

Institut für Umweltsystemforschung

How can social learning be supported during
the implementation of the European Water
Framework Directive?

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Summary

For a successful implementation of the European Water Framework Directive (2000/60/EC; WFD), learning has been identified by the European Commission as a prerequisite for both authorities and other stakeholders. Learning is essentially a social activity which develops, once individuals want to learn. This so called ‘social learning’ occurs in the context of a shared domain of knowledge, which different individuals want to improve by engaging with one another. Active social learning including direct interaction between different individuals is particularly vital for any changes which involve more than an improvement of current practice and which are more fundamental, such as changes towards sustainable management as required by the WFD. Thus, concepts of social learning have been developed to support learning in river basin management processes.

This thesis provides an analysis how learning can be supported during the implementation of the WFD. The aim is to improve the understanding of social learning in river basin management by analyzing both participatory processes and collaborative management processes. Based on this, recommendations have been developed to improve social learning in practical river basin management.

Participatory processes are initiated by the competent authorities to involve non-governmental stakeholders or (subordinate) authorities in the decision making process. Collaborative management processes comprise cooperation between authorities of equal/similar competence and cooperation between research projects and water authorities with the aim to integrate innovative changes into river basin management.

Four research questions address the different characteristics of river basin management:

- 1) Spatial misfits between participatory and decision making institutions as a result of the introduction of the river basin as management unit are addressed in question 1: *How do spatial misfits between participatory and decision-making institutions impede social learning?*
- 2) The formalized character of collaborative processes in terms of their pre-defined outcomes including aspects of liability is studied in question 2: *Does the formalized context of river basin management in Europe allow for social learning?*

3) Question 3 focuses on the role of representatives as the learning individuals and stakeholders of their organization: *What are conducive environments for social learning in river basin management?*

4) The task of integrating external knowledge, e.g. from research projects, into ongoing management processes is addressed in research question 4: *How does research contribute to social learning in river basin management? What challenges arise in applied research?*

The concept of social learning (SL), especially as developed in the European project HarmoniCOP (www.harmonicop.uos.de; contract no.: EESD-ENV-2000-02-57), formed the theoretical backbone of the analysis as it provides a context and interaction based approach to ongoing policy-processes in river basin management (RBM). This allowed to consider the challenge of SL to be supported by process design or the institutional settings. At the same time, it allowed to understand to which extent the efficiency of this support depends on the question whether or not the participants in the process recognize the options for improving their knowledge base and make use of them. Therefore, the theoretical approach in this thesis helped to analyse the role of process design and of the representatives in different implementation processes of the WFD.

The analyses have been mainly based on a German case study on the international Elbe river basin district, which was embedded in the European project HarmoniCOP. Here, the specific challenges (spatial misfit; the need for collaboration in formalized contexts) have been addressed exploring participatory and other collaboration processes as well as the actors' approach to SL. In order to understand collaboration processes between research and water management, the role of research in delivering tools to support the new challenges of the WFD has been studied during activities of the European Concerted Action Harmoni-CA (www.harmoni-ca.info; contract no.: EVK1-CT-2002-20003).

This thesis was developed in a cumulative manner. It includes the present framing document and the following four peer reviewed papers:

- Paper 1: Borowski, I., J.-P. Le Bourhis, C. Pahl-Wostl and B. Barraque (2008). " Spatial Misfit in Participatory River Basin Management: Effects on Social Learning, a Comparative Analysis of German and French Case Studies." *Ecology and Society* 13 (1): 7. [online] URL: <http://www.ecologyandsociety.org/vol13/iss1/art7/>

- Paper 2: Borowski, I. and C. Pahl-Wostl (2008). "Where can social learning be improved in international river basin management in Europe?" *European Environment* Volume 18, Issue 4, Pages 216-227, July/August 2008
- Paper 3: Borowski, I. (accepted). "Social learning beyond multi-stakeholder platforms: a case study on the Elbe River basin." *Society & Natural Resources*.
- Paper 4: Borowski, I. and M. Hare (2007). "Exploring the gap between water managers and researchers: Difficulties of model-based tools to support practical water management." *Water Resources Management* 21(7); p.1049-1074.

The results of the analyses show that potential support of social learning is not only to be found in participatory or other multi-stakeholder processes. However, the actors first engage themselves in social learning in their preferred environments- and these are not always the multi-party processes. On the positive side, multi-party processes provide the (often first) opportunity for different parties to engage with one another - and are thus a prerequisite for any social learning to take place between different parties. Nevertheless, these processes also contain many potential barriers to social learning at the initial level of process design. For example, in the multi-scale setting of river basin management, it is difficult to fully exclude spatial misfits. The link between participatory and decision making institutions has to be carefully managed to ensure that all the actors identify the benefits of their participation. Furthermore, participatory or other collaborative processes are initiated to bring different interests together; they are expected to have an impact on the final decision made by the responsible authority, including decisions on constraint resources. This creates a focus on the different and competing interests of the various stakeholders, rather than on a shared interest or domain as required for social learning.

Process design is not the only essential feature/element of social learning. What is actually learnt depends first of all on the engaging individuals. The analyses in this thesis show that individuals engage in social learning first of all with people they trust and with whom they expect to contribute to a domain of knowledge. Such individuals usually belong to the same stakeholder group. Representatives develop their individual network of peers and consider this an essential part of their expertise. Engaging with more competitive stakeholders generally takes place in the context of project cooperation, mostly in bilateral constellations. The results also show that actors engage in multi-stakeholder interaction in more

formal ways. Thus, participants of multi-stakeholder platforms do not expect them to provide an opportunity for open exploration and the development of options for collaboration. Still, if representatives are experienced in cooperation, they show more confidence in finding joint solutions and are more willing to take on joint responsibility. This is true for governmental authorities and other stakeholders as well as for researchers or scientists who aim to develop applicable research. For the latter, the nuances between the different interests may be even more difficult to identify, especially when they are obscured by the demand of research funding bodies for applied research.

These results have led to the following recommendations for the improvement of social learning in river basin management according to the WFD:

- ***Spatial misfits need to be carefully addressed to make participatory processes successful.*** The design of participatory processes as encouraged by the WFD along hydrological management units in a context of differently organized bodies of public administration increases participants' confusion. A strong and transparent link with participatory and decision making institutions is crucial and must be actively managed to make participatory processes successful.
- ***Potential constraints to the openness of the process or its outcomes including aspects of liability need to be taken into account to avoid withdrawal of disappointed participants.*** Public participation and cooperation are not easily achieved in the same processes as social learning. Incentives for public participation are closely linked to (competitive) stakeholders' interests. Competition may act as a constraint to social learning as it fosters strategic behaviour; reduces the openness of the process and impacts on the shared interest of contributing to the shared knowledge domain.
- ***To support social learning in strongly formalized contexts such as international river basin management, independent processes should be established which can decrease the perceived competition between the different parties.*** However, setting up social learning processes such as the European Common Implementation Strategy for the WFD, requires many resources. Research projects focusing on the challenges of the WFD (such as integration of ground- and surface water or economical assessments) may

provide alternative platforms here in the form of e.g. advisory boards, including not only water managers but also other stakeholders. These platforms need to be carefully designed to provide as many opportunities as possible for stakeholders to mutually engage. The theme of such platforms also needs to be carefully monitored so as to sustain the interest of the various practitioners. For example, stakeholders and water managers should be invited because of their expertise and their field of activity. Research projects might also aim to adjust their agenda to the needs of stakeholders and water managers, e.g. by studying specific areas or issues of (political) relevance.

- ***In order to profit from the natural process of social learning, training should be encouraged to foster social learning.*** Faced with the challenges of the WFD, representatives feel a strong pressure to learn. Since multi-stakeholder platforms are not perceived by representatives as platforms for open discussion, they engage in other social environments in SL. Still, if they gain more experience in joint learning processes, they are more open to also engage in multi-stakeholder environments. Thus, training should be provided to representatives individually or it should be set up in programs for the various stakeholder groups. In this way, the unfamiliar context of multi-party interaction would be avoided. Actors trained in social learning will also be more willing to engage with other stakeholder groups, as results of the analyses show: the representatives holding coordinative positions were more confident that a shared interest could be identified.
- ***The encouragement of social learning among researchers and water managers is necessary to improve their competence and promote the application of research results in river basin management.*** The European Member States have identified a substantial need for research to support the implementation of the WFD e.g. by providing applicable methods and tools. In general, researchers are strongly motivated (not only by the requirements of their funding agencies) to improve the application of research results. Involving water managers may facilitate the adaptation of research questions towards management relevant issues. It should be noted that there might be a thin line towards consultancy if research is then too much driven by demands. For a more open process, project independent exchange would be beneficial.

Deutsche Zusammenfassung

Eine erfolgreiche Umsetzung der Europäischen Wasserrahmenrichtlinie 2000/60/EG; WRRL) benötigt nach Meinung der Europäischen Kommission Lernprozesse, sowohl für die umsetzenden Behörden als auch für andere Interessengruppen. Im Kern ist Lernen eine Aktivität, die im sozialen Kontext stattfindet, wenn Individuen lernen wollen. Dieses sog. Soziale Lernen findet in Bezug auf einen gemeinsamen Wissenspool statt, den unterschiedliche Individuen durch gegenseitigen Austausch verbessern wollen. Gerade aktives Soziales Lernen, das im gegenseitigen, aktiven Austausch zwischen den Lernenden stattfindet, ist unabdingbar für jegliche Art von Veränderungen. Das gilt insbesondere für solche Veränderungen, die nicht nur eine Anpassung von Routinen erfordern, sondern auch Entwicklungen z.B. in Richtung Nachhaltiges Wirtschaften beinhalten wie von der WRRL vorgegeben. Daher wurden Konzepte des Sozialen Lernens entwickelt, um Lernprozesse in der Gewässerbewirtschaftung zu unterstützen.

Diese Arbeit hat untersucht, wie Soziales Lernen bei der Umsetzung der WRRL unterstützt werden kann. Sie zielt darauf ab, das Verständnis für Soziale Lernprozesse in der Flussgebietsbewirtschaftung zu verbessern über die Analyse von partizipativen und anderen kooperativen Prozessen. Auf dieser Grundlage sind Empfehlungen für die Verbesserung von Sozialem Lernen in der praktischen Flussgebietsbewirtschaftung entwickelt worden.

Beteiligungsprozesse sind solche, die von der zuständigen Behörde initiiert werden, um Interessenvertreter von Nicht-Regierungsorganisationen oder anderen, untergeordneten, Behörden einzubeziehen. Andere kooperative Prozesse umfassen sowohl die Zusammenarbeit zwischen gleichrangigen Wasserbehörden, z.B. bei der internationalen Kooperation, als auch Kooperationen zwischen Forschungseinrichtungen und Wasserbehörden, um innovative Ansätze besser in die Flussgebietsbewirtschaftung zu integrieren.

In den vier Forschungsfragen werden unterschiedliche Merkmale der Flussgebietsbewirtschaftung untersucht:

1) Die unterschiedlichen räumlichen Bezüge von Beteiligungs- und Entscheidungsinstitutionen als Ergebnis der Einführung der

einzugsgebietsbasierten Bewirtschaftung durch die Wasserrahmenrichtlinie sind Gegenstand der ersten Forschungsfrage: *Wie schränken unterschiedliche räumliche Bezüge zwischen Beteiligungs- und Entscheidungsinstitutionen Soziales Lernen ein?*

2) Der formale Charakter von Kooperationsprozessen im Hinblick auf ihre vordefinierten Ergebnisse und ihre Verbindlichkeit werden in der zweiten Forschungsfrage untersucht: *Ist Soziales Lernen möglich im formalisierten Kontext der Flussgebietsbewirtschaftung in Europa?*

3) Die Rolle von Repräsentanten als Ausgangspunkt von Lernprozessen im Flussgebietsmanagement ist der Kern der 3. Forschungsfrage: *Was sind fördernde Umgebungen für Soziales Lernen in der Flussgebietsbewirtschaftung?*

4) Die Herausforderungen, externes Wissen, z.B. aus Forschungsprojekten, in laufende Managementprozesse einzubinden, werden in Forschungsfrage 4 angesprochen: *Wie kann Forschung zu Sozialem Lernen in der Flussgebietsbewirtschaftung beitragen? Welche Herausforderungen gibt es für angewandte Forschung?*

Das Konzept zum Sozialen Lernen (SL), gerade wie es in dem europäischen Projekt HarmoniCOP entwickelt wurde (www.harmonicop.uos.de; contract no.: EESD-ENV-2000-02-57), stellt das theoretische Rückgrat der Analyse dar, indem es einen Kontext- und Interaktions- basierten Ansatz für laufende Politik-Prozesse in der Flussgebietsbewirtschaftung liefert. Das ermöglichte die Herausforderungen an SL zu berücksichtigen, um die Prozessgestaltung und die institutionelle Ordnung zu unterstützen. Gleichzeitig erlaubte es zu verstehen, in welchem Ausmass die Effizienz dieser Unterstützung davon abhängt, ob oder ob nicht die Teilnehmenden in dem Prozess die Möglichkeiten erkennen und nutzen, ihre Wissensgrundlage zu verbessern. Auf diese Weise half der theoretische Ansatz in dieser Arbeit die Rolle von Prozessgestaltung und die Rolle der Repräsentanten in unterschiedlichen Umsetzungsprozessen der WRRL zu analysieren.

Die Analysen basieren hauptsächlich auf einer deutschen Fallstudie im internationalen Elbeeinzugsgebiet, die in das europäische Projekt HarmoniCOP eingebettet war. Hier wurden besondere Herausforderungen (unterschiedliche, räumliche Bezüge; der Bedarf für Zusammenarbeit in formalisierten Kontexten) angesprochen, indem Beteiligungs- und andere kollaborative Prozesse untersucht

wurden, sowie auch der Ansatz der Repräsentanten zu SL. Aktivitäten der europäischen *Concerted Action* Harmoni-CA (www.harmoni-ca.info; contract no.: EVK1-CT-2002-20003) wurden untersucht im Hinblick auf die Rolle der Forschung bei der Bereitstellung von Werkzeugen, die die neuen Herausforderungen der WRRL unterstützen, um die Zusammenarbeit zwischen Forschung und wasserwirtschaftlicher Praxis zu verstehen.

Die Arbeit wurde kumulativ erarbeitet. Sie umfasst das vorliegende Rahmendokument und die folgenden vier wissenschaftlichen Veröffentlichungen (Paper):

- Paper 1: Borowski, I., J.-P. Le Bourhis, C. Pahl-Wostl and B. Barraque (2008). "Spatial Misfit in Participatory River Basin Management: Effects on Social Learning, a Comparative Analysis of German and French Case Studies." *Ecology and Society* 13 (1): 7. [online] URL: <http://www.ecologyandsociety.org/vol13/iss1/art7/>
- Paper 2: Borowski, I. and C. Pahl-Wostl (2008). "Where can social learning be improved in international river basin management in Europe?" *European Environment* Volume 18, Issue 4, Pages 216-227, July/August 2008
- Paper 3: Borowski, I. (accepted). "Social learning beyond multi-stakeholder platforms: a case study on the Elbe River basin." *Society & Natural Resources*.
- Paper 4: Borowski, I. and M. Hare (2007). "Exploring the gap between water managers and researchers: Difficulties of model-based tools to support practical water management." *Water Resources Management* 21(7); p.1049-1074.

Die Ergebnisse der Analysen zeigen, dass ein Potential zur Unterstützung von Sozialem Lernen nicht nur in Mehrparteien- und Beteiligungsprozessen identifiziert werden kann. Allerdings engagieren sich Akteure in Sozialem Lernen in von ihnen bevorzugten Umgebungen- und das sind nicht immer Mehrparteienprozesse.

Mehrparteien- und Beteiligungsprozesse bieten eine Möglichkeit für die verschiedenen Interessengruppen, gleichzeitig zu interagieren - und sind somit eine Grundvoraussetzung für Soziales Lernen zwischen diesen Parteien. Gleichzeitig beinhalten sie schon auf der Ebene der Prozessgestaltung zahlreiche mögliche Barrieren für Soziales Lernen. Es ist z.B. im mehrskaligen Kontext der Flussgebietsbewirtschaftung schwierig, unterschiedliche räumliche Bezüge auszuschließen. Die Verbindung zwischen Beteiligungs- und

Entscheidungsprozessen muss sorgfältig gestaltet werden, damit die Beteiligten die Vorteile des Beteiligungsprozess erkennen. Darüber hinaus werden Beteiligungs- oder andere kooperative Prozesse initiiert, um unterschiedlichen Interessen zusammenzubringen; es wird erwartet, dass sie die Entscheidungen der zuständigen Behörden, auch in Bezug auf die Verteilung knapper Ressourcen beeinflussen. Das unterstützt eine Fokussierung auf unterschiedliche und konkurrierende Interessen, aber nicht auf ein gemeinsames Interesse oder einen gemeinsamen Wissensgebiet, wie es für Soziales Lernen notwendig ist.

Soziales Lernen ist nicht nur von der Prozessgestaltung bestimmt. Was tatsächlich gelernt wird, hängt in erster Linie von den involvierten Individuen ab. Die Analysen dieser Arbeit zeigen, dass Repräsentanten eine Beziehung Sozialen Lernens zunächst mit Personen ihres Vertrauens eingehen, von denen sie auch einen Betrag zu ihrem Wissensgebiet erwarten. Meistens gehören diese Vertrauenspersonen der eigenen Interessengruppe an. Repräsentanten entwickeln ihr eigenes Netzwerk von Gleichgesinnten und betrachten dies als zentrales Element ihrer Expertise. Austausch mit konkurrierenden Interessenvertretern findet z.B. im Kontext von Projektkooperationen statt, in der Regel auf bilateraler Ebene. Mehr-Parteien Interaktionen werden im formalen Rahmen gehalten. Von ihnen wird nicht erwartet, dass sie Gelegenheit bieten, offen Kooperationsmöglichkeiten zu erkunden oder weiterzuentwickeln. Allerdings zeigen Repräsentanten, die Erfahrung in Kooperationen haben, auch Zuversicht im Hinblick auf die potentielle gemeinsame Entwicklung von Lösungen. Gleichzeitig sind sie auch eher bereit, eine gemeinsame Verantwortung zu erkennen. Das gilt sowohl für Repräsentanten aus Regierungsorganisationen und anderen Interessengruppen als auch aus wissenschaftlichen Einrichtungen, die versuchen, anwendbare Forschungsergebnisse zu erzielen. Gerade für die letztgenannten können die Unterschiede zwischen den unterschiedlichen Interessen von Forschung und Anwendung schwieriger zu identifizieren sein, gerade wenn Förderungsstrukturen für Forschungsprojekte die gewünschte Anwendbarkeit von Forschung in den Vordergrund stellen.

Diese Ergebnisse haben zu folgenden Empfehlungen für die Verbesserung von Sozialem Lernen in der Flussgebietsbewirtschaftung nach der WRRL geführt:

- ***Beteiligungsprozesse müssen mit unterschiedlichen räumlichen Bezügen zwischen partizipativen und Entscheidungsprozessen sorgfältig umgehen.*** Wenn Beteiligungsprozesse entlang hydrologischen Einheiten etabliert werden, und damit anders als sonst bei öffentlichen Verwaltungsstrukturen üblich, kann das die Verwirrung der Beteiligten in Bezug auf Sinn und Kompetenz des Prozesses erhöhen. Eine starke und transparente Verbindung mit Entscheidungsinstitutionen ist wesentlich und muss bewusst gestaltet werden für einen erfolgreichen Beteiligungsprozess.
- ***Die Einschränkung der Offenheit von Prozessen oder der Verbindlichkeit der Ergebnisse muss berücksichtigt werden um Enttäuschungen und Entzug der Teilnehmenden zu vermeiden.*** Beteiligung oder Kooperation kann nicht ohne weiteres in den gleichen Prozessen wie soziales Lernen stattfinden. Anreize für Öffentlichkeitsbeteiligung sind eng verbunden mit den (konkurrierenden) Interessen. Konkurrenz kann als Begrenzung für Soziales Lernen fungieren, weil es strategisches Verhalten verstärkt, die Offenheit für den Prozess reduziert und auf das geteilte Interesse wirkt, zum gemeinsamen Wissensbereich beizutragen.
- ***Um soziales Lernen in stark formalisierten Kontexten wie z.B. internationaler Flussgebietsbewirtschaftung zu stärken, sollten unabhängige Prozesse etabliert werden, die die wahrgenommene Konkurrenz zwischen den unterschiedlichen Interessensgruppen verringern.*** Allerdings benötigt die Einführung solcher Prozesse wie z.B. der *Gemeinsame Umsetzungsprozess* für die WRRL, ein hohes Maß an Ressourcen. Forschungsprojekte, die sich auf die Herausforderung der WRRL konzentrieren (wie z.B. die Integration von Grund- und Oberflächenwasser oder ökonomische Einschätzungen) können hier alternative Plattformen bieten, z.B. in Form von Beiräten, die nicht nur Wasserbehörden sondern auch andere Interessengruppen einbeziehen. Diese Plattformen müssen sorgfältig geplant werden, um den Beteiligten möglichst unterschiedliche Gelegenheiten des Austauschs zu geben. Auch das Thema solcher Plattformen muss sorgfältig überwacht werden, um das Interesse der unterschiedlichen Praktiker zu erhalten. Zum Beispiel sollten Interessenvertreter und Wasserwirtschaftler eingeladen werden aufgrund ihrer Expertise und ihres Arbeitsbereiches. Forschungsprojekte könnten

auch darauf abzielen, ihren Forschungsplan an die Bedürfnisse der Interessenvertreter und Wasserwirtschaftler anzupassen, z.B. indem spezifische Problemgebiete (politischer) Relevanz untersucht werden.

- ***Um das natürliche Auftreten von Sozialem Lernen zu nutzen, sollte Training angeboten werden, das Soziale Lernen fordert.*** Angesichts der Herausforderungen der WRRL empfinden Repräsentanten einen hohen Druck zu lernen. Weil Mehr-Parteien – Systeme nicht als Plattformen für offene Diskussionen empfunden werden, engagieren sie sich in anderen Umgebungen in Sozialem Lernen. Gleichzeitig, wenn sie mehr Erfahrungen in gemeinsamen Lernprozessen sammeln, sind sie auch offener sich in Mehr-Parteien-Umgebungen. Daher sollten sich Ausbildungen vor allem direkt an die einzelnen Repräsentanten richten oder interessengruppenspezifische Programme umfassen. Dadurch würde der unvertraute Kontext der Mehrparteien- Interaktion zunächst vermieden werden. Langfristig werden Akteure, die im Sozialen Lernen ausgebildet werden, auch ihre Offenheit gegenüber anderen Interessengruppen erhöhen: die Ergebnisse zeigen, dass Repräsentanten mit koordinativen Aufgaben mehr Vertrauen hatten, dass gemeinsame Interessen identifiziert werden könnten.
- ***Die Förderung von Sozialen Lernprozessen zwischen Forschern und Wasserwirtschaftlern ist notwendig, um Kompetenzen zu vergrößern und die Anwendung von Forschungsergebnissen in der Flussgebietsbewirtschaftung zu verbessern.*** Die Europäischen Mitgliedstaaten haben einen hohen Bedarf für Forschung identifiziert, die die Umsetzung der WRRL unterstützt, z. B. durch das zur Verfügung stellen von anwendbaren Methoden und Werkzeugen. Forschende haben in der Regel (nicht nur auf Grund von Förderrichtlinien) ein stärkeres Interesse, die Anwendung von Forschungsergebnissen zu verbessern. Die Einbindung von Wasserwirtschaftlern könnte die Anpassung der Forschungsfragen an praxisrelevante Themen erleichtern. Der Übergang zur Auftragsarbeit kann allerdings in manchen Fällen fließend sein, wenn Forschung sich zu sehr am Bedarf orientiert. Für einen offeneren Prozess würde projektunabhängiger Austausch hilfreich sein.

How can social learning be supported during the implementation of the European Water Framework Directive?

1 Context & Aim of Thesis

In December 2000, the European Directive on establishing a framework for Community action in the field of water policy (2000/60/EC) came into force. According to the German Federal Ministry this ‘Water Framework Directive’ (WFD) gives the insight that “despite decades of efforts and practical success in the individual sectors of water protection, a sustainable improvement in the condition of the waters can only be achieved by bringing together and taking an overall view of the various aspects and involving all parties concerned” (Bundesministerium für Umwelt 2001:17).

One of the most important changes in Germany due to the WFD is the introduction of ten river basin districts as management units different from the traditional units applied in public administration. However, the introduction resulted in new spatial misfits in the institutional settings (Moss 2003). Furthermore, there were changes concerning the integration of ground- and surface water management, the definition of biological and chemical quality objectives and the remediation obligations with binding deadlines that bring forth new obligations in terms of coordination. The WFD also puts strong emphasis on the (economic) effectiveness of measures to meet these requirements (Art. 3, Art.16). In addition, Art. 14 WFD demands that the Member States have to inform and consult all interested parties and to encourage their active involvement (EU 2002).

To meet all these challenges the European Commission has required learning for both authorities and stakeholders (EU 2002) for a successful implementation of the WFD. The Commission refers not only to newly involved non-governmental stakeholders but to also to water authorities and other governmental bodies. The demand for learning is not limited to developing strategic visions. Also, the development of sustainable measures, i.e. the daily practice of water managers

both at the level of the Commission and of the river basin districts, should be improved.

Learning essentially is defined as a social activity of individuals (Bandura 1977). Especially in the context of sustainable (water) resource management, learning has been considered as necessary for change and promising if learning processes were interactive and least hierarchical (Wals 2007).

Concepts of social learning (SL) have been developed and applied to analyse and to support learning processes in water resources management. Conceptual emphasis was given often to feature participatory processes of active stakeholder involvement aiming towards the joint development of solutions which would be better accepted and supported. For example, the SLIM-project, considering learning as a transfer of knowledge, included the “convergence of goals, criteria and knowledge (...), the process of co-creation of knowledge (...) [and] the change of behaviour resulting from understanding something through action” as the social aspect of learning (SLIM 2004:19). Similar, the HarmoniCOP- project refers SL “to the growing capacity of social entities to perform a common task related to a river basin.” (Craps 2003:8).

In coherence with this, much research has been carried out, in which social learning was shown to be supportive towards finding solutions in multi-party, participatory water resources management (e.g. Bouwen and Taillieu 2004; Ison et al. 2007; Jiggins 2002; Maarleveld and Dangbégnon 1999; Pahl-Wostl et al. 2007; Schusler and Decker 2002; Taillieu et al. 2003; Woodhill 2002). Most of the studies referred to multi-party participatory processes in local and regional contexts. Participatory processes in this context meant that stakeholders who had been so far not legally obliged to engage in the decision-making process, were invited to contribute their knowledge or other resources to the developing of joint approaches. If supra-regional actors were involved at all, they initiated SL processes for other stakeholders (i.e. not the water managers) e.g. to learn about the process of WFD implementation (Davis and Rees 2004; Ijjas and Botond 2004). Also, most of the studies identifying SL focused on processes that either aimed at the development of visions or (strategic) plans or were set up with the primary purpose to improve the fact – based knowledge on the water system (Ijjas and Botond 2004; Schusler and Decker 2002). SL was so far not shown to

motivate participants to invest in measures' implementation. Only in processes which included external funding measures were also implemented (e.g. Jiggins 1995).

Summarizing, SL has been often identified as supported in “side processes” of river basin management (RBM), i.e. in processes, which did not bind the participants legally. Instead, the processes aimed to integrate (local) stakeholders' support on a voluntary basis. It seems that the often rather technocratic, fact-based approaches leading to decision – making in river basin management (RBM) as a multi-scale* and multi-sector context (Enserink 2005; Nilsson 2002) pose strong challenges to SL.

Therefore, this thesis aims to improve the understanding of social learning in river basin management studying different processes in RMB. This means that not only participatory processes, including non-governmental stakeholders or subordinate authorities, are studied. Also collaborative management processes between equally competent authorities and, considering the need for scientific input to ensure a successful implementation of the WFD, collaboration processes between research and water management are explored for their potential to improve SL.

Considering RBM and SL as strongly context based processes, the methodological approach of a case study (Yin 2003) was chosen. The analyses are mainly based on a German case study on the international Elbe river basin district, which was embedded in the European project HarmoniCOP (www.harmonicop.uos.de; EESD-ENV-2000-02-57). Here, the specific challenges as described in the beginning (spatial misfit; the need for collaboration in formalized contexts) are addressed exploring participatory and other collaboration processes as well as the approach to SL of the actors.

For the understanding of collaboration processes between research and water management, the role of research in delivering tools to support the new challenges of the WFD has been studied during activities of the European Concerted Action Harmoni-CA (www.harmoni-ca.info).

This thesis has been developed in a cumulative manner. It includes the present framing document and the following four papers:

* For definition of “scale” and “level” please consult the glossary (Chapter 11)

- Paper 1: Borowski, I., J.-P. Le Bourhis, C. Pahl-Wostl and B. Barraque (2008). " Spatial Misfit in Participatory River Basin Management: Effects on Social Learning, a Comparative Analysis of German and French Case Studies." *Ecology and Society* 13 (1): 7. [online] URL: <http://www.ecologyandsociety.org/vol13/iss1/art7/>
- Paper 2: Borowski, I. and C. Pahl-Wostl (2008). "Where can social learning be improved in international river basin management in Europe?" *European Environment* Volume 18, Issue 4, Pages 216-227, July/August 2008
- Paper 3: Borowski, I. (accepted). "Social learning beyond multi-stakeholder platforms: a case study on the Elbe River basin." *Society & Natural Resources*.
- Paper 4: Borowski, I. and M. Hare (2007). "Exploring the gap between water managers and researchers: Difficulties of model-based tools to support practical water management." *Water Resources Management* 21(7); p.1049-1074.

Whereas the papers contain the results of the research, the framing document links them to a coherent piece of research, resulting in a set of recommendations to improve SL in RBM.

In the following section 2, the approach to SL as the theoretical background of this thesis is introduced. Section 3 presents the four different research questions. Section 4 provides an overview on the methodological approaches followed in the thesis. In sections 5-8 the four papers are presented. In section 9 conclusions are drawn and recommendations formulated for supporting SL in RBM. Section 10 contains the references and in section 11 a glossary is included.

2 Theoretical background: Social learning as a natural phenomenon and deliberately set up process

SL in natural resource management has got different roots such as in social psychology (e.g. Bandura 1977; Koelen and Das 2002) or organizational learning (e.g. Senge 1990; Wenger 1998). A high diversity of SL concepts (see e.g. Maarleveld and Dangbégnon 2002 or King and Jiggins 2002 for reviews) allows e.g. to emphasize on participatory process design or training of participants. Still, their shared focus is to enable individuals to better engage in a learning process either for personal development or to improve organizational performance or to enable sustainable management processes (e.g. Glasser 2007; Ison et al. 2004; Pahl-Wostl et al. 2007; Senge 1990; Wals 2007; Wenger 1998; Woodhill 2003).

Nevertheless SL is essentially a natural process (i.e. a process which emerges and takes place often without deliberate design or support), in which individuals engage because they want to learn, e.g. to adapt their practice (Bandura 1977; Wals and van der Leij 2007; Wenger 1998). Different levels of learning are distinguished as single-loop, double – loop or even triple loop learning. Single loop learning leads to improvement of practices (e.g. improvement of agricultural practice). Double loop learning (Argyris 1982) has happened if underlying assumptions for action (e.g. agricultural practice is central to nitrate reduction in the Northern Sea) are changed. It changes the problem-solving strategies of the actors (Loeber et al. 2007). For sustainable development, double – loop learning has been considered vital to achieve the necessary changes. Triple-loop learning (King and Jiggins 2002) is expected to induce changes of the background to the underlying assumptions (e.g. eco-system services may not change in a sustainable world).

SL can also take various forms. Broad definitions include even passive SL (i.e. one-way information flow), such as reading a book or listening to a presentation; SL can be active, involving hierarchies such as a student learning in discussions with a teacher; or it can be active, involving a non-hierarchical, two-way relationship between the learners (Glasser 2007). The processes in the context of active, non-hierarchical social learning are expected to entail the largest potential for change towards perception and management of society as one integrated system (Glasser 2007). These processes are also considered most efficient to

initiate double loop learning (Loeber et al. 2007). Research, including this thesis, thus explicitly aims to understand active, non-hierarchical SL processes to use and improve the potential of SL in sustainable development or collaborative management. SL is expected to contribute to the development of a joint understanding of the management issues, to increase the attention for different perspectives in the issues and subsequently, to facilitate the development of joint solutions on e.g. water management problems (e.g. Collins et al. 2007; Pahl-Wostl et al. 2007; Soekijad et al. 2004; Woodhill 2004).

Still, SL it is not per se a process leading to improved or even sustainable management but is in contrast one of the main reasons for the unsustainable state of our society (Glasser 2007:50). In management processes, groups can also learn not to learn (Wenger 2000). In multi-party processes, SL may even lead to “uprootedness” of representatives from their group (Wenger 1998). With the loss of support of participating stakeholder groups, SL in multi-party settings would impede learning processes in these groups.

In the context of RBM, the demands of the European Commission (see Introduction) translate as learning about the socio-ecological system, as learning about the different interests and perspectives from the various stakeholder and finally to learn how to act upon this new knowledge in terms of integrating it into RBM-plans or programmes of measures.

Taking up the challenges for members of a group (community) to engage with one another in SL many concepts of SL have a strong focus on process design. In the theoretical background of Paper 2 (p.5, Version 2) the relevant literature has been summarized to identify the three central prerequisites for a process to support SL. These prerequisites are:

- a pressure to learn for the participants which is addressed by the process
- the openness of the process in terms of (non) participation, design and outcomes, which allows the participants to engage in the process
- and, as a consequence of the other two, the presence of gains and incentives for participants to get involved in this specific process and not in an alternative one (if available).

Still, successful SL processes depend not only on the process design. All participants also need specific skills, even if in some concepts the strong focus on process design and the role of process facilitation might wrongly give the impression that the individual skills are mainly important for the person who leads the process. For example, concepts often attribute an integrated approach to RBM to the design of the process (HarmoniCOP 2005) but the participants must also have the ability to follow and further develop a system based approach (Senge 1990).

Another essential skill for SL to lead to changes is the critical examination of practices and reflection of mental frames to analyse effects of management actions (Dyball et al. 2007; Pahl-Wostl 2002). Argyris (2004) sees the (dis)ability of managers to critically reflect on their actions as the central limitation to SL. He strongly advises that this ability should be trained in managers (and researchers) for a true improvement of management (Argyris 2004).

For this thesis, concepts of SL linked to RBM were of major importance. A special emphasis on participatory RBM can be found in the concept of SL as developed in the European project HarmoniCoP (Craps 2003; Pahl-Wostl et al. 2007). Central basis of the HarmoniCoP-concept is the Community of Practice as developed by Etienne Wenger (Wenger 1998) which addresses organizational learning processes. By using both concepts as the theoretical basis for this thesis, it allows a perspective SL beyond participatory processes. In the following, the concepts will be presented in more detail.

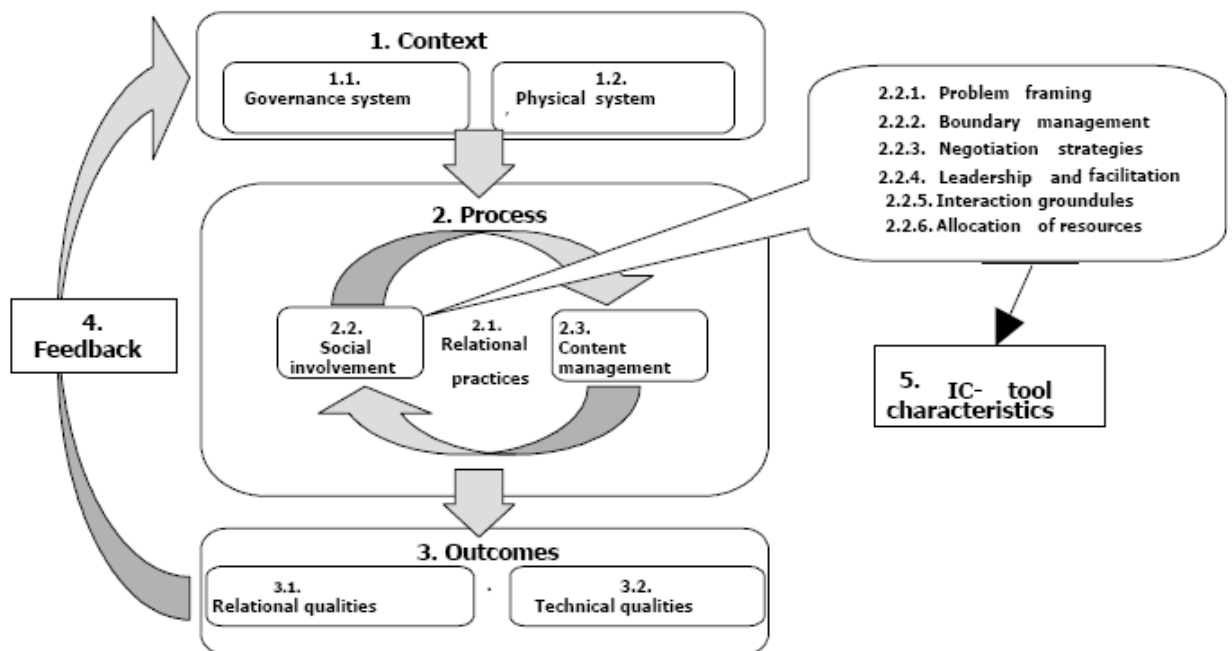
2.1 Social learning in participatory river basin management

The HarmoniCoP concept of SL was developed to improve SL in participatory processes in RBM. Figure 1 shows the core elements of this concept and their interaction. Central to the concept (Figure 1) is the process which is embedded in the context (see No1 in Figure 1) of the governance system (1.1.) and the physical system of the river basin (1.2). This context affects the process (2), and is at the same time influenced by it through feedback mechanisms (4) from the outcomes (3). These may include changes in the relational qualities between the actors (3.1), or in the technical qualities (3.2) in concrete outcomes such as agreements on measures or strategies. In this process, strong emphasis is given on social involvement of the actors (2.2) and the RBM-related content management (2.3).

Both are reflected in the relational practices (2.1): What are the key-issues during the discussions? How do the actors negotiate? Can changes in the actors' perspectives (or frames) be observed? How are rules and roles defined in the process? How are the resources distributed? Depending on each of these aspects, the process has more or less potential for SL.

This focus on social involvement allows a rather short time perspective on processes of only a few years. This is an advantage to other approaches to policy learning which need processes of about a decade to identify learning in the outcomes (e.g. Haas 1992; Haas and Haas 1995; Sabatier 1988). A full description of the concept can be found in Craps (2003) or Pahl-Wostl et al. (2007).

Figure 1: Concept of SL as developed in HarmoniCOP (Craps (2003):7)



2.2 Community of Practice as the underlying model to social learning in river basin management

Central to the HarmoniCOP concept of SL, is the concept of the Community of Practice (CoP) (Wenger 1998). It provides a model to capture the effectiveness and efficiency of natural SL processes. This makes it possible to transfer them into purposely set up learning processes.

Wenger considers a CoP as “a social structure that can assume responsibility for developing and sharing knowledge” (Wenger et al. 2002:29,). Locating learning in a CoP allows to directing the concept of learning towards a social-relational activity. This activity combines storing of information with active participation in social communities and leads to improvement of SL through the “inventiveness that makes practices effective” (Wenger 1998:10).

In the context of this thesis, the concept of CoP is taken as a structuring element for the analysis in Paper 2; it has been centrally guiding the analysis also in the other papers. Thus, it is presented in more detail and linked up with other SL concepts and the specific challenges in the context of RBM.

The three central structural elements of CoP are described as: 1) the domain; 2) community and mutual engagement; and 3) shared practice.

2.2.1 Domain of a CoP

A domain is a body of knowledge, which contains not a fixed set of issues but rather a theme or shared knowledge that is of relevance to all CoP members (Wenger et al. 2002). This focus on knowledge distinguishes a CoP from a project team (which has a specific target, such as implementing a plan) or a functional unit (which serves specific objectives meeting the requirements of the WFD).

The most important motivation for participants to engage in a CoP is its domain. Even if CoP are set up in an organizational context, the domain defines how members engage with one another, how many members participate and how much they identify with the CoP.

The domain is the shared interest of the CoP members. CoP members engage with one another to improve and contribute to the domain. The shared domain can thus not be competitive such as interest in a resource might be. In the context of RBM, a shared domain can evolve e.g. around practices to decrease soil erosion into surface waters. Similarly, a domain can include knowledge on how to implement the WFD without getting fined by the European Commission.

2.2.2 Community and Mutual Engagement in a CoP

Community and mutual engagement are the characteristics which are dealt with in the process design to set up a CoP. A Community of Practice consists of a number of members who mutually engage to improve their shared domain. This

engagement includes regular activities that enable different kinds of encounters (e.g. formal, informal) between its members. In a CoP, active participation of the members is central. However, not all members of a CoP have to participate in the same way. Peripheral participation can suffice for members who are new to the domain or are transferring to a new one. Peripheral participation also makes it easier to participate in more than one CoP, whose members can link different CoPs to each other, similar to representatives participating in different collaborative activities (Huxham 2000). In deliberately set up CoPs central participation is often linked with (jointly) assigning specific tasks to individual members. At the same time, when some members are given a specific role, other central members might easily let themselves be managed, i.e. they might lose their commitment and feel less responsible for the whole process. This may result in more activities for the facilitator and so to some kind of over-management, which is one of the central challenges of institutionalized CoPs (Wenger et al. 2002:28).

2.2.3 *Shared Practice in a CoP*

Among the participants a shared practice is developed to communicate on the domain. It includes a shared language that facilitates e.g. descriptions of a problem or insights into an issue (Wenger et al. 2002). A shared practice also includes a harmonized approach to specific problems, i.e. defining which information is relevant e.g. for monitoring success. While the shared practice is a result of a well working CoP it is at the same time a vehicle to acknowledge the different contributions of the members. “Successful practice building goes hand-in-hand with community building. The process must give practitioners a chance to gain a reputation as contributors to the community’s practice” (Wenger et al. 2002 :40).

In the context of RBM, a shared practice can be a common approach to monitoring of the groundwater status within the same basin, or an agreement on the definition of appropriate costs in different basins across Europe. So again, a shared practice is by its nature not competitive and is simultaneously implemented by the different members of a CoP. With regard to participatory approaches in RBM, jointly developed solutions such as local measures, which are also supported by non-local members, might also be considered a shared practice.

3 Introduction of Research Questions

Against this theoretical background, four research questions will be presented along the four papers of the thesis at hand. The research starts with investigating the meaning of collaborative and participatory processes in RBM by analysing two characteristics of the institutional settings, namely spatial misfit and high degree of formalization (Paper 1 & 2). Then, the potential of SL to support this processes is studied, taking the representatives of the different stakeholder groups in the multi-party setting as nuclei of SL (Paper 3). Finally, collaboration between research and water management which acknowledges the tradition of integrating external knowledge in RBM through research, is studied especially with regard to model-based tools are studied (Paper 4).

3.1 Research question 1: How do spatial misfits between participatory and decision-making institutions impede social learning?

Spatial misfit between river basins and river basin management institutions describes the misfit that occurs when the two do not refer to the same geographical area. Such spatial misfits are considered to impede sustainable management in river basins (Dietz et al. 2003; Folke et al. 2007; Gibson et al. 2000; Young 2002). The (re-)introduction of the hydrological scale by the WFD as the scale of management was intended to reduce this misfit. Instead, it may make collaboration often more difficult because collaboration has to include not only authorities from different sectors but also from different administrative regions (Moss 2003). For example, participatory structures, such as advisory boards or forums, can be set up at hydrological scales without fully adapting the participatory structure to the existing decision-making structure. This may result in parallel structures and spatial misfits within the institutional settings of river basin governance systems. In this thesis, RBM processes are analyzed to understand how these misfits affect SL and how they can be made to support SL considering a regional stakeholder – forum and the international working group for the implementation of the WFD in the Elbe basin as potential CoP's. Five indicators are applied in RBM processes with different spatial misfits, which support the emphasis of SL as a relational activity taking place in group but motivated by individual engagement. The indicators are the availability of multi-party interaction, the nature and implementation of outcomes, the process

boundary, the information flow, and the diversity of interaction. The results of this analysis can be found in Paper 1.

3.2 Research question 2: Does the formalized context of river basin management in Europe allow for social learning?

SL in multi-party settings needs self-motivated, non-formalized, largely self-organized and mutual engagement (Wenger 1998). However, governmental RBM such as in the Elbe River basin is generally embedded in a complex formalized legal and institutional context, which the actors can not easily adapt to their needs (Petry and Dombrowsky forthcoming).

The thesis explores, whether SL is still possible in this formalized context. For this, the different concepts of SL are summarized in terms of their shared process requirements for SL as the openness of the process, gains and incentives for the participants to engage in the process and a pressure to learn as the major motivation to learn from the other participants. With this, the focus is shifted from the multi-party group as a CoP to the multi-party process as a social learning system. The specific characteristics of the implementation process of the WFD at European level are studied as an example because in this context the institutional settings are considered least flexible. Two levels have been chosen: the level of the European Commission and the level of the international river basin districts.

At the level of the international river basin districts, the Elbe case study serves as an example. The potential for SL at the level of the European Commission is assessed, taking the Common Implementation Strategy (European Commission 2001) as an example. Complementing the practical examples, the analysis links also up with literature on regime theory (e.g. Bernauer 2002; Hasenclever et al. 1996; Lindemann 2006) and allows to put the concept of SL into perspective with other approaches to understand and improve (international) RBM. The results of this analysis can be found in Paper 2.

3.3 Research Question 3: What are conducive environments for social learning in river basin management?

The emphasis of the SL concept and in particular the concept of CoP on the need for mutual and motivated engagement of the participants as a pre-condition for SL to take place, allows also a less process-oriented perspective. SL “takes place when divergent interests, norms, values and constructions of reality meet in an

environment that is conducive to learning” (Wals and van der Leij 2007:18; emphasis added). This means that SL is not as such limited to multi-party platforms but generally needs an social environment that motivates individuals to learn through social engagement. Governmental RBM entails not only decision-making or participatory processes, which provide a basis for interaction. The representatives link up with their stakeholder group or participate in other collaborative structures. This means that setting up a CoP is not the same as setting up a multi-party forum but that, for using the potential of SL from the perspective of the representatives, other potential environments exist in which SL can prosper. The data of the Elbe River Basin case study have been analysed to explore further conducive environments for SL by understanding how the representatives engage in SL. The results can be found in Paper 3.

3.4 Research Question 4: How does research contribute to social learning in river basin management? What challenges arise in applied research?

Collaboration processes with research play an important role in the development of solutions for the challenges of sustainable development. The first approach of water managers to tackle complex ecological issues in RBM is to seek more technical information, such as insights from research projects or consultancy studies, in order to solve problems (Hanke et al. 2002; Nilsson 2002). Research to support the WFD implementation has also been identified as important by the EU Member States (de Rooy et al. 2005). In the context of natural resources management, many concepts about learning as knowledge transfer (SLIM 2004) focus more on acquiring explicit knowledge. This is often brought in from external parties such as research institutions. For example, epistemic communities (Haas and Haas 1995) have been introduced in this context as networks of professionals with recognized expertise and competence in a particular domain. They have an authoritative claim to relevant knowledge regarding policy within that domain. Epistemic communities are expected to stimulate learning processes by introducing new knowledge to international organizations. This means that they are expected to stimulate the political process whereby consensual knowledge is applied by policymakers to actually change their policy (Haas 2000; Haas and Haas 1995). Still, in integrated, sustainable RBM this consensual input or support might be too high a challenge for the scientific community since the highly complex nature of the issue asks for a range of perspectives and has not yet

resulted in one, unambiguous comprehensive approach for implementation of integrated, sustainable RBM. But also if research is more modest and aims to support water management by more specifically case – oriented research, results are not regularly taken up by water management. For example, research which has been carried out with the aim to give direct support to management (e.g. through computer based modelling or decision support tools) is rarely directly applied (Vonk et al. 2003). SL seems not easily to take place between researchers and water managers resulting in the transfer of new knowledge into practice.

Within the scope of this thesis, the specific barriers during the interaction between water managers and researchers during the collaboration process are explored.

For this, without applying the concept of SL explicitly, the differences between the domain of interest with respect to modelling tools in RBM are analysed for water managers and researchers based on the results of series of workshops to identify the particular difficulties of developing research results applicable in practical RBM. The results of this analysis can be found in Paper 4.

4 Methodological Background of Thesis

The research carried out in the context of this thesis has followed two approaches. Papers 1-3 are based on a case study on the Elbe River basin, which is described in section 4.1. Paper 4 synthesizes insights gained during an elicitation strategy on requirements for the application of model-based tools in integrated water resources management. The methodological approach of the forth paper can be found in section 4.2.

4.1 Methodological Approach of Case Study

The benefits of a case study approach to the research questions are, according to Yin, that a case study “(...) investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident (...)” (Yin 2003:23, emphasis added).

To understand SL in RBM requires case study based research as the process feeds back to the context and vice versa; SL as a natural phenomenon cannot be fully distinguished from the management processes in the river basins. The present case study was part of a set of nine case studies to gather comparable data on SL in participatory RBM in different European countries (Tippett et al. 2005). It was a real-time case study which was originally designed as mainly observatory but developed then in response to the demands of the water managers more towards participatory and designing case study. During the case study “first hand experience of PP at the river basin level [were gained], with the opportunity to influence the process (Rees et al. 2005:9)”. It gave some possibilities to test ideas generated on methods of social participation. “This (limited but active) role of the researcher in the case itself could be seen as problematic by those aiming at objective scientific knowledge” (Rees et al. 2005:9). This will become more clear during the descriptions of the different methods. It will be reflected on in the conclusions’ section (Chapter 9).

As part of the HarmoniCOP project, the case study was closely developed along the concept of SL (Craps 2003; Pahl-Wostl et al. 2007) and the “pool of questions” (Craps and Maurel 2003) which served as guidance for analysing SL. The Elbe River basin was chosen as German case study area because of the diversity of scales and levels, and the resulting number of administrative bodies

and processes in the Elbe River governance system, which reflects typical problems of German RBM due to institutionalized task division. Also, the specific German situation after the unification of the two German nation states in 1990 allowed to study a political system in transition. With the two main cooperation partners during the case study, the International Commission for the Protection of the Elbe River (ICPE) and the Thuringia Ministry of Environment, cooperation agreements were concluded with regard to data access and confidentiality. To acknowledge the provided option for doing research on real-time processes in the Elbe River basin, feedback was given to the hosts of the regional process after each meeting. At international level, a workshop was organized by the researcher for the water managers and stakeholders to discuss the appropriateness of public participation at international level in the Elbe River basin. This workshop was initiated to help fostering the discussion process of the participants but it was also used as a data base.

The analysis of the two processes in the Elbe River case study in this thesis, together with a third process analyzed by a partner institute, represented the German case study of the HarmoniCoP project. A full report on the case study can be found in Borowski et al. (2004). While the HarmoniCoP case study report sought to identify barriers and initiate mechanisms for SL in participatory settings in general, for this thesis specific aspects of SL were studied (see research questions in Section 3). The relevant processes for this case study were the process on the introduction of public participation at international level in the Elbe River basin and the process during the first year of the Unstrut-Leine stakeholder forum (ULF) in Thuringia.

4.1.1 Context of Elbe River Basin District

The international Elbe River basin district covers about 148.000 km². It is shared by four nations: Germany (almost 2/3 of the basin area), the Czech Republic (about 1/3) and Poland and Austria which together cover less than 1% of the basin area. Basin-wide demands result mainly from agriculture, flood protection, navigation and, less frequently, from domestic waste water and industrial effluent (IKSE 2004).

With the foundation of the International Commission for the Protection of the Elbe River (ICPE) in 1990, international collaboration had been established right

after the end of the GDR. According to the German constitution, the federal states (Länder) have the main authority for RBM. In the German part of the Elbe basin, the ten riparian Länder in 2004 established a “river district community” (Flussgebietsgemeinschaft) in order to coordinate the implementation of the European Water Framework Directive (2000/60/EC; WFD). The aim of the river basin district community is to support a harmonized implementation of the WFD, yet, the authority for final decision making stays with the Länder. Still, the federal states sometimes maintain an independent approach, e.g. for public participation.

Figure 2: The Elbe basin showing the 5 German coordination areas (coloured) and the federal states' borders (thin red lines) (Borowski et al. 2004).



At international level, the discussion linked to the introduction of public participation (PP) regarding the Elbe River basin was studied. The process was chosen because the formalized settings at international level were expected to constrain active involvement of stakeholders as encouraged by the WFD (Art.14 WFD) and thus to constrain SL. Also, different national cultures were expected to show in different approaches towards PP. This would lead to the identification of typical barriers and fostering mechanisms for SL in formalized RBM.

The process investigated at the regional level refers to the Unstrut-Leine stakeholder forum (ULF), established at the district level of Thuringia, a German federal state located in the Southwest of the Elbe basin. Initiator was the Thuringia Ministry of Environment. The aim of ULF is to consult and to give recommendations to the stakeholder advisory board at federal state level on issues concerning the implementation of the WFD in the area of the sub-basin Unstrut (a part of the Elbe River Basin) and the sub-basin Leine (a part of the Weser River Basin). In Thuringia, three such forums have been established at district (regional) level, merging the different basins with the different administrative districts. The process of the Unstrut-Leine-Forum in Thuringia was chosen not only as a precursory example for active involvement but also because the process is embedded in a multi-level system of stakeholder groups' involvement. The case study covers the first year of this process.

4.1.2 Data Generation & Approach to Analysis

The case study approach is characterized by the systematic combination of a number of data bases such as interviews, analyses of documents or observations (Yin 2003). This case study followed a real-time observatory analysis (Rees et al. 2005:9). Expert interviews, analysis of background and process documents, observation, a questionnaire, and the workshop on international PP (see 4.1) were used as data bases for the case study. The findings of the case study were discussed and evaluated at the “HarmoniCOP German Stakeholder Dialogue”, to which all participants and cooperation partners of the case study were invited.

In the following text, each data base will be described and reflected.

4.1.2.1 Analysis of major issues, key actors and stakeholders in the Elbe river basin

A literature review was carried out including public reports of the ICPE and of the Thuringia Environmental Ministry (Diening 2003a, b; EAGLF; IKSE 1999, 2000, 2003; Kühns et al. 2003; Reincke 2000; Thüringer Ministerium für Landwirtschaft 2001a, b, 2002, 2003, 2004; TLUG 2001; TMLNU 2004), the official and non-public minutes of the Working Group (WG) WFD of the ICPE (WG WFD). It helped to identify major ecological pressures and issues of discussion at international level and at regional as well as district level. These Elbe specific issues were linked with themes emerging from the WFD, identifying potential areas of conflict and needs of coordination.

Based on the results of the review and in cooperation with the partners in the Elbe river basin, key actors were identified as part of a stakeholder analysis. These key actors coming from the most active and influencing stakeholder groups were interviewed for the case study. In addition, the results of the stakeholder analysis enabled the members of the WG WFD to identify potential stakeholders for later involvement in participatory processes at international and national level of the Elbe River basin.

To start the stakeholder analysis a list has been made of potential contact addresses of the relevant stakeholder groups for the implementation of the WFD (agriculture, industry, environmental protection groups etc). This overview indicated, which organisation might be a potential cooperation partner at international and national level. The addresses were sorted according to themes which require coordination during the WFD implementation in general and on specific issues. The results were sent to the stakeholders and feedback on the results was invited and intended to be discussed at the workshop. Unfortunately, no feedback arrived. Some feedback, however, was retrieved during the interviews. For the interviews, interviewees were chosen among the key actors identified as those being already active in the processes and having a leading role in it.

4.1.2.2 Expert Interviews with application of the Hexagon-Method

Eleven structured expert interviews (Kvale 1996; Mayring 2002; Meuser and Nagel 1991) were carried out with experts on RBM in the German Elbe river basin (Table 1). The interview partners were representatives from different policy fields including water management, agriculture and environmental management. The aim of the interviews was to learn about different perceptions and expectations towards PP and SL from the key-actors in the studied processes. The questions were based on the so-called “pool of questions” (Craps and Maurel 2003).

For the analysis, the meaning of the answers was condensed along the research questions (Kvale 1996). Most interview questions were open. The interviews were organised in four thematic fields: the general background of the interviewee (job experience, perceived priorities in RBM), questions on collaboration and PP,

questions on the role of information and communication tools and specific questions on the processes in the Elbe basin.

As part of the thematic field “collaboration and PP”, questions included a card sorting activity and the Hexagon – Method. First, the interviewee had to select relevant stakeholders for the implementation of the WFD from a stack of cards which contained the results of the stakeholder analysis as well as the list of the members of the studied processes. Using the card sorting method allowed to identify groupings of stakeholders by the interviewees. Then, an exercise with an adopted form of the hexagon-method (cf. Hodgson 2000) was included to elicit information on the way cooperation took place between different actors. The interviewee was asked to identify existing collaborations related to water management by putting the cooperation partners on cards and arranging the cards on a large piece of paper, adding lines, arrows or any other symbol to describe the difference in cooperation with the different partners. The aim of the method was to elicit more detailed information on existing collaboration and to find out whether participatory approaches as required by the WFD would impact on collaboration partners.

The interviews took from one up to three hours. All interviews were taped, literally transcribed, or, when that was not possible, journalized. In the analyses, the interviewees were de-personalized. During the interviews, the tape recorder was not always allowed, and almost all interviewees had one or several times, when they asked me to stop the tape before answering a question. This data could not directly be used, but pointed towards the challenges of multi-party interaction to be met notwithstanding the agreed approach of multi-party participatory processes.

The interview partners are listed in the table below.

Table 1: Overview on interviewees and their organizations, including their participation in the different management processes. NGO= Non-Governmental Organization; WFD: European Water Framework Directive; ICPE: International Commission for the Protection of the Elbe River; WG WFD: ICPE Working Group on the implementation of the WFD

Interviewee No	Organisation represented by interviewee	participates in process(es) at...
1	Agricultural Chamber, national level	national level
2	Federal Ministry of Environment, Water Department; Chair of WG WFD	international & national level
3	Environmental NGO, coordinating activities of NGO on WFD in Germany	national level
4	ICPE Secretary	international level
5	Coordination of German Laender in Elbe river basin	national and international level
6	Ministry of Environment in Thuringia; spokesperson of German delegation at WG WFD	regional, international and national level
7	Water company (Thuringia Long Distance Water Supply)	regional, local level
8	Environmental State Agency Erfurt	regional, local
9	Farmers' Association Kyffhaeuserkreis.	local
10	Regional Planning Association of Northern Thuringia	regional, local
11	Environmental State Agency Sondershausen	regional, local

4.1.2.3 Workshop on Public Participation at international level

This one-day workshop took place on 23rd March 2004 in Hof, Germany, directly before the 10th consultation of the WG WFD. The workshop's aim was to discover the potentials of PP at the international level of the Elbe River Basin. It provided a discussion forum on options and potentials for PP during the implementation of the WFD at international basin level.

15 water managers from the WG WFD participated in the workshop. Additionally, initiated by the chairperson of the WG WFD, stakeholders had been invited by the ICPE. One representative from the environmental NGOs and one from the agricultural chamber in Lower-Saxony participated.

Prior to the workshop, the participants were sent a background document and a preliminary version of the stakeholder analysis. They were asked to prepare themselves for the workshop by reflecting on the potential benefit of PP at international basin level in the Elbe basin and about potential support their organization could provide to the participatory process.

During the workshop, the following questions provided guidance during the discussion in the workshop:

What is the aim of participation at basin level?

Which decisions require consultation at basin level?

Who should be involved?

Which forms can participation take?

When should participation take place?

At the workshop, four steps were taken:

- Working Step 1: Brainstorming on elaboration of appropriate forms of PP for the ICPE
- Working Step 2: Stakeholder Analysis – linking different forms of PP to different stakeholders
- Working Step 3: What can be decided in which phase of the WFD? – Comparing the results from the first part of the workshop with the aim of participatory efforts in the Elbe basins.
- Working Step 4: Setting priorities - what activities are feasible and desired?

The output of the workshop contained a list with three potential activities for PP at international level: a newsletter, a regular information meeting and an international stakeholder forum. This list was used as a starting point for decisions concerning the PP activities in the WG WFD and was directly implemented into the next meeting of the working group on 25/26th March 2004. Although it was not aimed to develop specific measures for implementation at international level, all results of the workshop were implemented by the WG WFD.

4.1.2.4 Observing participation in the ULF stakeholder forum

The concept of SL implies primarily very appealing ideas, namely to build up understanding and to find joint solutions. Interviewees generally show a positive attitude towards SL. However, whether or not SL indeed takes place, depends strongly on the way interaction takes place and on the process of cooperation.

Observation was chosen as a method to study relational activities, social involvement and content management (see Figure 1) in the ULF. By observation, it was attempted to trace whether the discussion took place involving all participants and whether different actors contributed in different ways. It was assumed to be positive for SL when more interaction between different participants took place.

Observation allows gaining insights where the discrepancy between verbal expression and real behaviour play no significant role. Observation is supposed to exclude also difficulties originating from communication between researcher and “researched person” (Friedrichs and Lüdtke 1972:20). If observation takes place based on a clearly structure template, it allows to get insights which are relatively independent from the observer.

During the observation, the interactions were documented based on a modified SYMLOG approach by Bales and Cohen (1982). The SYMLOG approach encompasses both the emotional, nonverbal dimension and the intended background of an action. To capture the emotional tendency (positive or aggressive) and the function of the contribution of a person (such as looking for or providing of information and orientation respectively), sixteen categories were distinguished (see Table 2). Each observed interaction was categorized. It was also noted if the contribution was remarkably long or short. If people predominantly interacted in a specific way such as providing information it was

assumed that specific roles could be assigned to them according to the HarmoniCOP concept of SL (Craps 2003). After the meetings, the observer always had a short de-briefing with the hosts of the process to give feedback on the process and suggestions on process management.

Table 2: Categories of observed interactions during the meetings of the ULF

1. facilitating process
2. presentation
3. shows solidarity
4. does not agree, passive/ not emotional
5. shows tension, asks for help
6. acts confronting
7. looks for solutions, asks for suggestions
8. takes notes
9. whispers with neighbours
10. relaxes, makes jokes
11. agrees, passive/ not emotional
12. gives orders/ suggestion
13. gives opinion/ evaluation
14. gives orientation
15. asks for information/ orientation
16. invites opinions/ evaluation

However, discussion and thus the interaction between the participants was limited. Also, as said before, the design of the case study was observatory, i.e. the role of the observer was intended to be a passive one, influencing the ongoing processes and the involved participants as little as possible. However, in Thuringia, during the first encounter with the regional actors the researcher was greeted with “Oh, here comes the grass of the Ministry”. Moreover, participants of the discussions addressed their contributions often directly to the observer instead of the moderator or the other participants. This gave a clear indication that the observer did not have a passive role but was perceived by the participants as integrated into the process.

In summary, the observational data did provide only little insights into existing relations between the different actors but more into their expectations and suspicions towards the process and thus into the challenges of multi-party processes.

For further evaluation of the observational data, a questionnaire was filled in after the 3rd meeting by the participants of the ULF. This meeting was the last meeting observed. Questions asked about the engagement of individual participants, about the interaction with other organizations from the same stakeholder group and about the expectations towards the process. Results were analyzed mainly to answer the following questions: How do the links between the scales and levels influence social learning processes on each scale? How can the interface between the regional forum and the representative's organizations be managed?

Almost all of the 22 present members, except for one, returned the completed questionnaire.

4.1.2.5 Evaluation of Case Study by actors - HarmoniCOP German Stakeholder

Dialogue

The results of the case study were discussed and evaluated based on the draft report during a German Stakeholder Dialogue - Meeting which was part of the HarmoniCOP project and organized by the researcher. All interviewees, cooperation partners and other interested stakeholders from the Elbe river basin were invited to a half-day's workshop. The 23 participants represented a wide range of possible interests and constituencies, ranging from international to regional authorities as well as representatives from NGOs and academia. To introduce themselves, all workshop participants indicated their location in the Elbe basin as well as their area of work. Most of the participants were involved in river basin management on the international level. To give interactive feedback the participants split up into three working groups combining representatives from international authorities, regional authorities and NGOs respectively. The groups were given an hour to discuss prerequisites for successful PP on different administrative levels. To structure the discussion the groups were provided with the following guiding questions:

1. What is new and surprising to you in the case studies presented?

2. What according to your work/your own experience is missing in the case studies?
3. What do you consider irrelevant?
4. What are the conditions for 'good participation'; what has to be given so that you can participate/get involved?
5. What can others learn from the case studies?

After these discussions in the working groups, the plenary group convened to present and discuss results. The results of the report were summarized in a national stakeholder report (Kranz and Borowski 2004).

4.2 Methodological Approach to the Analysis of the science-policy interface

This section summarizes the approach followed in Paper 4. While most of the thesis focuses on the collaboration between different (often competing) stakeholders in water management in general, the fourth paper takes up the particular cooperation between water managers and researchers. With this, it stresses the importance of integrating insights from research into RBM. At the same time, interaction between researchers and water managers is the only one in the multi-party setting, where water managers expect mainly to receive information and insights, while the design of many participatory processes in general suggest that water managers provide information but do not need significant input from the other stakeholders (cf. Chapter 1). Thus, the fourth paper broadens the perspective on SL by including an analysis of the challenges related to integrating external knowledge coming from research projects into RBM. The paper was developed as part of the European Concerted Action *Harmoni-CA* (www.harmoni-ca.info; EVK1-CT-2002-20003). It synthesizes the results of a two-year requirements elicitation strategy, which was carried out during summer 2003 and winter 2004 to identify the character and challenges of the science – policy interface. As in a learning process, the strategy aimed also at stimulating both water managers and researchers to reflect more on their work and the potential support of research for the implementation of the WFD. The strategy followed an action science approach as it sought “both to promote learning in the client system and to contribute to general knowledge.” (Argyris et al. 1987:36).

All of the work in this context, such as the design, implementation and evaluation of the workshops was carried out in close collaboration with Seecon Deutschland GmbH (Dr. Matt Hare) and is thus only shortly described in the context of this thesis.

The elicitation strategy started with the assumption that the challenges are caused by a lack of understanding on both sides of the requirements by a lack of communication and exchange, and by the fragmentation in water management conflicting with an integrated river basin management approach. The strategy consisted of three workshops with a total of 23 water managers and 30 (mainly senior) researchers participating. Acquiring the participants was in general rather

difficult due to the broad topic of computer-based modelling support for RBM. Especially to increase the incentives to participate for the water managers much effort was necessary to specify the topic and to make it relevant to the practical work of water managers whose experience with modelling was often rather ambiguous. The workshops were strictly output driven. They were designed to engage the participants in break out groups in intensive discussions, which were documented and reported back to the other participants. In addition to the workshops, during five river basin meetings in Hungary, Denmark, Germany, France and Belgium 3-10 water managers per basin were interviewed. The river basin meetings served to learn on the ground about the water managers' requirements.

Although the forth paper builds not explicitly on the concept of SL, it contributes to the understanding of SL processes in RBM by focusing on the different frames of water managers and researchers. Paper 4 synthesizes the results of the elicitation strategy by identifying seven central assumptions, which researchers followed intending to apply their results in practical water management. These assumptions are linked to the perspective of water managers as present during the elicitation strategy to point out major differences between the two groups. Based on these insights, recommendations are made for improving research and development and ultimately the use of model-based tools in river basin management processes is proposed.

In the next four chapters, the papers are presented in their original wording, and if available also in the journal's layout. In the conclusion sections reference is made if possible to the pages as in the published version.

5 Paper 1: Spatial misfit in participatory river basin management: effects on social learning. Results from German and French case studies

This chapter was published as Borowski et al (2008).

Reference: Borowski, I., J.-P. Le Bourhis, C. Pahl-Wostl and B. Barraque (2008). "Spatial misfit in participatory river basin management: effects on social learning. Results from German and French case studies." Ecology and Society 13 (1): 7. [online] URL: <http://www.ecologyandsociety.org/vol13/iss1/art7/> Part of a Special Feature on Social Learning in Water Resources Management

ABSTRACT. With the introduction of river basin management, as prescribed by the European Water Framework Directive (WFD), participatory structures are frequently introduced at the hydrological scale without fully adapting them to the decision-making structure. This results in parallel structures and spatial misfits within the institutional settings of river basin governance systems. By analyzing French and German case studies, we show how social learning (SL) is impeded by such misfits. We also demonstrate that river basin-scale institutions or actors that link parallel structures are essential for promoting river basins as management entities, and for encouraging SL between actors at the river basin scale. In the multi-scale, multi-level settings of river basin governance, it is difficult to fully exclude spatial misfits. Thus, it is important to take our insights into account in the current transition of water management from the administrative to the hydrological scale to get the greatest benefit from SL processes.

6 Paper 2: Where can social learning be improved in international river basin management in Europe?

This chapter was published as Borowski and Pahl-Wostl (2008).

*Reference: Borowski, I. and C. Pahl-Wostl (2008). "Where can social learning be improved in international river basin management in Europe?" *European Environment*. 18 (4) pp. 216-227, July/August 2008*

Abstract

In recent years, collaborative planning and processes of social learning (SL) have gained increasingly in interest in river basin management. In this paper, we first summarize the prerequisites for SL to take place in collaborative management processes. These are openness, gains and incentives, and a perceived pressure to learn. We then study the European situation subsequent to the introduction of the European Water Framework Directive (2000/60/EC; WFD) as an example. Based on an analysis of policy documents, a case study of the Elbe river basin and an elaboration of concepts related to theories of international regimes, we conclude that the conditions for SL are often not met if management processes are highly formalised. Considering SL that is necessary for innovation and change, this can best be supported through the establishment of parallel "learning processes", such as the Common Implementation Strategy that accompanies implementation of the WFD at European level.

7 Paper 3: Social learning beyond multi-stakeholder platforms: a case study on the Elbe River basin

A revised version of this chapter has been accepted for publication by Society and Natural Resources.

Full Reference: Borowski, I. (accepted). "Exploring more potential for social learning in river basin management: A case study on the Elbe River basin." (accepted for publication by Society & Natural Resources)

Abstract:

Social learning is often featured in multi-stakeholder processes established to learn about and align differing interests in river basin management. At the same time, multi-stakeholder processes are established as an element of formalised institutional settings, which often seem to impede social learning. Here, I explore further potential to support social learning based on a case study on the international Elbe River basin. The results of the study reveal that multi-stakeholder platforms are impeded due to their focus on differing interests. Social learning needs to place a greater emphasis on a shared domain of knowledge. Representatives engage more readily in social learning with peers who they do not perceive as their direct competitors. Representatives with experience in engaging within their own stakeholder groups are shown to be more confident in engaging with other stakeholder groups. It is therefore necessary to undertake capacity building for representatives prior to engaging in multi-stakeholder platforms.

Introduction

To ensure all ecological, social and economical aspects in river basin management (RBM) are integrated, the European Commission has promoted a learning approach featuring multi-party collaborative approaches (EU, 2002). Unlike with bilateral mechanisms, multi-party collaboration involves the different parties meeting at the same time. The benefits of multi-stakeholder meetings are increased transparency and the opportunity to directly engage with other (competing) stakeholders. Furthermore, collaborative approaches are also considered to facilitate and support learning as a social activity. Social Learning (SL) in this context is defined as a process to improve the "*capacity of social entities to perform common tasks in a river basin*" (Craps, 2003, p. 8).

In governmental RBM, which is frequently transboundary (at regional, national, or international levels), participants in multi-party settings are stakeholder groups. In this paper, the term "stakeholder group" not only includes non-governmental organisations, such as environmental groups, but also governmental organisations that either implement the Water Framework Directive (WFD), such as water authorities, or are interested parties from another sector, e.g. chambers of agriculture. Stakeholder groups send representatives to multi-party meetings, implying a dual challenge for SL to take place within a multi-stakeholder group of representatives. Not only do representatives have to learn, they also have to seek the support of those represented. Representatives have to transfer their

learning experience to their stakeholder group, i.e. SL also has to take place within the stakeholder group.

SL in water resources management is expected to contribute towards a shared understanding of management issues among different parties and to improve the ability to understand the different interests and positions (e.g. Ison et al., 2007; Pahl-Wostl, 2002; Woodhill, 2003). Nonetheless, collaborative governance structures, such as multi-stakeholder forums, are not automatically social environments in which SL leads to a shared understanding and the joint development of solutions. Collaborative governance structures have proven to be particularly successful if they no longer need to develop a joint understanding of the problems at hand but can already start from a shared perception and motivation to develop solutions (Huxham, 2000). Furthermore, multi-stakeholder settings are faced with intense challenges to support SL, which appear difficult to address by merely focusing on the process design (e.g. Jiggins et al., 2007; King and Jiggins, 2002; Mostert et al., 2007). Some of the challenges can originate from the inherent structural complexity of institutional settings and the high level of diversity among the collaborating parties in terms of, e.g. aims, resources, power, disciplines and culture (Huxham, 2000; Sneddon et al., 2002; Warner, 2006).

This paper aims to gain an insight into how SL can be supported in multi-party settings of RBM despite these challenges.

Considering multi-party settings as groups where members may engage in SL, concepts of SL as applied in RBM are strongly rooted in organisational learning (e.g. Collins et al., 2007; Maarleveld and Dangbégnon, 1999; Mostert et al., 2007; Soekijad et al., 2004). Until now, studies have often analysed the support of deliberately set up multi-stakeholder processes to SL, resulting in recommendations for the process design of public participation (e.g. Blackmore and Ison, 2007; Mostert et al., 2007; Schusler et al., 2003). This paper shifts the focus towards the skills and interests of participants. It starts out from the assumption that participating members in a successful collaborative process for SL need to 1) engage in individual learning processes for their personal benefit (Wenger, 1998) and 2) have specific skills to enable the organisation to profit from their learning (Argyris, 1982; Senge, 2006; Wenger, 1998). This does not intend to diminish the importance of how processes are designed or of the institutional settings. Instead, the paper considers different social environments (e.g. multi-party meetings, bilateral interactions, conferences, coffee breaks) which representatives choose to improve their knowledge and practice, i.e. how they engage in SL.

To this end, a case study on stakeholder participation in the international Elbe River basin is presented. To gain an insight into SL, we explore in this paper where representatives perceive a shared domain to learn about, who they engage with, and how they do so. Acknowledging the traditional role of multi-stakeholder platforms in SL studies, the link between participatory multi-stakeholder approaches and SL is studied.

In the next section, the case study and the approach to the analysis will be outlined before presenting the results of the analysis. The paper will conclude with recommendations for promoting SL in RBM.

Case Study: Social Learning in the Elbe River basin

The international Elbe River basin district is shared by four nations: Germany (almost 2/3 of the basin area), the Czech Republic (about 1/3) and Poland and Austria, which each cover less than 1% of the basin area. Basin-wide issues include nutrient load, hydro-ecological connectivity and upstream industrial pressures (IKSE, 2003). The governance system of the Elbe River basin is characterised by the parallel existence of collaborative approaches referring to either the hydrological scale (e.g. basin, sub-basin, water body levels) or a purely administrative-political scale (e.g. international or regional levels). The latter is determined by a legally defined division of competencies and responsibilities, whereas the hydrological scale has been (re-)established as a consequence of the European WFD (2000/60/EC; WFD). At both scales, there is cooperation between (the same) governmental water authorities. For example, international collaboration has existed for the whole Elbe River between the Czech Republic and Germany since the International Commission for the Protection of the Elbe River (ICPE) was founded in 1990. Collaboration, focusing primarily on the main stream of the Elbe River, achieved the development and successful implementation of a plan of action to dramatically improve the water quality (IKSE, 2003). Collaboration was extended to the entire basin area with the introduction of the WFD, including Poland, Austria and the European Commission. In Germany, the ten riparian federal states (*Länder*) have the main competencies for RBM. They established a German “river district community” (*Flussgebietsgemeinschaft*, FGG) that coordinates implementation of the WFD in the German Elbe basin. The FGG has no further powers beyond coordination. The federal states are still the main competent level for implementation of the WFD. In some cases, the federal states still maintain independent and disharmonious approaches, e.g. for public participation.

The German case study on the Elbe River basin (Borowski et al., 2004) examined SL in the context of the two collaborative processes linked to participatory activities (at international and regional level) in 2003-2004 from the German perspective. The representatives engaged in these activities are the starting point of my analysis. Some of these representatives were involved in the studied process at the (inter-)national basin level, while others participated in the regional level of Thuringia.

At the international level, the discussion process on the potential introduction of public participation was studied. This process was based in the WFD Working Group, the coordinating working group for the implementation of the WFD in the ICPE. In other words, at the international level, SL was studied in a (mainly) non-participatory management body. During the case study, interviews were conducted with representatives of the ICPE, the German Environmental Ministry (chair of the process), the spokesperson of the German delegation and a representative of the FGG (members of the WFD Working Group). In addition,

interviews were held with one representative each of the association of chambers of agriculture and of the environmental NGOs at the German national level.

At the regional level, the case study focused on a process in Thuringia that was deemed one of the most advanced approaches to public participation in the Elbe River basin. The study focused on the first year of a district-level stakeholder forum where organised stakeholders were invited to support implementation of the WFD by contributing to the programme of measures and its implementation. In this first year of the forum, meetings were held to provide information on the implementation process. In addition, participants were asked to propose and select (externally financed) pilot studies that were to give an insight into potential future measures as an element of the implementation of the WFD. During the case study, a representative of the initiating Ministry of Environment in Thuringia and two representatives from the district level water authority were interviewed. In addition, interviews were held with representatives from a water supply company, a regional planning agency and a farmers' organisation.

Table 1 gives an overview of the organisations and stakeholder groups represented in the interviews.

Table 1: Main Organisations represented by interviewees. The number in brackets represents the number of interview partners. (The interview with the ICPE was carried out with both representatives simultaneously.*) WG WFD: Working Group WFD of the International Elbe Commission; FGG Elbe: German Elbe River Basin Community.**

Stakeholder Group	Organisation	Participated in WG WFD	Member of FGG Elbe	Thuringia participatory process
Water authorities	ICPE (International Commission for the Protection of the Elbe River) (2)*	x		
Water authorities	Federal Ministry of Environment (1)	x	x	
Water authorities	Ministry of Environment in Thuringia (1)	x	x	x
Water authorities	FGG Elbe (River District Community of German Elbe Basin) (1)	x	x	
Environment	Gruene Liga (national environmental organisation) (1)	(x) (participation initiated)		
Agriculture	Agricultural Chamber at federal state level/ National Association of Agricultural Chambers (1)	(x) (different representative)		
Agriculture	Local Farmers Organisation in Thuringia(1)			x
Water supplier	Thuringia Water Supplier (1)			x
Regional planning	Thuringia Regional Planner (1)			x
Water authorities	Thuringia Water Authority, district level (2)			x

Approach to the analysis

To understand how representatives engage in SL, this paper goes back to the roots of SL concepts specifically developed for RBM (Collins et al., 2007; Craps, 2003), using the concept of “Community of Practice” (CoP) by Wenger to analyse SL. CoPs are “*a social structure that can assume responsibility for developing and sharing knowledge*” (Wenger et al., 2002, p. 29). A CoP evolves around a shared domain of knowledge that its members wish to improve. To this end, they engage with one another and negotiate meanings (and the importance) of different interactions or concepts. CoPs can be supported or initiated, and depend primarily on participants’ self-motivated engagement.

In the analysis of this paper, the case study results were analysed to identify shared domains of knowledge and representatives’ self-motivated engagement with others to improve these domains. Interviewed representatives were asked open questions about how, with whom and why they engage in collaboration on water issues. The interviewees were also asked to write the names of their collaboration partners on cards and put them in relation to themselves, according to the differences between the collaborations. The interviews were designed on the “pool of questions” put forward by Craps and Maurel, (2003). SL was identified if representatives indicated exchange and the joint development of solutions or shared objectives. The results were analysed if collaboration included stakeholders with competing interests and if they were bilateral or multilateral. The potential for SL in multi-stakeholder settings was then derived.

The original case study included a number of data sources. In the context of this paper, the analysis focuses on data collected between summer 2003 and summer 2004 through eleven semi-structured interviews with twelve interviewees. To complement the interview data, reference is made to other sources of data, such as observational data.

All interviewees were involved not only in the studied processes (see Table 1) but also in other collaborative structures in the Elbe River basin.

Seven of the interviewees were working at a governmental water authority, which had a major task to implement the WFD. Five of these seven were from German water authorities. For this reason, the “German water authorities” stakeholder group was first studied to see whether and how their members engage with other representatives in SL. The responses by the other four representatives (from agriculture, environment, regional planning) were then analysed, focusing on similarities or differences with the group of water managers. Finally, the data was explored to understand the role of multi-stakeholder platforms for SL and RBM.

How do representatives engage in social learning?

Knowledge of how to successfully implement the WFD was defined as a central aspect by the German water managers interviewed. Water managers struggled with the greater emphasis on integrating different interests and the new challenge of public participation, which they initially appreciated because they had hope for greater acceptance of their activities. In general, they wanted to gain experience in the involvement of NGOs and cooperation between water managers in how to build trust and get used to each other’s methods of governance. Nonetheless, it cannot be said that all German water managers had the same focus within the

knowledge domain of successfully implementing the WFD. For example, district level managers stated their main challenge considered involving new cooperation partners in the development and implementation of measures. One district water manager described this as *“using the implementation process (...) to facilitate and ensure the support of all relevant parties and avoid later delays with the implementation of measures.”*

With an aim to identify the self-motivated aspects of collaboration, the interviewees were asked how they manage and engage in cooperation. Here, representatives differentiated between formalised and informal interaction.

Transparency and organisational commitment was the aim of official interactions through formalised procedures. Ensuring information flow on results and agreements was achieved by formalised communication. Formalised approaches helped keep the responsibility for the process at an organisational level. The function of being a representative was then more important than an individual being a representative. Similar patterns were followed if water managers engaged with other stakeholder groups. However, when asked about existing forms of cooperation, the water managers usually first referred to informal forms of cooperation and went on to describe their network. All interviewees reported that they first contact close colleagues or assumed allies to develop strategies or solutions, or to explore room for negotiation. Occasionally, these allies were also representatives of different stakeholder groups, who were then considered especially open and skilled at listening to other interests. As one interviewee described it: *“You know your audience.”* Water managers mainly engaged, for instance, at bilateral level with representatives of farmers’ organisations or environmental NGOs. Cooperation with other stakeholder groups was generally driven by specific issues or tasks; nonetheless, the water managers principally felt obliged to manage without the support of other stakeholder groups. As a consequence, no knowledge provision was expected or acknowledged from other stakeholders. This can be perceived as a constraint to SL between water managers and other stakeholder groups since water managers did not expect to exchange their knowledge or practice based on other stakeholders’ input.

Regarding cooperation within one’s own stakeholder group and with other stakeholder groups, the personal network was highlighted as being more important than the function of the interviewee in his/her organisation. For example, several water managers stressed the positive atmosphere among water managers in the Elbe River basin. They saw this as an advantage and a form of expertise. Only at the district level did water managers express uncertainty on the future form of collaboration within the Thuringia governmental water sector. They suspected major changes within the governmental settings. These interviewees highlighted formal procedures for interaction with other water managers within Thuringia, unless they were members of their own department. Informal exchange was only mentioned with water managers from other *Länder*. This shows that self-motivated engagement was impeded in competitive or uncertain situations.

Summarising, water managers primarily seem to engage in SL in informal interactions, since they then exchange with others with a stronger focus of improvement of their knowledge and practice. At the same time, it became

apparent that this interaction was not only based on the fact that a particular person works as a water manager. Representatives also needed to trust one another and to feel they were not competitors. They needed to be sufficiently open and able to contribute to the knowledge domain in question, i.e. they needed to be capable of giving support to approaching management problems. Not all of the interviewees from the other stakeholder groups shared the water authorities' interest to successfully implement the WFD. The other stakeholders focused more on maintaining their (competing) interests. This indicated that there were also different knowledge domains the representatives wanted to improve. However, all representatives showed similar methods of engagement and approaching problems, in particular those from other governmental authorities (such as the chamber of agriculture). This also included the differences between formal and informal interaction. Only the representative from the environmental organisation explicitly described formal approaches as marginal. The environmental representative stressed the shift to e-mail-based communication as being increasingly important for mutual engagement. This was due to the increasing lack of resources for travelling (money, time) and the need to develop positions in a relatively short time in response to new governmental or other proposals. Formal meetings and approvals were less important to the representative of the environmental NGO. Strategic decisions, however, were preferably developed face-to-face in meetings. For example, to reach an agreement on a strategy for the Elbe basin, a workshop was organised by environmental NGOs. This workshop enabled the involvement of several new citizens' groups, which had recently emerged and had not yet been integrated in the larger network. This shows that, although the concept was not explicitly mentioned, SL was identified by the environmental stakeholders as an important element and was supported, especially in difficult situations with expected allies.

Multi-stakeholder meetings and Social Learning

After having identified how representatives engage in SL, in this section we analyse whether multi-stakeholder meetings were conducive to SL from the perspective of representatives. Multi-stakeholder interaction was generally welcomed by the interviewees as an opportunity to obtain information on (other) water authorities' plans but not for engaging in discussion. Multi-stakeholder interaction was perceived by water managers as a necessity to improve the transparency of management processes. Water managers hoped that multi-stakeholder approaches as a form of public participation would help improve acceptance of their work, i.e. for implementing measures, or for the (specific) investment of resources.

At international and national levels, interviewees identified multi-stakeholder platforms such as coordination bodies as being sometimes rather exhausting but nonetheless necessary meetings where participants were expected to stick to positions rather than to negotiate. Multi-stakeholder interaction was felt to be a threat to one's own interests. This was particularly expressed by interviewees who were only used to bilateral contacts. Only the representative from the environmental NGO primarily stressed the advantage of multi-party meetings at

the international level in terms of improving the transparency of governmental actions.

Thus, the commonly accepted rule for preparing for (potentially) difficult discussions and developing joint positions was to establish bilateral contact in a more informal way, such as calling someone by phone. Direct discussions at multi-party meetings were perceived by most interview partners to be a risk of open conflict, diminishing the potential for cooperation.

At district and regional levels in Thuringia, the role of the regional forum in Thuringia was perceived in a similar manner by the participants. Although one of the official objectives of the forum was to establish and improve cooperation between the different parties, this was observed by stakeholders (not the water authorities) with suspicion. They were unsure how the water authorities would be able to meet the goal of jointly developing measures. Observational data also showed that participants did not really engage in discussion. For example, even questions requesting clarification were rarely asked. Instead, representatives frequently expressed concern that there would be too much discussion, "leading to nothing".

Concluding, this means that multi-stakeholder platforms such as stakeholder forums are not expected by participants to be places for open discussion where they can learn with other participants. As the results from Thuringia show, this can also be true in the presence of official objectives to provide such a place if stakeholders cannot see how these objectives can be met. Trust in the initiator of the multi-stakeholder platform and the resulting expectations of representatives play an important role in whether they actively engage in multi-stakeholder meetings or whether they take a more passive role, such as simply being informed. The (pre)defined roles of individual members in multi-stakeholder platforms (e.g. the role of information provider and facilitator) can easily lead to over-management, strongly limiting SL (Wenger et al., 2002). Nonetheless, even if SL is not supported in multi-stakeholder meetings between the different stakeholder groups, the results show that multi-stakeholder platforms at least contribute to mutual engagement within the different stakeholder groups. This internal capacity building eventually feeds back to improved cooperation with other stakeholders: some representatives demonstrated more firmness in developing joint solutions in multi-stakeholder settings than others. They were more experienced in coordinating within their stakeholder group, assuming the chair or being spokesperson. Thus, they were experienced in developing a shared domain for engaging in learning processes, and not only with their closest peers. However, this could also mean they were more experienced in dominance and "thuggery" (Huxham, 2000, p. 353) to safeguard their interests in collaborative approaches.

Conclusions & Recommendations

This paper analysed where SL can be supported in multi-stakeholder settings, despite the associated barriers. The concept of CoP has proven useful in studying the self-motivation of representatives and identifying a shared domain to identify from the representatives' perspective where (potentially improvable) processes of SL emerge. The results show that representatives who seek

support first engage with individuals whom they trust. It also became apparent that such people do not necessarily have to be from the same stakeholder group (i.e. water managers do not only engage first with other water managers) and that not all members of the same stakeholder group trust and consult one another. Representatives engage in SL in the safe environment of their own network of peers.

In contrast, representatives behave in multi-stakeholder settings according to their role as representatives, i.e. they aim to maintain their stakeholder groups' interest. The emphasis of multi-party interaction is generally on the varied interests. Multi-stakeholder platforms are not considered per se safe environments for open discussion. Interaction remains formal but is not as open as necessary for SL.

This means that participatory multi-party platforms cannot be expected to be very strong in terms of SL among the different stakeholders, especially if they have only recently been established. To promote SL between different stakeholder groups, it is important to provide more support for identifying shared domains. Achieving this within the institutionalised settings of participatory platforms will be difficult. More independent spaces, e.g. research-based visioning workshops, are necessary here.

The results also point to a second method of fostering SL in RBM by improving the representatives' individual capacity. Training representatives in how to engage in SL, e.g. by improving their capacity to reflect or understand other parties, would help them gain more confidence first before they engage in multi-stakeholder interaction. However, at the end of the day, capacity to engage in SL is still only the first step in finding more sustainable solutions and will usually lead to solutions that are better supported. In order to gear change towards sustainable management, more training, e.g. on system-based approaches, will be necessary.

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8 Paper 4: Exploring the gap between water managers and researchers: Difficulties of model-based tools to support practical water management

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Abstract:

Supported by EU funds, the European research community has been putting much effort into providing model-based tools to support water resource managers in implementing water management as well as the implementation of the Water Framework Directive. This paper presents the results of a two-year long elicitation phase which aimed to explain why the use of tools in water management is not as great as the corresponding investment in applied research in this area might suggest it should be. The paper identifies a gap between water managers and research community that is evidence of a mutual misunderstanding of the fundamental activities of both communities. We elaborate on these misunderstandings between these two communities by focussing on their attitudes towards seven assumptions that derived from an elicitation phase carried out between 2003 and 2004. These misunderstandings appear to revolve around the issues of the role and importance of model-based tools in water management; the transferability of models to new target sites; the role of participatory modelling in water management; how to solve lack of confidence in model-based tools; the development of computer user interfaces to improve tool usability; and the nature of model integration. Based on these insights, recommendations for improving research, development and ultimately the use of model-based tools in river basin management processes are proposed. The recommendations include improving researchers' understanding of water management processes and the role their tools play within such a process; identifying for both communities the importance that such tools can play as part of social learning-oriented management processes; improving the role of software consultancies as carriers of research results; considering new methods of model transferability between target basins; and expanding the structure of funding for academic research and development projects to allow the greater provision of non-technical requirements such as post-development tool maintenance and transferability, required by water managers.

9 Conclusions and Recommendations of Thesis

This thesis has analysed how learning can be supported during the implementation of the European Water Framework Directive (2000/60/EC; WFD). As outlined in more detail in the introduction of this thesis, the concept of social learning (SL) formed the theoretical backbone of the analysis as it provides a context and interaction based approach to ongoing policy-process in river basin management (RBM). SL is expected to contribute to the development of a joint understanding of the management issues, to increase the attention for different perspectives in the issues and subsequently, to facilitate the development of joint solutions on e.g. water management problems.

A special emphasis on participatory RBM can be found in the concept of SL as developed in the European project HarmoniCoP (Craps 2003; Pahl-Wostl et al. 2007). Central basis of the HarmoniCoP-concept is the *Community of Practice* as developed by Etienne Wenger (Wenger 1998) which addresses organizational learning processes. A *Community of Practice* (CoP) can be considered as a group of persons who exchange with one another because they want to improve their knowledge on a shared domain of interest; in this sense a CoP provides a model of where and how SL does take place.

Using these concepts as the theoretical basis for this thesis helped to consider the challenge of SL to be supported by process design or the institutional settings. At the same time, it allowed to understand how the efficiency of this support depends strongly on whether or not the participants in the process recognize the options for improving their knowledge base and make use of them. The theoretical approach in this thesis thus helped to analyse the role of process design and of the representatives in different implementation processes of the WFD leading to recommendations on how to improve SL in RBM.

The analyses have been mainly based on a German case study on the international Elbe river basin district, which was embedded in the European project HarmoniCOP (www.harmonicop.uos.de; contract no.: EESD-ENV-2000-02-57). Here, the specific challenges (spatial misfit; the need for collaboration in formalized contexts) have been addressed exploring participatory and other collaboration processes as well as the approach to SL of the actors. For the understanding of collaboration processes between research and water

management, the role of research in delivering tools to support the new challenges of the WFD has been studied during activities of the European Concerted Action Harmoni-CA (www.harmoni-ca.info; contract no.: EVK1-CT-2002-20003).

This thesis was developed in a cumulative manner. It includes the present framing document and four peer reviewed papers (see p. 3). This section concludes the thesis by first providing reflection on the methodological approach before summarizing the results of the papers along the four research questions. Finally, recommendations are presented on how to improve SL in the WFD implementation.

9.1 “Here comes the grass”- Reflection on Methodological Approaches

Considering RBM and SL as strongly context based processes, the methodological approach of a case study (Yin 2003) was chosen. This allowed to developing a sound basis of data and knowledge on river basin management in the Elbe River basin. It further facilitated my understanding of the complexity of social learning processes. However, there were several challenges during the implementation of the case study (see Chapter 4) that I would like to reflect on.

The design of the case study was originally observatory, i.e. my role was intended to be a passive one, influencing as least as possible the ongoing processes and the involved participants. However, in Thuringia, during my first encounter with the regional actors I was greeted with “Oh, here comes the grass of the Ministry”. Also other occasions during the data collection showed that I was an obtrusive observer. In addition, my role shifted away from passive observatory because I offered my “objects of study” some compensation of being studied in form of feedback on the process and a workshop. With this my role became clearly one of participating.

This might be considered as a negative impact on the objectivity of my data, since it is clear that I cannot claim any more to have been an un-obtrusive observer. From the perspective of action science, however, as a science to not only describe the “world as is” but also to provide opportunities for the world to change (Argyris et al. 1987) the development of the case study and the role change of the observer into participant can be considered as rather positive. Since the focus of the thesis is on the opportunity for SL and the mechanisms which support it, I think the case study, because of the difficulties with objective data collection, had

the positive effect that I became aware of the difficulties of SL in competitive environments in RBM.

If challenged to take up the research question a second time, I would take an even more action research driven approach by directly offering support to achieve management objectives by establishing parallel multi-party action. I would try not to interfere directly with ongoing processes e.g. by observing them, but instead focus more on the individual actors. This would of course give also the participants in my research a more active role, since they already would need a motivation to engage with this parallel process. In this, an action science approach certainly acted as a challenge to keep participants but also as a foster mechanism for SL among the engaged participants.

The water authorities facilitated the case study in the Elbe River basin and appreciated its outcomes because they perceived as gain the fostering of the discussion on public participation and the fact that they got qualified but low cost support on a process in an early stage. It shows that a close connection of the action research process with ongoing “real water management” processes is important. This was also confirmed during the requirements elicitation strategy as water managers were looking for answers to specific WFD related questions and showed little openness to adapt their questions to the answers provided by the researchers. Thus, the processes established should closely relate to existing management issues.

In the following, the results of this thesis will be summarized in the answers to the research questions.

9.2 Research question 1: How do spatial misfits between participatory and decision-making institutions impede social learning?

With the introduction of the hydrological scale as the scale of management in river basin management, the WFD increased the potential for spatial misfit between different institutions such as decision making and participatory bodies. If spatial misfits exist, multi-party, participatory processes may contain many potential barriers to social learning, even at the level of process design. Studying the availability of multi-party interaction, the nature and implementation of outcomes, the process boundary, the information flow, and the diversity of interaction in RBM processes with different spatial misfits, emphasis was given to

SL as a relational activity taking place in group but motivated by individual engagement. The results of the Elbe case study showed that SL is not necessarily impeded by spatial misfit if the interface between participatory and decision-making institutions is carefully managed.

A close link of the decision-making institutions to the participatory process is important to ensure that the gains and incentives are sufficient for stakeholders to engage in participatory processes. This became evident in the successful process in Thuringia, during which the Ministry of Environment felt not only obliged to establish a sound participatory process but was also the competent authority for implementing the WFD (see Paper 1). A strong interface supports the results of the participatory processes being incorporated by decision-making institutions. If this interface consists in form of a coordinating body it should enable exchange between the different processes and should as well have the mandate for communicating with stakeholders, establishing multi-party interaction and facilitating information flow. For social learning, strong interaction between the processes can provide support as it increases the gains and incentives: resources for participation are in general limited and stakeholders prefer to invest them effectively. At the same time, strong interaction can act as a barrier to social learning because by increasing the relevance of the outcomes, the openness in the process will be constrained. This has been shown in the ambivalent position of the International Commission for the protection of the Elbe River. There, formally no decision-making power was granted to the working group for the implementation of the WFD. Still, the awareness that recommendations would be almost certainly approved by the national Ministries was identified as major constraint to open discussion (see Paper 2). Thus, if social learning is intended in the participatory or collaborative processes, the balance has to be carefully maintained between advancing a shared domain of knowledge and producing decision-relevant output such as agreements on measures or funding.

9.3 Research question 2: Is social learning possible in the formalized context of river basin management in Europe?

Governmental RBM is generally embedded in a complex formalized legal and institutional context, which the actors can not easily adapt to their needs. Still, SL also in multi-party settings needs self-motivated, non-formalized and mutual engagement. Participatory or other collaborative processes are initiated in river

basin management to bring different interests together. The stakeholders expect to influence the final decision made by the responsible authority, including decisions on constraint resources. The thesis has thus explored, whether SL is still possible in this formalized context. For this, the different concepts of SL were summarized in terms of their shared process requirements for SL as the openness of the process, gains and incentives for the participants to engage in the process and a pressure to learn as the major motivation to learn from the other participants. This way, emphasis has been given to process design. In addition, the concept of SL has also proven useful in analysing literature from another field of collaborative planning, namely on regime theory. It put the concept of SL into perspective with other approaches to understand and improve (international) RBM.

The analysis showed that looking at the process from a perspective of results helped the involved stakeholders to assess the credibility and legitimization of a process. This creates a focus on the different and competing interests of the various stakeholders, rather than on a shared interest or domain as required for social learning. This becomes evident at international level in the Elbe basin, where representatives perceive cooperation as a means to influence national activities in their own country but less to adjust with international requirements (see Paper 2:6-ix²). Social learning is impeded by the inflexibility of and the high stakes involved in formalized negotiation processes e.g. at international level. Thus, processes to support social learning need to be to some extent independent of formalised decision-making processes. Often, multi-party processes are initiated and established because of the competing interests, which impede the water authorities' tasks for integrated river basin management. A shared domain or a shared interest is not perceived by the stakeholders as the results in the Elbe basin show: While most of the water managers in the German Elbe River basin want to implement successfully the WFD, the stakeholders focus on maintaining their interest, i.e. protecting agricultural activities or ecological values (Paper 3:7-vi). The case study in the Elbe River basin and other examples from literature showed also that the success of social learning at the level of international river basin districts is influenced by the existing pressures on the ecological and social

² The papers were included in this framing document in their published wording, and if available also in the journal's layout. In this section reference is made if possible to the pages as in the published version. If this is not possible, the page number is the same as in the respective section of this document (e.g p. 6-i).

system. Although the European WFD acts as a facilitator by introducing pressure to learn (and thus a potentially shared domain), the results show that this is not always sufficient, since it is very likely that the competition between different interests such as agricultural, ecology or shipping dominates the process. In this sense, the formalized context in river basin management acts in general as a barrier to social learning and formalized institutions are unlikely to act as Community of Practice. This barrier, however, can be softened through the identification of a shared domain, which does not include competitive elements. In the context of the WFD, the process of the Common Implementation Strategy was presented as positive example (Paper 2:6-x), in which the shared domain on how to implement the WFD contributed to a successful process. Also at the level of the basin district, the way of cooperation in the technical working groups were described more similar to a Community of Practice than the coordinating working group (Paper 2: 6-x). In this sense, it shows that too much direct influence on decisions acts as a barrier to SL.

9.4 Research Question 3: What are conducive environments for social learning in river basin management?

Not only process design is essential to social learning. What is actually learnt depends first of all on the engaging individuals. In the concept of SL this is acknowledged by stressing the different skills and roles of actors in the process. It allows taking the actor's perspective for assessing where most supportive social environments for learning are perceived and used. In this, it has proven useful to identify natural emerging processes of SL which can then be targeted for further support.

The results show that representatives in RBM engage themselves in social learning first of all with people they trust and with whom they expect to contribute to a domain of knowledge. Such individuals usually belong to the same stakeholder group. Representatives showed a lot of interest to improve their knowledge and to gain experience in how to best represent their groups' stakes. Representatives in the Elbe River basin developed their individual network of peers and consider this an essential part of their expertise (Paper 3:7-vi). Engaging with more competitive stakeholders generally takes place in the context of project cooperation, mostly in bilateral constellations. Multi-stakeholder interaction is primarily restricted to formal interaction and is not expected to provide

opportunity for open exploration and the development of options for collaboration. For social learning, conducive environments are thus not multi-party platforms but environments, which are chosen by the individuals themselves, e.g. their network of peers. This seems at first sight to contradict the idea of SL and the aspirations linked to the concept that establishing multi-stakeholder platforms would be sufficient for successful collaborative planning and SL, i.e. they would work like Communities of Practice. However, representatives see the role of multi-party platforms also in providing transparency to policy processes. Platforms often provide initial contacts to other stakeholder groups and act in this way as a first requirement for joint SL. Also, if representatives are experienced in cooperation, they show more confidence in finding joint solutions and are more willing to take on joint responsibility. For promoting SL, multi-stakeholder platforms need thus to be embedded in a context of further activities to improve interaction between the stakeholders.

9.5 Research Question 4: How does research contribute to social learning in river basin management? What are the challenges in applied research?

Funding bodies, researchers, and water managers estimate the potential of support by research for the integrated water resources management required by the WFD as being high. The actual application of research outputs is much lower. As the research on integrated modelling tools exemplifies, the differences between water managers and researchers show how SL is impeded due to the lack of a shared domain (Paper 4:1069).

From the perspective of SL, the importance of the shared domain for engaging in a SL process is most obvious. Water managers and researchers both are experts in their own fields. They are influenced by their own goals and methods of working, which result in different views on uncertainty, integration and the role of model-based tools in decision making. The shared domain of improving river basin management is thus too complex to serve as a starting point for social learning between researchers and water managers. Researchers have to engage more with water managers to better understand their needs and their domain of knowledge. For this, research might act as facilitator between water managers and other stakeholders, providing tools to improve the understanding of the different aspects of river basin management. Water managers also have to engage closer with research institutes to better communicate their needs and interests.

9.6 Recommendations

Summarizing, this thesis offers a differentiated understanding on supporting SL in the implementation of the WFD. It results in the following recommendations:

- ***Spatial misfits need to be carefully addressed to make participatory processes successful.*** The design of participatory processes as encouraged by the WFD along hydrological management units in a context of differently organized bodies of public administration increases participants' confusion. A strong and transparent link with participatory and decision making institutions is crucial and must be actively managed to make participatory processes successful.
- ***Potential constraints to the openness of the process or its outcomes including aspects of liability need to be taken into account to avoid withdrawal of disappointed participants.*** Public participation and cooperation are not easily achieved in the same processes as social learning. Incentives for public participation are closely linked to (competitive) stakeholders' interests. Competition may act as a constraint to social learning as it fosters strategic behaviour; reduces the openness of the process and impacts on the shared interest of contributing to the shared knowledge domain.
- ***To support social learning in strongly formalized contexts such as international river basin management, independent processes should be established which can decrease the perceived competition between the different parties.*** However, setting up social learning processes such as the European Common Implementation Strategy for the WFD, requires many resources. Research projects focusing on the challenges of the WFD (such as integration of ground- and surface water or economical assessments) may provide alternative platforms here in the form of e.g. advisory boards, including not only water managers but also other stakeholders. These platforms need to be carefully designed to provide as many opportunities as possible for stakeholders to mutually engage. The theme of such platforms also needs to be carefully monitored so as to sustain the interest of the various practitioners. For example, stakeholders and water managers should be invited because of their expertise and their field of activity. Research projects might also aim to adjust their agenda to the needs of stakeholders and water managers, e.g. by studying specific areas or issues of (political) relevance.

- ***In order to profit from the natural process of social learning, training should be encouraged to foster social learning.*** Faced with the challenges of the WFD, representatives feel a strong pressure to learn. Since multi-stakeholder platforms are not perceived by representatives as platforms for open discussion, they engage in other social environments in SL. Still, if they gain more experience in joint learning processes, they are more open to also engage in multi-stakeholder environments. Thus, training should be provided to representatives individually or it should be set up in programs for the various stakeholder groups. In this way, the unfamiliar context of multi-party interaction would be avoided. Actors trained in social learning will also be more willing to engage with other stakeholder groups, as results of the analyses show: the representatives holding coordinative positions were more confident that a shared interest could be identified.
- ***The encouragement of social learning among researchers and water managers is necessary to improve their competence and promote the application of research results in river basin management.*** The European Member States have identified a substantial need for research to support the implementation of the WFD e.g. by providing applicable methods and tools. In general, researchers are strongly motivated (not only by the requirements of their funding agencies) to improve the application of research results. Involving water managers may facilitate the adaptation of research questions towards management relevant issues. It should be noted that there might be a thin line towards consultancy if research is then too much driven by demands. For a more open process, project independent exchange would be beneficial.

10 References in framing document

(Literature referred to in the papers (Chapter 5-8) can be found in the respective chapters).

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11 Glossary

Term	Abbreviation if applied in thesis	Meaning
actor		all organizations or individuals participating in a process
level		“The units of analysis that are located at the same position on a scale. Many conceptual scales contain levels that are ordered hierarchically, but not all levels are linked to one another in a hierarchical system.” (Gibson et al. 2000:218). See also definition of “scale” below.
organised stakeholder/ stakeholder group		(groups of) organisations which have a specific interest in water management. Their stake can be derived from either their potential to influence water management (e.g. farmers) and/ or to be influenced by water management (e.g. anglers).
public participation	PP	both activities to involve the broad public and organized stakeholder groups.
scale		“The spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon.” (Gibson et al. 2000:218). In the context of this thesis, spatial scale can be e.g.

Term	Abbreviation if applied in thesis	Meaning
		further differentiated in administrative or hydrological scales. See also definition of “level” above.
social learning	SL	<i>an interplay between social competence and personal experience. It is a dynamic two-way relationship between people and the social learning systems in which they participate. It combines personal transformation with the evolution of social structures” (Wenger 2000:227)</i>
river basin management	RBM	all activities in a river basin to
Water Framework Directive	WFD	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy
public/ interested parties		the broad public, consisting of individuals members of the public as well as of unorganised stakeholder groups. Synonymous to “interested parties” (Art. 14 WFD)

