Ross Beveridge, Jan Monsees, Timothy Moss
with assistance from: Jens Bischoff and Jan Meuel

The IRS Handbook

Analysing institutional and political contexts of water resources management projects

IRS
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Ross Beveridge
Jan Monsees
Timothy Moss

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EXECUTIVE SUMMARY

Water resources management projects, however technical or research-focused, are fundamentally dependent upon political and institutional arrangements and processes. Indeed, a failure to address adequately the prevailing political and institutional circumstances has become a widespread criticism of projects as well as of the dominant paradigm of Integrated Water Resources Management (IWRM). Adopting a more 'context-sensitive' approach is, however, a complex task, particularly for project managers and researchers who are working within a resource-constrained setting with little practical support to help them tune their interventions to fit contexts of implementation.

Against this background the German Federal Ministry of Education (BMBF) funded the 'WaRM-In' project (Strengthening Integrated Water Resource Management through Institutional Analysis. An Analytical Tool and Operative Methodology for Research Projects and Programmes). This project aimed to strengthen social science research within the Ministry's Research and Development (R&D) water management projects by providing guidance on conducting institutional and political analysis. While this obviously entails an engagement with theories and concepts, the objective was always to produce a practical guide and set of resources usable within R&D projects.

This IRS Handbook was written first and foremost for social scientists. Thus some general knowledge of relevant theories and methods has been assumed. Nonetheless, the handbook has been composed in a way that makes it both accessible and informative to project managers or, more generally, someone from a natural science or engineering background.

The handbook provides an analytical framework to refine projects in both planning and implementation phases, an accompanying methodological guide for utilisation and an appendix of useful research resources. The approach is problem- and solution-focused. The rationale for this is that projects' objectives should be context-specific, oriented to the problems in a particular place and aware of the existing institutional and political arrangements found there. Thus the analytical framework presents an inductive, 'bottom-up' research process. Research starts with observation, before moving to analysis and ways forward.

Another key characteristic of the approach is its openness and flexibility. The framework draws on a range of approaches, without imposing one on the researcher. Instead, a basic structure is provided and a number of suggestions are given as to how to adapt and extend the analysis to suit specific contexts of research and application. Relevant literatures are outlined in the research resources appendix, which should be consulted simultaneously (by way of links provided within the text), allowing the researcher to determine which concepts and methods are most applicable and relevant to the research area.

The IRS Handbook has been designed primarily for use in future BMBF R&D water resources management projects, with their general structure of a 1-year pilot phase, followed by a 3-year implementation phase. For this reason, Fast-track (designed to be carried out in the first year) and In-depth (designed to be carried out over the 3 years) versions have been devised. However, given the fairly typical structure of BMBF projects and the general language and approach adopted in the handbook, this should not hinder its wider use in other funding contexts. Furthermore, the handbook can be used globally. The bottom-up, inductive approach presented here focuses research on the contextual conditions of implementation, wherever that may be. For these reasons, it is hoped that the handbook will also be of interest to the broader water resources management community.

1. INTRODUCTION

>> The Challenge

Water resources management is inherently difficult. There is now an acceptance that water problems are not merely 'natural' or 'technical' but are rather a problem of governance (Molle et al. 2008, 4), a result of the 'politics' of water (Mollinga 2008). Tackling problems effectively is dependent on a wide range of interlinking factors: institutional arrangements, the socio-political context of planning, development and management practices, the form and effectiveness of legal frameworks, funding levels, the social and environmental conditions, access to technology, types of governance and governance 'issues' (e.g. transparency, corruption, etc.), educational and development levels, and the quality of research on water problems (Biswas 2004, p. 248). Within this context the adoption of an 'integrated' approach, often termed IWRM, or an 'adaptive' approach must be seen as both highly ambitious and very challenging to those involved in implementation (Mitchell 2005, p. 1335). This is particularly the case for project managers and researchers who are tasked with turning laudable objectives and principles into on-the-ground practices in often complex local contexts. Frustration has emerged with the lack of progress in implementing integrated approaches and many IWRM projects, especially those in Developing and Transition (D&T) countries, have been criticised recently for failing to address adequately the prevailing political and institutional circumstances at local, regional, national and transnational scales (e.g. Biswas 2004; Conca 2006; Molle 2008; Butterworth et al. 2010).

It is increasingly recognized that water management project managers need practical support on the ground to help them tune their interventions to fit the institutional contexts of implementation (Chéné 2009; Saravanan et al. 2009). International water organizations may have devised toolboxes (e.g. GWP) and academics decision-making support systems (e.g. Giupponi 2007) to help practitioners implement IWRM, but they do not provide the means to apply these off-the-peg guidelines in specific contexts of implementation. Such tools may alert managers to general institutional issues, but projects need to incorporate continuous analysis of the institutional opportunities and constraints as a core feature of their work programmes. There is, then, a need to strengthen social science research within water management projects. To support this process, guidance is required on appropriate analytical approaches and methods.

>> The Purpose

This handbook is designed to be used both by social science researchers tasked with doing institutional and political analysis in water research projects and the project managers themselves who require the analysis to design and implement their projects. Thus, though the handbook primarily addresses the social scientist, it has been written to accommodate and inform the project manager or, more generally, someone from a natural science or engineering background. Further, the handbook outlines a way of including institutional and political analysis in the design and implementation of projects (as is revealed below). The handbook has been designed specifically to assist water research projects funded by the German Research Ministry (BMBF), but its potential application is for applied R+D water resources management projects generally.

The handbook has been written to be used in water research projects both in the EU and globally in D&T countries. Clearly there are often huge differences between EU and D&T country contexts (as well as between countries within each group). We have not, however, produced

two (or more) versions of the handbook. This is precisely because the approach outlined here focuses the researchers gaze on contextual conditions, on the specificities found in a particular place at a particular time, whether in Europe or beyond. By employing a 'bottom-up' approach to research, the overall aim is to help project managers adapt the general principles of institutional analysis to contexts of action.

The approach outlined here focuses on problems and solutions. The premise is not that these exist a priori and that the task is simply to identify and tackle them. Rather problems are inseparable from people (and their perceptions), settings/domains (in which they live) and possible courses of action (which they think could achieve a desired future situation) (Roth 1995, 372). The key for research is to reveal the different ways in which problems are defined and constructed by actors so that the project can frame problems and solutions appropriately. It is about accepting the importance of power and the fundamentally political nature of these processes and water resources management in general.

The handbook provides an analytical framework to refine projects in both planning and implementation phases, a methodological guide for utilisation, an appendix of useful resources and general advice on the often difficult task of finding the information necessary to identify relevant political processes and institutional arrangements. By 'institution' we mean not only "those legal, political and administrative structures and processes through which decisions are made" (Ingram et al. 1984, 323), but also the formal and informal rule systems (Mayntz and Scharpf 1995) and meaning contexts (Schmidt 2010) which shape actions. By 'political' we mean the "social relations of power in water resources management" (Mollinga 2008, 10). Water politics is about the contestation of power and practices and prompts a concern for a "range

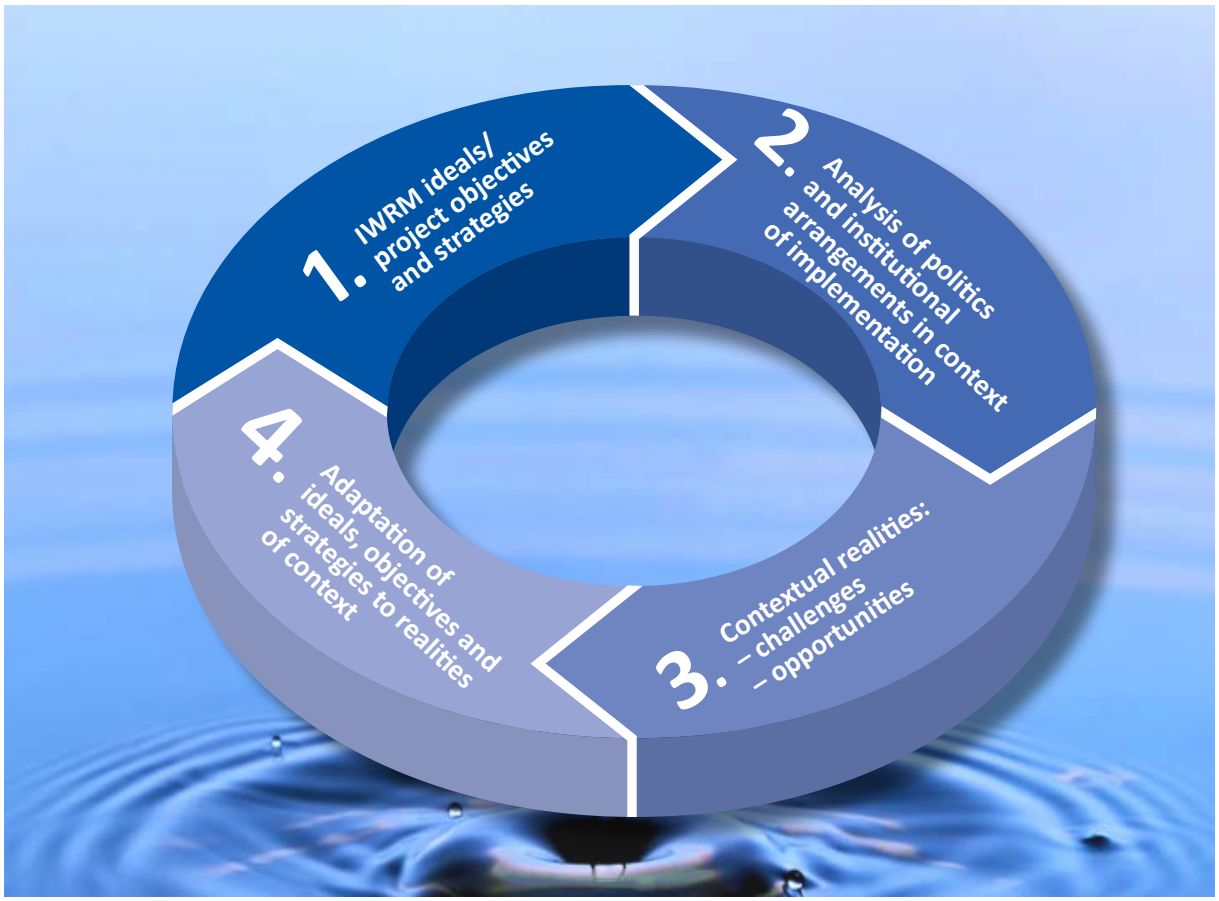


Figure 1: Putting IWRM in context

of interaction patterns in water management, including negotiation and struggle, and also less explicit and longer term disputations and controversies" (Mollinga 2008, 10). By encouraging and guiding a thorough assessment of institutional and political conditions, the handbook facilitates the embedding of policies and projects within specific socio-political contexts, rather than letting them run alongside or in conflict with existing institutional structures and practices.

>> The Rationale of the Handbook

Accordingly, the premise of this handbook is that IWRM projects' objectives should be context-specific, attuned to the problems of water resources management in a particular place and sensitive to the existing institutional and political arrangements found there. Following much of the recent literature on IWRM (e.g. Mollinga 2006; Moriarty et al. 2010; Butterworth et al. 2010; Saravanan et al. 2009; Lankford et al. 2007), an awareness of, and an 'adaptable' (Pahl-Wostl 2007) approach to, local contexts of action is seen as fundamental to achieving effective and equitable change in water resources management. There is a need to put notions such as IWRM into context: to move from global, exogenous 'solutions' to local, endogenous plans of action (see Fig. 1). The realities of local contexts resist the ideal types and standard models which populate much of the literature on water resources management. The key for projects is to address the institutional and political challenges typically encountered when implementing integrated approaches: e.g. problems of institutional interplay and spatial fit, lack of participation, equity and accountability, a general mismatch with needs and conditions in specific places (see Beveridge and Monsees Forthcoming for a detailed discussion). Conversely, detailed, continuous analysis should also reveal opportunities for achieving needs-based, context-sensitive reform.

The analytical framework presented below sets out an inductive, 'bottom-up' research process. Rather than starting with a theory and hypothesis of how things are, or should be, research begins with observation and learning, before moving to analysis and the proposal of ways forward. In this way the handbook hopes to encourage problem- and people-orientated reform and avoid the pitfalls of the 'one-size-fits-all' approach which often characterises mainstream research.

>> The Methodological Approach

This handbook was developed through detailed research of the literature on water resources management and, crucially, in close conjunction with project managers and researchers themselves. The goal was to devise an approach which combined state-of-the-art research with an appreciation of the realities of working in water management projects. The first step was to review the institutional and political challenges of adopting integrated approaches to water resources management. From this we produced a database of 500 titles, identifying key institutional and political challenges of IWRM in a) D&T countries and b) EU countries. We then validated these findings with expert interviews and two expert workshops addressing real experiences in the field. The criticisms of current practices which emerged informed the design and content of the analytical framework.

The second step was to consider the range of frameworks and tools of institutional analysis currently available to researchers of water resources management. A database of frameworks of institutional analysis was produced from a search of 30+ organizations, 35+ journals, 25+ databases and 15+ research projects globally. These provided the inspiration and building

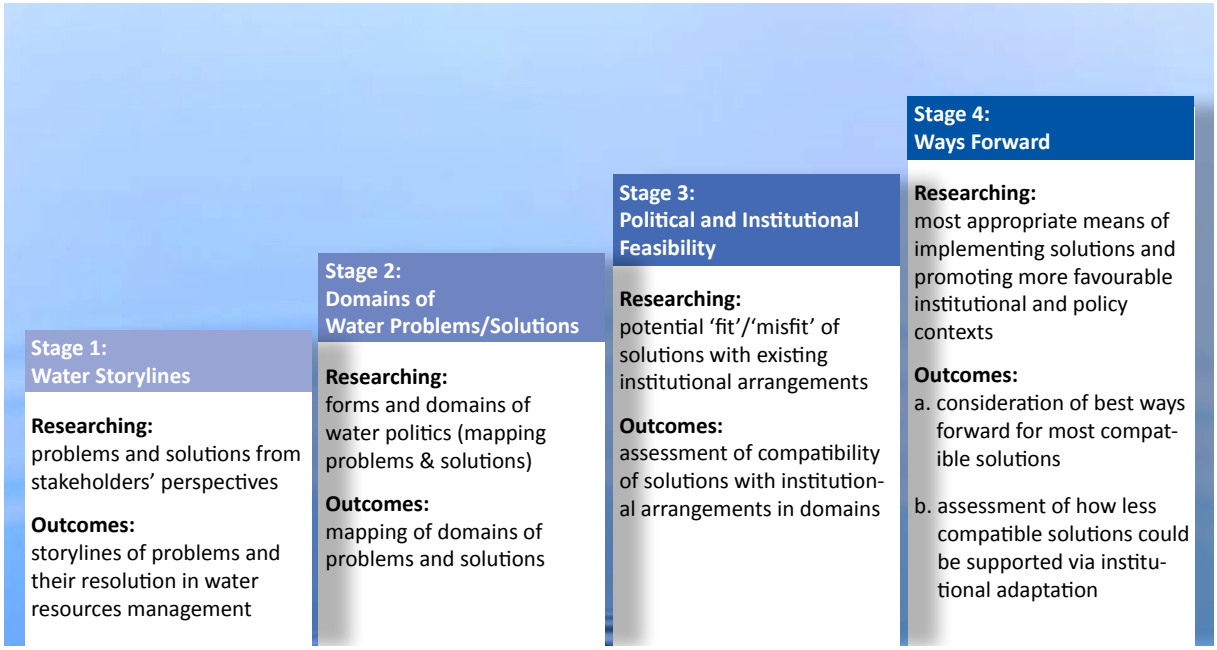


Figure 2: The key steps and outcomes in the analytical framework

blocks for the analytical framework and supporting research resources. Following this we developed, tested and refined the analytical framework and operative methodology through active engagement with project managers and researchers. Draft versions were distributed for discussions and expert workshops; feasibility tests were conducted with researchers on projects. These provided crucial inputs throughout the writing process.

>> Structure of the Handbook

The following section (Section 2) outlines the general analytical framework. This centres on a four-stage research process with clearly identified purposes, analytical questions and research steps (see Fig. 2).

Stage 1: Water Storylines describes a means of researching problems and solutions in water resources management from stakeholders' perspectives. This inductive approach fixes the researchers' gaze directly on what actors think and do in relation to water resources management. It is about identifying what is at stake in water resources management in the project area and who the stakeholders are. More specifically, it examines their narratives about problems in the area, the ways they construct causal chains between issues, events, other actors and their general surroundings. It focuses on the ways in which problems and solutions are defined. In doing so, it also details the range of ways of thinking about water resources management, strategies for achieving objectives, as well as any contests or points of consensus concerning problems and proposals for their resolution. Importantly, this also entails an assessment of the storylines of project funders and the project managers regarding problems/solutions, as well as their ways of thinking about water resources management. In other words, the project itself, its objectives and personnel, are also part of the analysis.

Stage 2: Domains of Water Problems/Solutions builds on the storyline research by mapping problems/solutions in terms of the political, cultural, spatial, hydrological and temporal domains within which they are embedded. Whether they are focused on extraction rules (institutional) or upstream-downstream uses of a river (spatial, institutional), problems have different dimensions and actors different stakes in them. This stage is concerned with characterising the form problems take as well as the places, or "domains of interaction" (Mollinga 2008), in which they are found. In part, research aims to spatially locate problems within the implementation context. More fundamentally, it details the nature of the problem, the issues to be addressed and changed, contests and power relations, as well as the courses of action deemed relevant to solving the problem. This is, then, about alerting projects to the factors most crucial to a consideration of problems and solutions.

Stage 3: Political and Institutional Feasibility shifts the focus firmly onto the assessment of solutions and their potential 'fit'/'misfit' with existing institutional arrangements and processes. The institutional arrangements and processes of the domains relevant to solutions are assessed in terms of their key characteristics, such as their problem-solving approach and formal and informal rules of interaction. The aim here is to expose the arrangements and processes upon which change is dependent and gauge the degree to which they might be amenable to such change, i.e. the extent to which there is a 'fit' with the proposed solutions, what implementation problems might be expected ('misfits') and where further information is needed to clarify the degree of 'fit'.

Stage 4: Ways Forward is concerned with identifying the most appropriate means of implementing solutions and promoting favourable institutional and policy settings. The aim is twofold. First, an assessment is made of how solutions with a high degree of 'fit' with existing institutional relations might best be taken forward. This might be in terms of the allocation of resources, the formation of partnerships with organisations or the introduction of particular technologies, etc. Second, suggestions are made as to how those solutions with a low degree of 'fit' could be advanced by means of adaptation or reform to institutional arrangements at one or more of the relevant domains. The objective here is to explore opportunities for generating more favourable institutional contexts for a particularly desirable solution so that it is not sidelined as being unrealistic under current circumstances.

Section 3: Research Resources is designed to be used in conjunction with the four-stage analytical framework. As well as providing some general information on other pertinent handbooks, a selection of existing approaches particularly relevant to conducting research in each of the four stages is presented. If the analytical framework provides an overall guide to conducting research, the research resources section can be seen as offering suggestions as to the conceptual and theoretical approaches needed to actually analyse institutional and political contexts. Key texts, quotations, methodological guidance, useful links, further reading and examples of diagrams, charts, boxes and tables are displayed. These are often linked to specific research questions and tasks in Section 2. To help researchers use the two sections interactively the relevant pages in the research resources section are noted in Section 2. In the electronic PDF version researchers can click on the links provided to move between the two sections. The approaches listed under each stage are by no means exhaustive and researchers are encouraged to draw on their own knowledge of literatures to carry out the analysis.

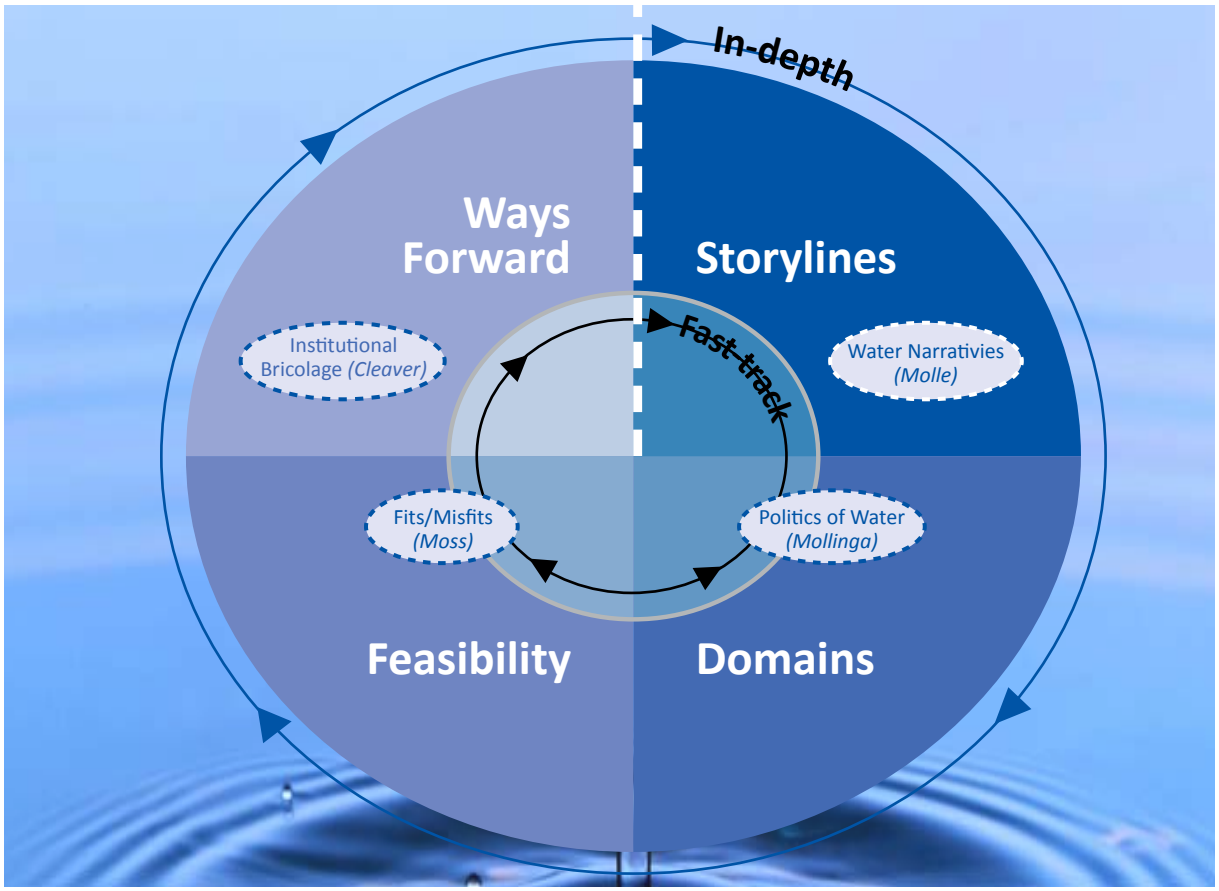


Figure 3: Two-speed, four-stage, modular and iterative approach to research in water projects

>> How to use the Handbook

First, it is important to note that the handbook does not draw on a single theoretical literature nor does it 'impose' a single analytical approach on researchers. Instead, it draws a number of literatures together into an overarching approach to doing political and institutional analysis in water resources management projects. The framework is focused on the core concerns outlined in the four stages: 'Water Storylines', 'Domains of Water Problems/Solutions', 'Political and Institutional Feasibility' and 'Ways Forward'. Beyond these and the literatures deemed integral to their examination, the handbook has been designed to be adaptable both to 'field' conditions and the interests of the researcher. The handbook is based on a modular, two-speed approach. Within each stage a variety of approaches suitable to achieving research objectives are grouped into modules and links are provided to useful resources in Section 3: Research Resources. Aware of the time and resource constraints of projects, 'Fast-track' and 'In-depth' versions are presented.

The Fast-track version has been designed to fit with preliminary, pilot stages of projects whereby the researcher aims, within a limited time period (6-12 months), to gain a general overview of the institutional and political context. The Fast-track version focuses on problems and proposed solutions endogenous to the context of implementation. This should enable R+D projects to align the objectives of their main phases to the problems facing stakeholders. Further, the four-stage analysis ultimately provides an assessment of the extent to which local solutions can be built into the R+D projects. More generally, it provides projects with a sense of the key issues, actors and organisations, as well as areas of contestation and consensus. The outcomes of the Fast-track research should therefore provide a basis for designing the main project phase.

The In-depth version is appropriate to the main phase of an R+D project, in which the researcher aims to provide a much more detailed analytical account. Furthermore, the focus of research shifts to a consideration of the project's general objectives in relation to the institutional and political context of implementation. Thus if the Fast-track version is primarily concerned with unearthing endogenous solutions to water resources management problems (and assessing the extent to which they can be promoted within research projects), a specific concern of the In-depth research is to assess exogenous solutions. Research follows the same four-stage approach, but the project itself is introduced to the storyline research; i.e. the project manager's own storyline regarding problems and their solutions are analysed in conjunction with local, endogenous storylines. The aim here is to assess the extent to which the project's own problems and solutions can generate storylines that win support from actors and to assess the politics and institutional re-configurations they might entail. Alongside this consideration of the project's objectives, it is important to note that the In-depth research continues to consider problems and solution as perceived by local actors. Institutional and political contexts are rarely stationary; projects need to regularly update their research to take account of, e.g., changes in government or the emergence of a new water problem in a village community.

Despite this apparently neat division of research into stages and modules, it is important to note that the research process should be iterative, particularly in the 'In-depth' version. There are sound practical, ethical and methodological reasons for this. Revealing institutional and political conditions in relation to bio-geophysical and socio-economic dimensions is a complex task, one made even more challenging by the practicalities of conducting fieldwork. For instance, the need to build-up contacts with previously unknown local actors, information deficits, time and resource constraints necessitate a flexible approach to research. Thus it is appreciated that researchers may switch backwards and forwards between stages when dealing with particular issues (or 'storylines', problems/solutions) as and when necessary. Further, we have built in 'checks' to ensure that stakeholders are included throughout the research process and can assess the validity of research findings. This is crucial to the fair and accurate representation of all interests, as well as the accountability of the research project. Methodologically, this is also a good thing. It allows the researcher to regularly test and update findings in what will normally be a changing institutional and political context.

With this flexible structure and ethos in hand, it is hoped that researchers will use the handbook creatively. For example, different points of entry to the four-stage approach could be made according to the particular context of use. Thus if a researcher was tasked with doing institutional and political analysis for a project which already had set solutions to be implemented in a place (for example, an irrigation system in a particular sub-catchment), then s/he might begin with Stage 3 'Political and Institutional Feasibility'. Prior to moving onto 'Ways Forward', however, the researcher may feel that a broader knowledge of water problems in the area is required and thus conduct storyline research, drawing on the analytical and methodological material in Stage 1. Such an approach would be entirely justified as water projects have their own distinct shape and objectives. In short, while the approach here outlines a research process, it is accepted that it is 'idealised' and that the realities of a project may require significant adaptation.

2. ANALYTICAL FRAMEWORK

2.1 Stage 1: Water Storylines

Researching:
Identifying storylines of problems and possible solutions from stakeholders' perspectives

Assessing:
What is at stake and who the stakeholders are; contests and consensus; actors and coalitions

>> Purposes

The main focus of this first stage is water resources management problems and solutions as perceived by stakeholders themselves. If the goal of realising context-sensitive research projects is to be taken seriously, the first research step must be an inductive one. Basic information about water resources management must come from the actors involved. Assumptions should not be made, preconceptions should be avoided. Instead, research must concentrate on what actors say and do with regards to water resources management. This can be very different from official versions of what happens in water resources management or what the formal organisations might suggest should happen.

The main aims here are to identify what is actually at stake and who the stakeholders are in the context of implementation. Research concentrates on revealing the different forms of contestation apparent in a particular place: the "range of interaction patterns in water management, including negotiation and struggle, and also less explicit and longer term disputations and controversies" (Mollinga 2008, 10). What are the key contests and areas of consensus? Which are the most important actors and coalitions of actors in relation to problems and solutions? Through addressing such questions, research in this first stage places water resources management in its historical and socio-political context.

One effective way of conducting this type of inductive research is to focus on 'storylines', on what people say about their surroundings and how they explain what they do. Stories are fundamentally important to the way we make sense of the world. They "use language to frame what has happened to a set of characters in a particular time and place" (Eckstein & Throgmorton 2003, 14). The notion of "storylines" (cf. in particular Hajer 2006 and Fischer 2003) or "narratives" (see Molle 2008 on "water narratives") is a well-developed analytical concept in the social sciences. It is used to reveal the ways in which actors causally link events, people, their surroundings, etc., through some form of story. It should not be assumed that storylines always present a 'truth'. Rather, storylines should be seen as perceived truths, as making claims to what the truth of a matter actually is. Language is not neutral. Actors have strategic interests as well as limited information. Their stories will be reflections of both. As such, storylines must be verified – as far as possible – through comparison.

Overall, analysing storylines helps to identify the meaning context (Schmidt 2010) of water research projects. Identifying storylines also entails identifying the storytellers, the actors who promote a storyline and the way in which they represent other actors (see Hajer 1995). In carrying out research on this subject, it is crucial to include the project and the funding organisation in the analysis. Project managers and researchers should be considered in situ: within the contexts in which they work. They have their own perceptions, interests and objectives, and their actions have institutional and political effects. The same is true of the funding agencies, whose call for projects sets priorities and shapes the interests not only of project managers but also of the actors in the context of implementation. These can also be understood and analysed in terms of storylines, which may or may not be in conflict with the storylines of other actors.

Storylines:

"people tell facts in a story" (Hajer 2006, 69)

"interpret events and courses of action in concrete social contexts" (Fischer 2003, 102)

"they simplify and offer a stable vision and interpretation of reality" (Molle 2008, 136)

Guiding Questions

- What stories do actors tell about problems and their (possible) resolution in water management?
- How are problems defined? What are the perceived causes of problems and what kind of changes and (financial, technological, human) resources are mentioned as necessary to making improvements?
- Which actors are affected by problems, who is held responsible for them and who is seen as able to resolve them (i.e. who are the stakeholders)?
- Which problems/solutions are most frequently mentioned?
- What coalitions of actors are presented or, less directly, are discernible in storylines?
- Where are the points of consensus or conflict within and between different storylines?

RELEVANT READING:

Storylines are central elements of discourse analysis; for illustrations of this and other related concepts, **>> see pp. 36-38 in 'Resources' section**

>> Procedure for Fast-track and In-depth analysis

>>	Fast-track	In-depth
		Even if a Fast-track version has been recently completed, research should repeat these steps in greater detail to take account of any changes and increase knowledge of the area.
1	Carry out desk research to gain an overview of a) available sources and b) key issues, events and actors. From this develop a list of actors to be contacted for initial interviews.	Carry out desk research. Conduct detailed media, documentary and literature analysis checking for new developments, sources of information and contacts. From this provide an updated report on key issues, events and actors and an expanded list of interviewees.
2	Conduct 'helicopter' interviews with 1-2 actors (helicopters) chosen because they have an overview of the area e.g. a journalist, NGO worker, researcher.	Contact the 'helicopters' again, adding one or two to provide fresh insights and a wider representation of interests.
3	On the basis of data collected from these steps, identify and conduct interviews with 3-5 key actors in the field, ideally from a broad cross-section: different types of resource user, politicians, civil society actors, etc. Focus the interviews on the guiding questions (see above). Interviews should also be conducted with the project manager to gain a sense of the project's perspective on these questions.	With reference to the data collected (here and in the Fast-track version), conduct interviews with 10-15 actors reflecting the diversity of interests. The objective here is wider and deeper coverage and to provide a more thorough account of problems and solutions. Focus the interviews on the guiding questions above. Interview the project manager on definitions of problems/solutions and, crucially, their intended courses of action within the main phase.
4	Identify storylines in the interview data. Look for key causal chains explaining and linking problems/solutions.	Identify storylines in the interview data (the causal chains explaining and linking problems/solutions).
5	Characterise the storylines. What aspects of water resources management do they focus on? Depict problem definitions and proposed solutions.	Characterise and contextualise storylines. What aspects of water resources management do they focus on? What are the backgrounds to these problems? (Further documentary research may be necessary.) Which social, political, economic, cultural practices are apparent in storylines? Assess how these are relevant to problems/solutions.
6	Link actors to the storylines. Identify the main stakes/stakeholders in water problems/solutions. Note actors that are viewed as supporting or opposing storylines.	Link actors to the storylines. Identify the main stakes/stakeholders in water problems/solutions. Note actors that are viewed as supporting or opposing storylines. What links these coalitions of actors?
7	Compare the storylines. Are there links between perceived problems/solutions? Where are the conflicts and points of consensus?	Compare the storylines. Reflect on the similarities and differences in the aspects of water resources management, practices and coalitions of actors mentioned. Also, reflect on the different interests apparent and potential for conflict and consensus.
CHECK	Ask 'helicopters' to check authenticity and relevance of storylines to the area. If inconsistencies emerge, conduct more interviews and revise findings.	Ask 'helicopters' to check authenticity and relevance of storylines to the area. Send reports to interviewees for verification. If inconsistencies emerge, conduct more interviews and revise findings.
8	Discuss implications of the storyline analysis for the project with the project manager.	Compare the project storyline to the stakeholder storylines. Discuss the findings with the project manager.
	Present results in a simple table.	Present the results in a short report.
>>	For more detailed guidance >> see pp. 37-38 in Research Resources on Hajer's 10 research steps and three "layers" of discourse.	

>> Stage Products

>>	Fast-track	In-depth
1	A table outlining and comparing the storylines, the main stakeholders in problems/solutions and the coalitions of actors seen to be supporting and opposing storylines.	**A short report presenting the storylines research. Particular emphasis should be placed on the comparison between the project's own storyline and those of the local actors. Conclude the report with an assessment of likely points of consensus and conflict.**

2.2 Stage 2: Domains of Water Problems/Solutions

Researching:

Forms and domains of water politics (mapping problems and solutions)

Assessing:

Political/temporal/spatial/scalar/hydrological domains to which storylines (on problems & solutions) can be attributed

>> Purposes

Stage 2 builds on the analysis of water storylines by mapping out their political/temporal/spatial/scalar/hydrological dimensions. The aim is to locate problems/solutions, to think of them as existing in various 'domains'. All problems (as well as solutions) exist across a range of dimensions and different actors have different stakes in them. For example, problems related to river contamination through agricultural use might have, inter alia: institutional dimensions (is there a law covering substance input and runoffs?), political dimensions (which actors are negatively affected by this contamination? Which gain the most from the activities that cause the pollution?) and spatial dimensions (do the contaminating activities occur in a different place to where the effects are felt?).

Thus the notion of domains of water problems/solutions denotes more than the geographical location in which problems/solutions are found. It is, more fundamentally, concerned with the actors and contestations revealed in Stage 1, including the strategies, tactics and power relations that shape them (Zeitoun and Warner 2006). Domains outline the 'politics of water' (Mollinga 2008). They could also be termed "issue domains" (Garb 2008, 2) or 'action arenas' "where individuals interact, exchange goods and services, dominate one another or fight" (Ostrom 1999, 42).

Identifying domains is the first step in honing in on the relevant contexts of action for project managers. It is not just about identifying formal institutions and processes; analysis must go further than this. Rather, following Mollinga (2008, 12), it is about determining the relevant "domains of interaction" in water politics:

Domains of Interaction:

1. Have different space and time scales,
2. Are populated by different configurations of main actors,
3. Have different types of issues as their subject matter,
4. Involve different modes of contestation and
5. Take place within different sets of institutional arrangement.

There are a variety of approaches which could be utilised to plot out the different dimensions of problems/solutions. Notable examples include Lebel *et al.* (2005) on mapping spatial and temporal dimensions, Mollinga's (2008) forms of water politics, Zeitoun and Warner 2006 on hydro-hegemony and Zeitoun and Allan (2008) on types of power. This latter dimension, power, should be seen as crucial, even if researching it may prove challenging. All interactions between actors in water resources management are shaped by forms of power, however benign these may appear. Power and interests also inform actors' perception of problems and solutions – they must therefore be considered in water research projects.

Analysis should attempt to ascertain what form these power relations take and how they are linked to actors and storylines. For instance they might be classified in terms of 'Hard Power' (coercion, the power over others); 'Soft Power' (the capacity to bargain, to influence without coercion); the power of ideas or the ability to control agendas, through a storyline for example (adapted from Zeitoun and Allan 2008, who draw on Lukes' Three Dimensions of Power).

Guiding Questions

- In which political/spatial/scalar/temporal domain(s) are problems and solutions located?
- What stakes do actors have in problems/solutions?
- Who has power according to these storylines?
- Who is portrayed as being responsible for problems? Who is seen as affected by them? And who appears to have the power to resolve them?

RELEVANT READING:

For examples from Lebel et al. (2005); Mollinga's (2008); and Zeitoun and Allan (2008)

>> see pp. 39 - 42 in 'Resources' section

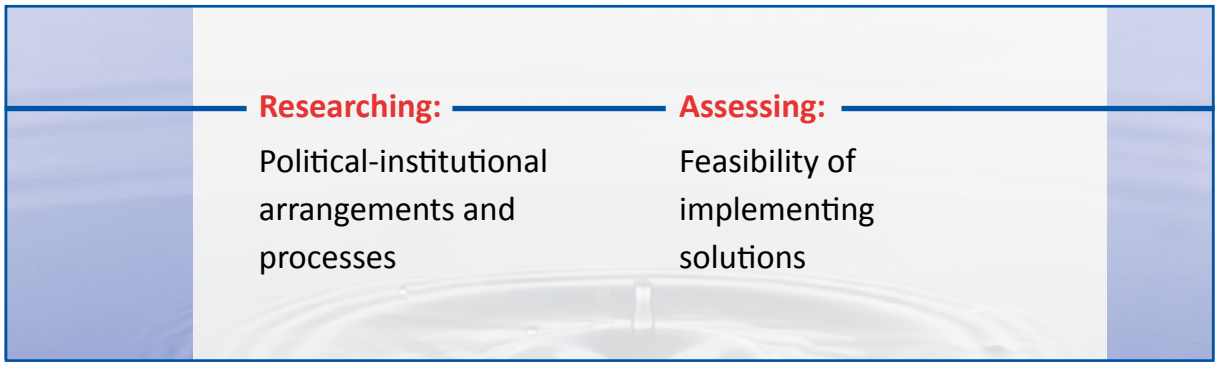
>> Procedure for Fast-track and In-depth analysis

>>	Fast-track	In-depth
		If a Fast-track version has not recently been carried out, research should begin by repeating steps 1-4, as they provide the core empirical material for the more detailed analysis here. The following steps provide suggestions of how to use literatures relevant to conducting this type of research.
1	Desk research: subject storylines to simple mapping of political/temporal/spatial/scalar/hydrological dimensions. Present results in a diagram.	Return to Mollinga (2008) >> see Research Resources p. 39. Having located problems/solutions in domains (Fast-track, step 1), further categorise them according to the dimensions of 'water control' they address: socio-economic and regulatory, organisational and managerial, technical and physical. Create a new diagram plotting these dimensions against the domains of water control.
2	Following Mollinga 2008 >> see Research Resources p. 39 perform a refined mapping of the 'politics of water'. Demarcate problems and solutions according to domains of water politics, classified in terms of 'what is at stake' in storylines ranging from 'everyday politics' to 'global water politics'.	To reflect more substantially on the scalar and spatial dimensions of storylines follow Lebel et al. (2005) >> see Research Resources p. 40. Address the guiding questions 1 and 2 again, in terms of 'scale', 'position' and 'place' of problem/solutions. Present the results in a diagram (adapting figures in Lebel et al 2005, pp. 2&11 >> see Research Resources p. 40).
CHECK	Present findings to selected stakeholders. Ask them to corroborate the domains mapped (correcting any mistakes) and to address the guiding questions 2-4 (above).	
3	Develop diagrams on three dimensions of politics, space and time.	Assess the temporal (and spatial) dimensions of problems/solutions with reference to Dore and Lebel (2010), >> see Research Resources p. 41.
4	Discuss implications of the domain analysis for the project with the project manager.	Drawing on Zeitoun and Warner (2006) and Zeitoun and Allan (2008), analyse forms and relations of power >> see Research Resources pp. 41-42. Answer guiding questions 3 and 4.
CHECK		Present findings of Steps 1 and 2 to selected stakeholders. Ask them to corroborate the domains mapped (correcting any mistakes) and to address guiding questions 2-4.
5		Present final results in report with computer-generated diagrams and commentary. Discuss the implications for the project with the project manager.

>> Stage Products

>>	Fast-track	In-depth
1	A set of diagrams (with explanatory notes) mapping the domains of problems and solutions and a brief written assessment of the implications for the project.	A report containing diagrams (with explanatory notes) illustrating the domains of water problems/solutions, their various dimensions, written responses to the guiding questions and an assessment of the implications for the project.

2.3 Stage 3: Political and Institutional Feasibility



>> Purposes

In Stage 3 the analysis moves on to political-institutional arrangements and processes relevant to potential solutions. Having mapped the relevant political/spatial/hydrological domain(s) of problems, this stage assesses the compatibility of proposed solutions. Clearly, such an assessment can only ever be a rough measure of how change might unfold. The most important thing is that the analysis provides project teams with a clear idea of the relevant political-institutional arrangements in place and a general sense of the extent of change each solution might entail. The purpose is to 'follow the solutions': to trace the existing institutional arrangements relevant to the implementation of a proposed solution and reflect upon the feasibility of achieving change. Again, analysis must go beyond formal institutions to include informal, even tacit, factors and beyond 'static' portrayals to include processes.

There are, of course, a multitude of approaches which could be utilised to carry out this research (see p. 43 in Research Resources section). A useful way of thinking about compatibility in general terms is Moss' (2003a) notion of 'Fit/Misfit' between proposed change and existing institutional arrangements. Building upon Göhler (1997), Moss (2003a) directs the analysis towards six components of institutional arrangements which researchers, perhaps particularly those working in D&T countries, should add to, drawing on other literatures:

Key Components of an Institutional Configuration
(Adapted from Moss 2003a and Göhler 1997)

1. **Frameworks of action & problem-solving approach:**
   Informal institutions (e.g. conventions, norms, routines) which shape decision-making
2. **Policy mechanisms**
   E.g. legally-binding rules, property rights, planning laws, decision-making processes
3. **Political-administrative structures**
   Relevant organisations of political system (e.g. water authorities)
4. **Market structures**
   Means through which economic relations are governed (e.g. pricing mechanisms)
5. **Organised & non-organised actors**
   Actors organised to represent their interests/those actors who are not
6. **Rules of procedure and forms of Interaction**
   Formal legal rules governing procedures and informal means of coordination and discussion between actors

Research in this stage focuses on comparing the components of institutional arrangements and processes with those likely to be entailed in implementing a proposed solution.

RELEVANT LITERATURE:
>> see pp. 43 - 45
e.g. Institutional Analysis and Development (IAD) (Ostrom et al. 1994; Ostrom 2005) and Institutional Dimensions of Global Environmental Change (IDGEC) (Young 2002; IHDP 2005).

Guiding Questions

- In terms of Moss' components, how is water resources management institutionally configured?
- Which political and institutional arrangements and processes are most relevant to implementing solutions?
- What kind of institutional configuration might the proposed solutions require?
- How compatible are the requirements of the proposed solution with the existing arrangements and processes? What level of fit/misfit exists between the proposed solutions and existing institutional arrangements?
- Overall, how feasible do solutions appear to be?

>> Procedure for Fast-track and In-depth analysis

>>	Fast-track	In-depth
1	Assess the political and institutional configuration of water resources management in the country context. Through a literature review and documentary analysis, conduct rough categorisation according to Moss' list of institutional components and any others deemed relevant. Illustrate results in a simple table.	Supplementary reading of alternative analytical approaches and examples of use: IAD, ACI, etc. >> see Research Resources section pp. 43 - 45 Do any of these approaches seem more appropriate to the research context and material available? If so, adapt following procedure accordingly.
CHECK	Ask relevant stakeholders to confirm, clarify or improve the assessment.	
2	Referring to findings from Stages 1 and 2, select for analysis those solutions which appear to enjoy the widest support. Consider the kind of institutional configuration (according to Moss' components) that each might require to be implemented. E.g. what kind of problem-solving approach is apparent in the storyline about a particular problem and its solution? Follow this process for each of the selected solutions.	Conduct a more detailed analysis of the institutional configuration of water resources management in the country context. Through a further review of literature and other sources provide a written assessment following Moss' components and others of relevance.
CHECK		Ask relevant stakeholders to confirm, clarify or improve the assessments.
3	Compare the findings of steps 1 and 2 using a table: how compatible is each of the solutions in relation to the context of action? >> See p. 43 in Research Resources for an example of Fit/Misfit table from Moss (2003a)	Consider the institutional configuration required to implement the solutions identified in Stage 1 (including the project's solutions). E.g. which policy mechanisms are mentioned in or might be relevant to storylines on solving problems? Which kind of organised and non-organised actors are important? Follow this process for each of the solutions.
CHECK		Ask relevant stakeholders to confirm, clarify or improve the assessment. Conduct focus group discussions to test the findings.
4	Provide a report summarising findings.	Compare the findings of steps 2 and 3 using a table: how compatible is each of the solutions in relation to the domain of action? Provide a written commentary as well as a table on Fit/Misfits.
5	Discuss implications with the project team.	On the basis of these findings, develop more in-depth analysis using supplementary literature e.g. Fit, Interplay and Scale (Young 2002) >> see Research Resources pp. 44 - 46 for other relevant literature.
6		Provide a report summarising findings.
7		Discuss implications with the project team.

>> Stage Products

>>	Fast-track	In-depth
1	A table illustrating the relative compatibility or 'fit' of the selected solutions with existing contextual conditions. The table should be supplemented with some loose ranking of the feasibility of solutions, outlining potential pitfalls and windows of opportunity.	A written assessment of the relative compatibility or 'fit' of all the proposed solutions with existing contextual conditions. Drawing on the wider literature, the report should include some loose ranking of the feasibility of solutions, with particular attention given to the project's solutions in comparison to competing or complementary stakeholder solutions.

2.4 Stage 4: Ways Forward

Researching:

Most appropriate means of implementing solutions and promoting more favourable institutional and policy contexts

Assessing:

Potential for problem-oriented change

>> Purposes

Stage 4 is concerned with identifying the most appropriate means of implementing solutions with a high degree of fit and promoting institutional and policy settings more conducive to those solutions which display a low degree of fit. The aim is to ascertain ways of encouraging problem-oriented reform to address the needs of stakeholders within the limitations of the project and finding equitable and realistic ways forward in water resources management. Policies and reforms are unlikely to succeed without the support of actors affected by them. It is important to note that the ways in which actors perceive benefits and disadvantages may be more important than a 'rational' assessment of costs and benefits. I.e. fostering support and credibility to ensure that a project is accountable may not be an entirely rational process. Changes are also unlikely to succeed if appropriate knowledge, resources, technologies, etc. are not available to implement reforms.

There are two parts to the research here. The first assesses how solutions with a high degree of fit with existing institutional relations might best be further promoted. This could refer to the targeted allocation of project resources, the development of alliances with relevant organisations, or the introduction of particular technologies, etc. Second, suggestions are developed as to how those solutions with a low degree of fit could be advanced by means of adaptation or reform of institutional arrangements at one or more of the relevant domains. This could, for example, entail the establishment of stakeholder groups to discuss particular problems or other means of encouraging learning processes and coalition building. It might even entail advising on re-shaping existing institutions. The overall objective here, then, is to explore opportunities for generating more favourable institutional contexts for a particularly desirable solution so that it is not sidelined as being unrealistic under current circumstances.

Key questions when implementing IWRM solutions:

"[…] who should be involved, how to facilitate the coordination among these stakeholders, and how they should integrate."

Saravanan et al. (2009, 80)

RELEVANT LITERATURE:

>> see pp. 47 - 48

Saravanan et al. 2009 on accountability, inclusion, participation.

The literature on institutional design (Ostrom, Cleaver, etc.).

More practice-oriented approaches include DFID 2003, Lankford 2007 and Lankford et al. 2007

Guiding Questions

(Adapted from Mollinga et al. 2007):

In terms of solutions with a high degree of fit:

- What specific measures and resources are required to implement solutions?
- Who should be included/consulted in implementation?
- How long would it take? And how should costs and benefits be equitably distributed?

In terms of solutions with a low degree of fit:

- What will be the benefits of institutional and policy reform and how will these benefits be distributed? What will be the costs and who will bear them?
- Who will be the bearers of institutional transformation? Who will constitute the coalition of interest groups to push forward and implement the change?
- Around which storylines/issues can such efforts be organised most productively?
- How can these coalitions be supported?
- What can realistically be done to adapt the enabling and constraining conditions for this institutional transformation?
- How can knowledge producers and processors such as project researchers and managers, consultants and reflective practitioners play a more active role in this process?

>> Procedure for Fast-track and In-depth analysis

>>	Fast-track	In-depth
	Work for this stage should be thought of as a) encouraging processes of learning and coalition building (perhaps even conflict resolution), b) utilising methods to determine the allocation of resources and (c) re-thinking, when necessary, political and institutional arrangements and processes.	Given that the main phase of the project may be underway, discussions with stakeholders and cost-benefit assessments have to be more targeted and detailed. The final report should include very specific options for promoting solutions within the time available. Work here should be more clearly divided between pathways A (solutions with a high level of fit) and pathways B (solutions with a low level of fit). The former are more likely to be achievable within the time span of a project.
1	Establish stakeholder meetings to assess the results of research Stages 1-3. Members of the project team should also be involved in these meetings as well. Meetings should be led by the guiding questions above, with discussions focused on the solutions which the project should address in the main phase. Record results in a brief report.	Refer to the wider literature to better identify methods of facilitating practical and participatory research processes e.g. IFAD 2008 on classifying different stakeholders >> see Research Resources pp. 47 - 50
2	Other methods such as cost-benefit assessments may be employed to gauge financial costs of implementing solutions (Lankford 2007). >> see Research Resources p. 47	On this basis, establish a series of stakeholder meetings to assess the results of Stages 1-3. Members of the project team should also be involved in these meetings as well. Meetings should be led by the guiding questions above and focus on pathways to be pursued during the project.
3	Meet with the project team to openly reflect on the findings and the overall research results. This should be a reflexive exercise, driven by the guiding questions above and focused on planning for the main project phase.	Refer to the wider literature to outline a series of pathways for the solutions. Include measures to ensure stakeholder participation and practical steps through which change can be promoted. See for example Lankford 2007 on breaking large issues down into more manageable 'tasks' >> see Research Resources p. 47. Record results in a report.
4	Write a brief report on potential pathways for WRM reform during the main project phase for both most and least feasible solutions.	Meet with the project team to openly reflect on the findings and the overall research results. This should be a reflexive exercise, driven by the guiding questions above. Decisions should be made as to pathways A and B to be followed during the project.
5		Present results in a report.
6		Later in the project, arrange further stakeholder meetings to reflect on the value of project work completed, prospects for change within the rest of the project and afterwards.
7		Discuss the findings with members of the project team. Reflect on measures implemented. Devise a strategy for pursuing pathways after the project. Present final results in written reports.

>> Stage Products

>>	Fast-track	In-depth
1	Report outlining potential pathways for WRM reform in the main project phase: A. consideration of the best ways forward for most feasible solutions B. assessment of how less compatible solutions could be supported, including possible means of adapting existing institutional arrangements in particular domains.	More detailed report outlining potential pathways for WRM reform in the main project phase: A. consideration of best ways forward for most feasible solutions B. assessment of how less compatible solutions could be supported, including possible means of adapting existing institutional arrangements in particular domains.
2		Brief written outline of facilitated processes for pathways A and B.
3		Strategy for pursuing pathways A and B after the termination of the project.

3. RESEARCH RESOURCES

The purpose of this section is to help support analysis and research in water resources management projects by providing additional information on how research may be conducted. An appendix of research resources is presented, e.g. conceptual approaches, important texts, key quotations, methodological guidance or useful links, as well as examples of diagrams, charts, boxes and tables which are connected to the four research stages set out in section 2 of this handbook. The inspiration and building blocks for these research resources stem from a database of frameworks of institutional analysis which was produced from a search of 30+ organizations, 35+ journals, 25+ databases and 15+ research projects globally. The section first gives some advice on general reading (3.1) and then turns to a selection of approaches, frameworks, tools and methods that can be utilised in the four individual research stages (3.2). The first two parts of this section serve as a kind of annotated bibliography, one centred to a large extent on diagrammatic representations. Finally, the section concludes with a comprehensive list of references (3.3).

3.1 General reading and advice

Handbooks and source books

As outlined in the introduction, this handbook does not 'impose' a single analytical approach on researchers but instead draws a number of literatures together into an overarching approach to conducting political and institutional analysis in water resources management projects. It is worth noting that there are a number of other handbooks and source books on researching institutional dimensions of water resources management, many of which may be of use to researchers. Furthermore, although they emerge from different contexts and have different foci, the concerns and approaches presented in these books are at least in some ways similar to that outlined here. Eight such books, published mainly by international organisations, are summarised below in reserve chronological order:

a) **GWP & INBO, Global Water Partnership & International Network of Basin Organisations: "A Handbook for Integrated Water Resources Management in Basins", Stockholm & Paris, 2009.**

Perhaps the most prominent handbook in the field of IWRM research is the GWP/INBO handbook. It is not aimed at researchers but rather basin managers and government officials. Although it starts from the assumption that "devising appropriate institutional responses lies at the heart of the IWRM approach", it focuses merely on formal institutional arrangements and organisational structures, neglecting informal institutions and the inherently political dimension of water.

b) UNESCO, United Nations Educational, Scientific and Cultural Organization: "IWRM Guidelines at River Basin Level, Part I: Principles; Part 2-1: The Guidelines for IWRM Coordination; Part 2-2: The Guidelines for Flood Management; Part 2.3: Invitation to IWRM for Irrigation Practitioners", Paris, 2009.

These guidelines in four volumes cover a broad range of IWRM issues with reference to practical examples from all over the world. UNESCO views it as complementary to the GWP/INBO handbook. Part 1 mainly targets policy-makers. Parts 2-1 and 2-2 are compiled for

practitioners "from the point of view of comprehensive coordination of IWRM at river basin level" and part 2-3 is aimed at irrigation practitioners and water user representatives. Institutional analysis is not discussed substantially in this book.

c) **ICLEI, Local Governments for Sustainability /Philip, R. et al.: "Local Governments and Integrated Water Resources Management (IWRM), Part III: Engaging in IWRM – Practical Steps and Tools for Local Governments", Freiburg, 2008.**
Though particularly developed to provide practical assistance to local governments, this guidance document is also useful for researchers. It contains a number of check lists, work sheets and templates with regard to the implementation of IWRM on the local level. It shows, for example, how to make use of stakeholder analysis, problem tree analysis, SWOT analysis, scenario building and participatory rural appraisal. Again, however, institutional analysis is not one of the main topics addressed.

d) **IFAD, International Fund for Agricultural Development /Lobo, C: "Institutional and organizational analysis for pro-poor change: meeting IFAD's millennium challenge", Rome, 2008.**
This source book is a response to the needs of IFAD's country programme managers, consultants, project managers and partners in the field. It pursues "a dual approach: while being firmly focused on practice, it nevertheless attempts to explain the theoretical underpinnings of the approaches adopted and the purpose of the analytical methods used." Although it does not specifically address water management issues, the IFAD source book bears similarities to the IRS approach and can therefore be used to complement the four stages outlined in section 2.

e) **NeWater project /Barlebo, H. C. (Ed.): "State-of-the-art report with users' requirements for new IWRM tools", Deliverable 4.2.1, Copenhagen, 2007.**
This report is one of the NeWater project deliverables. It reviews IWRM tools in a variety of branches, e.g. catchment modelling, uncertainty assessment, economic evaluation, public participation, decision-support systems and integrated frameworks. A useful classification of IWRM tools and information on user requirements for new tools is also provided, but institutional analysis is only of minor concern.

f) **DFID, Department for International Development /Wilson, D. & Beaton, L.: "Promoting Institutional & Organisational Development – A Source Book of Tools and Techniques", London & Glasgow, 2003.**
Although not tailored to IWRM or water management in general, this source book collects a number of useful tools and techniques, which are relatively easy to handle and hence seem particularly suitable for the 'Fast-track' analysis but also as a complementary resource when conducting 'In-depth' research.

g) **IHE, International Institute for Infrastructural, Hydraulic and Environmental Engineering/van Hofwegen, P.J.M. & Jaspers, F.G.W.: "Analytical Framework for Integrated Water Resources Management – Guidelines for assessment of institutional frameworks", Delft, 1999.**
This consultancy study was carried out for the Inter-American Development Bank (IDB) "to help borrowing member countries to shift from a sectoral, development-based focus to an integrated, management-based approach." An increased emphasis on institutional issues

is seen as central to this strategy; however, informal institutions are not considered. The analytical framework was developed for use in Guatemala, Jamaica, Colombia and Chile but it is not limited to these countries.

h) ICLARM, International Center for Living Aquatic Resources Management/Pido, M. D. et al.: "A Handbook for Rapid Appraisal of Fisheries Management Systems (Version 1)", Manila, 1996.

Although not new and focused on fisheries, this sound and systematic handbook could nevertheless be a rich resource for water-related institutional analysis given the concise presentation of a number of useful tools and techniques.

More general reading

Apart from these handbooks and source books there are many other valuable texts of general interest in this field. These include papers by Mitchell (1990 and 2005) on integrated approaches to water resources management in a conceptual and comparative manner respectively, by Jønch-Clausen and Fugl (2001) on the conceptual foundation of IWRM, by Allan (2003) on the political challenge that IWRM presents, by Blomquist et al. (2005) on a comparison of institutional arrangements in eight river basins worldwide, by Hooper (2008) on best practices in river basin governance, by Lankford and Hepworth (2010) on monocentric ('cathedral') versus polycentric ('bazaar') approaches to basin management and by Muller (2010) on normative (Dublin) versus pragmatic (Rio) approaches to IWRM.

Cleaver and Franks (2008), however, warn against uncritically adopting such instrumental, context-free 'success story' and 'good practice' approaches. To counter this they provide a helpful distinction between different end uses of research and several related attributes (Table 1). Researchers in water resources management projects should, they argue, always be clear about their position in this matrix when doing field research.

	Research for		
	Knowledge	Policy	Practice
Scope	Defined by researchers	Defined by policy makers	Defined by users
Focus	Improved understanding of the world around us	Evidence of outcomes	Guidance for interventions
Timescale	Long-term, indeterminate	Medium-term, continuing	Short-term, bounded
Type of data and presentation of results	Intensive or extensive empirical research with findings generalised to theoretical propositions and to raising further questions. Uncertainty accommodated	Generalised, focus on 'success stories', 'best practices' with lessons for 'scaling up' and 'scaling out'. Certainty of linkages (inputs and outputs) required.	Specific and localised, often presented as tools or checklists.
Audience	Academics, intellectuals	Policy makers, politicians	Practitioners

Table 1: Research for knowledge, policy and practice (Cleaver and Franks 2008, p. 166, Table 1)

3.2 Approaches, Frameworks, Tools and Methods

>> 3.2.1 Research Resources for Stage 1: Water Storylines

Underlying this stage is the assumption that researchers in water resources management projects should avoid preconceptions about problems and solutions and be prepared that the realities of water resources management may differ from what the formal organisational structures might suggest should happen. The basic information about these realities must come from the actors involved: the stakeholders. This implies the need to identify who these stakeholders are and what is actually at stake. One suggested way to capture this is to draw on the storyline concept as outlined in the policy discourse literature.

Key theoretical and conceptual contributions on this topic have been made by Hajer (1995, 2003, 2006) and Fischer (2003) with respect to the importance of discourse to the conduct of politics and also by Schmidt (2010) who asserts the importance of discourse to thinking about institutions. Schmidt's intention is to establish 'Discursive Institutionalism' as a fourth 'New Institutionalism' of political science alongside 'Rational Choice Institutionalism', 'Historical Institutionalism', and 'Sociological Institutionalism' (ibid.). Institutions are viewed here as 'carriers' of collective ideas and norms and discourse as the 'system of meaning' in which institutions are formed, maintained, resisted and reformed (ibid.).

Hajer's 'argumentative' approach aims for an explanation of the prevalence of certain discursive constructions and for a study of the power structures in society (1995, chapter 2). In doing so, it shows that discourse is central to processes of socio-political change (ibid). This is empirically demonstrated through two case studies on ecological modernisation in the United Kingdom and in the Netherlands (1995, chapters 4 & 5). His approach centres on the core terms discourse, storylines and discourse coalitions. Discourse is seen as "an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices" (2006, 67). The concept of storyline stems from the observation that peoples' statements about the world often take the form of a narrative. "A story-line … is a generative sort of narrative that allows actors to draw upon various discursive categories to give meaning to specific physical or social phenomena" (1995, 56). The term discourse coalition is defined in Box 1.

Discourse coalitions are defined as the ensemble of …	
1.	a set of storylines;
2.	the actors who utter these storylines; and
3.	the practices in which this discursive activity is based.
	Storylines are here seen as the discursive cement that keeps a discourse coalition together.

Box 1: Definition of discourse coalitions (adapted from Hajer 1995, p. 65)

Utilising this approach for water resources management, the focus is placed on actors' communication and contestation of ideas and norms surrounding water and land use; on revealing different 'storylines' and coalitions of actors (Hajer 2003). In-depth research might expand upon the storyline focus to study vocabularies and epistemic figures in water resources management (see Hajer's three layers in policy discourse – Box 2).

	3 layers in policy discourse
1.	Analysis of storylines, myths and metaphors: (crisp) generative statements that bring together previously unrelated elements of reality and thus facilitate coalition formation
2.	Analysis of policy vocabularies: sets of concepts structuring a particular policy, consciously developed by policymakers
3.	Analysis of epistemic figures: certain rules of formation that underpin theories/policies but are 'not formulated in their own right'

Box 2: Three layers in policy discourse (adapted from Hajer 2003, p. 104, Table 3.1)

Howarth (2005) provides useful methodological insights on conducting discourse analysis. He addresses "questions concerning the appropriate relationship between description, understanding and explanation, the role (if any) of causal explanation, the place of critique and normative evaluation, the problems surrounding appropriate research design, and so on" (ibid., 317). He also highlights problems in dealing with the wide range of rather different types of empirical data normally generated in case studies. Considering text as data and data as text, he offers a pragmatic systemisation of empirical data, which is illustrated in Table 2.

	Linguistic	Non-linguistic
Reactive	Interviews	Participant observation, action research
Non-reactive	Documents	Images, constructs, architectures

Table 2: Systematic distinction of empirical data (adapted from Howarth 2005, p. 335, Fig. 1)

In methodological terms, Hajer (2006) identifies at least ten steps necessary when doing discourse analysis (see Box 3). The key to identifying storylines is to look for causal chains linking problems to solutions, identifying roles of key actors and mentioning important events. Equally important is to identify ways of thinking about water, i.e. socio-cultural practices in discussions and values attached to water, which is especially important in developing and transition countries. Interviews centred on problems and their solution should quite naturally yield storylines. The best approach may be semi-structured interviews, allowing space for interviewees to talk freely. A few, simple set questions designed to prompt the interviewees could provide a general structure. What are the main problems in the area? Where exactly are they located and who do they affect in the context? What and who are the causes of the problem? What can be done to solve them? Who could help? When conducting in-depth research also ask for contacts for further interviews. However, it may be necessary to look across interviews to build-up a coherent storyline if, for example, an interviewee provides no concrete explanation for a problem.

10 steps in doing discourse analysis	
1.	Desk research
2.	'Helicopter interviews' with a few actors who have an overview of the context, ideally from different positions within it. Helps to identify key actors
3.	Document analysis regarding problem-solving approach, storylines, etc.
4.	Interview with key players/stakeholders
5.	Identification of sites of argumentation/contestation
6.	Analysis of positioning effects of storylines in relation to different actors
7.	Identification of key incidents
8.	Analysis of the coherence of argumentation, practices and data in selected cases
9.	Interpretation
10.	Second visit to key actor

Box 3: Ten steps in doing discourse analysis (adapted from Hajer 2006, pp. 73-74)

A number of useful publications on storylines, narratives and relevant methodologies is available under www.uel.ac.uk/cnr/at the Centre for Narrative Research, University of East London. Apart from the conceptual approach presented above there are further complementary or alternative ones. The 'Social Network Analysis' by Wassermann and Faust (1994), for example, conceptualises social relationships as nodes (the actors) and ties (all kinds of relationships, e.g. friendship) which can be visualised as a graphical representation of a network and allows for quantitative analysis. The 'Constellation Analysis' by Schoen et al. (2004) is an interdisciplinary bridging concept that draws on visualisation and maps relationships between all important societal, technical and natural factors in complex settings. An example of a more specific approach to identify and analyse stakeholders in river basin management relevant to participation in the course of implementing the EU Water Framework Directive has been elaborated by Muro et al. (2006).

>> 3.2.2 Research Resources for Stage 2: Domains of Water Problems/Solutions

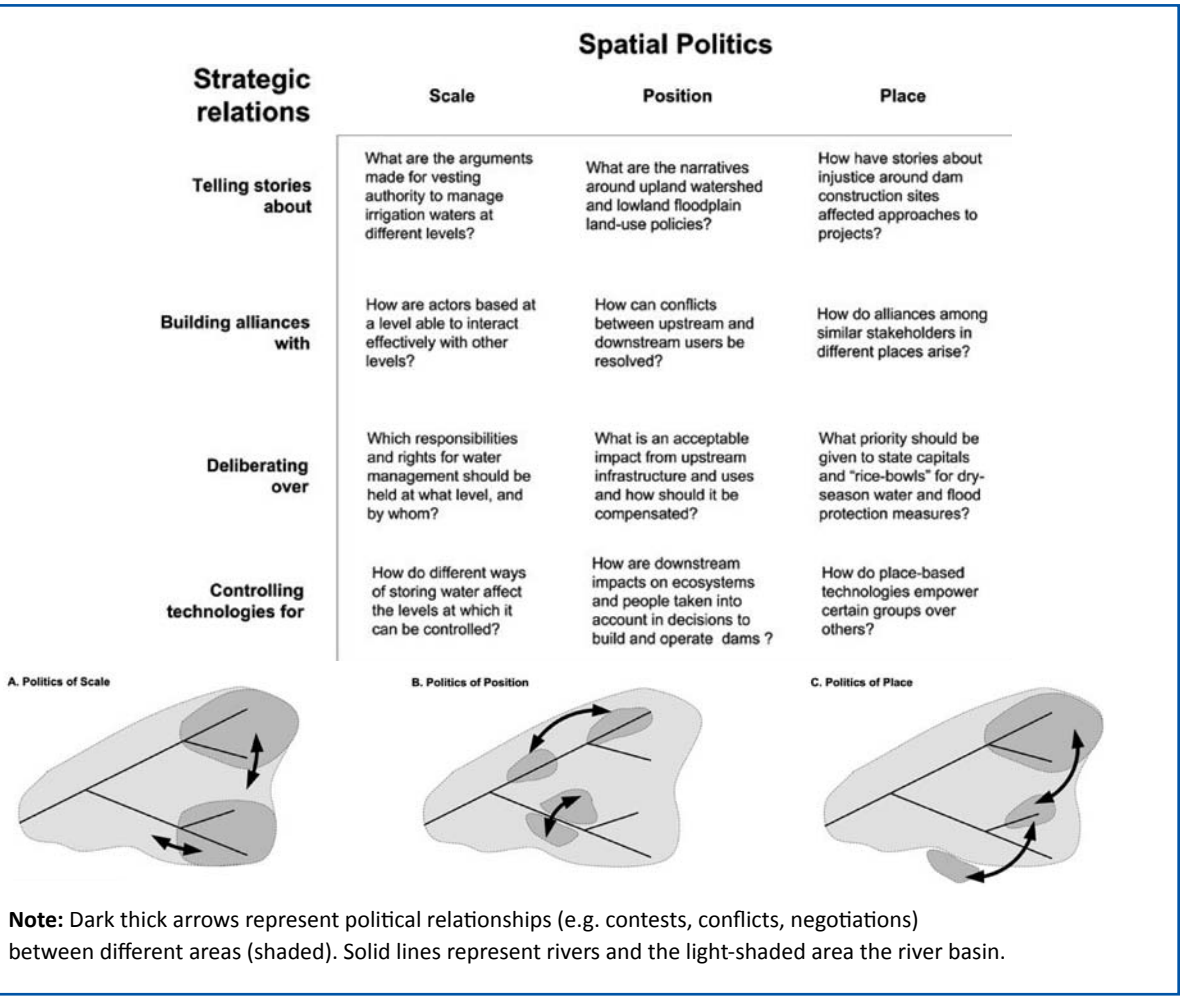
This stage relates to the multidimensional (spatial, temporal, etc.) qualities of the water problems and solutions identified in the previous stage. This second stage is, in one sense, a mapping exercise, employing various ways of visualising and graphically representing water problems and solutions. However, it is much more than just mapping: it is about the actors acting in different domains, the different stakes they have there, the tactics and strategies they pursue and their power relations.

Key texts for theoretical and conceptual guidance here include Mollinga (2008), Lebel et al. (2005), Lebel et al. (2008), Zeitoun and Warner (2006) and Zeitoun and Allan (2008). Mollinga aims to incorporate an understanding of 'politics' in the study of water resources management, which he views as inherently political (2008, 8). The proposition "is based on the idea that water control is at the heart of water resources management and should be conceived as a process of politically contested resource use" (ibid., 10). Mollinga argues it should be perceived three-dimensionally: technical/physical, organisational/managerial and regulatory/socio-economic (ibid.). He then develops a topology of water politics by discerning four domains of interaction according to different space and time scales, actor configurations, issue types, contestation modes and institutional settings. A fifth domain represents the linkages between the first four domains (Box 4).

A topology of water politics	
1.	The ***"everyday politics of water resource management"***: contestation of day-to-day water use and management
2.	The ***"politics of water policy in the context of sovereign states"***: contestation of policy-making processes at the nation-state or sub-national level
3.	The ***"inter-state hydropolitics"***: water conflicts & negotiations between states, e.g. over water allocation/distribution
4.	The ***"global politics of water"***: the institutions, policies and regulations which have emerged since the 1990s
5.	The ***"linkages between or across these domains"***: the travelling of policy issues and water contestations across different domains

Box 4: A topology of water politics (adapted from Mollinga 2008, pp. 12-13)

In another highly relevant text for research in this stage, Lebel et al. (2005, 1) argue that appropriate scales in water resources management "cannot be unambiguously derived from physical characteristics … [but are] a joint product of social and biophysical processes". They highlight that spatial scales should not be taken as given, instead they might be created, constrained and shifted in the self-interest of certain actors who "can change power and authority by working at different spatial levels" (ibid.). Scale choices can cause biases in environmental assessments and, moreover, can even be used/abused as a means of inclusion or exclusion. Regardless of its usefulness, according to Lebel et al. the scale metaphor has been stretched to embrace many kinds of spatial relationships. Instead, they prefer to differentiate more precisely between the politics of scale, position and place (ibid.). An illustration is provided in Figure 4 with examples of related analytical questions.



Note: Dark thick arrows represent political relationships (e.g. contests, conflicts, negotiations) between different areas (shaded). Solid lines represent rivers and the light-shaded area the river basin.

Figure 4: A schematic representation of the politics of scale, position and place around regional water resources plus examples of analytical questions about strategic spatial relations of actors (adapted from Lebel et al. 2005, pp. 2 & 11, Figs. 1 & 4)

In another paper Lebel et al. (2008) adopt a multi-level perspective to map and study governance challenges related to the conservation of terrestrial biodiversity in upper tributary watersheds in South East Asia. For this purpose they develop a framework centred on three scales (groups, resources, spaces) which are explained first in terms of how they and their different levels are created or discovered. These scales "correspond approximately to questions about who and why (groups), what (resources), and where (spaces)" (ibid., 130). The aggregated entities moving up these levels are people (on the groups scale), ecological processes (on the resources scale), and jurisdictional areas (on the spaces scale) (ibid., 129). Observations on each scale are then clustered around eight mechanisms by which scales and levels are contested in conservation within communities: bounding, representing and justifying (on the groups scale); using and understanding (on the resources scale); and classifying, zoning and administering (on the spaces scale) (ibid., 130). The approach deploys a number of illustrative graphical representations. Similarly, in an analysis of six case studies of deliberative engagements dealing with the development and management of water resources in the Mekong basin, Dore and Lebel (2010) demonstrate how to utilise mapping techniques (Figure 5) when one is confronted with two spatial scales (hydrological and administrative-territorial) and overlapping time/planning scales.

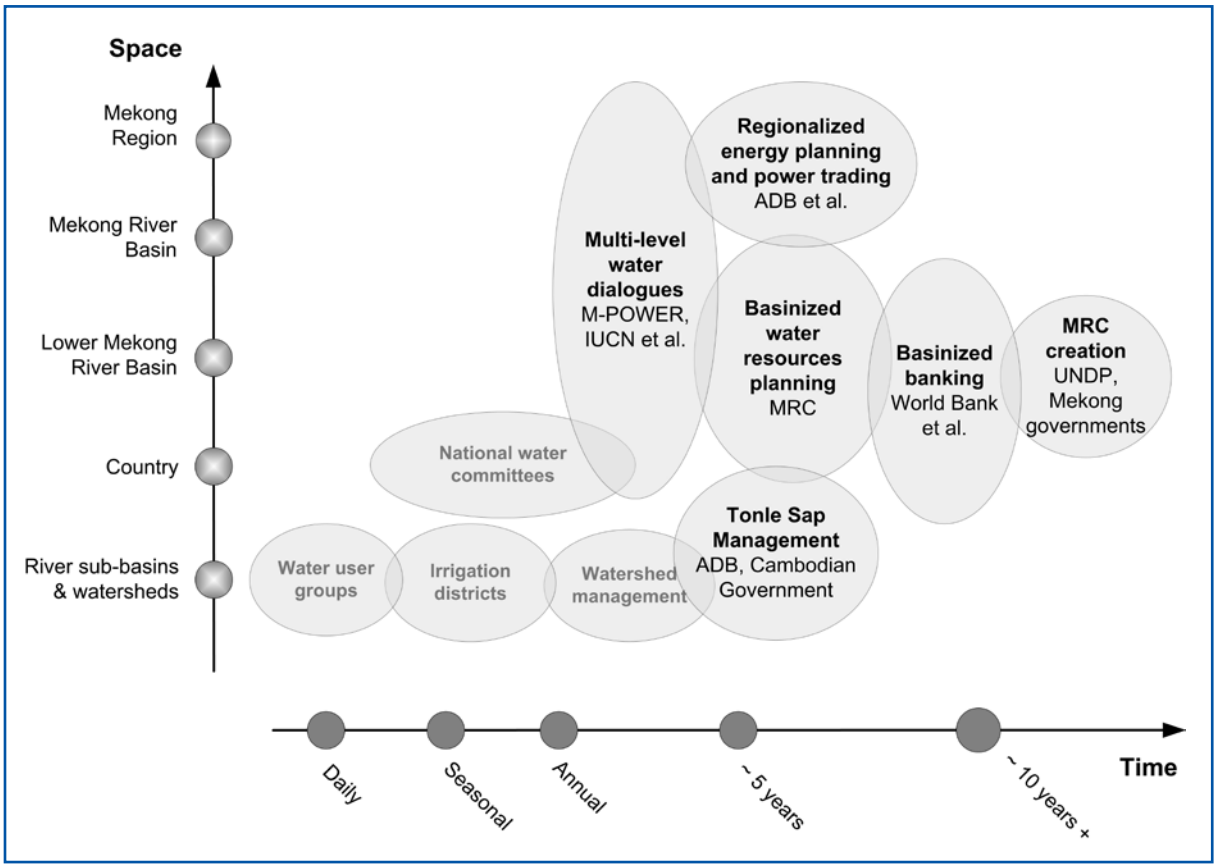


Figure 5: Deliberative engagement in the Mekong region mapped onto the primary spatial and temporal scales and levels (Dore and Lebel 2010, p. 67, Fig. 3)

Two further key papers analyse trans-boundary water conflicts which are located, in Mollinga's terminology, in the 'inter-state hydropolitics' domain. Their concern is that "conventional analysis tends to downplay the role that power asymmetry plays in creating and maintaining situations of water conflict that fall short of the violent form of war …. The conceptual Framework of Hydro-Hegemony … attempts to give these two features – power and varying intensities of conflict – their respective place in the perennial and deeply political question: who gets how much water, how and why?" (Zeitoun and Warner 2006, 435). An illustration of the approach is provided in Figure 6. Introducing the basic concept of hydro-hegemony, Zeitoun and Allan (2008, 3) highlight that "both power and political economy processes are especially effective when they operate invisibly." They address three different forms of power (structural, bargaining and ideational), which are explained as follows: "The most common form of power for countering the established order is bargaining power. The most effective form of [power] for establishing or preserving the order is ideational power" (ibid., 11).

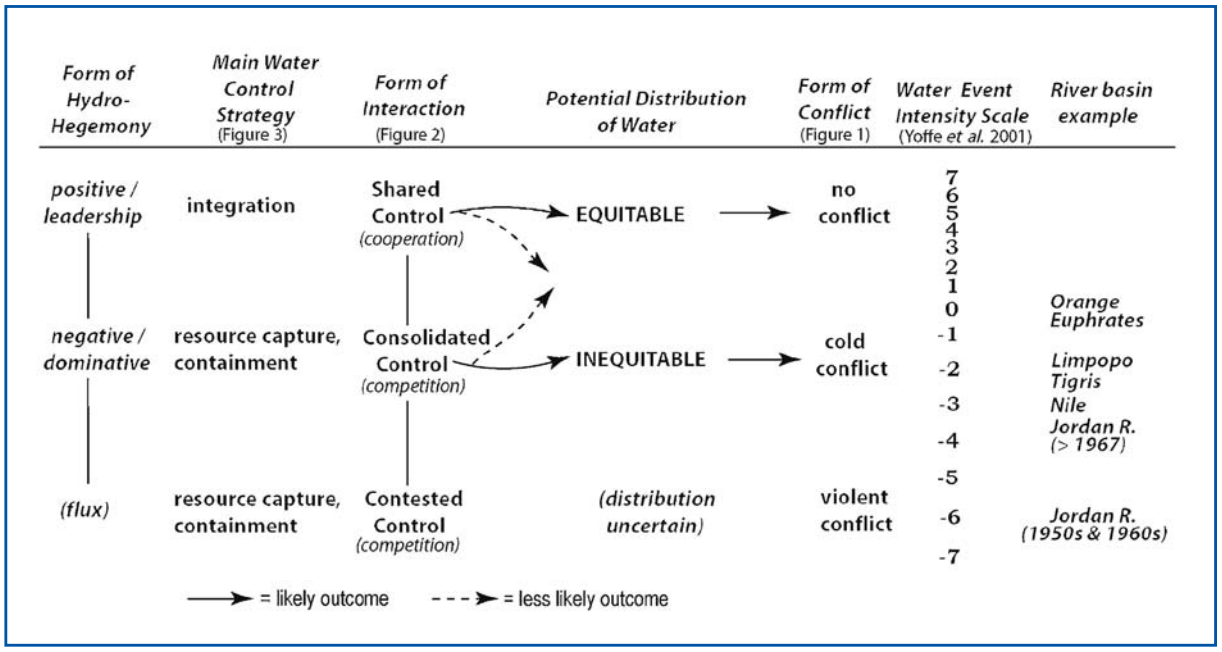


Figure 6: The framework of hydro-hegemony:
Combining the form of hydro-hegemony, form of interaction, outcome interaction and intensity of conflict (Zeitoun and Warner 2006, p. 453, Fig. 5)

>> 3.2.3 Research Resources for Stage 3: Political and Institutional Feasibility

'Feasibility' is understood here in institutional and political terms and the purpose of this stage is to 'follow the solutions': to trace the existing institutional arrangements relevant to the implementation of a proposed solution and to reflect upon their feasibility. Proceeding in this fashion entails a clear focus on the notion of institutional fit or misfit (to provide a general sense of feasibility or compatibility of solutions). Given the multitude of approaches to institutional analysis it is, then, reasonable to concentrate first on those approaches that either conceptualise this notion or exemplify it through case studies. For a more general and fundamental discussion of the problem of fit see, for example, Folke et al. (2007) and Moss (2012).

A productive way of thinking about fit in practical terms has been demonstrated by Moss' (2003a) study on the implementation of the EU WFD in Germany. Six components of institutional arrangements are qualitatively assessed here in terms of their manifestation in key features of the water sector in Germany. Figure 7 presents this assessment of institutional fit with reference to the component 'problem-solving approach', which consists of six key features. The approach can easily be adapted to the context-specific circumstances of other countries/river basins.

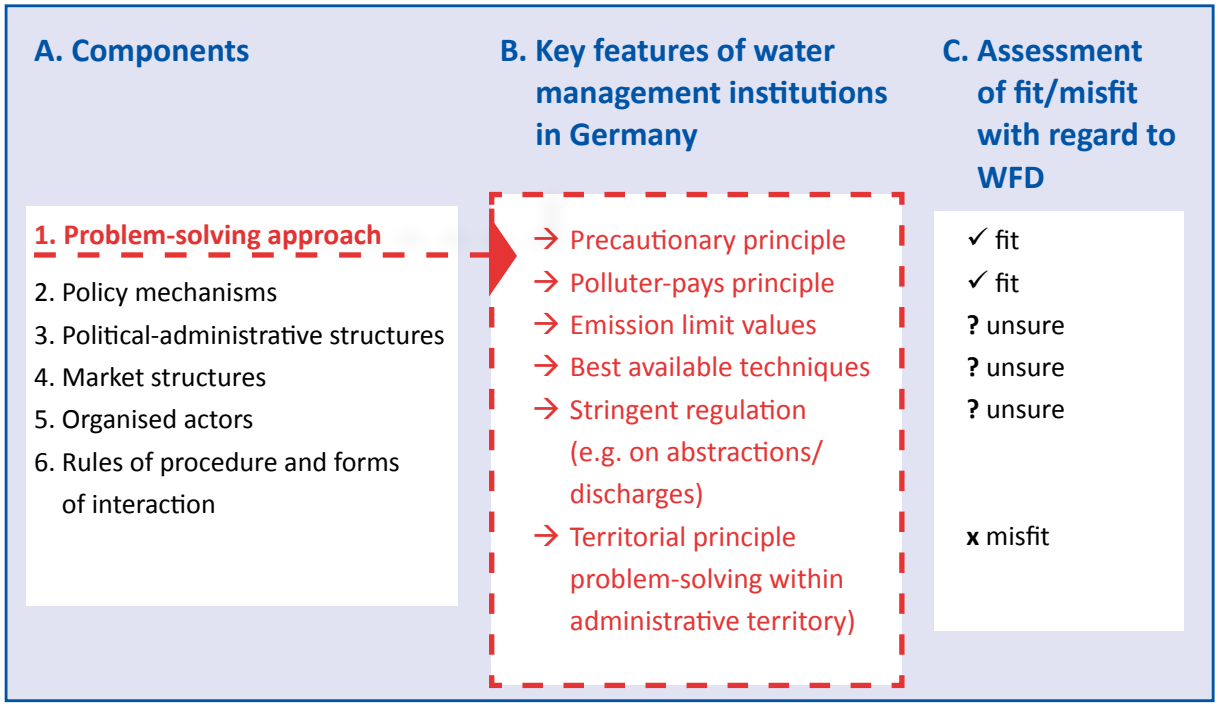


Figure 7: Components of an institutional system and assessment of institutional fit, exemplified by key features of the water sector in Germany (adapted from Moss 2003a)

A similar approach, referred to as the "Procedure for Institutional Compatibility Assessment (PICA)", has recently been proposed by Theesfeld et al. (2010, 383 f.). The procedure starts by clustering a number of policy options (step 1), which are then described by a set of "crucial institutional aspects (CIA)" (ibid.) (step 2). This is followed by an evaluation based on indicators of their potential to facilitate or hinder the respective policy options (step 3) and, finally, an aggregated, qualitative assessment of institutional fit/misfit (step 4). Figure 8 illustrates the PICA approach using the example of the EU Nitrate Directive.

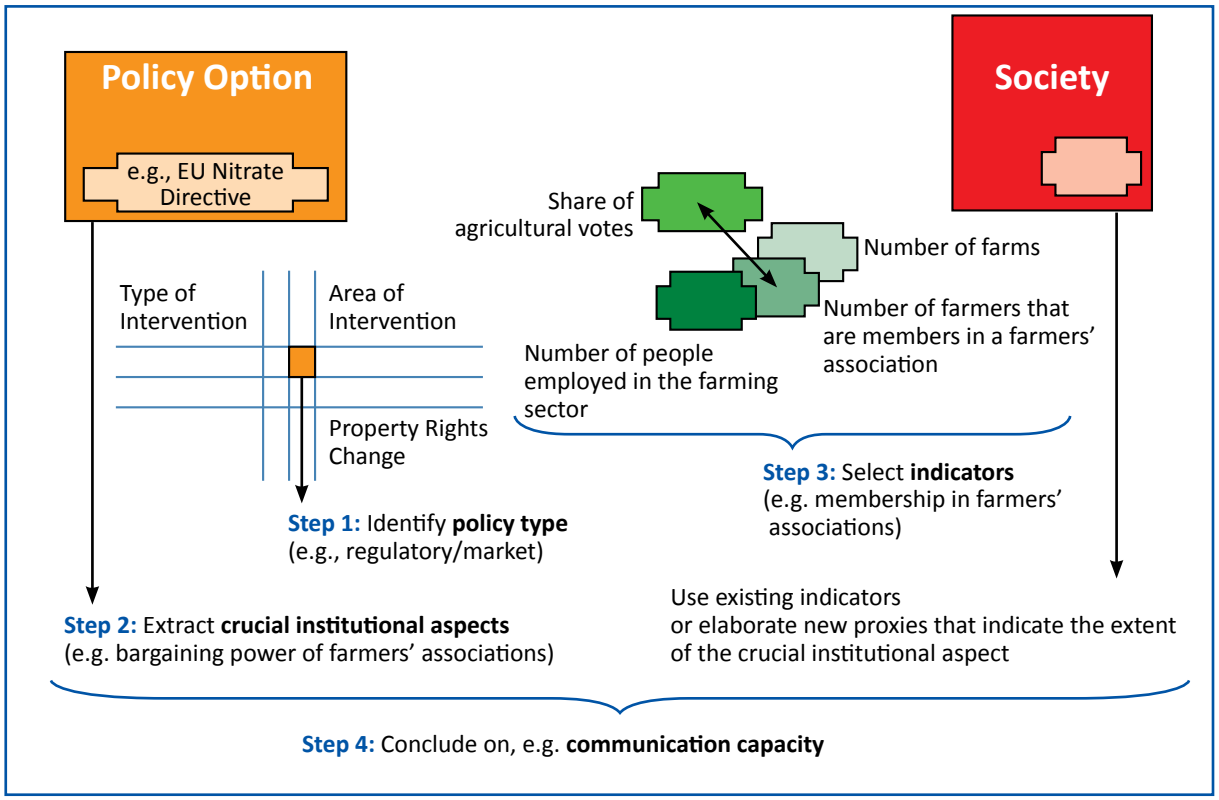


Figure 8: Scheme of the procedure for institutional compatibility assessment
(Theesfeld et al. 2010, p. 394, Fig. 2)

Whereas the aforementioned approaches refer to the notion of fit/misfit, Young (2006) addresses another crucial dimension of institutional feasibility: vertical interplay among scale-dependent environmental and resource regimes. Having identified five typical patterns of cross-level interplay (Figure 9), he argues "it is dangerous to focus attention exclusively on … only a single level on the scale of jurisdiction" (ibid., 14). For a general discussion of the problems of fit and (vertical and horizontal) interplay see Young (2002) and also Moss (2003b) on the reciprocal relationship between institutional interplay and fit.

Beyond those approaches addressing the problems of institutional fit and interplay there are a large amount of more general and broader frameworks of institutional analysis. Among them the pioneering work of Elinor Ostrom and colleagues on the 'Institutional Analysis and Development' (IAD) framework, e.g. in Ostrom (1990, 2005 and 2011) and Ostrom, Gardner and Walker (1994), is clearly the most prominent. Originally designed to understand rather limited common pool resource regimes, e.g. farmer-managed traditional irrigation schemes, the IAD framework is currently being extended to make it applicable to the analysis of much more complex systems: the 'Program in Institutional Analysis of Social-Ecological Systems' (PIASES) Framework (McGinnis and Ostrom 2010).

The IAD framework has also influenced and inspired a large number of scholars who have applied it in numerous case studies and also further developed, extended and enriched the original model. For example, Pahl-Wostl et al. (2010) use it as a building block in their 'Management and Transition Framework' (MTF), which was developed to study complex water governance regimes within the NeWater research project. Further examples include Ebenhöh (2007), who has designed agent-based models of water management regimes on the basis of the IAD framework, Saravanan (2008), whose systems approach to complex water management institu-

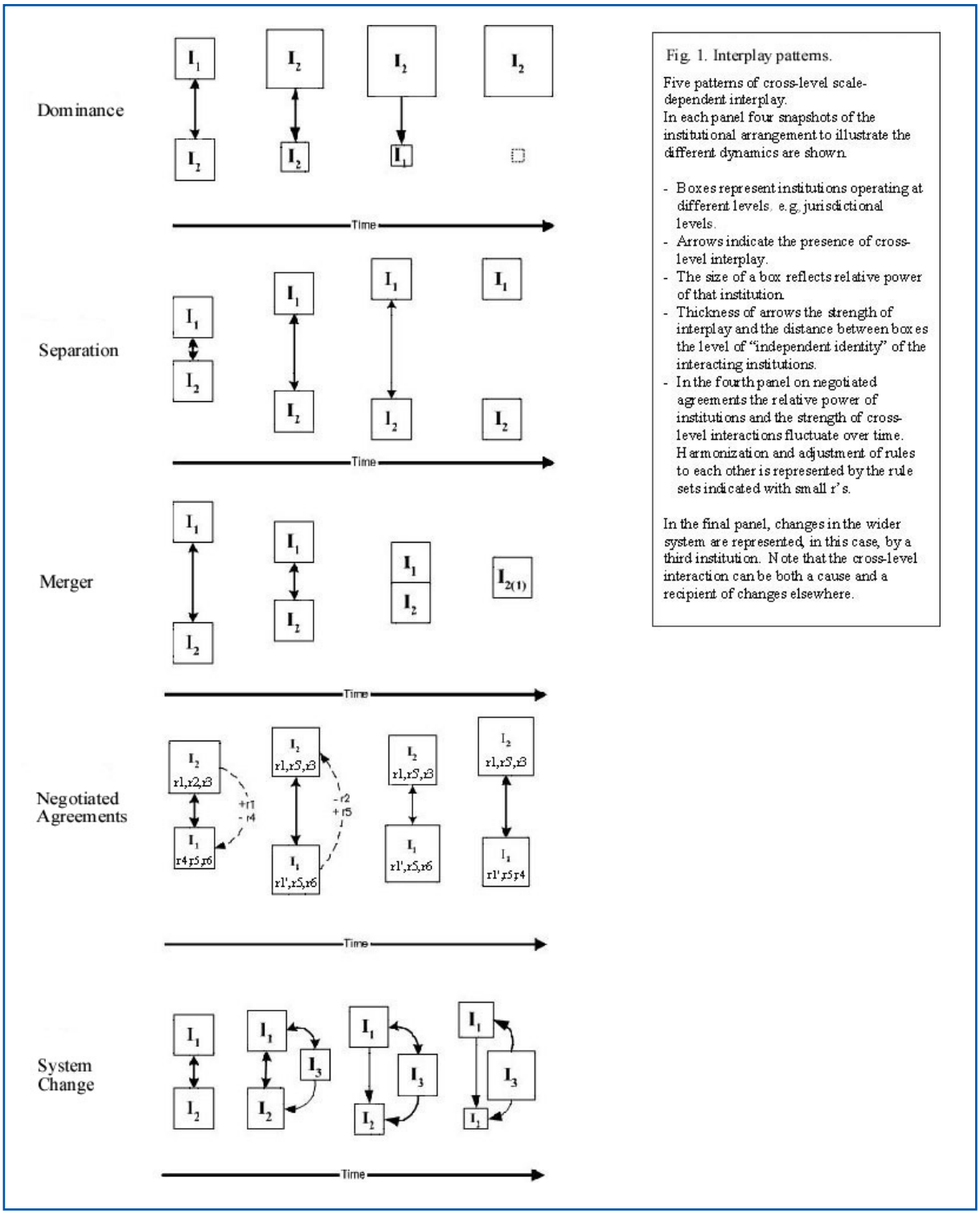


Figure 9: Five patterns of cross-level scale dependent interplay (Young 2006, Fig. 1)

tions builds on it, and Clement (2010) who has developed a politicised version of the IAD framework (see Figure 10). The latter could potentially be integrated with the discourse analytical storyline approach presented in Stage 1 of this Handbook. Alongside these approaches, which are tightly connected to the IAD framework, other ones draw more generally on a number of its components, e.g. the 'Institutional Decomposition and Analysis' (IDA) framework by Saleth and Dinar (2004, see in particular chapters 4 and 5).

It should, however, be noted that attempts by IAD proponents to identify universally applicable basic rules and institutional design principles have been contested by a number of scholars. Cleaver, for example, notes that "the school of 'institutional crafting' … is based on concepts which are inadequately socially informed and which ill-reflect the complexity, diversity and ad hoc nature of institutional formation" (2002, 11). A similar view is expressed by Merrey and Cook (2012).

Further notable examples of approaches to institutional analysis with regard to water resources management comprise studies conducted by the International Water Management Institute (e.g. Bandaragoda 2000) and the pioneering work of Ingram et al. (1984) to develop guidelines for improved institutional analysis in water resources planning, the value of which for contemporary water research has been demonstrated recently by Poirier and Loë (2010).

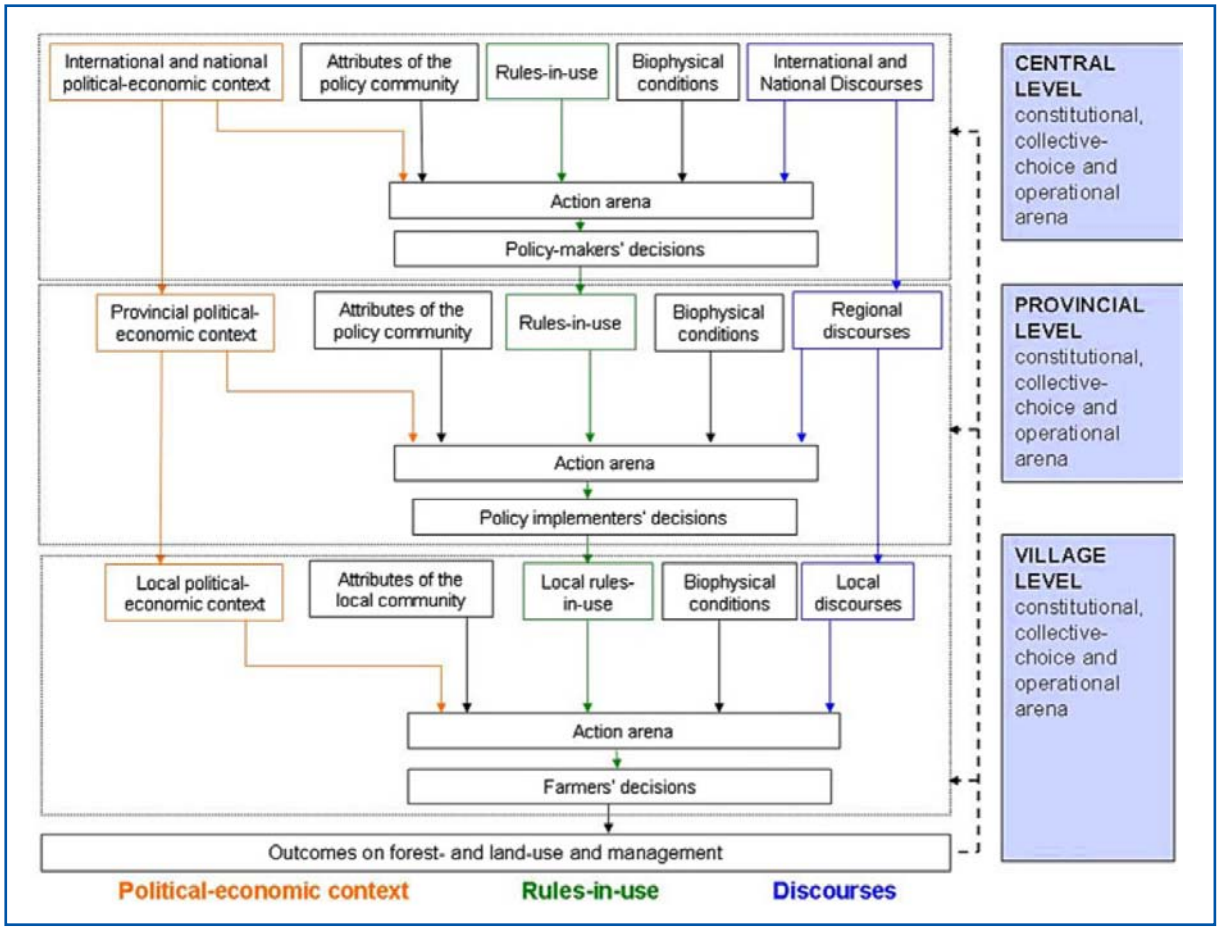


Figure 10: Overview of the overall framework adopted for the study of forest policies in Vietnam ['Politicised IAD framework'] (Clement 2010, p. 145, Fig. 6)

>> 3.2.4 Research Resources for Stage 4: Ways Forward

Building on the previous three stages the final stage has two aims. First, to find ways to further promote solutions with a high degree of institutional fit through the targeted allocation of project resources, development of alliances with relevant organisations or the introduction of particular technologies. Second, to suggest appropriate institutional adaptations or reforms to advance solutions with a low degree of institutional fit.

One of many key texts for theoretical and conceptual guidance, especially for developing countries, is offered by Lankford (2007) and Lankford et al. (2007). This approach aims to move "from integrated to expedient water resources management" (Lankford et al. 2007, 8) and usefully combines a concern for effectiveness with participation. It is based on the assumption that to gain a deeper understanding of the feasibility of projects it is necessary to consider more thoroughly a) the contextual conditions in terms of actors, support for particular solutions and the benefits to be gained (and for which actors) and b) the time and material resources of the project. Lankford emphasises that 'solutions' should be thought of in terms of 'tasks', i.e. "to break large issues into more manageable objectives" (Lankford 2007, 49). This can be achieved through risk-based analysis to "identify component tasks and then identify which are effective in cost-benefit terms" (ibid., 50) and "specific conflict resolution exercises [that] address locally relevant and socially critical concerns" (ibid.). In relation to research stage 4, these methods could be followed for both those solutions deemed most feasible and those solutions deemed unfeasible that enjoy most support.

Central questions that need to be addressed when bringing solutions forward is the distribution of costs and benefits between different groups of stakeholders and the identification of potential carriers of, and opponents to, institutional transformation and their respective power and interest. In Slootweg and Mollinga's impact assessment framework "the term 'stakeholder' is interpreted in its widest possible sense" (2009, 98). They identify four main categories related to the impact of policies, projects etc. on stakeholders and make a further distinction between onsite stakeholders (directly affected) and distant ones (indirectly affected) (ibid., 99 f.). For an illustration see Figure 11. In another example, the IFAD (2008) has developed a helpful guiding matrix regarding possible strategies for engagement with different forms of stakeholder interest and power (Table 3). Furthermore, the IFAD provides general information on "crafting interventions and seeing change through", including general prerequisites for success (ibid., chapter 8, 85-94).

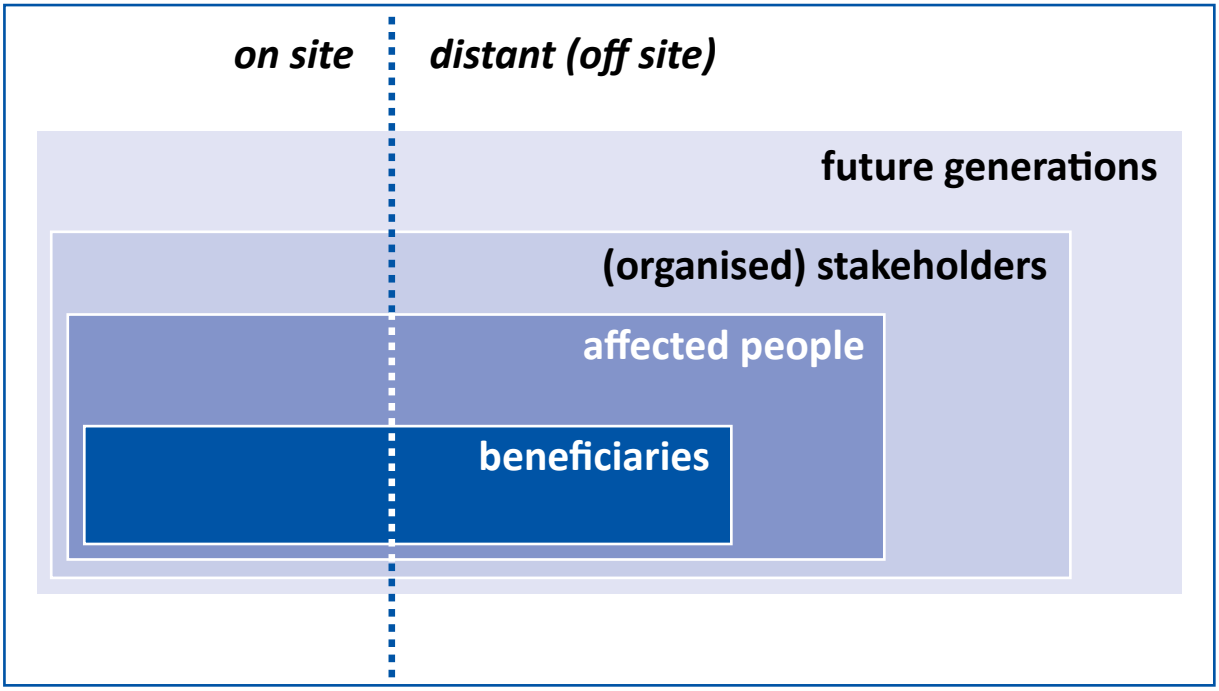


Figure 11: Stakeholders (Slootweg and Mollinga 2010, p. 99, Fig. 4.2)

	Stakeholder interest		
Stakeholder power	**Positive interest**	**Neutral interest**	**Negative interest**
Very powerful/powerful	Collaborate with, involve closely in the process	Win over, or at least ensure that s/he doesn't turn hostile	Mitigate impacts, neutralize, defend against
Moderately powerful	Collaborate with, involve closely in the process	Win over, or at least ensure that s/he doesn't turn hostile	Mitigate impacts, neutralize, defend against
Negligible power	Involve, build capacity, secure interest	Win over, or at least ensure that s/he doesn't turn hostile	Monitor, mitigate impacts, neutralize

Table 3: Strategic orientation to manage stakeholder relationship (IFAD 2008, p. 84, Table 15)

	Single loop	Double loop	Triple loop
Institutions—general	No calling into question of established institutions, signs of unilateral reinterpretation	Reinterpretation of established institutions by many parties	Established institutions changed and/or new institutions implemented
Regulative institutions	Existing regulations are strictly followed and used to justify established routines	Regulatory frameworks identified as major constraints for innovation	Formal substantial changes in regulatory frameworks, new policies implemented
	New by-laws and interpretations of existing law to accommodate exceptions	More juridical conflicts about rule interpretation	Institutional change towards more flexible regulations that leave room for context specific implementation. More process regulations
		Exemptions allowing innovative approaches and experimentation	
Normative institutions	Established norms are used to justify prevailing system Relying on codes of good practice	Established norms and routines are called into question	Change which can be identified in public discourse and new practices
Cultural-cognitive institutions	Discourse remains in established paradigms that are refined.	New ideas emerge beyond isolated groups	Discourse dominated by new paradigm (media, political debate, public hearings, scientific conferences)
	Radical alternatives clearly dismissed.	Strong arguments about alternative views—"ideological" debates	Powerful representatives of "main-stream" argue in new paradigm
Uncertainty	Uncertainty used to justify non-action	Uncertainty accepted and perceived as opportunity in processes of negotiations and reframing	Uncertainty discourse emphasizes different perspectives and world views
	Activities to reduce uncertainties. Reliance on science to find the truth/a solution	Existence of different perspective and world views explicitly acknowledged	New approaches to manage uncertainty (e.g. participatory scenario development) and risk (e.g. risk dialogues, robust action) are implemented with corresponding efforts to change structural constraints
	Discourse focuses on technical approaches to dealing with uncertainty with goal to improve predictive capabilities	Established approaches to managing uncertainty and risks are called into question	Conscious decision-taking under (irreducible) uncertainty with the prospect of adapting the measures when necessary
Actor network	Actors remain mainly within their networks—communities of practice	Explicit search for advise/opinion from actors outside of established network (e.g. invitation to meetings)	Changes in network boundaries and connections
	Established roles and identities are not called into question	New roles emerge—e.g. facilitators in participatory processes Arguments about identify frames—e.g. what does it mean to be an "engineer" Boundary spanners of increasing importance that start to connect different networks—communities of practice	New actors groups and roles have become established Changes in power structure (formal power, centrality—new actors in centre) Identity frames/roles get blurred/ less important, rather joint approaches than isolated performance according to one's role
Multi-level interactions	Vertical coordination in established patterns—e.g. increased regulation from the top level Pattern of flow of authority (by institutions) does not change. Mainly uni-directional	Increased informal knowledge exchange between levels Informal coordination groups to improve exchange in planning processes established	Formalized participation of actors at different levels Established practices of knowledge exchange across levels More polycentric structures and balance between bottom-up and top-down approaches
Governance mode	No change in the relative dominance of governance types	Other than dominant governance types start to become more visible and dominant governance type called into question (e.g. discussion of market based instruments if absent before, introduction of participatory approaches, emergence of bottom-up participatory processes, argument about dominance of one type—bureaucratic hierarchies or privatization)	New governance types implemented, established governance types substantially changed
	Improvement of performance within established governance modes	Informal networks shaping discourse and supporting experimental innovations become more prominent	More diverse governance structures– less dominance of one type Learning networks challenging dominating structural assumptions become effectively connected to and influence established policy arenas

Table 4: Characterization of changes in governance regimes expected for single, double and triple loop-learning (Pahl-Wostl 2009, p. 360, Table 1)

Pahl-Wostl develops a framework that, although not restricted to case studies, nevertheless allows a flexible, context-sensitive analysis. She conceptualizes "change … as social and societal learning that proceeds in a stepwise fashion moving from single to double to triple loop learning. Informal networks are considered to play a crucial role in such learning processes" (2009, 354). She assumes institutional change proceeds in the direction of more flexible and context-specific, formal as well as informal regulations, where "a major role is attributed to non-state actors … boundary spanners, knowledge brokers and emergent leadership" (ibid., 363). Table 4 summarizes the sequence of learning cycles from single-loop (incremental improvement) to double-(reframing) and triple-loop learning (transforming).

From a stage-based perspective, Saleth and Dinar (2005) attempt to synthesise the main findings from water institutional reforms in six countries "to provide insights into the internal mechanics and dynamics evident in the process of water institutional change" (ibid., 1). Their aim is, moreover, to identify "a few practically relevant principles for reform design and implementation [and to synthesise] reform theories with actual practices by providing anecdotal evidence for various theoretical postulates and practical reform principles" (ibid.). "The major upshot … is that the change process is not entirely evolutionary or autonomous. Deliberate and purposive policies can substantially alter or reinforce the course of institutional change" (ibid., 8). Reform design principles such as institutional prioritisation, sequencing and packaging are developed from sequential and structural linkages between different institutional components. They can be utilised as a strategic and tactical means to alter the process of institutional change by helping to minimise transaction costs, exploit synergetic effects and counter political opposition to water sector reforms. "Institutional prioritization enables us to target reform efforts and investments on those components having a high probability of success, immediate performance returns and downstream reform facilitation" (ibid., 8). Saleth and Dinar conclude that "ad hoc approaches to reforms, as dictated by political and financial constraints, can be counterproductive owing to the dilution of their effects and consolidation of reform opposition. … the best strategy is to have selective but sequentially linked reforms focused on institutional components and sectoral contexts with a better reform prospect" (ibid., 18).

However, in contrast to the school of 'institutional crafting', and in a critique of universal institutional design principles, Cleaver (2002) advocates 'institutional bricolage'. She rejects the common dichotomy of formal and informal institutions and instead distinguishes between bureaucratic and socially embedded institutions (ibid., 13). She replaces the idea of "narrowly rational 'institutional engineers' in favour of 'do-it yourself' bricoleurs" (ibid., 17). Opposed to rational choice thinking, in her conception "'institutions do the thinking' on behalf of people and institutions are constructed through a process of bricolage – gathering and applying analogies and styles of thought already part of existing institutions" (ibid., 15). The concept of institutional bricolage may also include the co-opting of existing, enduring, robust and socially embedded decision-making arrangements and relations of co-operation for new purposes rather than the deliberate crafting of new bureaucratic institutional arrangements for particular functions (ibid., 21, 28).

3.3 Bibliography

Allan, J.A., 2003. Integrated Water Resources Management is more a Political than a Technical Challenge. In: Alsharhan, A.S. and Wood, W.W., eds. Water Resources Perspectives: Evaluation, Management and Policy. Amsterdam: Elsevier, 9-23. >> click here

Bandaragoda, D.J., 2000. A Framework for Institutional Analysis for Water Resources Management in a River Basin Context. International Water Management Institute (IWMI), Working Paper 5. >> click here

Biswas, A., 2004. Integrated water resources management: A reassessment. *Water International*, 29 (2), 248-256. >> click here

Beckmann, V. and Padmanabhan, M., eds. 2009. Institutions and Sustainability: Political Economy of Agriculture and the Environment - Essays in Honour of Konrad Hagedorn. Dordrecht: Springer.

Beveridge, R. and Monsees, J. (forthcoming). Bridging Parallel Discourses of Integrated Water Resource Management (IWRM): Institutional and Political Challenges in Developing and Developed Countries.

Blomquist, W., Dinar, A. and Kemper, K., 2005. Comparisons of Institutional Arrangements for River Basin Management in Eight Basins. World Bank Policy Research Working Paper 3636, Washington D.C. >> click here

Butterworth, J., Warner, J., Moriarty, P., Smits, S. and Batchelor, C., 2010. Finding Practical Approaches to Integrated Water Resources Management. *Water Alternatives*, 3 (1), 68-81. >> click here

Chéné, J.-M., 2009. Integrated Water Resources Management: Theory versus practice. *Natural Resources Forum*, 33 (1), 2-5. >> click here

Cleaver, F., 2002. Reinventing Institutions: Bricolage and the Social Embeddedness of Natural Resource Management. *The European Journal of Development Research*, 14 (2), 11-30. >> click here

Cleaver, F. and Franks, T. 2008. Distilling or diluting? Negotiating the water research-policy interface. *Water Alternatives*, 1 (1), 157-176. >> click here

Clement, F., 2010. Analysing decentralised natural resource governance: proposition for a "politicised" institutional analysis and development framework. *Policy Sciences*, 43, 129–156. >> click here

Conca, K., 2006. Governing Water: Contentious Transnational Politics and Global Institution Building. Cambridge, MA: The MIT Press.

DFID, 2003. Department for International Development. Promoting Institutional & Organisational Development – A Source Book of Tools and Techniques. London & Glasgow. >> click here

Dore, J. and Lebel, L., 2010. Deliberation and Scale in Mekong Region Water Governance. *Environmental Management*, 46, 60–80. click here

Ebenhöh, E., 2007. Designing Agent-based Models of Water Management Regimes using the IAD Framework. In: Ostrom, E. and Schlüter, A., eds. The Challenge of Self-Governance in Complex, Globalizing Economies. Freiburg: Institute of Forest Economy, 81-98. >> click here

Eckstein, B. and Throgmorton, J., 2003. Story and sustainability: planning, practice and possibility for American cities. Cambridge, MA: The MIT Press.

Fischer, F., 2003. Reframing Public Policy: Discursive Politics and Deliberative Practices. New York, NY: Oxford University Press.

Folke, C., Pritchard, L. jr., Berkes, F., Colding, J. and Svedin, U., 2007. The Problem of Fit between Ecosystems and Institutions: Ten Years Later. *Ecology and Society*, 12 (1), 30. >> click here

Garb, Y., Pulver, S. and VanDeveer, S.D., 2008. Scenarios in society, society in scenarios: toward a social scientific analysis of storyline-driven environmental modeling. *Environmental Research Letters*, 3 (045015) 1-8. >> click here

Giupponi, C., 2007. Decision Support Systems for implementing the European Water Framework Directive: The MULINO approach. *Environmental Modelling and Software*, 22 (2), 248-258. >> click here

Göhler, G., 1997. Wie verändern sich Institutionen? Revolutionärer und schleichender Institutionenwandel. In: Göhler, G., ed. Institutionenwandel. Leviathan Sonderheft, 16/1996. Opladen: Westdeutscher Verlag, 21-56.

GWP, no date. Global Water Partnership: GWP ToolBox (online). >> click here

GWP & INBO, 2009. Global Water Partnership & International Network of Basin Organisations. A Handbook for Integrated Water Resources Management in Basins. Stockholm & Paris. >> click here

Hajer, M., 1995. The Politics of Environmental Discourse: Ecological Modernization and the Policy Process. Oxford: Oxford University Press.

Hajer, M., 2003. A frame in the fields: policymaking and the reinvention of politics. In: Hajer, M. and Wagenaar, H., eds. Deliberative Policy Analysis. Understanding Governance in the Network Society. Cambridge: Cambridge University Press, 88–110.

Hajer, M., 2006. Doing discourse analysis: coalitions, practices, meaning. In: van den Brink, M. and Metze, T., eds. Words matter in policy and planning. Discourse theory and method in the social sciences. Utrecht: Netherlands Geographical Studies, 65–74. >> click here

Hooper, B., 2008. Best practice integrated river basin governance. In: Dehnhardt, A. and Petschow, U., eds. Sustainability in River Basin Management. A Question of Governance. München: Oekom, 135–161.

Howarth, D., 2005. Applying Discourse Theory: the Method of Articulation. In: Howarth, D., and Torfing, J., eds. Discourse Theory in European Politics: Discourse Theory in European Politics. New York: Palgrave Macmillan, 316-349.

ICLARM, 1996. International Center for Living Aquatic Resources Management (Pido, M. D. et al.). A Handbook for Rapid Appraisal of Fisheries Management Systems (Version 1). Manila. >> click here

ICLEI, 2008. Local Governments for Sustainability (Philip, R. et al.). Local Governments and Integrated Water Resources Management (IWRM), Part III: Engaging in IWRM – Practical Steps and Tools for Local Governments. Freiburg. >> click here

IFAD, 2008. International Fund for Agricultural Development (Lobo, C.). Institutional and organizational analysis for pro-poor change: meeting IFAD's millennium challenge. Rome. >> click here

IHDP, 2005. International Human Dimensions Programme on Global Environmental Change (Young, O. et al.). Science Plan: Institutional Dimensions of Global Environmental Change. IHDP Report No.16. Bonn.

IHE, 1999. International Institute for Infrastructural, Hydraulic and Environmental Engineering (van Hofwegen, P.J.M. and Jaspers, F.G.W.). Analytical Framework for Integrated Water Resources Management – Guidelines for assessment of institutional frameworks. Delft.

Ingram, H.M., Mann, D.E., Weatherford, G.D., and Cortner, H.J., 1984. Guidelines for Improved Institutional Analysis in Water Resources Planning. *Water Resources Research*, 20 (3), 323-334. >> click here

Jønch-Clausen, T. and Fugl, J., 2001. Firming up the Conceptual Basis for Integrated Water Resources Management. *Water Resources Development*, 17 (4), 501-510. >> click here

Lankford, B., 2007. Integrated, adaptive and domanial water resources management. Chapter for CAIWA Conference, Basel, 12-15 Nov 2007. In: Pahl-Wostl, C., Kabat, P. and Möltgen, J., eds. Adaptive and Integrated Water Management. Berlin: Springer, 39-60.

Lankford, B., Merrey, D., Cour, J. and Hepworth, N., 2007. From integrated to expedient: An adaptive framework for river basin management in developing countries. IWMI Research Report 110, Colombo. >> click here

Lankford, B. and Hepworth, N., 2010. The Cathedral and the Bazaar: Monocentric and Polycentric Basin Management. *Water Alternatives*, 3 (1), 82-101. >> click here

Lebel, L., Garden, P. and Imamura, M., 2005. The Politics of Scale, Position, and Place in the Governance of Water Resources in the Mekong Region. *Ecology and Society*, 10 (2), 18. >> click here

Lebel, L., Daniel, R., Badenoch, N., Garden, P. and Imamura, M., 2008. A multi-level perspective on conserving with communities: Experiences from upper tributary watersheds in montane mainland Southeast Asia. *International Journal of the Commons*, 2 (1), 127-154. >> click here

Mayntz, R. and Scharpf, F., eds., 1995. Gesellschaftliche Selbstregelung und politische Steuerung. Frankfurt am Main: Campus-Verlag.

McGinnis, M.D. and Ostrom, E., 2010. IAD and SES Dynamic Flows: Introducing the Program in Institutional Analysis of Social-Ecological Systems (PIASES) Framework. Preliminary draft of a paper to be presented at 13th Economics of Infrastructures Conference, Delft, Netherlands, April 27-28, 2010. >> click here

Merrey, D.J. and Cook, S., 2012. Fostering Institutional Creativity at Multiple Levels: Towards Facilitated Institutional Bricolage. *Water Alternatives*, 5 (1), 1-19. >> click here

Mitchell, B., 1990. Integrated water management, In: Mitchell, B., ed. Integrated Water Management: International Experiences and Perspectives. London, New York: Belhaven Press, 1–21.

Mitchell, B., 2005. Integrated water resource management, institutional arrangements, and land-use planning. E*nvironment and Planning A*, 37, 1335-1352. >> click here

Molle, F. 2008. Nirvana Concepts, Narratives and Policy Models: Insights from the Water Sector. *Water Alternatives*, 1 (1), 131-156. >> click here

Molle, F., Mollinga, P.P. and Meinzen-Dick, R., 2008. Water, Politics and Development: Introducing Water Alternatives. Water Alternatives, 1 (1), 1-6. >> click here

Mollinga, P.P., 2006. IWRM in South Asia: A Concept Looking for a Constituency. In: Mollinga, P.P., Dixit, A. and Athukorala, K., eds. Integrated Water Resources Management: Global Theory, Emerging Practice and Local Needs. London: Sage, 21-37.

Mollinga, P.P., 2008. Water, Politics and Development: Framing a Political Sociology of Water Resources Management. *Water Alternatives*, 1 (1), 7-23. >> click here

Mollinga, P.P., Meinzen-Dick, R.S. and Merrey, D.J., 2007. Politics, Plurality and Problemsheds: A Strategic Approach for Reform of Agricultural Water Resources Management. *Development Policy Review,* 25 (6), 699-719. >> click here

Moriarty, P., Batchelor, C.,Laban, P. and Fahmy, H., 2010. Developing a Practical Approach to 'Light IWRM' in the Middle East. *Water Alternatives*, 3(1), 122-136. >> click here

Moss, T., 2003a. Induzierter Institutionenwandel 'von oben' und die Anpassungsfähigkeit regionaler Institutionen: Zur Umsetzung der EU-Wasserrahmenrichtlinie in Deutschland. In: Moss, T., ed. Das Flussgebiet als Handlungsraum. Institutionenwandel durch die EU-Wasserrahmenrichtlinie aus raumwissenschaftlichen Perspektiven. Münster: Lit-Verlag, 129-175.

Moss, T., 2003b. Solving Problems of 'Fit' at the Expense of Problems of 'Interplay'? The Spatial Reorganisation of Water Management following the EU Water Framework Directive. In: Breit, H., Engels, A., Moss, T. and Troja, M., eds. How Institutions Change: perspectives on social learning in global and local environmental contexts. Opladen: Leske+Budrich, 85-121.

Moss, T., 2012. Spatial Fit – from Panacea to Practice: Implementing the EU Water Framework Directive. Ecology and Society. 17 (3), 2 >> click here

Mostert, E., Craps, M. and Pahl-Wostl, C., 2008. Social learning: the key to integrated water resources management? *Water International*, 33 (3), 293-304. >> click here

Muller, M., 2010. Fit for Purpose: taking integrated water resource management back to basics. *Irrigation and Drainage Systems*, 24 (3-4), 161-175. >> click here

Muro, M., Ober, I. and Scheumann, W., 2006. Zielgruppenermittlung und Zielgruppenanalyse für die Öffentlichkeitsbeteiligung im Flussgebietsmanagement: Ein Leitfaden für die Praxis. Umweltbundesamt, Texte 28/06. >> click here

NeWater project (Barlebo, H.C., ed.), 2007. State-of-the-art report with users' requirements for new IWRM tools. Deliverable 4.2.1. Copenhagen. >> click here

Newig, J., Pahl-Wostl, C. and Sigel, K., 2005. The Role of Public Participation in Managing Uncertainty in the Implementation of the Water Framework Directive. *European Environment*, 15, 333–343. >> click here

Ostrom, E., 1990. Governing the Commons: The Evolution of Institutions for Collective Action. New York, NY: Cambridge University Press.

Ostrom, Elinor, 1999. Institutional Rational Choice: An Assessment of the IAD Framework. In: Theories of the Policy Process, ed. Paul Sabatier. Boulder, CO: Westview Press.

Ostrom, E., 2005. Doing Institutional Analysis: Digging Deeper Than Markets and Hierarchies. In: Menard, C. and Shirley, M.M., eds. Handbook of New Institutional Economics. Münster: Springer, 819-848.

Ostrom, E., 2011. Background on the Institutional Analysis and Development Framework. *The Policy Studies Journal*, 39 (1), 7-27. >> click here

Ostrom, E., Gardner, R. and Walker, J., 1994. Rules, Games, and Common Pool Resources. Ann Arbor, MI: University of Michigan Press.

Pahl-Wostl, C. 2007. Transition towards adaptive management of water facing climate and global change. *Water Resources Management* 21 (1), 49–62.

Pahl-Wostl, C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change*, 19, 354–365. >> click here

Pahl-Wostl, C., Holtz, G., Kastens, B. and Knieper, C., 2010. Analyzing complex water governance regimes: the Management and Transition Framework. *Environmental Science & Policy*, 13, 571-581. >> click here

Poirier, B.A. and Loë, R.C., 2010. Analyzing Water Institutions in the 21st Century: Guidelines for Water Researchers and Professionals. *Journal of Natural Resources Policy Research*, 2 (3), 229-244. >> click here

Roth, W.-M., 1995. From "Wiggly Structures" to "Unshaky Towers": Problem Framing, Solution Finding, and Negotiation of Courses of Actions During a Civil Engineering Unit for Elementary Students. *Research in Science and Education*, 25 (4), 365-381. >> click here

Saleth, M.R. and Dinar, A., 2004. The Institutional Economics of Water: A Cross-country Analysis of Institutions and Performance. Cheltenham, UK: Edward Elgar and World Bank. >> click here

Saleth, M.R. and Dinar, A., 2005. Water institutional reforms: theory and practice. *Water Policy*, 7 (1), 1-19. >> click here

Saravanan, V.S., 2008. A systems approach to unravel complex water management institutions. *Ecological Complexity*, 5, 202-215. >> click here

Saravanan, V.S., McDonald, G.T. and Mollinga, P.P., 2009. Critical Review of Integrated Water Resources Management: Moving beyond polarised discourse. *Natural Resources Forum*, 33, 76-86. >> click here

Schmidt, V.A., 2010. Taking Ideas and Discourse Seriously: Explaining Change Through Discursive Institutionalism as the Fourth "New Institutionalism". *European Political Science Review*, 2 (1), 1-25. >> click here

Schön, S., Nölting, B. and Meister, M., 2004. Konstellationsanalyse: Ein interdisziplinäres Brückenkonzept für die Technik-, Nachhaltigkeits- und Innovationsforschung. TU Berlin, Zentrum Technik und Gesellschaft (ZTG), Discussion Paper 12/04. >> click here

Slootweg, R. and Mollinga, P.P., 2009. The impact assessment framework. *In*: Slootweg, R., Rajvanshi, A., Mathur, V. B. and Kolhoff, A., eds. Biodiversity in Environmental Assessment: Enhancing Ecosystem Services for Human Well-Being. Cambridge: Cambridge University Press, 13–26.

Theesfeld, I., Schleyer, C. and Aznar, O., 2010. The procedure for institutional compatibility assessment: ex-ante policy assessment from an institutional perspective. *Journal of Institutional Economics,* 6 (3), 377-399. >> click here

UNESCO, 2009. United Nations Educational, Scientific and Cultural Organization. IWRM Guidelines at River Basin Level, Part I: Principles; Part 2-1: The Guidelines for IWRM Coordination; Part 2-2: The Guidelines for Flood Management; Part 2.3: Invitation to IWRM for Irrigation Practitioners, Paris. >> click here

Wasserman, S. and Faust, K., 1994. Social Network Analysis: Methods and Applications. New York, NY: Cambridge University Press.

Young, O., 2002. The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale. Cambridge, MA: The MIT Press.

Young, O., 2006. Vertical Interplay among Scale-dependent Environmental and Resource Regimes. *Ecology and Society*, 11 (1), 27. >> click here

Zeitoun, M. and Allan, J.A., 2008. Applying hegemony and power theory to transboundary water analysis. *Water Policy*, 10 Supplement 2, 3-12. >> click here

Zeitoun, M. and Warner, J., 2006. Hydro-hegemony – a framework for analysis of trans-boundary water conflicts. *Water Policy*, 8 (5), 435-446. >> click here

IRS
Leibniz Institute for
Regional Development
and Structural Planning

Flakenstraße 28 - 31
D-15537 Erkner

Phone: +49 (0) 33 62 / 7 93 - 0
Fax: +49 (0) 33 62 / 7 93 - 111
E-Mail: regional@irs-net.de
www.irs-net.de