closely in the process. Meanwhile, the time constraints of the stakeholders will be taken into account, and most of the actual work will be done by the researchers.

4 Framework for analysis

The cases presented in the previous chapter will be studied using a common analytical framework. This analytical framework revolves around six central themes: (1) Institutional changes made for implementing the WFD, (2) Coordination across scales, (3) Coordination between sectors, (4) Public participation, (5) “Appropriation” of the WFD at the local level, and (6) The role of expertise. This chapter will first introduce the idea behind identifying central themes and how the themes were actually identified, and then introduce the six themes. More information on our research design will be given in the next chapter.

4.1 A theme-based approach

As discussed in chapter 1, the aim of the i-Five project is to support the implementation of the WFD by promoting the transboundary exchange of experiences, by broadening the range of methods and tools available to water managers (the i-3's), and by helping them to develop the best approach for their own situation. To reach this aim, we will study the performance of different i-3's performed in their own national context. In addition, we will compare the different experiences. To do so, however, a common basis for comparison must be developed.

A first basis for comparing the performance of i-3's is the WFD itself. Despite all institutional, geographical and socio-economic differences, in all three case studies the WFD has to be implemented. Since the WFD is quite big and complex, we decided to focus on what we see as the core of the WFD: the definition of environmental objectives and the development and implementation of measures to achieve these objectives. We will not compare the objectives and measures themselves since the basins themselves differ too much to make direct comparison interesting. However, the different approaches that are used to define objectives and develop and implement measures can be compared.

To aid this comparison of approaches, we have decided to focus on a limited number of central themes. For selecting the central themes we identified four criteria:

- The themes should reflect key challenges in implementing the WFD (cf. section 2.4) and be relevant for the “Quick scan method” that will be developed (cf. section 6.1).
- The themes should be recognizable for non-experts in order to facilitate interaction between science and practice. Jargon should therefore be avoided.
- It should be possible to address all themes in each national case study, although the focus of the different case studies can be different
- The themes should be reflected in the scientific literature. This allows us to use insights from the literature for the cases and to use the experience gained in the cases to further science.

The themes have been identified at the kickoff meeting of the project in Montpellier on 23 and 24 October 2008. First, the participants developed a long-list of themes that they saw as

important, as well as a few basic questions on each theme that should be answered in each case study to allow comparison. This resulted in 24 themes (see Appendix). In a second round, the participants were asked to identify one or two central themes that they were willing to coordinate and would focus on in their national case study. This round resulted in six central themes (see Table 6). In a third round the 24 original themes were revisited to check whether they are covered by the central themes. Most of them are.¹⁰

Theme	Weser basin	Thau basin	Meuse basin
1. Institutional changes made for implementing the WFD (Cemagref, Engref)	XX	XX	XX
2. Coordination across scales (Seecon)	XXX	X	X
3. Integration between sectors (Cemagref)	X	XXX	X
4. Public participation (Seecon, with support from TU Delft)	XXX	X	X
5. "Appropriation" of the WFD at the local level (Cemagref)	X	XXX	X
6. The role of expertise (TU Delft)	X	X	XXX

Table 6: Overview of central themes, theme coordinators (between brackets) and emphasis in the basin (X: basic attention, XX: much attention, XXX: specific focus)

The identification of central themes forms part of a flexible and reflexive research design, in which theory and practice inform each other (cf. Kolb, 1984) and in which the researchers and other stakeholders mix. The central themes have been identified by the researchers only, but they have been selected with an eye on their relevance for practice, and preliminary contacts and discussions with the some stakeholders in the cases had already taken place. Between October 2008 and January 2009, the theme coordinators inventoried the literature relevant for their case, again with an eye on practical relevance, and in the same period further discussions with the stakeholders took place. This resulted in the current inception report. Subsequently, this approach will be discussed with the stakeholders at the first international i-Five workshop with stakeholders in Hanover on 21-22 January 2009. Following the workshop, the case studies will start in full. During the case studies, additional literature study will take place on specific issues that turn out be crucial in practice, and at the end of the project stock will be taken of a) the lessons *for* practice, which will take the form of the "Quick scan method", and of b) the lessons *of* practice for theory.

4.2 Institutional structure and changes for implementing the WFD

In order to compare institutional structures, a common understanding of institutional structures for water management is needed. Institutional structures for water management

¹⁰ The six central themes overlap to some extent, which is inevitable if we take an integrated view on water management, but they do show what we want to focus on in our research.

were extensively studied in Europe by the Eurowater group (Correia, 1998a, b). This will be the basis for the case studies. The presentation of institutional settings will be updated by reporting the new organization induced by the WFD. It is proposed to develop an institutional mapping of competences and responsibilities in water management in the three countries. In addition, and mostly in the French case, the social drivers for institutional change will be addressed. This will help to make the description by the Eurowater group more dynamic and reveal the roles of the different actors. Scholars interested in institutional change usually distinguish resistant actors and entrepreneurial actors. Resistant actors can use the opportunities that the current institutions offer to them ("veto points"), which turns them into "veto players: - actors having the power to oppose a measure or a plan (Caporaso, Cowles, & Risse, 2001 ; Dolowitz & Marsh, 2000; Tsebelis, 2002). Entrepreneurs can act as brokers, bridging different worlds that may show more or less willingness to share information (Sabatier & Jenkins-Smith, 1993; Trottier, 2006).

4.2.1 Detailed and basic questions

This section presents the basic questions that will be addressed in each case study in order to map institutional responsibilities before and after the WFD (questions 1 and 2), as well as the detailed questions that will be addressed primarily in the French case study and concern the social factors that may explain institutional change (question 3).

1. Historical background

The description of the historical background will be based on Correia *et al.*'s (1998a, b) description of water management in France, Germany and The Netherlands, complemented with additional sources. Based on this description, the changes brought about by the WFD will be described as well as the change process. Basic questions that will be addressed are the following:

- 1.1 Were environmental objectives set before and, if so, by whom? Were they binding?
- 1.2 Who had to take measures and who had to pay for them?
- 1.3 Was there already cost recovery for water services or were there other financial transfers between water users and water services providers (including for ecological services)?
- 1.4 What was the organizational structure for water management and other relevant policy sectors?

The organizational structure could be described in terms of six models: 1. Coincidence of hydrological and administrative boundaries; 2. Centralized river basin management by the State; 3. Horizontal transfer of tasks and responsibilities to the biggest administrative unit within the basin, 4. Coordination/ cooperation at the river basin level; 4. River basin authorities; 6. No river basin management at all (cf. Mostert, 1998).¹¹

¹¹ Model 3 and 4 can be seen as two extremes on a continuum, ranging from 1) informal but regular cooperation, to 2) formal cooperation, 3) with an independent secretariat, 4) and a formal board or governing body that is composed, in a bottom-up fashion, of representatives of the partners, and 5) an independent river basin organization with its own legitimacy, e.g. by means of elections. For a full description of the organizational structure we may need to distinguish between different "functions" (policy/ planning, regulation, infrastructure management, financing, research/ advice) and between different sectors (e.g. water quality control, flood protection, water supply, nature protection, land-use planning, etc.).

- 1.5 For how long have important institutions been in place? If they are recent, what existed before (only in the postwar period)?
2. *National translation of the WFD vocabulary and its local physical and political meaning*
 - 2.1 How many water bodies have been designated as artificial or heavily modified?
 - 2.2 How many river basin districts have been identified and have they been split up in subareas? Do they match existing administrative or political areas or not?
 - 2.3 Who has been designated as competent authority and what are its tasks and relations with other government bodies?
 - 2.4 Has pollution control changed?
3. *Detailed questions to address drivers of institutional change (especially for the French case study)*
 - 3.1 Which actors (individuals or organizations) steer changes induced by the WFD?
 - 3.2 Whose duty is it to comply with the WFD at local scale?
 - 3.3 What links do steering actors have with international arenas?
 - 3.4 What are the veto points (constitutional rules opening opportunity for vetos) and who are the veto players (actors having the power to oppose a measure or a plan) (Caporaso et al., 2001 ; Dolowitz et al., 2000; Tsebelis, 2002)?
 - 3.5 Who are the actors acting as brokers (in a continuum between gate-keepers and facilitators)?

4.3 Coordination across scales

4.3.1 Main issues

Water management requires complex coordination across scales (Huitema & Bressers, 2006) and thus can offer classical examples of multi level governance of natural resources.¹² Coordination across scales touches upon issues related to stakeholder participation, the role of expertise, etc., but this section will focus on the decision-making process within the water authorities, specifically concerning the definition of environmental objectives and the selection of measures. Both the objectives and the measures depend on the use made of the possibilities for exemption under art. 4 WFD, and therefore decision-making on the use of these exemptions will receive attention as well.

With respect to the environmental objectives, it is important to note that the way water is managed locally can have a significant impact on upstream and downstream water bodies. Environmental objectives can therefore not be developed for each water body individually. Instead, an overarching view at the basin level is required. Yet, the local knowledge on individual water bodies that is available at the local level should not be lost, since this is

¹² See Rauschmayer, Wittmer, & Paavola (2007) for an analytical governance framework and an example concerning water and biodiversity. See Eckerberg & Joas (2004) for a rather critical view on the usefulness of the concept in practice.

usually much more detailed and has a much broader scope than the aggregated knowledge available at higher levels.

A similar argument pertains to the selection of measures: because of potential upstream or downstream impacts, the selection of measures requires an overarching view. Yet, many potential measures have a local character and most relevant information on the measures is available at this level. On top of that, the legal responsibility and legal competencies for implementing measures may be located at many different levels: national, regional, local, etc. To complicate matters, the possibilities for financing measures do not always match the legal tasks and responsibilities.

The WFD adds two additional challenges to this. First, the WFD requires the selection of a cost-effective set of measures. If costs were taken into account previously, this was often done implicitly, but now this has to be done explicitly and measures at different scales need to be compared in a transparent way in order to find the “cheapest solution” for reaching the environmental objectives. (see Interwies *et al.* (2004) for the basic principles of a possible approach.) The existing allocation of tasks and responsibilities and the actual financing possibilities may make it very hard to implement the “cheapest solution” in practice.

Secondly, the WFD requires a river basin approach (see e.g. Bruns, 2007). Consequently, the “cheapest solution” has to be found for each individual river basin. For most countries the river basin is a relatively novel scale that does not correspond to existing water management structures and certainly not to institutions in related policy sectors, such as land use planning and nature protection. This may create a number of difficulties for the implementation of the WFD, especially at the local scale (see Kastens & Newig, 2007). In international basins, moreover, different countries have to coordinate among each other. Especially at the international basin scale it will be hard to integrate local knowledge and match the measures with the possibilities for financing. In general, the opinion is widespread that the WFD will lead to significant institutional changes at various governance levels (see e.g. Bruns, 2007; see also section 4.2).

While some research has been done on the impact of the WFD on water governance (Huiteima & Bressers, 2006), the I-Five project comes in good time since the requirement of setting up RBMPs by 2009 allows for a much more practical analysis of this issues at this point in time.

4.3.2 Basic and detailed questions

The main focus of our work concerning scale issues is the way in which the definition of environmental objectives and selection of measures are dealt with in the administrative structure of member states. We will look at the situation before the introduction of the WFD and at the changes brought about by the WFD. Moreover, we will look at the water management system and the institutional set-up of the country in general since these differ from country to country and influence to a large extent how specific institutional solutions for implementing the WFD will function in practice.

The assumption behind our work is that a practical and effective “moving between scales” is needed in order to deal with the two central points of WFD-implementation mentioned above. Such an integrated decision making-process would need to be based on an overall approach at the river basin scale and the member state level as an agreed upon starting point. This approach should then be used for the practical development of environmental objectives and

the selection of measures, using local knowledge. Moreover, procedures should be put in place to aggregate the objectives and measures at the river basin scale and check their compatibility/ appropriateness/ completeness. The resulting draft set of measures then may need to be revised, and to ensure that the measures will be implemented, all decision-making levels will need to be involved in this.

The details of such “moving between scales” will differ from country to country and even basin to basin, depending on for instance the degree of centralization/ decentralization and the political culture. What we are interested in is whether and how this moving between scales takes place and how successful it is – and ultimately whether interesting i-3s have been used or developed to promote moving between scales and whether these i-3s or the process of their development could be interesting for other countries or basins. Key measures of success are 1) the existence of a basin wide approach, as witnessed by for instance a coherent, basin wide set of objectives and measures; 2) optimal use of local knowledge, resulting in, among others, tailor-made solutions for specific water bodies and local variation; 3) agreement of all involved authorities on the RBMP; and 4) appropriate financial arrangements for implementing a cost-effective set of measures.

Based on the above, this theme will strongly focus on the decision making procedures, including public participation (see section 4.5) and the link between sectors (section 4.4), as well as on the financing system for measures. All the questions listed below should be seen in this light.

Basic questions to be addressed in each case study:

1. Which water management organizations at which scales are involved in the decision-making process regarding the environmental objectives and the measures (who decides on what) and how is their interaction organized?
2. What has changed as a result of the implementation of the WFD? How have environmental objectives and cost-effective sets of measures been identified in practice for the first RBMP (including possible use of the exemptions), what are the main challenges addressed by these changes, and which challenges remain, if any?
3. Does the financial set-up of the water management institutions correspond to their obligations to implement measures?

More detailed questions for the German case study:

4. How are the definition of environmental objectives and the selection and implementation of measures (including exemptions) organized across scales - from the area cooperations (*Gebietskooperationen*) to the FFG Weser level and among the relevant administrative units at each level (the “Federal States” and their institutions)? Which factors and actors play a role? How are different approaches agreed upon at higher levels communicated to lower levels, and how are they implemented? What are related challenges and potential solutions?
5. What is the role of financing and especially of restrictions concerning financing possibilities? To what extent are the available budgets known and to what extent do the costs of measures play a role in the planning process? What are the financially secured budgets? Are there alternative sources for financing measures? According to which criteria is the revenue of the *Wasserpfeuning* (an environmental tax on water abstractions) distributed/ used? (The draft RBMP will be used here as a first basis of our work.)

6. What would be needed (and under which circumstances) for optimizing the process of selecting cost-effective sets of measures, so that information/ knowledge at the lower administrative levels is used but at the same time an integrated planning at a higher scale is possible? How can financing restrictions at all levels be taken into account better in the planning process?
7. In how far can the area cooperations function as an instrument of decentralized water management and for linking scales?
8. Should the planning of measures at the level of the area cooperations get a more legally binding character? How much responsibility are the members of the area cooperations willing to take? How much decentralization is possible and advisable?
9. What would be the financial consequences of this?
10. Have there already been changes, and if so, which, in the organization of financing and decision-making in order to make the area cooperations operational or, more generally, to implement the WFD?

4.4 Integration of sectors

4.4.1 Main issues

Already in 1998, the European Union recognized the need for a better integration of policy areas to meet its environmental objectives and for sustainable development (European Council's summit in Cardiff). Moreover, the WFD (preamble 16) explicitly recognizes the need for integration of different policy areas relevant to water at the European level:

"Further integration of protection and sustainable management of water into other Community policy areas such as energy, transport, agriculture, fisheries, regional policy and tourism is necessary. This Directive should provide a basis for a continued dialogue and for the development of strategies towards a further integration of policy areas. This Directive can also make an important contribution to other areas of cooperation between Member States, inter alia, the European spatial development perspective (ESDP)."

This is in line with integrated approaches for natural resources or territorial management that have developed in the past thirty years, such as integrated environmental management (Margerum, 1999; Margerum & Born, 1995), Integrated Coastal Zone Management (ICZM) and integrated water resources management (GWP, 2000; Mitchell, 1990, 2005; Mostert, Craps, & Pahl-Wostl, 2008a). Water managers need to cooperate to a far greater extent than in the past with organizations outside the sphere of water management. As stated by Moss (2004), cross-sectoral governance is strongly required when implementing the WFD, especially to better integrate its objectives in land use plans.

The Common Implementation Strategy also recognizes the need to ensure coherence between the implementation of the WFD and other sectoral and structural policies. In parallel with the activities under the CIS, DG Environment is supposed to pursue a further integration of specific requirements of the WFD into other Community Policies, such as agricultural, fisheries and marine policies, regional policy including spatial planning, energy policy (especially renewable energy/ hydropower) and transportation policy. At the national level in France, the "basic orientation N°9" of the SDAGE called in 1996 for "thinking of water management in terms of land use", even if the first effects have emerged only very recently. The law of 21 April 2004 strengthens the legal scope of SDAGE and SAGE: within 3 years,

the “Territorial Cohesion Blueprints” (*Schémas de Cohérence Territoriale* or SCoT) and the Local Urban Plan (*Plan Local d’Urbanisme* or PLU) will have to be compatible with the SDAGE and SAGE.

Some authors have focused on the integration of the WFD and the Common Agricultural Policy (Herbke, Dworak, & Karaczun, 2006), while other authors have explored the general linkage between the WFD and spatial planning policies (Carter, 2007; White & Howe, 2003) or between the WFD and the Strategic Environmental Assessment (SEA) Directive (Carter & Howe, 2006). The SEA Directive requires a formal environmental assessment of certain plans and programmes which are likely to have significant effects on the environment. Since (changes in) land use, such as urban sprawl, farming activities, etc., significantly influence water quality, it is important to use water quality criteria from the WFD in the strategic assessment of land use plans. In France, the SEA Directive has been transposed into national law in 2004, both in the general environment code and in the urban code. As a result, environmental assessment is more and more widely used in urban planning processes based on the SCoTs and the PLUs.

4.4.2 Basic and detailed questions

In each case study several basic question will be addressed concerning sectoral integration at different scales (national – river basin district – regional – local):

1. *Mapping the terrain*
 - 1.1 How is territorial management organized at different government levels? Which sectors deal with "territorial management" and what is the place of the “water sector” in this?
 - 1.2 What are the major differences between the different sectors (policies, laws, responsible organizations, mismatch in boundaries at different scales)?
 - 1.3 Do the geographical boundaries match with each other and with the boundaries of river basins and water bodies?
2. *Bridging sectoral differences*
 - 2.1 Have any specific institutions and instruments been created or adapted for promoting cross-sectoral governance that includes the water sector (new administrative bodies, new procedures, commissions, specific cooperation processes, ...)?
 - 2.2 To which extent have local contextual factors, such as good relations, cultural factors or individual “leaders”, facilitated or hampered cross-sectoral governance?
3. *Impact of the WFD*
 - 3.1 Has the WFD changed the organization of territorial management?
 - 3.2 To which extent does the WFD currently influence the (cross-sectoral) decision making process, the level of public participation, the content of planning documents and list of actions of other sectoral policies implemented on the same territory?

More detailed questions are the following:

4. When cross-sectoral policies are implemented, is there a legal hierarchy between public policy instruments and if so, what is the place of those related to the WFD?
5. To what extent does trans-sectoral knowledge integration and collective learning take place to develop a more holistic understanding of territorial complexity and independences between sectors, including the water sector? Are there any specific IC Tools, research projects, research traditions or intermediaries that may facilitate or have facilitated this?

4.5 Public participation

4.5.1 Main issues

Since art. 14 of the WFD requires public participation, many Member States have developed various strategies, methods and tools to fulfil this new requirement. To ease understanding, we define public participation as “direct participation in decision-making by non-governmental stakeholders (the general public, individual companies and organized interest groups). It requires but goes beyond providing access to and actively disseminating information, and may include consultation and different forms of active involvement of the public” (Ridder et al., 2005). Public participation thus covers both “stakeholder participation” and participation of ordinary citizens. In addition, different government bodies may participate in the implementation of the WFD, but this issue is already covered in section 4.2, 4.3 and 4.4. Section 4.7 on the role of expertise in the implementation of the WFD touches upon the issue of participation as well. Indeed, one of the most important issues related to participation is whether the local expertise of stakeholders is integrated in decision-making.

The public participation requirements from the WFD are the following:

- a) Three-stage consultation process for the river basin management plans (art. 14 par. 1, first sentence)
- b) Encouragement of “active involvement of all interested parties” (art. 14 par. 1, second sentence)
- c) Access to background information (art. 14 par. 1, last sentence, Annex VII point A.11)
- d) Feedback to the stakeholders on the changes to the plan as a result of the public input (Annex VII, point A.9)¹³

The WFD does not define “active involvement”, but based on an analysis of the WFD text, the CIS guidance document on public participation concludes that it is not the same as consultation and implies that the interested parties participate actively in the implementation of the WFD by discussing issues and contributing to their solution (Drafting Group, 2002; cf. Ridder et al., 2005). In addition to these four requirements, some argue that the WFD implicitly requires an actor analysis (Newig, 2005).

Nowadays the potential benefits of participation are widely recognized. The HarmoniCOP handbook (Ridder et al., 2005) mentions the following reasons for organizing public participation:

- Participation can be legally required. E.g. many national planning laws require the public disclosure of legally binding land-use plans.
- Participation can improve decision-making. The participants may give valuable additional information, contribute new perspectives on the issues at stake and come up with creative solutions.
- Participation can improve implementation of decisions, increase legitimacy and prevent litigation and (costly) delays.

¹³ Other national and international regulations contain public participation requirements as well, such as the Aarhus convention (Convention on access to information, public participation in decision-making and access to justice in environmental matters, done at Aarhus, Denmark, on 25 June 1998) and the European Directive on Environmental information (2003/4/EC).

- Participation can be organized for “moral” reasons, to complement representative democracy, improve transparency and accountability of government, reduce the distance between government and citizens, increase responsiveness of the state and allow individuals to protect their rights without having to institute lengthy and costly legal proceedings.
- Related to this point, participation can promote active citizenship and empower citizens. Active citizenship supported through an active participation process can eventually lead to learning of all parties involved.

Many participatory processes have already been organized and many are taking place at this moment. Yet, in many cases participation does not meet expectations. Within the Harmoni-COP projects ten participatory processes were analyzed to see whether any “social learning” took place (in other words, whether the stakeholders involved “learned together to manage together” the issues in which they had a stake). The analysis resulted in eight groups of issues that influence the success of participatory processes (cf. Leach & Pelkey, 2001; Mostert et al., 2007). These eight themes can be used in designing and conducting participatory processes and for evaluating such processes.

1. *The role of stakeholder involvement*
Often, the means, timing and purpose of stakeholder involvement are not clarified. Moreover, the status of the initiative in which the stakeholders can become involved often remains unclear and the organizers sometimes lack decision-making powers. As a result, stakeholders may become frustrated or decide not to participate at all.
2. *Politics and institutions*
Authorities must be willing and capable to start and manage participatory approaches. In practice, authorities often lack experience and may fear to lose control if they open up decision-making.
3. *Opportunities for interaction*
In practice, “participation” is often limited to information provision or obtaining views from the public by means of surveys, interviews, public commenting periods and public hearings. However, these means do not allow people to interact, discuss or develop something together. This is essential for improving legitimacy and extending “ownership” of decisions and for empowering citizens and promoting active citizenship.
4. *Motivation and skills of leaders and facilitators*
Expert facilitation by persons that are seen as neutral can improve the legitimacy and efficacy of the participatory process. In practice, it is often a staff member from one of the interested parties that act as facilitator.
5. *Openness and transparency*
Other factors promoting legitimacy and efficacy of participatory processes are openness and transparency. Openness and transparency can be promoted by joint development (or at least discussion) of the participatory process, by clear ground rules and by timely and continuous feedback, e.g., through the dissemination of minutes. Often, it is necessary to develop a communication plan in advance, which should identify the different audiences and consider their different information needs and preferred communication style.
6. *Representativeness*
If important stakeholders are missing from the process legitimacy may be impaired. A stakeholder analysis at the beginning of the process can help organizers to target the most important stakeholders and understand what they need to participate.
7. *Acceptance and integration of different perspectives of a problem*
Often a participatory process starts with a pre-defined problem that may not be shared by all stakeholders. This reduces the willingness of these stakeholders to participate

and commit themselves. Moreover, it may result in quite narrow, non-integrated solutions. Hence, willingness to accept and integrate different perspectives on the problem is important.

8. *Resources*

Limited time and finances of both organizers and other stakeholders often hinder effective participation processes. This should be considered early on in the planning process, and stakeholders should be made clear how much time and possibly finances they will have to invest if they decide to participate. Some financial or other support may be necessary.

Participatory processes in the water sector face issues of uncertainty (Blackmore, 2007) concerning for instance climate change. Not only do we have to deal with uncertainty with respect to our natural system but also with respect to the human drivers of climate change – e.g. future emissions of CO₂ – and the reactions of our social system – political decision-making and individual behavioural change. In order to cope with uncertainty, adaptive and reflective water management systems are needed, and participation plays a key role in such systems (Pahl-Wostl, Newig, & Ridder, 2007). Participation can increase the knowledge base for adaptive management, help to disseminate knowledge on uncertainties, and realize change “on the ground”. Moreover, change is believed to be quicker than in the case of hierarchical decision-making. Hence, the importance of public participation and how to organize it is only increasing.

4.5.2 Participation analyzed

Two basic questions concerning participation will be central in the case studies:

1. At which (administrative) levels and how does participation take place?
 2. How are the outcomes of participation considered in decision-making?
- For each question several sub-questions will be given as well as some more explanation.

1. *At which (administrative) levels and how does participation take place?*

1.1 What is the degree or level of participation?

Different typologies for describing the “level” or “intensity” of participation have been developed, most of which go back to Arnstein’s “ladder of citizen participation” (Arnstein, 1969). Table 7 (next page) presents a few. We will use the typology from the CIS Guidance document on public participation (Drafting Group, 2002), which is shown in the column most to the right.

Levels/Degrees of Participation


	<i>BMZ Participation Concept (1999: 7)</i>	<i>Brinkerhoff/ Goldsmith (2001: 5)</i>	<i>McGee/ Norton (2000: 14-16)</i>	<i>Bliss (2000: 8)</i>	WFD Guidance
Degree of interactivity and devolution of power 	information-sharing	information-sharing	information-sharing	information-sharing	Information
	consultation	consultation	consultation	consultation	Consultation
	collaboration	collaboration		participation	active involvement ↓ social learning
	joint-decision making	joint-decision making	joint-decision making	Co-determination	
	Empowerment	empowerment	initiation and control by stakeholders	partnership	
	Control by stakeholders			Control by stakeholders	

Table 7: Typologies of levels of public participation (Drafting Group, 2002; cf. Eberlei, 2001)

1.2 Who are the target groups at different administrative levels?

Potential target groups include government bodies from other policy sectors, municipalities, stakeholders from industry and agriculture, environmental NGOs and other public interest groups, and individual citizens.

1.3 Which means (instruments/ methods/ tools) are used to reach the target group or groups?

Tools for information provision include websites, flyers, posters, exhibitions, maps and public notices and displays. For consultation one can think of focus groups, interviews, questionnaires, public fora and public hearings. In case of active involvement, stakeholder dialogues, cooperative workshops, citizen's juries, future conference and other meetings could be organized. Table 8 (next page) presents some methods. This categorization according to level of involvement is meant to provide a first orientation only and cannot replace a proper analysis for selecting the most appropriate tools and methods in a specific case. Besides, tools in themselves do not lead to a better quality of the participatory process. Ultimately, it is the quality of process management and the expertise in applying the tools that make the difference.

1.4 How formal or informal are the tools and methods used?

Formal tools and methods are quite structured and strict, with strict and predetermined steps, whereas informal tools are more free-flowing. Formal tools and methods can be used for participatory processes in which the participants formally represent their organization or group, whereas informal methods may be more appropriate for participatory processes in which individuals participate as individuals. Furthermore, formal methods may be more appropriate for official decision-making and informal methods to explore issues earlier on in

Brainstorming	Workshop setting focused on the collection of a large number of ideas on a specific topic
Citizens' jury	A series of meetings, attended by a group of randomly selected people who represent the general public, to learn about and discuss a specific issue and draw conclusions.
Focus group	Group interviews with 6-10 people
Group model building	Facilitated session in which participants build a model to improve their understanding of the issue
Interviews	Question and answers session, face-to-face or by telephone, often with open questions and the possibility of extensive answers.
Problem/ cause analysis	In-depth analysis of causal network which is behind a problem that may be conducted by or with stakeholders
Public hearing	Formal meeting which presents the public with information and provides a forum for answering questions and collecting opinions
Reframing workshop	Workshop setting that allows participants to explore different analytical frameworks and enrich their problem perception
Review sessions	Workshop setting to monitor progress, keep momentum, discuss lessons learnt and evaluate steps taken so far
Role playing game	Gaming situation in which players play roles in a real or imaginary context
Round table conference	Facilitated open discussion between participants
Scenario building	Workshop setting in which possible long-term developments are explored and policy options for the present and the immediate future are discussed
Geographic Information System (GIS)	System used for storage, mapping and analysis of geographical data that may support participatory processes
Graphic tool-kit	Tools that help to illustrate discussions during workshops (whiteboards, flipcharts, etc.)
Maps	Graphic scale models
Comment Management system	(Computer) system for the structuring and archiving of comments for future reference and follow-up
Planning kit	User-friendly decision support system that presents the effects of proposed (technical) measures
Questionnaire	List of written structured questions for one-way information gathering
Simulation models	Computer models that help to gain insight in effects of combinations of measures
Spatial mental models & maps	Geographical representation and structuring of perceptions about issues, which may be used to start or structure discussions
Website	Computer-based collection of information accessible on the Internet, sometimes including a forum

Table 8: Selected tools and methods for public participation (Ridder et al., 2005)

the process. And finally, the preferences of the participants and the experience of the facilitator are important for deciding between more formal or more informal methods.

Table 9 give some examples of tools and methods that are more formal and that are more informal. However, a lot depends on how a specific tool is used in practice. For instance, some round tables, listed as more informal tools, may be conducted more formally than some public hearings, which are listed as more formal tools.

More formal tools	More informal tools
Public hearings	Round Tables (conferences)
Petitions	Stakeholder Dialogues
Citizen jury's	Future Conference
Advisory Councils & Commissions	Focus groups
Referendums	Cooperative workshops
Advisory councils	Role playing games
	Group model Building

Table 9: Examples of more formal and more informal tools supporting participation

1.5 How many people participated at which phase of the process, and what role(s) did they play? If they represented groups or organizations: did they continuously represent their group or organization or did the representatives change?

1.6 What were their resources (time, knowledge, ...)?

1.7 Are there any known conflicts between the participants? Did the participatory process influence the conflict and in what way?

2. *How are the outcomes of participation considered in decision-making?*

2.1 For which phase of the implementation of the WFD was participation organized and how?

2.2 How are the outcomes of participation integrated into decision-making? Are there legal requirements to take the outcomes into account or are the outcomes purely informative for the authorities, who have discretionary powers to decide what to do with the outcomes? What informal rules are followed in practice, what is politically accepted and what not? Is there a requirement to give feedback to participants concerning the use made of the outcomes, is this common practice, and how is feedback given, if at all?

2.3 Are the participants satisfied with their involvement? What are or were the expectations of the participants and in how far were they met?

2.4 Do people see scope for improvement, where and how?

2.5 How can the effectiveness of the participation that was carried be measured? Were criteria and indicators developed beforehand? Did ideas/ plans exist to undertake an assessment/evaluation?

Examples of quantifiable indicators include:

- How many stakeholders participated?
- How many different items (pieces of information, wishes, proposals, ...) were suggested by the participants and what percentage was taken over by the authorities and incorporated in subsequent decisions?

- Are participants mobilizing their own resources (how much) and contributing to the project materially?

Examples of qualitative indicators are:

- Did the participants show any behavioural changes?
- Are they “empowered”? Do they achieve increased self-reliance and control?

Table 10 presents the criteria used for evaluating public participation in Lower Saxony.

Criteria	Indicators and additional factors
1. Developing new institutions, particularly network building between partners	New networks, working groups, new formal and informal relationships
2. Seeking the involvement of all major sectors, interests and geographic areas	The type and numbers of stakeholders involved, representativeness and continuity of participation
3. Effectively communicating the process and role of stakeholders in the process	The majority of stakeholders consider the process transparent; they can cope with the information (amount and flow); they agree on and support process management; they understand the process and their role in it
4. Improving the capacity of the stakeholders to make joint decisions	The majority of stakeholders consider the process worthwhile, their contribution made a difference. The time and work invested by stakeholders in the process is considered appropriate
5. Enhancing mutual understanding of the views and positions of stakeholders	Stakeholders report an improvement in the understanding of others' viewpoints and that new perspectives have been gained; the way in which conflicts are reported by stakeholders; the effects of participation in terms of developing a common perspective and vision of the participatory process and a better understanding of each other's position
6. Developing a shared perception of problems	Perceived potential of process to solve conflicts
7. Reflecting on the process as such and giving feedback	Reported feedback, evaluations

Table 10: Criteria and indicators used for evaluating public participation in Lower Saxony (Borowski, Kastens, & Ridder, 2008)

2.6 Are there any factors that make the participation process unique for the specific situation?

This question relates to the institutional context in which participation takes place, as well as to other factors, such as the presence of a very urgent problem or a long history of participation.

4.6 “Appropriation” of the WFD at the local level

The i-Five project deals with the implementation of the WFD at the local level. This focus on the local level raises different questions concerning for instance the local context and the local expectations concerning water management and the WFD, the instruments or institutions that are crafted or modified locally to meet the requirements of the WFD, and the issue whether these requirements trigger other local changes. If we want to transplant innovative instruments or institutions for implementing the WFD, we first need to understand the impact of the WFD on local water management practices.

As stated in section 1.2, i-3's may be designed purposefully, they may emerge in the WFD implementation process, and they may be imported from elsewhere. In the second case, the i-3 emerges from a kind of *bricolage* or DIY (“do it yourselves”) process, in which objects produced elsewhere are given new functions and meaning (Innes & Booher, 1999). Not only the result of this process, but also the process itself may be potentially interesting for other contexts.

The implementation of existing tools such as the French SAGE (local water management plan) may be analyzed in the same way as new i-3's. A lot of research has already been conducted on the implementation of the SAGE, as well as on the less formal “river contracts” (Allain, 2002; Allain & Emerit, 2003; Latour & Le Bourhis, 1995; Le Bourhis, 2003; Salles & Zelem, 1997).¹⁴ The experiences with the SAGE have led to the writing of a national implementation guide, published in July 2008.¹⁵ New requirements have been integrated in the SAGE procedure, such as the requirement to analyze the impact of human activity (art. 5 WFD). We currently need feedback on the implementation of the modified procedure.

In the i-Five project the appropriation of the WFD at the local level will be studied in order to understand the conditions of success and failure of an i-3. We use “appropriation” in a broad sense (Richard-Ferroudji, 2008; Thévenot, 2006, p.25) to refer to the process of making something suit well, of adapting to local conditions, of constructing and recognizing new or modified artefact as judicious and relevant. Appropriation in this sense involves dynamic “shaping” of human practices and artefacts, such as the WFD, and has three dimensions: a strategic dimension, familiarization and legitimation. The WFD could for instance be used strategically in order to obtain funding for local projects that the proponents had wanted for a long time, but can now be “sold” as required by the WFD or as contributing to achieving the environmental objectives. In other words, the WFD could be used instrumentally in order to promote specific interests (such as agriculture: Busca, 2002). Familiarization involves a translation of an artefact (such as the WFD) into more familiar terms and cognitive schemes (“referentials”) and the development of new routines (Berger and Luckman, 1967). The latter may include the development of new habits or new equipment. Finally, new artefacts require

¹⁴ Other authors have studied how instruments and institutions are crafted or reshaped through local appropriation. Ostrom for example focuses on the design, operation, and maintenance of water-supply systems with consumer involvement (Ostrom, 1992). She discusses the crafting and acceptance of management rules and their legitimacy. In the USA, Selznick studied the trajectory of the Tennessee Water Authority from an organizational point of view and showed how stakeholders appropriated this new institution strategically (Selznick, 1949).

¹⁵ Guide méthodologique pour l'élaboration et la mise en oeuvre des Schémas d'Aménagement et de Gestion des Eaux – MEEDDAT - ACTeon – Juillet 2008, 98p.

legitimation in terms of the “common good”. A key question is whether the WFD is seen as contributing to the common good.

4.6.1 Detailed and basic questions

The following questions concerning appropriation will be central in the case studies:

1. Human support to WFD implementation

Basic questions

1.1 Beside official institutions responsible for the implementation of the WFD, what local organizations show an interest for the implementation of the WFD and what are their interests? Which local interests are translated in terms of the WFD? Who supports the objectives of the WFD? Are there conflicting interests? Do local people accept the risk of not reaching a good water status?

Detailed questions

1.2 Who takes care of the everyday life of the sub-basin? Who engages oneself for the sake of a better water environment? Who is legitimate in the local water management field? Who are the *porteurs de projet* (initiators of water management projects, sponsors of measures) and who facilitate implementation?

We will identify the “champions” of a more sustainable basin: people who act to make water issues very concrete, translate technical issues into human interactions, and are or could be involved in the implementation of the WFD even if they are not responsible for it.

The formal organization for WFD implementation is addressed in section 4.2.

2. Knowledge shaping and hybridization

Answering this question requires interviews with local stakeholders and inhabitant to analyse their point of view on the WFD. It will mainly be addressed in the French case study. The issue of expert knowledge integration will be developed in the next section.

Detailed questions

2.1 Does the WFD make sense to local people? What is or are the local understanding or understandings of the WFD on the site? To what extent can we see a social construction of the local understanding of the WFD (reactivation of old “myths”, development of local types and routines)? How does it encounter or stumble on local water policies and “referentials”? For example, do local people have a view of nature that is compatible with the view incorporated in the WFD and national implementation? These questions will be answered through surveys and discourse analysis.

2.2 What is the impact of the WFD on the production of local maps and local database? Does the WFD necessitate the gathering of new informations or the creation of new indicators? Do reference sites make sense to local people?

2.3 To what extent is local knowledge recognized and taken into account? Is it embedded in the i-3 that is studied?

4.7 Role of expertise

Implementing the WFD and especially setting environmental objectives and developing programmes of measures requires a lot of information. It is not enough that good analyses are made, the information should also be used in decision-making. Decision-making is ultimately political. If, however, scientific and technical expertise is not used, environmental objectives may be agreed upon that cannot be reached. This may result in infringement procedures and ultimately in heavy fines (cf. section 2.3.1). In addition, the information, skills and creativity of the local stakeholders is important. This expertise can be used for improving the analyses made by the technical experts and for developing measures that are less of a burden for the stakeholders and have the highest chance of actually being implemented in practice.

This section first gives a short overview of the different ways in which expertise can be incorporated in natural resources management in general. Next, it discusses a number of issues related to the role of expertise, such as the issue of uncertainty, communication and trust, and the issue of “lay expertise.” The section closes with a short list of the basic questions on expertise that will be addressed in each i-Five case study and more detailed questions that will be addressed in the Dutch case study.

4.7.1 *Incorporating expertise in management*

Information and expertise can be incorporated in natural resources management in different ways (Table 11, next page). In essence, there are three main approaches: a) dissemination of ready-made expertise; b) involvement of the stakeholders in research; and c) stakeholders become (co-) researchers. The first option is the classical approach. Researchers produce their expertise more-or-less independently, which is subsequently communicated to decision-makers, the general public and other stakeholders. This may be done in the form of research reports, advices, policy briefs and handbooks or manuals; by means of training and education; through presentations; or by using the mass media. By definition, the stakeholders have no or very little control over the expertise that is produced, but they are supposed to be interested in it and to use it for decision-making.

An interesting group of tools that give the stakeholders somewhat more control are decision support systems or DSSs. DSSs can be defined as “interactive, computer-based systems, which help decision makers use data and models to solve unstructured problems” (Gorry and Morton 1971, quoted in Turban & Aronson, 2001, p. 13). Typically, they consist of a simulation model and/ or databases and a user-friendly interface that allow non-expert users to perform queries. The Dutch “Planning Kit”, for instance, allows users to compose their own flood protection strategy for the Dutch rivers. At its core sits a database that stores the effects on peak water levels of 700 measures, such as lowering floodplains and widening the river bed at specific locations. These effects have been predicted using the SOBEK model. In addition, the database stores information on the costs of the measures and artist impressions. Using a simple interface, non-expert users can compose their own set of measures for lowering peak water levels (Schijndel, 2006). The Planning Kit does not, however, allow the user to add new measures or discuss the quality of the research that went into it. Most importantly, it incorporates a specific “framing” of the flood management problem. In

A. Dissemination of research

- Research reports and advices
- Policy briefs, handbooks, manuals
- Presentations
- Classical training and education
- Influencing public opinion through the mass media
- Decision-support systems

B. Stakeholder involvement

- Research programming and review procedures
- Contact with client during the research project
- Broader stakeholder involvement in formulating ToRs, discussing drafts, etc.

C. Stakeholders as (co-) researchers

- Data collection, monitoring and other information supply by stakeholders
- Participatory modelling
- Policy/ field experiments

Table 11: Three main approaches for incorporating expertise in natural resources management, with examples

accordance with the Dutch flood protection policy at the time (e.g. Silva, Dijkman, & Loucks, 2004), the measure dyke heightening has not been included, but only measures for lowering peak water levels by providing more “room” for the river.

In some cases, DSSs are developed with involvement of potential end-users. This happened in the case of the WFD Explorer that is the central focus in the Dutch case study. The WFD Explorer therefore falls in the second approach for incorporating expertise in management: stakeholder involvement. Stakeholder involvement in research covers a lot. It could mean that one client – usually the organization paying for the research – tells the experts exactly what they should do, but it could also mean a dialogue between the experts and the client, in which the experts find out what the needs of the client are and the client finds out what is possible and what he or she could reasonably ask for. Moreover, involvement does not have to be limited to only one client, but could also include other government bodies and non-governmental stakeholders. Practically, stakeholders can become involved in research programming decisions, in setting the Terms of Reference for specific projects, in reviewing proposals and in discussing progress and (draft) conclusions. For this purpose supervisory boards or project steering committees are often set up, which may have a broad composition. In addition, stakeholders can be involved informally in research on the initiative of the experts.

The third main approach dissolves the boundary between expertise/ research and management, at least partly. In this approach stakeholders become (co-) researchers. They may become involved in monitoring or other forms of data collection or supply other information and ideas to the experts. Moreover, they may develop models themselves or with the help of professional experts, using techniques such as Bayesian network analysis (Hare et al., 2006; Henriksen et al., 2007; Vennix, 1999). And finally, they may become actively involved in field experiments or policy experiments, designing, conducting and evaluating the experiments themselves with possibly some help from the professional experts. This is for instance promoted in adaptive management theory (Pahl-Wostl, 2006). A key issue in this approach, as well as in the second approach, is which stakeholders are involved and which are not.

In practice, the different approaches can be combined. A research project can for instance start with a group model building exercise involving key stakeholders in order to develop a common understanding of the issues at stake. Subsequently, additional research can be conducted by experts, in which some stakeholders are involved through the project steering committee while other, less central stakeholders are merely informed about progress, for instance through newsletters and a website. Finally, the research results could be used for developing a DSS for some or all stakeholders. In addition the results of the project may be disseminated in different ways.

4.7.2 Issues

*The status of expertise; objective and certain?*¹⁶

Since 1970 much social science research has been conducted, which has yielded relevant insights for the implementation of the WFD. First of all, this research has shown that expertise is less certain and objective than is often thought. In individual research projects, choices are made concerning the thematic, geographic and temporal delimitation of the research, the alternatives to include and exclude, and how to deal with uncertainty (Frankena, 1988). These choices are influenced by the wishes and requirements of the funding agencies and the world views and values of the experts involved (e.g. Douglas, 2005; Thompson, Ellis, & Wildavsky, 1990). In addition, the disciplinary background of the experts plays a role. Hydrologists, for instance, focus on different issues and aspects than ecologists or economists, who analyze these issues differently and come up with different solutions (cf. framing theory: Dewulf et al., 2005a; Dewulf et al., 2007; Dewulf et al., 2005b).

As to uncertainty, it is possible to identify three different sources. Uncertainty in general refers to the situation in which there is not a unique and complete understanding of an object or a system (Brugnach et al., 2008). This may result from limited or imperfect information, and if this is the case, uncertainty could be reduced or even eliminated by conducting more research. Uncertainty may, however, also result from inherent variability or unpredictability of the object or system. In that case, uncertainty will always remain and all that can be done is to improve the capacity to cope with uncertainty. Finally, uncertainty may result from different ways to interpret the available information or, put differently, from different ways of “framing” the object or system. This type of uncertainty will not be reduced by more research. Stakeholders in ambiguous situations often see their own interpretation of the situation as the only possible or legitimate interpretation and may try to persuade the other stakeholders of this or try to impose their interpretation on them.¹⁷ Alternatively, stakeholders may recognize other interpretations and try to develop a new, richer and more inclusive interpretation.

Many authors have concluded that research and expertise more generally are “socially constructed” and reflect primarily social realities. Yet, we may argue that research and expertise should reflect material realities as well (e.g. Collins & Evans, 2002; Knorr Cetina, 1995) Expertise may be compared to making maps. Many different maps can be made of a given area, each selecting and representing different features and serving different pur-

¹⁶ Section 4.7.2 is partly based on Mostert & Raadgever 2008b.

¹⁷ In this context “stakeholders” definitely includes different disciplinary experts. They too often see their own selective interpretation as the only possible or legitimate interpretation, and this is an important obstacle for interdisciplinary research and for cooperation between experts and lay persons.

poses, but to serve their purpose, each map should be correct and contain no mistakes. Similarly, any topic can be studied in many different ways, each reflecting different values and worldviews, but within each perspective there is valid and invalid research. The classical scientific standards still apply, but they should be complemented with others (cf. the notion of "extended peer review": Funtowicz & Ravetz, 1990).

Limited use of expertise?

Experts often complain that their expertise is not used in decision-making. This is often correct in as far as "instrumental use" is concerned: the use of expertise to help resolve specific current issues. Research may for instance show that measure A has a more positive effect on the water status than measure B without costing anything more, but still measure B may be chosen. This may be so because measure A does not fit in the current policy or because other, politically more influential stakeholders have to pay for measure A. The theoretical solution would be to change the policy or to compensate some stakeholders for the extra costs they have to incur. This is, however, no longer a technical-scientific problem, but calls for flexible institutions and for a well-organized implementation process in which the different stakeholders collaborate well.

Instrumental use is, however, not the only way in which expertise is used. Expertise that is not used to help resolve current issues may still influence how stakeholders think about the issue and may lead to innovation in the longer run. This is called conceptual use or the "enlightenment function" of expertise, and it is in fact more common than instrumental use (Amara, Ouimet, & Landry, 2004; Weiss, 1977). In addition, expertise may be used strategically. This occurs when research is used exclusively to legitimize preferred solutions and further particular agendas. An example is Margaret Thatcher's appropriation of climate change in 1988 in order to dismantle the coal industry and promote nuclear power (Carvalho & Burgess, 2005). To facilitate strategic use, some alternatives or effects may be excluded from consideration, specific assumptions may be used and conclusions may be reformulated in a specific way (e.g. a new technology may be called "promising" instead of "untested"). Other stakeholders may then conduct research that studies different alternatives and effects, uses different assumptions, and arrives at different conclusions. This may eventually result in a "report war" (Buuren & Edelenbos, 2004).

Communicating expertise and the issue of trust

Use of expertise requires that it is communicated appropriately. Traditionally, communication of expertise has been studied using the public understanding of science or PUS model, also known as the deficiency model or the scientific literacy model. This model is based on the assumption that the stakeholders need to understand particular scientific concepts and facts and that the experts should teach them these concepts and facts. The concepts and facts themselves are portrayed as fixed and certain. However, despite many efforts applying this model, there is little evidence of any increase in public understanding of science (Kim, 2007; Logan, 2001; Weigold, 2001). This is often attributed to the inability of the experts to communicate clearly and to the limited intellectual capacities of the other stakeholders and their limited willingness to learn. There may be some truth in this. Many experts have difficulties speaking plain language and lack a clear view of their target audience and its interests.

In many cases the researchers could benefit from involving professional communication experts, but this may not prevent all problems. In addition, the public may lack trust in the researchers and their research. Trust is, however, a complex concept. According to Brian

Wynne (1992; 1996), trust is not something that the public possesses or not: it results from the interactions between the experts and their public and from the social and institutional context in which these interactions take place (cf. Bachman, 2001; Kramer, 1999; Vangen & Huxham, 2003). Factors influencing trust include the track record of the experts (have they been proven wrong in the past?), their consideration of the information and views of the public, their openness to criticism, their institutional affiliation, and the “recognizability” or relevance of their research. This does not only depend on the language that is used, but also on the concepts that are used and the values that are reflected in the research.

In reaction to the poor performance of the public understanding of science model, an alternative model has been developed, called the contextual or interactive model (Kim, 2007; Logan, 2001; Weigold, 2001). Its starting point is not the expertise, but the needs and interests of the public and the context in which they have to or can use the science. This model acknowledges the subjective or “constructed” character of expertise and pays as much attention to the production as to the consumption of knowledge. Communication in this view is not one-way transfer of knowledge from researchers to the other stakeholders, but a continuous interaction between these two groups.

Collaborative expertise and the problem of “lay expertise”

The discussion so-far points to the importance of collaboration between the experts and the other stakeholders. Collaboration between these two groups helps to ensure the relevance of the resulting expertise for the other stakeholders, it can broaden the range of values and interests that are reflected in the expertise, increase the legitimacy of the research, and generally promote that the expertise will actually be used in practice (Mostert et al., 2008b). Yet, realizing all these benefits requires that all major stakeholders are involved in the research and not just one “client”. Moreover, it poses special problems if the number of major stakeholders is high, as will be the case in implementing the WFD. In this case only the “most important” (most influential and/ or most affected) stakeholders can be involved, and one may have to work with representatives of stakeholder groups. Besides, “collaborative expertise” does not exclude more traditional dissemination activities. These may be useful for reaching stakeholders that have not been involved actively in the research.

A special issue is the position and role of “local” or “lay experts”: persons who do not have formal qualifications, such as an engineering degree, but still possess special skills and information that is relevant for the issue at hand. An example is a local farmer, who works in the basin every day. His expertise will be based more on his own experience and the local situation than the experience of the “certified experts”, who usually use more formal approaches and abstract concepts. In theory, lay expertise and certified expertise can complement each other. In practice, however, lay expertise is often not recognized, and certified experts sometimes seem to be personally challenged by the notion that lay persons can possess relevant expertise as well (Petts & Brooks, 2006; Scheer, 1996; Wynne, 1992).

Additional roles of expertise

Expertise may not only inform the policy process, but also provide a central focus in the policy process or even structure the interactions and negotiations in this process. If, for instance, participatory modelling takes place for a specific issue, all discussions on this issue could revolve around the model building exercise – what effects to study, whose concerns should be taken into account, which alternatives should be assessed, how should they be evaluated, who has to take action, etc. The discussions themselves could be structured using different Information and Communication Tools (IC-Tools), ranging from the very

simple, such as whiteboards and flip-charts, to Wiki's, interactive maps and "group decision-rooms" for computer-based discussions (e.g. Craps & Maurel, 2003; Olson et al., 1992).

4.7.3 Detailed and basic questions

In each i-Five case study, the following four questions concerning the role of expertise will be addressed. They will be answered in more or less detail, depending on the availability of information and how much there is to tell, but all will be addressed at least at a basic level:

1. What information do the stakeholders get and is their local expertise used in the implementation process?
This question will also get attention in the evaluation of the public participation process in each case (see section 4.5).
2. What collaboration has there been between the technical experts and the staff involved in setting environmental objectives and developing and implementing measures? What expertise is actually used?
For practical purposes, the case studies may focus on one or two of the most important research projects or on the role of a central working group dealing with research.
3. Is expertise actually used in decision-making at the political level?
We will have access to the draft and the final river basin management plans, to media reports and some other public documents, such as (in the Dutch case) minutes of the discussions in Parliament on the WFD. Moreover, some interviews may be held, either directly with stakeholders at the political level, or with their advisors.
4. Are there any special tools used in the implementation process?
Only the tools will be discussed that did or were meant to play a central role or are very special or innovative.

The role of expertise is the special focus in the Dutch case study, in which the development and use of the WFD Explorer will be evaluated. This is a DSS for defining environmental objectives and developing a programme of measures. In the Dutch case study all issues presented in the previous section will be studied in detail. The Dutch case study will address questions such as:

5. What choices have been made in developing the WFD Explorer and by whom?
6. How (un)certain and reliable are the outcomes?
7. How well does the Explorer present the results, and how user-friendly is it?
8. Have potential end-users been involved in the (further) development of the Explorer, who, how and when?
9. To what extent does the Explorer incorporate local knowledge?
10. Do the potential end-users trust the Explorer?
11. Has the Explorer actually been used, by whom and how?
12. What have been the results of using the Explorer? Did it have any effect on the environmental objectives and measures selected, and if so, to everybody's satisfaction?
13. How well does the Explorer "fit" in the implementation process of the WFD in The Netherlands and the Meuse Basin?
14. Does this process facilitate effective and transparent decision-making on environmental objectives and measures and the use of technical expertise?
15. How could the WFD Explorer be developed further a) for use in the Meuse Basin and other parts of The Netherlands, or b) for other countries and basins?

In addressing these questions, the Explorer will be compared with other models and other means to incorporate expertise in the implementation of the WFD that have been used or could have been used or were considered.

5 Research design and involvement of stakeholders

5.1 Research design

The i-Five project will follow a case study approach as described by Yin (1989). The cases are used for building up, testing and further developing our “theory” on i-3’s to support the implementation of the WFD, or more generally, multi-actor decision-making on technically complex issues. In terms of Yin (1989), we will use the case studies for “theoretical generalization” and not for statistical generalization. The cases have been chosen on the basis of a) the i-3 or i-3s that is or are used, and b) the willingness of key stakeholders to cooperate with the researchers. Moreover, the cases should have enough in common to make comparison possible and offer enough diversity to make it interesting. Information will be collected by means of interviews and workshops with stakeholders and by means of document analysis. Additional information will be sought until the point that it does not improve our understanding anymore. The analysis will include a description of the characteristics of the i-3’s and their implementation requirements, as well as a description of the legal, institutional and cultural background of the region/ area in which they have been used.

In addition, the case studies will be compared to each other. The objective of the cross-case comparison is twofold: to obtain a better view on the individual cases and their specificities, and to distil more generic insights from the cases by systematically comparing the information obtained. Among other things, the cross-case comparison will pay attention to the innovative character of the i-3’s in other countries than their origin – what is common in one context may be innovative in another. In addition, the institutional context in which the different i-3’s function will be assessed and compared (cf. section 4.2). Moreover, the comparison will look for “matching counterparts” of the i-3’s or parts of the i-3’s in different cases (e.g. the French *Agence de l’eau* and the Dutch *Waterschap*).

As to the institutional context, a junior researcher located in France and supported by senior staff will spend 16 months collecting and comparing information on the legal/ institutional and cultural background of each case, using the answers to the basic questions given by the other teams. The analysis will include the development and cross-comparison of “cognitive maps” of the legal/ institutional and cultural context in order to identify significant elements of the context for the Quick scan. Similarly, the three case studies will be compared on the other five themes.

The results and insights obtained from the cross-case comparison will be further integrated to serve as a basis for the development of the Quick Scan Method and later for the development of a training package (see chapter 6). The cross-case comparison will eventually study the potential for “transplantation” of specific instruments and institutions in different institutional settings by answering the following questions:

1. In which institutional settings and under what circumstances could the i-3 work?
2. To what extent can the i-3 be adapted to, or made to fit in different settings and circumstances?

To this end, “what if” scenarios will be developed and assessed (partly with stakeholders) to see under which circumstances an i-3 can be implemented in another case study area. “What if” questions include for instance what if the budget would be half?; what if we have far less data?; and: what if one important stakeholders would not cooperate? The i-3 characteristics and design parameters will be compared with the organization of the water management system in each of the three case studies.

5.2 Involvement of stakeholders in the research

The progress of the case studies will be presented at three international stakeholder meetings (see section 1.2) and stakeholders will have direct access to the experiences in the other cases. Small excursions will be organized as regular activity at these meetings to facilitate the exchange of experiences. Within the individual case studies regions national workshops serve as means for knowledge generation and exchange. It will ensure the dissemination of the results to policy makers and practitioners. Questions for fact-finding and understanding can be directly answered in the interaction between researchers and other participants.

Furthermore, during the national and international workshops, policy makers and practitioners who are not directly involved in the case studies can gain ‘hands on’ experience with the project results. The workshops will also be used to validate the results as stakeholders and experts external to the project will be asked for feedback. This will increase the feeling of ownership of the case study partners and this in turn is expected to increase their willingness and capacity to become “messengers” for the project.

6 Expected results, dissemination and training

6.1 Quick scan method

The Cross Case Comparison will provide the basis for the development of a Quick scan method. This method aims to help decision-makers to quickly get an idea whether a specific i-3 may be of interest for him or her and whether it could help the issues that he or she faces and could be used, in the specific institutional, political and cultural context. The Quick Scan method will be a qualitative method depicting the potentials of an I3 and at the same time the obstacles. The method will not provide the decision-maker with a “cooking book recipe” for solving his or her problems, but it will inform him or her on what is possible and promote reflection and learning. This may result in the decision-maker adapting the i-3 to suit his or her needs, or to a completely new i-3 that is loosely inspired by the i-3 studied. The importance of adaptation in water management is more and more emphasized (Timmerman, Pahl-Wostl, & Moeltgen, 2008), and this applies to specific instruments and institutions as well. The quick scan method aims to support adaptive processes and the development of completely new solutions.

Often adoption of innovative instruments and institutions is motivated by political considerations without necessarily analyzing the appropriateness for the local situation. In other cases adoption would be appropriate but is not done because of “institutional inertia”. The development of the Quick scan method will provide decision makers with more information on how to guide and control institutional change and by better assessing the individual situation in regard to the appropriateness of institutional change. The Quick scan method will provide information that is valuable especially to policy-makers and practitioners who consider adaptation and adoption of i-3’s under different circumstances. A Quick scan of an i-3 will, for example, inform practitioners whether the legal conditions for this I3 are met.

To develop such a method, a systematic review of the I3 design parameters important for implementation will be conducted, trying to match these with the most important aspects of the water management system of the area where such an i-3 could be transplanted. The better the match, the higher the potential for transplantation.

A final comparative report including the case study comparison and the development of the Quick Scan method will – before its finalization be submitted for review to a panel consisting of both internationally recognized experts and practitioners.

6.2 Training and capacity building

Capacity building is an ongoing activity in the project and is characterized by a) intensive exchange between the researchers and the stakeholders in the different case studies, and b) active participation (and learning) of the stakeholders in international project meetings (see

section 5.2). The local partnerships that have been built already by the i-five researchers as basis for the national case studies will provide stepping stones for a wider project outreach among governmental and other organizations. In addition, specific training and capacity building at the end of the project will help to reach out to broader audiences. These activities will include the following:

- Development of a training package based on the i-3's and the Quick scan method. In the training package, the different case study results and the 'Quick Scan' method will be summarized in a sense that conclusions can be drawn by practitioners how to deal with i-3's in their particular working context. The documentation of the i-3 plus the Quick scan method provide criteria and questions concerning the applicability of the i-3 under different circumstances to help practitioners for decision-making in regard to the choice of i-3's and their adaptation. The training package will be flexible and can be adapted to specific training needs and national contexts. It will be published as a report.
- One-day training workshops will be conducted in the three case study regions for the stakeholders of the project as well as for other practitioners from other regions and from the national level to extend the scope and the information on project results to higher administrative levels within the countries. These national workshops may be conducted differently depending on case study. In some case studies it may seem conducive to carry out one final training workshop just at the level of the case study region and conduct an additional workshop for further national outreach, in other case studies these two activities may be merged. Depending on the training needs, the emphasis of the workshops will be either on information transfer, on practical exercises, or on discussion and reflection.
- Attaching a half-day training workshop to a conference that attracts a larger and European audience from science and the water policy level to further disseminate the training package. This could be the final IWRM-net conference in Oct. 2010 in Brussels.

6.3 Publications and presentations

Continuous dissemination – from the beginning of the project – of project information and achievements will be done by means of the i-Five project website (see the next chapter), the use of project newsletters, posters and certainly publications. Publications of project results will target different scientific and policy-relevant (peer-reviewed) journals, in part co-authored by case study partners. The first joint article will summarize and compare the institutional settings of the three case study regions. G. Bouleau will be the lead author. Smaller articles will be placed in national journals, including journals for practitioners.

A simple but effective means of dissemination are to place short articles in newsletters of larger projects or give presentations at conferences of related projects such as the FP6 Integrated Projects NeWater, Aquastress, FLOODsite and SPICOSA. A poster was already presented at the Final NeWater conference in Sevilla, November 2008. A short article depicting the status quo of i-five and describing its relation to the NeWater project will be published in the final Newater newsletter in January 2009.

Among other newsletters and websites, the following ones will be targeted for publications of quick results: the European Water Management news (www.ewaonline.de), the Global Water



Partnership (www.gwpforum.org), the European Water Partnership newsletter (www.ewp.eu), the UNESCO Waterportal (www.unesco.org/water/news/newsletter/index.shtml), the International Water Office (<http://oieau.fr>), the International Network of River Basin Organisations (www.riob.org), WaterForum Online (www.waterforum.net), the KoWa Newsletter (Kommission Wasserforschung, www.dfg-wasserkommission.de/media), the Water Information System Europe (<http://ec.europa.eu/environment/water>) and the Dutch WFD portal (www.kaderrichtlijnwater.nl).

Outreach to other countries in addition to the three partner countries will be also guaranteed by using European platforms for exchange in water management (e.g. EUWI newsletter, WISE newsletter) and using existing links – as well as establishing new ones – to European projects with larger scope and impacts.

6.4 Website

Continuous dissemination, from the beginning of the project, does also take place by means of the i-Five interactive web communication platform: www.i-five.eu. It serves for internal project communication, but it is mainly developed to communicate the most important information on i-3's to a broader public and to document project results to a larger audience. Besides offering all project documents for download, it provides useful tools for WFD practitioners and interested persons, such as the project glossary that defines terms such as "active involvement". The glossary will be further elaborated during the project. Another tool is the "WFD Browser" that already provides the translations of the different WFD articles to English, German, Dutch and French respectively in a simple manner. These applications may increase the attractiveness of the page that people are encouraged to visit from time to time and help to establish the envisaged end-user dialogue.

References

- Allain, S. 2002. La planification participative de bassin: Analyse des conditions d'émergence et des modalités d'élaboration des SAGE, volume n°1: INRA.
- Allain, S., & Emerit, A. 2003. Projets d'aménagement hydraulique, concertation et planification participative de bassin : une approche en terme "d'action publique négociée". *Natures Sciences Sociétés*, 11: 255-265.
- Amara, N., Ouimet, M., & Landry, R. 2004. New evidence on instrumental, conceptual, and symbolic utilization of university research in government agencies. *Science Communication*, 26(1): 75-106. (<Go to ISI>://000223162200005)
- Arnstein, S. 1969. A ladder of citizen participation in the USA. *Journal of the American Institute of Planners*: 216-224.
- Bachman, R. 2001. Trust, Power and Control in Trans-Organizational Relations. *Organization Studies*, 22: 337-365.
- Blackmore, C. 2007. What kinds of knowledge, knowing and learning are required for addressing resource dilemmas?: a theoretical overview. *Environmental Science and Policy*, 10(6): 512-525.
- Borowski, I., Kastens, B., & Ridder, D. 2008. Area co-operations as an instrument of public participation for implementing the EU Water Framework Directive: networking and social learning. *E-Water*(accepted for publication).
- Bradford, R., Duncan, P., & Tarcy, B. 2000. *Simplified Strategic Planning: A No-nonsense Guide for Busy People who Want Results Fast!*: Chandler House Press.
- Brugnach, M., Dewulf, A., Pahl-Wostl, C., & Taillieu, T. 2008. Towards a relational concept of uncertainty: about knowing too little, knowing differently, and accepting not to know. *Ecology and Society*, 13(2): 20. (www.ecologyandsociety.org/vol13/iss2/art30)
- Bruns, A. 2007. Coastal Governance im Wandel: Die Umsetzung der Wasserrahmen-richtlinie in Schleswig-Holstein. In G. Gönnert, B. Pflüger, & J.-A. Bremer (Eds.), *Von der Geoarchäologie über die Küstendynamik zum Küstenzonenmanagement*: 35-44. Leiden: EUCC- TheCoastal Union.
- Busca, D. 2002. *La mise en oeuvre négociée des dispositifs agri-environnementaux, Effets d'organisation, enjeux de territoire et dynamique d'appropriation stratégique*. CERTOP CNRS (UMR 5044) Université Toulouse Le Mirail, Toulouse. (busca@univ-tlse2.fr)
- Buuren, A. v., & Edelenbos, J. 2004. Conflicting knowledge. *Science and Public Policy*, 31(4): 289-299.
- Caporaso, J., Cowles, M., & Risse, T. (Eds.). 2001. *Transforming Europe, Europeanization and Domestic Change*. N.Y.: Cornell University Press Ithaca.
- Carter, J., & Howe, J. 2006. The Water Framework Directive and the Strategic Environmental Assessment Directive: Exploring the linkages. *Environmental Impact Assessment Review*, 26(3): 287-300.
- Carter, J. G. 2007. Spatial planning, water and the Water Framework Directive: insights from theory and practice. *Geographical Journal*, 173(4): 330-342.
- Carvalho, A., & Burgess, J. 2005. Cultural circuits of climate change in UK broadsheet newspapers, 1985-2003. *Risk Analysis*, 25(6): 1457-1469.
- CIS. 2003. *Guidance document n.o 13: Overall approach to the classification of ecological status and ecological potential*. Luxembourg: Office for Official Publications of the European Communities. (forum.europa.eu.int/Public/irc/env/wfd/library)
- CIS. 2008. Policy Paper Climate Change and Water. (forum.europa.eu.int/Public/irc/env/wfd/library)
- Collins, H., & Evans, R. 2002. The Third Wave of Science Studies: Studies of Expertise and Experience. *Social Studies of Science*, 32(2): 235-296.

- Common Implementation Strategy Working Group 2.2. 2003. **Guidance document no. 4. Identification and Designation of Heavily Modified and Artificial Water Bodies.** (circa.europa.int)
- Correia, F. N. 1998a. **Institutions for water resources management in Europe Vol. 1.** Rotterdam: Balkema.
- Correia, F. N. 1998b. **Selected issues in water resources management in Europe Vol. 2.** Rotterdam: Balkema.
- Craps, M., & Maurel, P. 2003. **Social learning in river basin management; Pool of questions HarmoniCOP WP2 reference document.** Leuven: COPS. (www.harmonicop.info)
- Dolowitz, D. P., & Marsh, D. 2000. Learning from Abroad: The Role of Policy Transfer in Contemporary Policy Making. **Governance**, 13(1): 5-24.
- Douglas, H. 2005. Inserting the Public Into Science. In S. Maasen, & P. Weingart (Eds.), **Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making:** 153-169. Dordrecht: Springer.
- Drafting Group. 2002. Guidance on Public Participation in relation to the Water Framework Directive; Active involvement, consultation, and public access to information, **Prepared in the Framework of the Common Implementation Strategy of the European Commission and the EU Member States.** (forum.europa.eu.int/Public/irc/env/wfd/library)
- Eberlei, W. 2001. **Institutionalised Participation in Processes Beyond the PRSP:** Institute for Development and Peace (INEF).
- Eckerberg, K., & Joas, M. 2004. Multi-level Environmental Governance: a concept under stress? **Local Environment**, 9(5): 405-412.
- Eisenberg, E. M. 1984. Ambiguity as strategy in organizational communication. **Communication Monographs**, 51(227-242).
- European Commission. 2007. **24th Annual report from the Commission on Monitoring the Application of Community Law (2006) (COM(2007) 398 final).** (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0398:FIN:EN:PDF>)
- Fiske, J. 1996. **Introduction to Communication Studies.** London: Routledge.
- Frankena, F. 1988. The emergent social role and political impact of the voluntary technical expert. **Environmental Impact Assessment Review**, 8(1): 73-82.
- Funtowicz, S. O., & Ravetz, J. R. 1990. **Uncertainty and quality in science for policy.** Dordrecht: Kluwer.
- Gorry, G. A., & Morton, M. S. S. 1971. A Framework for Management Information System. **Sloan Management Review**, 13(1): 55-70.
- GWP. 2000. **Integrated Water Resources Management:** Global Water Partnership. (<http://www.gwpforum.org/gwp/library/Tacno4.pdf>)
- Herbke, N., Dworak, T., & Karaczun, Z. 2006. WFD and Agriculture—Analysis of the Pressures and Impacts Broaden the Problem's Scope, Interim Report: Version 6—18/10/2006. (http://www.ecologic.de/download/projekte/1950-1999/1966/1966_deliverable_2-1.pdf)
- Huitema, D., & Bressers, J. T. A. 2006. Scaling water governance: the case of the implementation of the European Water Framework Directive in the Netherlands; Paper presented to the Synthesis Conference of the Institutional Dimensions of Global Environmental Change program, Bali, Indonesia, December 2006, **CSTM-reeks nr. 304:** 1-22.
- Innes, J. E., & Booher, D. E. 1999. Consensus building as role playing and bricolage: toward a theory of collaborative planning. **Journal of the American Planning Association**, 65(1): 9-26.
- Interwies, E., Kraemer, R. A., N., K., Görlach, B., Dworak, T., Borchardt, D., Richter, S., & Willeckeet, J. 2004. **Basic principles for selecting the most cost-effective combinations of measures for inclusion in the programme of measures as described in Article 11 of the Water Framework Directive.** Berlin: Umweltbundesamt.
- Kaika, M., & Page, B. 2003. The EU Water Framework Directive: Part 1. European Policy-making and the changing topography of lobbying. **European Environment**, 13: 314-327.

- Kastens, B., & Newig, J. 2007. The Water Framework Directive and agricultural nitrate pollution: will great expectations in Brussels be dashed in Lower Saxony? *European Environment*, 17(4): 231-246.
- Kastens, B., & Newig, J. 2008. Will participation foster the successful implementation of the WFD? The case of agricultural groundwater protection in North-west Germany. *Local Environment*, 13(1): 27-41.
- Kim, H. 2007. PEP/IS: A New Model for Communicative Effectiveness of Science. *Science Communication*, 28(3): 287-313.
- Knorr Cetina, K. 1995. Laboratory Studies: The Cultural Approach. In S. Jasanoff, G. E. Markle, J. C. Petersen, & T. Pinch (Eds.), *Handbook of science and technology studies*: 140-166. Thousand Oaks, Calif.: Sage Publications.
- Kolb, D. A. 1984. *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, N.J.: Prentice-Hall.
- Kramer, R. M. 1999. Trust and Distrust in Organizations: Emerging Perspectives, Enduring Questions. *Annual Review of Psychology*, 50: 569-598.
- Latour, B., & Le Bourhis, J.-P. 1995. Donnez moi de la bonne politique, je vous donnerai de la bonne eau, Rapport sur la mise en place des CLE: MEDD.
- Le Bourhis, J.-P. 2003. De la délibération à la décision - L'expérience des commissions locales de l'eau, *Concertation, décision et environnement : regards croisés, vol. 2*: 16: La documentation Française.
- Leach, W. D., & Pelkey, N. W. 2001. Making Watershed Partnerships Work: A Review of the Empirical Literature. *Journal of Water Resources Planning and Management*, 127(6): 378-385.
- Logan, R. 2001. Science Mass Communication: Its Conceptual History. *Science Communication*, 23(2): 135-163.
- Margerum, R. D. 1999. Integrated Environmental Management: The Foundations for Successful Practice. *Environmental Management*, 24(2): 151-166.
- Margerum, R. D., & Born, S. M. 1995. Integrated Environmental Management: Moving from Theory to Practice. *Journal of Environmental Planning and Management*, 38(3): 371-391.
- Mitchell, B. 1990. *Integrated water management; international experiences and perspectives*. London: Belhaven Press.
- Mitchell, B. 2005. Integrated water resources management, institutional arrangements, and land-use planning. *Environment and Planning A*, 37: 1335-1352.
- Moss, T. 2004. The governance of land use in river basins: prospects for overcoming problems of institutional interplay with the EU Water Framework Directive. *Land Use Policy*, 21(1): 85-94.
- Mostert, E. 1998. River Basin Management in the European Union: How it is done and how it should be done. *European Water Management*, 1(3): 26-35.
- Mostert, E., Craps, M., & Pahl-Wostl, C. 2008a. Social Learning: the key to integrated water resources management? *Water International*, 33(3): 293-304.
- Mostert, E., Pahl-Wostl, C., Rees, Y., Searle, B., Tàbara, D., & Tippett, J. 2007. Social learning in European river basin management; Barriers and supportive mechanisms from 10 river basins. *Ecology and Society*, 12(1): art19.
- Mostert, E., & Raadgever, G. T. 2008b. Seven rules for hydrologists and other researchers wanting to contribute to the water management practice. *Hydrology and Earth System Sciences*, 12: 1087-1096.
- MU Niedersachsen. 2005. *Erlass des Umweltministeriums vom 15.03.2005. Konzept für die Umsetzung der Wasserrahmenrichtlinie im Geschäftsbereich des Niedersächsischen Umweltministeriums - Bildung von Gebietskooperationen. Vol. 49. Hannover.*
- Newig, J. 2005. Die Öffentlichkeitsbeteiligung nach der EG-Wasserrahmenrichtlinie: Hintergründe, Anforderungen und die Umsetzung in Deutschland. *Zeitschrift für Umweltpolitik und Umweltrecht*, 28(4): 469-512.

- Olson, J. S., Olson, G. M., Storrøsten, M., & Carter, M. 1992. ***How a group-editor changes the character of a design meeting as well as its outcome.*** Paper presented at the 1992 ACM conference on Computer-supported cooperative work.
- Ostrom, E. 1992. Crafting institutions for self-governing irrigation systems, ICS press: 36: traduction et synthèse de Lavigne Ph, août 1996, Inter-réseaux s/c, Paris.
- Page, B., & Kaika, M. 2003. The EU Water Framework Directive: Part 2. Policy innovation and the shifting choreography of governance. ***European Environment***, 13: 328-343.
- Pahl-Wostl, C. 2006. The importance of social learning in restoring the multi-functionality of rivers and floodplains. ***Ecology and Society***, 11(1). (<http://www.ecologyandsociety.org/vol11/iss1/art10/>)
- Pahl-Wostl, C., Newig, J., & Ridder, D. 2007. Linking Public Participation to Adaptive Management. In P. Quevauviller (Ed.), ***Groundwater Science and Policy: An International Overview.*** Cambridge: Royal Society of Chemistry.
- Petts, J., & Brooks, C. 2006. Expert conceptualisations of the role of lay knowledge in environmental decisionmaking: challenges for deliberative democracy. ***Environment and Planning A***, 38(6): 1045–1059.
- Rauschmayer, F., Wittmer, H., & Paavola, J. 2007. ***Multi-level Governance of Natural Resources: Tools and Processes for Water and Biodiversity Governance in Europe (GoverNat).*** (<http://www.eumon.ufz.de/data/DP2007035456.pdf>)
- RBA Centre TU Delft, & WL | delft hydraulics. 1997. Onderzoek rond de Kaderrichtlijn waterbeheer; Inventarisatie/ Onderzoek rond de Kaderrichtlijn waterbeheer; De stroomgebiedsbenadering en het Nederlandse waterbeheer. Deel 1: Inventarisatie, ***R3117 / RIZA rapport 98.031.*** Delft/ Lelystad: WL | delft hydraulics/ RIZA.
- Richard-Ferroudji, A. 2008. ***L'appropriation des dispositifs de gestion locale et participative de l'eau - Composer avec une pluralité de valeurs, d'objectifs et d'attachements.*** Paris.
- Ridder, D., Mostert, E., & Wolters, H. A. (Eds.). 2005. ***Learning Together To Manage Together; Improving Participation in Water Management.*** Osnabrueck: University of Osnabrueck, USF. (www.harmonicop.info)
- Rijswick, H. F. M. W. v. (Ed.). 2008. ***EG-recht en de praktijk van het waterbeheer*** (Tweede, herziene druk ed.). Utrecht: STOWA.
- Sabatier, P. A., & Jenkins-Smith, H. C. (Eds.). 1993. ***Policy change and learning, an advocacy coalition approach.*** Boulder: Westview Press.
- Salles, D., & Zelem, M.-C. 1997. Processus de negociation des contrats de rivière dans le bassin Adour-Garonne.
- Scheer, S. 1996. ***Communication between irrigation engineers and farmers; The case of project design in North Senegal.*** Wageningen: Wageningen University.
- Schijndel, S. A. H. v. 2006. The Planning Kit, a decision making tool for the Rhine Branches. In J. v. Alphen, E. v. Beek, & M. Taal (Eds.), ***Floods, from defence to management. Proceedings 3rd International Symposium Flood Defence, Nijmegen, 25-27 May 2005:*** 763-769. London.: Taylor & Francis Group.
- Selznick, P. 1949. ***TVA and the grass roots.*** Berkeley: University of California press.
- Silva, W., Dijkman, J. P. M., & Loucks, D. P. 2004. Flood management options for The Netherlands. ***International Journal of River Basin Management***, 2(2): 101-112.
- Steyaert, P., & Ollivier, G. 2007. The European Water Framework Directive: How Ecological Assumptions Frame Technical and Social Change. ***Ecology and Society-***, 12(1).
- Syncera Water B.V., Arcadis, Instituut voor Milieuvraagstukken (VU), & Centrum voor Milieurecht (UvA). 2005. ***Verkenning argumentatielijnen fasering en doelverlaging (derogaties) Kaderrichtlijn Water.*** Arnhem: Syncera Water B.V.
- Thévenot, L. 2006. ***L'action au pluriel Sociologie des régimes d'engagement:*** La découverte.
- Thompson, M., Ellis, R., & Wildavsky, A. B. 1990. ***Cultural theory.*** Boulder, Colo.: Westview Press.
- Timmerman, J., Pahl-Wostl, C., & Moeltgen, J. 2008. ***The Adaptiveness of IWRM: Analysing European IWRM Research.*** London: IWA Publishing.

- Trottier, J. 2006. Donors, Modellers and Development Brokers: The Pork Barrel of Water Management Research. *Reconstruction. Studies in contemporary culture*, 6(3).
- Tsebelis, G. 2002. *Veto Players: How Political Institution Work* Princeton: University Press Princeton.
- Turban, E., & Aronson, J. E. 2001. *Decision support systems and intelligent systems*. Upper Saddle River, New Jersey: Prentice Hall.
- Vangen, S., & Huxham, C. 2003. Nurturing Collaborative Relations; Building Trust in Interorganizational Collaboration. *The Journal of Applied Behavioral Science*, 39(1): 5-31.
- Water Directors. 2008. *Conclusions on Exemptions and Disproportionate Costs; Water Directors' meeting under Slovenian Presidency, Brdo, 16-17 June 2008*. (http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/thematic_documents/environmental_objectives/disproportionate/_EN_1.0_&a=d)
- Weigold, M. F. 2001. Communicating Science: A Review of the Literature. *Science Communication*, 23(2): 164-193.
- Weiss, C. 1977. Research for Policy's Sake: The Enlightenment Function of Social Research. *Policy Analysis*, 3(4): 531-545.
- Wenger, E. 1998. *Communities of practice: learning, meaning, and identity*. Cambridge, U.K.; New York, N.Y.: Cambridge University Press.
- White, I., & Howe, J. 2003. Policy and practice: Planning and the European union water framework directive. *Journal of Environmental Planning and Management*, 46(4): 621-631.
- Wynne, B. 1992. Misunderstood misunderstanding: Social identities and public uptake of science. *Public Understanding of Science*, 1(3): 281-304.
- Wynne, B. 1996. Misunderstood misunderstandings: social identities and public uptake of science. In A. Irwin, & B. Wynne (Eds.), *Misunderstanding science? : the public reconstruction of science and technology*. 19-46. Cambridge ; New York: Cambridge University Press.
- Yin, R. K. 1989. *Case study research; design and methods* (2nd ed.). London: Sage.

Acknowledgements

The authors would like to thank everybody who made this research possible. The different teams have been funded in the framework of first Joint Call for Research of IWRM-net on IWRM "Towards Effective River Basin Plans" by the following organizations:

- Cemagref: Ministère de l'écologie, de l'énergie, du développement durable et de l'aménagement du territoire (MEEDDAT, Ministry of Ecology, Energy, Sustainable Development and Territorial Planning)
- Engref: Ministère de l'écologie, de l'énergie, du développement durable et de l'aménagement du territoire (MEEDDAT, Ministry of Ecology, Energy, Sustainable Development and Territorial Planning)
- Seecon: PTKA (Project Management Agency Research Centre Karlsruhe)
- Delft University of Technology: Rijkswaterstaat Waterdienst

In addition, we would like to thank all institutions and individuals with whom we have cooperated in preparing this inception report and drafting the project proposal. We cannot mention all, but we would like to mention especially the Syndicat Mixte du Bassin de Thau, NLWKN Lower Saxony (Mr. Simon Henneberg, Ms. Birgit Heddinga, Mr. Heiner Harting), and Waterboard Brabantse Delta.

Appendices

1. List of maps

Map 1: The river basin district Weser (black line) and the border of Lower Saxony, p. 19

Map 2: The Weser river basin district, coordination areas and the three area cooperations studied in the German case study, p. 20

Map 3: Location of the Thau sub-basin in the Rhône-Méditerranée river basin district and the perimeter of the SCoT process, p. 22

Map 4: The Meuse river basin district and the waterboard Brabantse Delta, p. 25

2. List of tables

Table 1: Project planning, p. 4

Table 2: Most important European water directives, p. 6

Table 3: Contents river basin management plan, p. 10

Table 4: Programme of measures, p. 11

Table 5: European guidance documents produced in the Common Implementation Strategy for the WFD, p. 14

Table 6: Overview of central themes, theme coordinators, and emphasis in the basin, p. 28

Table 7: Typologies of levels of public participation, p. 38

Table 8: Selected tools and methods for public participation, p. 39

Table 9: Examples of more formal and more informal tools supporting participation, p. 40

Table 10: Criteria and indicators used for evaluating public participation in Lower Saxony, p. 41

Table 11: Three main approaches for incorporating expertise in natural resources management, with examples, p. 45

3. List of figures

Figure 1: Work packages and workflow of the i-Five project, p. 2

4. Glossary of key terms, acronyms and abbreviations

This glossary explains all acronyms and abbreviations used in the project, as well as a number of key terms. Key terms included are those that a) are not used in ordinary language, or b) may cause confusion because they are used in a "technical" sense that differs from ordinary usage or because different authors use them in different ways. In some cases the meaning of a term cannot be understood without knowing something of the theory in which it figures, and in those cases the essence of the theory in as far as relevant for the term has been summarized in a few sentences. These summaries do not do full justice to the theory and should be seen as a first introduction and an *aide-mémoire* only.

As a general rule, the i-Five project uses terms in their broadest sense. If a more narrow sense is meant, this is indicated by adding an adjective or an explanatory phrase or by using a different term with a more narrow meaning.

Readers are advised that the English terms used do not always correspond completely with related terms in other languages and that these terms may have somewhat different connotations.

The glossary is also available on <http://www.i-five.eu>, including hyperlinks to related terms and to articles from the WFD. Updates will be made available on line only.

<i>Term</i>	<i>Definition</i>
Active involvement	◀ Term from WFD art. 14. Active involvement refers to any level of <i>public participation</i> above <i>consultation</i> . Active involvement implies that the interested parties participate actively in the implementation of the WFD by discussing issues and contributing to their solution (Drafting Group, 2002; Ridder et al., 2005).
Agence de l'eau	◀ French organization at the district level in charge of (1) co-financing investments for an integrated water management (since the water act of 1964) and (2) planning water uses for a better protection of aquatic ecosystems (since the water act of 1992). The agence de l'eau collects taxes on polluting discharge and water uptakes and supports water users' project for a better water management. Since 2006, Its five-year and annual program has been subjected to Senate and Legislature's approval. The Agence de l'eau is directed by a "comité de bassin" (basin committee) of water users, administrative officials and elected representatives, appointed by the Préfet.
Area cooperation	◀ Area cooperations are established as an advisory body for the implementation of the WFD in Lower Saxony, Germany (by decree in Dec. 2004). Members of the area cooperations are representatives of organizations like local authorities, water and agricultural associations, chambers of agriculture and industry, environmental NGOs, water utilities, authorities for water transport and forestry, etc.
Art. 5 analyses	◀ Three analyses that are required under WFD art. 5: (1) analysis of the characteristics of each river basin district, (2) review of the impact of human activity, and (3) economic analysis.

Artificial water body	<ul style="list-style-type: none"> a) "A body of surface water created by human activity" (WFD art. 2.8) b) A body of water created by human activity that is designated as an "artificial water body." Several additional requirements apply for designating a water body as "artificial" (WFD art. 4.3, see section 2.2.1)
Broad public	◀ See <i>General public</i>
Certified expert	◀ See <i>Expert</i>
Collaboration	◀ From Latin "collaborare", meaning literally working together. Collaboration can be analysed in terms of three phases. First, potential participants need to come together and commit themselves to collaborate ("convening"). Secondly, they need to agree on the goals for the collaboration and the measures to take ("direction setting"). Thirdly, this agreements needs to be implemented ("implementation"; Gray 1989). As used here, collaboration includes different forms of negotiation. Moreover, it is used as a descriptive and not as a prescriptive term. It takes a lot of time and effort and should only be embarked upon if the issue is important enough and there is a good chance of success (Huxham & Vangen, 2005).
Communication	◀ Social interaction through messages (Fiske, 1996). Communication is not limited to exchanging or disseminating information and may involve establishing or conforming social relations, identities and communities, giving orders, asking questions, influencing other people, self-expression, etc.
Competent authority	◀ National (or international: WFD art. 3.5) authority that Member States have to identify or newly establish as part of the "administrative arrangements" that they have to make for implementing the WFD on their territory (WFD art. 3.3 and WFD art. 3.5).
Consultation	◀ Level of <i>public participation</i> . It implies that the public can react to plans or ideas of government, either in writing or at a hearing, or that government actively seeks the comments and opinions of the public through for instance surveys and interviews. Art. 14 of the WFD refers to written consultation only, but WFD Preamble (14) and WFD Preamble (16) refer to consultation more generally (Drafting Group, 2002; Ridder et al., 2005).
Cooperation	◀ Used as synonym for <i>Collaboration</i>
Cost recovery	◀ See WFD art. 9. Member States have to "take account of the principle of recovery of the costs of water services, including environmental and resource costs".
Decision Support System	◀ An interactive, computer-based systems, which helps decision makers use data and models to solve unstructured problems" (Gorry & Morton, 1971, quoted in Turban & Aronson, 2001, p. 13).
DSS	◀ <i>Decision Support System</i>
Environmental objectives	◀ The environmental objectives from WFD art. 4 (see section 2.2.1 and 2.2.3)
Expert	◀ Person possessing <i>expertise</i> . This includes the "certified experts" with formal qualifications, usually within a specific scientific discipline, and "lay" or "local experts", who lack formal qualifications but still possess special skills and information. In this report "experts" is used to refer to certified experts; the non-certified experts are always referred to as "lay" or "local experts".

Expertise	<ul style="list-style-type: none"> ◀ a) Special skills and information that are considered relevant for a specific issue (“expertise in...”). b) The products of expertise, such as research reports and advices.
FRD	<ul style="list-style-type: none"> ◀ Flood risk directive (Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks)
General public	<ul style="list-style-type: none"> ◀ Individual citizens. In WFD Preamble (46) the term is used loosely and seems to refer to the individual citizens and organized stakeholders.
Good chemical status	<ul style="list-style-type: none"> ◀ See section 2.2.1.
Good ecological potential	<ul style="list-style-type: none"> ◀ See section 2.2.1.
Good ecological status	<ul style="list-style-type: none"> ◀ See section 2.2.1.
Good quantitative status	<ul style="list-style-type: none"> ◀ See section 2.2.1.
Good water status	<ul style="list-style-type: none"> ◀ See section 2.2.1.
Groundwater body	<ul style="list-style-type: none"> ◀ "A distinct volume of groundwater within an aquifer or aquifers" (WFD art. 2.12)
Harmonization	<ul style="list-style-type: none"> ◀ Operation securing consistency within a group
Heavily modified water body	<ul style="list-style-type: none"> ◀ a) A surface water body that “as a result of physical alterations by human activity is substantially changed in character” (WFD art. 2.9) b) Such a body of water that has been designated as a “heavily modified water body”. Several additional requirements apply for designating a water body as “heavily modified” (WFD art. 4.3, see section 2.2.1)
I-3	<ul style="list-style-type: none"> ◀ Innovative instruments and institutions for implementing the WFD. I-3s may a) be designed purposely to help the implementation, b) emerge in the implementation process without being purposely designed, or c) be “transplanted” from elsewhere. The i-3s studies in the i-Five project fall in category a) and b), but their “transplantability” will be assessed.
IC-tool	<ul style="list-style-type: none"> ◀ <i>Information and communication tool</i>
Implementation	<ul style="list-style-type: none"> ◀ (European directives) Transposition in national law, followed by the application in practice.
Information and communication tool	<ul style="list-style-type: none"> ◀ Material artefact, device or software to support communication and/or collaboration (Craps & Maurel, 2003; Ridder et al., 2005).
Infringement procedure	<ul style="list-style-type: none"> ◀ Procedure that the European Commission can start if it thinks that a Member States has not implemented a directive correctly. Ultimately, the European Court of Justice may impose hefty fines and penalties. (art. 226-228 EC Treaty, see section 2.3.1)
Innovation (innovative)	<ul style="list-style-type: none"> ◀ Practical application of new and original solutions. Innovation is therefore not the same as invention. Moreover, the innovative character of solutions is relative: what is new and original in one country or one basin, may be standard practice in another. The term innovation has positive connotations, and indeed learning is not possible without innovation. However, innovation implies specific goals to be achieved and is therefore not neutral, and innovation is not necessarily effective for reaching these goals.

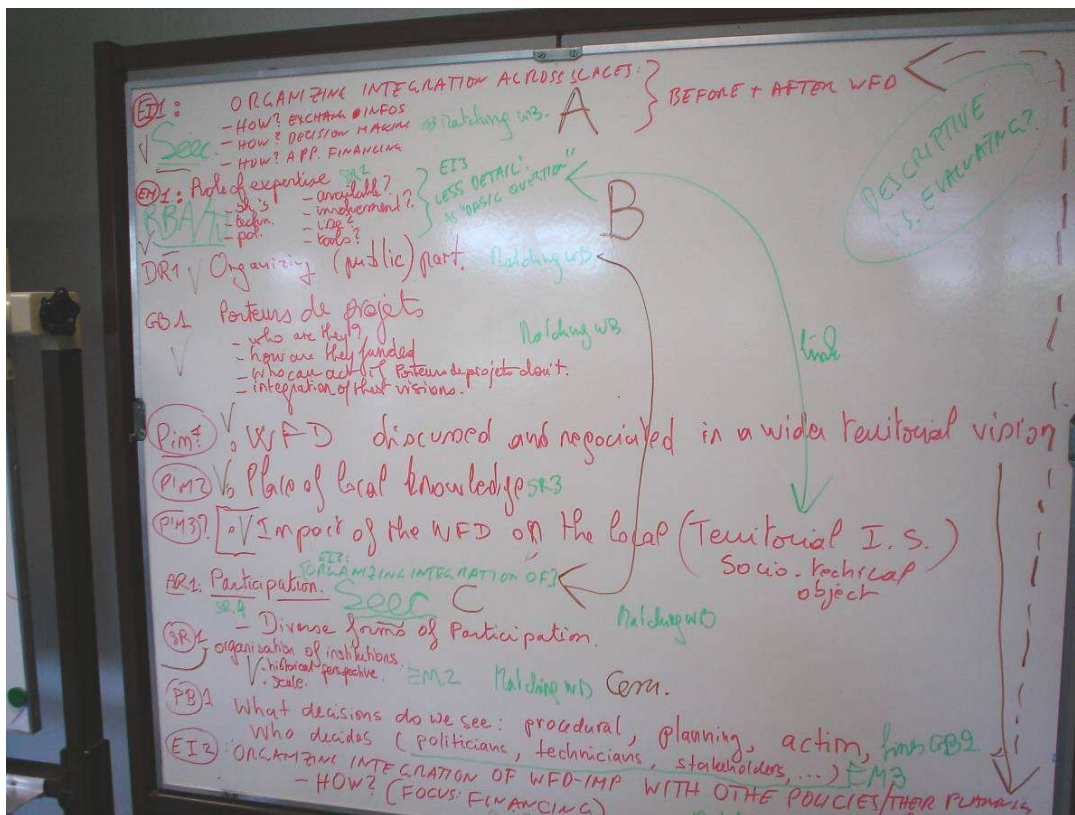
Institution	◀ All “humanly devised constraints that structure human interaction. They are made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behaviour, conventions and self-imposed codes of conduct), and their enforcement characteristics” (North, 1990). Other authors use the term to refer to formal institutions or to organizations only.
Instrument	◀ Artefact crafted by humans in order to achieve specific goals.
Integration	◀ 1. To make into a whole by bringing all parts together; unify. This operation may require mutual adjustment so as to overcome contradictions between parts and to reach harmonization. 2a. To join with something else; unite. 2b. To make part of a larger unit: integrate the new procedures into the work routine (www.answers.com).
Interested party	◀ Term used in WFD, art. 14. Considered to be synonymous with <i>stakeholder</i> , first meaning.
Lay expert	◀ See <i>Expert</i>
Legal uncertainty	◀ <i>Uncertainty</i> resulting from vague or ambiguous legal provisions and from difficulties in predicting how the courts will interpret these provisions and rule in specific cases (and, in the context of European Law, whether or not the European Commission will start an infringement procedure).
Local expert	◀ See <i>Expert</i>
Measures (WFD)	◀ “Basic measures” that are required under existing directives (WFD art. 11.3) and “supplementary measures” that may be needed for achieving the environmental objectives of the Directive (WFD art. 11.3). Together, they make up the “programme of measures” (WFD art. 11.2). According to WFD Annex III(b), Member States have to select the most cost-effective combination of measures, based on the economic analysis of water uses, but the basic measures have to be included in the programme of measures in any case.
MSFD	◀ Marine strategy framework directive (2008/56/EC)
NGO	◀ Non-governmental organization
Political uncertainty	◀ <i>Uncertainty</i> concerning the future behaviour and decisions of political decision-makers, such as elected representatives and ministers, that may result from the difficulty of involving and gaining commitment from them early in the policy process and from political changes that may take place later on.
PP	◀ <i>Public participation</i>
Programme of measures	◀ See <i>Measures</i>
Public	◀ “One or more natural or legal persons and (...) their associations, organisations or groups” (Aarhus Convention, SEA Directive (2001/42/EC)). Cf. <i>Stakeholder</i> . Government bodies are usually not considered to be part of the “public”.
Public involvement	◀ See <i>Public participation</i>

Public participation	<ul style="list-style-type: none"> ◀ Direct participation in decision-making by non-governmental stakeholders (the general public, individual companies and organized interest groups). It requires but goes beyond providing access to and actively disseminating information, and may include consultation and different forms of active involvement of the public (Ridder et al., 2005). Other authors reserve the term for participation by the general public only and contrast it with “stakeholder participation”: participation by organized stakeholders. Still other authors use “(public) participation” as one form of “public involvement”, together with “consultation”. In this case “(public) participation” refers to any level of public participation (in our sense) above consultation.
RBMP	<ul style="list-style-type: none"> ◀ <i>River basin management plan</i>
Reference conditions	<ul style="list-style-type: none"> ◀ The natural or near-natural conditions of a specific type of water body. They form the basis for determining the “good ecological status” (WFD Annex V, see section 2.2.2)
Reference site	<ul style="list-style-type: none"> ◀ Site with natural or near-natural conditions used for determining the reference conditions for a specific type of water body.
River basin	<ul style="list-style-type: none"> ◀ “The area of land from which all surface run-off flows (...) into the sea at a single river mouth, estuary or delta” (WFD art. 2.13). In practice, this term is often used to refer to the main management unit for implementing the WFD: the <i>river basin district</i>.
River basin district	<ul style="list-style-type: none"> ◀ Main management unit for implementing the WFD, consisting of one or more adjacent <i>river basins</i>, including coastal waters and the groundwaters assigned to the district (WFD art. 2.13 and WFD art. 3.1).
River basin management plan	<ul style="list-style-type: none"> ◀ Plans required by WFD art. 13, following the procedure of WFD art. 14.1.
SAGE	<ul style="list-style-type: none"> ◀ Schéma d’Aménagement et de Gestion des Eaux. French instrument created by the French water act of 1992. This binding planning document determines objectives and rules required to reach a integrated water management at the scale of the sub-basin. Should be in accordance with the <i>SDAGE</i>. The SAGE is developed by a local commission of water (Commission locale de l’eau) which members are appointed by the Préfet among administrative officials, elected representatives and NGO.
SDAGE	<ul style="list-style-type: none"> ◀ Schéma Directeur d’Aménagement et de Gestion des Eaux. French instrument created by the French water act of 1992. This binding planning document determines objectives and principles required to reach a integrated water management at the scale of the district. The SDAGE is co-developed by the Agence de l’eau and the state office in charge of the environment at the district level, under the responsibility of the Préfet coordonnateur de bassin. It is subjected to public inquiry and Préfet’s approval.
Social learning	<ul style="list-style-type: none"> ◀ A process of collective and communicative learning, leading to new knowledge, and skills, the development of trust and new or improved relations. This in turn forms the basis for a common understanding of the issue at hand and for collective action (cf. Muro, 2008). Social learning may be summarized in one phrase as “learning together to manage together” (Ridder et al., 2005).

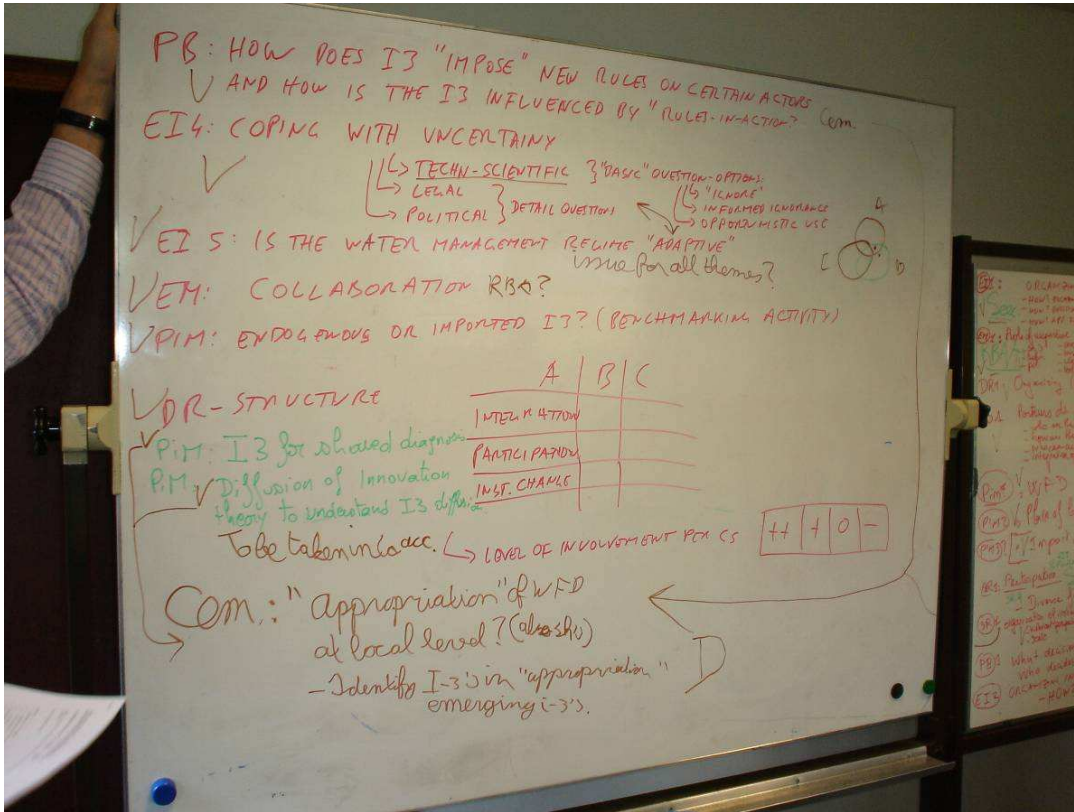
Stakeholder	<ul style="list-style-type: none"> ◀ Any person, group or organization with an interest or “stake” in an issue, either because they may be affected by the issue or because they may have some influence on its outcome (cf. Freeman, 1984). Stakeholder in this sense includes authorities, experts, the “general public” and organized interest groups. Other authors reserve the term for organized interest groups only.
Stakeholder participation	<ul style="list-style-type: none"> ◀ See <i>Public participation</i>.
Surface water body	<ul style="list-style-type: none"> ◀ "A discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, a transitional water or a stretch of coastal water" (WFD art. 2.10, WFD Annex II; see section 2.2.3)
SWOT analysis	<ul style="list-style-type: none"> ◀ Analysis of "Strengths, Weaknesses, Opportunities and Threats" (Bradford, Duncan & Tarcy 2000)
Technical expert	<ul style="list-style-type: none"> ◀ A <i>Certified expert</i> with formal qualifications in a technical or natural science discipline.
Technical-scientific uncertainty	<ul style="list-style-type: none"> ◀ <i>Uncertainty</i> concerning technical and natural system, in the context of the WFD especially concerning the effects of measures on the water status.
TOR	<ul style="list-style-type: none"> ◀ Terms of reference
Trust	<ul style="list-style-type: none"> ◀ 1. (noun) the firm belief that an actor will act (or a technical system will perform) dependably, securely and reliably within a specific context. ◀ 2. (verb) acting on the basis of this belief.
Uncertainty	<ul style="list-style-type: none"> ◀ Uncertainty refers to the situation in which there is not a unique and complete understanding of an object or a system because of the inherent variability or unpredictability of the object or system, because of limited or imperfect information, or because the object or system and the available information on it can be seen and interpreted in different perspectives (Brugnach et al., 2008). In this report, we distinguish between technical-scientific uncertainty, legal uncertainty and political uncertainty.
Water body	<ul style="list-style-type: none"> ◀ Smallest management unit for implementing the WFD. See <i>Surface water body</i> and <i>Groundwater Body</i> and section 2.2.3.
WFD	<ul style="list-style-type: none"> ◀ European Water Framework Directive (2000/60/EC)
Wiki	<ul style="list-style-type: none"> ◀ A page or collection of Web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified markup language. (http://en.wikipedia.org/wiki/Wiki)

5. Long-list of themes developed at Montpellier workshop, unprocessed version, 23-24 October 2008

See for the background section 4.1 of this report.



First whiteboard (see next page for second whiteboard)



Second whiteboard

6. How the current inception report implements the project proposal

Call for research

The i-Five project was submitted for the first Joint Call for Research of IWRM-net on IWRM "Towards Effective River Basin Plans". It addressed in particular the theme "Water Governance" and the outputs "investigate the right territory for water management" and "interconnecting the different administrative scales"; "techniques for efficient setting of objectives"; "techniques to integrate expert judgement, multi-disciplinary scientific knowledge and stakeholders' involvement"; and "decision-support tools" (Call for research proposals; Pilot Common Call, p. 4).

Objectives and research questions

According to the proposal (p. 12-13), "the i-Five project aims to support the implementation of the WFD by promoting the transboundary exchange of experiences, by broadening the range of methods and tools available to water managers, and by helping these water managers develop the best approach for their circumstances. The scientific objectives of the project are:

- I. To identify and evaluate i-3's for promoting cooperation between (a) different scales, (b) different sectors, (c) governmental and non-governmental stakeholders, and (d) technical experts and lay persons.
- II. To study different institutional settings, their dynamics, and how they affect the performance of different i-3's.
- III. To study the potential for 'transplantation' of specific instruments and institutions in different institutional settings.
- (...)
- IV. To bring together and relate literature and approaches from different scientific disciplines, to implement an interdisciplinary approach and report about the experiences."

To meet these objectives, "the project will analyse ongoing WFD implementation processes in which particular i-3 are put into practice. The following research questions will be addressed:

Concerning objective I:

3. What are the characteristics of the i-3 under study (basic concept, underlying assumptions, operational design parameters, implementation procedure, ...)?
4. How is the implementation process of the WFD in general organized? Particular attention will be paid to:
 - (a) the interactions between different scales (basin, national, sub-basin, local, cf. Karstens et al., 2007) and sectors (agriculture, urban development, ...)
 - (b) the involvement of stakeholders in the process (WFD art. 14)
 - (c) the involvement of technical experts and the role of their expertise
 - (d) the adaptive management capacity of the selected institutional settings.
5. How was the i-3 developed and applied? The same points will get attention.
6. How did the i-3 function and what have been its effects to date?

Concerning objective II:

7. What are the characteristics of the national and local institutional settings (organizational structure, allocation of tasks and competencies, financing structures, decision-making procedures, 'adaptiveness'/ robustness and flexibility)?

8. Under what circumstances has the i-3 been applied (geographic, demographic, economic, socio-political, etc.)?
9. Which institutional characteristics and circumstances have been important for the i-3's functioning?

Concerning objective III:

10. In which institutional settings and under what circumstances can the i-3 work?
11. To what extent can the i-3 be adapted to / made to fit in different settings and circumstances?

Concerning objective IV:

12. What new insights and experiences can we add to the literature on polycentric governance, public participation and collaboration, science and technology studies, participatory analysis, comparative public administration and the WFD?"

The central themes specified in chapter 4 of this inception report follow directly from the first two objectives: "Institutional structure for implementing the WFD" addresses objective II and the other themes address objective I. The central themes will guide the case study research. In the case study research, the research questions that correspond with objective I and II – research questions 1 to 7 – will be addressed. The case comparison is geared towards answering research questions 8 and 9 and thereby reaching objective III. Objective IV and research question 10 constitute a continuous thread running through both the case studies and the case comparison. Our approach on this point has been described in section 4.1.

Expected results

According to the proposal (p. 18, WP3 description), "the tangible results of the i-Five project will comprise detailed information on i-3's for implementing the WFD with their requirements, and a 'Quick Scan' method that will help water management professionals to select, and modify where necessary, i-3's for their needs." The quick-scan "will afford a systematic review of on the one hand the i-3 design parameters important for implementation, and on the other hand of the most important aspects of the water management system of the area in question. The more matching features and requirements are found on both sides, the higher the potential for 'transplantation'. The 'Quick-Scan' method will provide information that is valuable especially to policy-makers and practitioners who consider adaptation and adoption of I 3s under different circumstances. A 'Quick Scan' of an i-3 will, for example, inform practitioners whether the legal conditions for this I 3 are met"

The quick-scan method is discussed in this report in section 6.1. More details can be given only after the case study research is well under way. Further development of ideas for the quick-scan method is scheduled for September 2009 (see section 1.2).

Dissemination and training

According to the proposal, p. 19, training and dissemination activities will "comprises the following major activities:

- Continuous dissemination – from the beginning of the project – of project information and achievements by means of the i Five project website and use of project newsletters, media and other means for 'low threshold' communication (...).

- Dissemination of project results in scientific and policy-relevant (peer-reviewed) journals (...).
- Outreaching to other countries in addition to the three partner countries by using European platforms for exchange in water management (e.g. EUWI newsletter, WISE newsletter) and using existing links – as well as establishing new ones – to European projects with larger scope and impacts (...). Presentations given during events organized by these projects will gain European and other international attention.
- Development of a training package based on the i-3's and the 'Quick Scan' method.
- Conducting training workshops.”

The inception report covers all these points and gives more details. To prevent unecessary repetition, the reader is referred to section 5.2, 6.2, 6.3 and 6.4.

Planning

The planning presented in section 1.2 of this report is a simplified version of the planning presented in Figure 2 of the proposal (p. 21), yet it gives more specifics on what will be produced when. The deliverables that will be produced are the same as those mentioned in the proposal. However, the final case study reports will not be ready until the end of the project.