Actor analysis for water resources management

Putting the promise into practice

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Acronyms and abbreviations

BCM	billion cubic metres
CUSW	Cebu Uniting for Sustainable Water (Philippines)
DANA	Dynamic Actor Network Analysis
DENR	Department of Environment and Natural Resources (Philippines)
DSI	General Directorate for State Hydraulic Works (Turkey)
EEAA	Egyptian Environmental Affairs Agency
EU WFD	European Union Water Framework Directive
FMT	Formulation Mission Team (Case Philippines)
GMCR	Graph Model for Conflict Resolution
IWFD	Implementation of the Water Framework Directive (project) (Case Turkey)
LGU	Local Government Unit
MALR	Ministry of Agriculture and Land Reclamation (Egypt)
MCDW	Metro Cebu Water District (Philippines)
MoE	Ministry of Environment (Turkey)
MHP	Ministry of Health and Population (Egypt)
MWRI	Ministry of Water Resources and Irrigation (Egypt)
MPWWR	Ministry of Public Works and Water Resources, now MWRI (Egypt)
NGO	Non-Governmental Organization
NH	Province of North-Holland (Netherlands)
NIPAS	National Integrated Protected Areas System (Philippines)
NOPWASD	National Organization of Potable Water and Sewage Disposal (Egypt)
NWRP	National Water Resources Plan (project) (Case Egypt)
PA	Protected Area (Case Philippines)
PDoE	Provincial Directorate of Ministry of Environment (Turkey)
PODP, PO	Project Organization for Diffuse Pollution (Case Netherlands)
RBMP	River Basin Management Plan (Case Turkey)
RNE	Royal Netherlands Embassy
RWG	Regional Working Group (Case Turkey)
RWS	Rijkswaterstaat (Dep. of Public Works & Water Management, Netherlands)
SODA	Strategic Options Development and Analysis
TA	Technical assistance (Case Philippines)
TSG	Technical Support Group (Case Philippines)
TU Delft	Delft University of Technology (Netherlands)
USC	University of San Carlos (Philippines)
VNhG	Association of Municipalities in North-Holland (Netherlands)
Water REMIND	Central Cebu Water REsources Management through INtegrated Development
WFD	(European Union) Water Framework Directive
WRC	Water Research Centre, University of San Carlos (Philippines)

Preface and acknowledgements

This book describes the use of actor analysis for water resources management, focusing on the contribution that actor analysis can make to policy analysis activities in the water sector. It is the result of a PhD research carried out at the Policy Analysis section of the Faculty of Technology, Policy and Management at Delft University of Technology, partially funded by Delft Cluster.

This research started with a discussion with some people at WL|Delft Hydraulics who were involved in the preparation of a National Water Resources Plan for Egypt, and who realized that they did not want to produce yet another smart policy proposal that would end up somewhere on a shelf in the Egyptian Ministry. This (lack of) use of scientific knowledge in policy processes and the communication between (technical) experts and policy makers are central research themes at the Faculty of Policy, Technology and Management, where a number of people study the interaction between policy makers and analysts and develop methods and tools to improve this interaction. One of the analytical tools that is a logical candidate to help improve this interaction is actor analysis, also known as stakeholder analysis or network analysis.

My research into the possible use of actor analysis in water resources management would not have been possible without the support of many people. First and foremost is my promotor, Wil Thissen who provided me with the opportunity to do PhD research and offered me a large degree of freedom in organizing it, making it a truly rewarding experience. Eelco van Beek was very helpful in establishing the link to the work of WL | Delft Hydraulics and Delft Cluster, which allowed me to combine research with practical experience in Egypt and the Philippines. Also Kees Bons offered very useful support for the actor analysis work in Egypt, and later on in the research he helped a lot by reading the first drafts of the chapters, offering a critical view that certainly helped to improve my texts. Pieter Bots, who is always full of fresh and inspiring ideas, also read draft chapters and shared his experience on developing participatory applications and writing scientific papers with me.

The (water) experts involved in the NWRP project provided me with a first research case. I am much indebted to all of them for involving me in their work, being patient with me, supporting me in thinking of possible applications and uses of actor analysis for their work, and reviewing my texts on their case. I will not mention all their names, but nevertheless some people deserve specific attention in this preface: Hans Wesseling, who helped me to get started, Casper Veeningen and Tarek Sadek, who supported me throughout, and Alexander Mueller, whom I again ran into in Cebu later in the research, completely unexpectedly.

The experiences gained in Egypt, as well as the literature review that was triggered by those experiences, allowed me to more precisely define the direction of my research, to gain a solid basis in the field of actor analysis and to

execute additional cases in a much faster pace. Also for these following cases, in North Holland, Turkey and the Philippines, I am much indebted to the people involved for allowing me to participate in their projects, for helping me to execute the actor analyses, for evaluating the results of the actor analyses and for reviewing draft texts on their case. Many people were involved in all these cases. I am grateful to all of them, especially Hans Overbeek, Els van Bon, Monique Zwiers en Marja van Hezewijk for the work in North-Holland. Çağri Muluk, Mattijs Hehenkamp, Teun Botterweg, Enrico Moens, Frank Jaspers, Özçan Yavas and Doğan Akar for the work in Turkey. Father Herman van Engelen, Fe Walag, Jaap de Lange, Tatah Rapliza, Tjitte Nauta and the WRC staff for the work in the Philippines. These people have helped me a great deal, but of course the final texts in this book and any remaining mistakes are solely my responsibility.

Even with all these names of people involved in cases, the list of people to be acknowledged is not yet complete. At least as important as the above people, who all helped me to gain practical experience, was the role of my colleagues, peers and teachers. Machtelt Meijer, Linda Carton, Sonja Karstens and Alexander de Haan, my fellow PhD students at the Policy Analysis section, not only offered interesting academic discourse but also interesting conversation. Actually, the same goes for the other people at the policy analysis section: Bert Enserink, Els van Daalen, Jill Slinger, Jos Timmermans, Warren Walker and Scott Cunningham. I also enjoyed very much the interactions with other PhD students at the faculty, through the peer group discussions with Helen, Mark, Maura, Miriam, Ruben, and the supervisors Michel van Eeten and Cees Beers. Finally, without teachers such as Tineke Ruijgh-Van der Ploeg, Giampiero Beroggi, and Pete Loucks I would not have developed the interest in the use of decision analytic techniques to support water resources management that led me to do this PhD research in the first place.

When my research was all done and written up, some people helped me to finalize the presentation of the results in this book. Jippe “the-map-maker” Hoogeveen prepared the maps for the case study chapters. Edith Knijf designed the cover, doing a remarkably good job matching actor analysis to artwork. I thank Miranda Aldham-Breary for correcting the English and offering some free lessons on English, babies and cats.

Finally, in line with tradition, the people who are dearest to me are all the way at the end of the list. As I am writing this preface, they are just one room away, and it feels good to know that they are there. Karlijn is probably the one who suffered the most from me doing PhD research, when I came home with a head full of thoughts, or went traveling for yet another interesting case study or conference. Cas was just in time to suffer a little. Out of a slight feeling of guilt and a vast feeling of love, I dedicate this book to them.

1. Actor analysis, an unfulfilled promise

1.1. Actor analysis and its promise for water experts

1.1.1. The role of water experts in policy making on water resources management

Water resources management is traditionally supported by water experts. These water experts come in various shapes and forms: from hydraulic engineers who capture morphological processes in river beds in three-dimensional computer models, to chemical scientists who analyse impacts of landfills on nearby groundwater quality; from policy scientists who study the development of water institutions, to hydrologists who simulate water flows in river basins; from agricultural and civil engineers who design irrigation and drainage systems, to mathematicians who programme genetic algorithms to design a set of rules for the operation of large freshwater reservoirs. Some of these water experts aim to support the development of water resources management policies. They may be from a variety of backgrounds and disciplines, being scientists, consultants or civil servants, but they have in common that they use their expertise to support public agencies in the development of water resources management policies. These are the water experts discussed in this study. They might be called water resources management specialists, water policy analysts or water policy experts, but for reasons of practicality, in the remainder of this study, they will be simply referred to as water experts.

These water experts develop various analysis tools and models to support policy development in the field of water resources management. In the past decades, a systems analysis approach has been dominant, meaning that water experts have used simulation and optimization techniques to develop mathematical computer models to identify efficient solutions to water resources management problems (Loucks et al., 1981; Goeller et al., 1985; Mays 1996; Simonovic, 2002). In more recent years however, water experts have become aware of a gap between their work and the actual use of their results in practice. Often, policy makers do not implement the solutions proposed by water experts, and, despite the studies made available to them, display a poor understanding of the crucial role of water in socio-economic development (Nakayama, 1998; Falkenmark, 2002; Holmes and Kuylenstierna, 2003).

This has caused water experts to reflect on their role in policy making, to see how they might decrease the gap between their analyses and the policy making process. Water experts have come to recognize the importance of addressing the needs of policy makers in their work, in one way or another (Loucks, 1992, 1995; Dinar 1998; Cosgrove and Rijsberman, 2000; Acreman, 2001; Coulomb, 2002; Holmes and Kuylenstierna, 2003). Nowadays, they are

exploring ways to improve the connection between their analyses and the policy making process, for example through the use of participatory modelling, multi-stakeholder decision support frames, role playing, and institutional analyses (e.g. Van Hofwegen and Jaspers, 1999; Hämäläinen et al., 2001; Ubbels and Verhallen, 2001; Van Eeten et al., 2002).

1.1.2. Producing useful knowledge in a multi-actor policy setting

A complicating factor in this regard is the complexity of the policy making process. Policy making in the field of water resources management, just as in many other fields, takes place in a network of different parties, called actors, who all have their own interests and concerns, and who all control a part of the resources needed for successful policy implementation (Marin and Mayntz, 1991; Bressers et al., 1995; Kickert et al., 1997). Policy problems are in the eye of the beholder and different actors are likely to be interested in different problems (Dunn, 1981, p.97). Finding technical solutions to the problems of just one actor is not sufficient for successful water policy development, as this is likely to neglect the interests of other actors that might be able to frustrate the policy implementation in a later stage. There is generally not one single actor that is powerful enough to control the course of the policy making process and that can, in isolation, determine the relevant research agenda for water experts.

The existence of such multi-actor complexity puts additional demands on the water experts, as they have to take into account the different problem perceptions, interests and positions of the actors (Van de Riet, 2003). One of the ways to deal with this multi-actor complexity is to embark on an iterative process together with the main actors involved. Such an iterative process requires effort from both water experts and policy makers, but the focus here is on the water experts. The challenge for water experts is to translate their scientific knowledge to information that fits the demands of policy makers, and to find out how they should position themselves to ensure that their analysis contributes to policy making (cf. Forester, 1989; Geva-May and Wildavsky, 1997; De Bruijn and Ten Heuvelhof, 2003; Van de Riet, 2003).

1.1.3. The unfulfilled promise of actor analysis for water experts

There are several analytical methods and tools that can be used by water experts to study the concerns and information needs of the actors in a policy making process. These methods and tools, which take the actors as the starting point for analysis, are here referred to as actor analysis methods. They can help water experts to explore their multi-actor environment and to "give stakeholders a voice in the analysis" (Van de Riet, 2003, p.26). In the past they have been applied in the field of water resources management under such labels as stakeholder analysis, influence analysis, or conflict analysis (e.g. Fang et al., 1993; MacArthur, 1997; Borsuk et al., 2001; Kontogianni et al., 2001; Schouten et al., 2001; Stone, 2002). These applications have shown that actor analysis methods produce knowledge about the actors involved in the field of water

resources management, i.e. about their interests, relations, influence, problem perceptions, concerns, preferred solutions to policy problems, etc. It is this kind of knowledge that helps water experts to connect their work to the world of policy makers, in various ways. This kind of knowledge:

- helps water experts to identify questions and frame problems in a way that is relevant to policy makers, and it helps to identify problems that policy makers find worth solving (cf. Wildavsky, 1992)
- is needed for the design of appropriate participation structures that enable the interaction between policy makers and water experts throughout the analysis process (Mostert, 2003)
- can help water experts to evaluate the feasibility of different policy options and directions, based on the interests and influence of different actors (Brugha and Varvasovszky, 2000, p.244-45)
- enables water experts to address the concerns and interests of various actors and to use knowledge from a broad actor base, which enhances the legitimacy and the analytical value of the analysis (cf. Mayer, 1997, p.40, 45; Johannes et al., 2002)

Given the desire of water experts to connect their analyses to the policy making process, one would expect that they would show a considerable interest in the use of actor analysis methods that help them understand this policy making process. However, actor analysis and related approaches are only slowly finding their way into common usage by the community of water experts. A review of scientific publications in the water sector shows that only a small number of publications focus on actors or stakeholders, especially when compared to the number of publications on the more classic hydrological and hydraulic modelling that do not focus on actors or stakeholders (Table 1.1).

This relative silence in the water community is striking, because the reports on applications of actor analysis in the water sector, even if there are relatively few, suggest that there are available methods that produce encouraging results (Borsuk et al., 2001; Kontogianni et al., 2001; Schouten et al., 2001; Stone, 2002). Water experts want to close the gap between themselves and policy makers and there are methods for actor analysis available that can help them to do so, but still water experts do not use them very often. Actor analysis appears to be a promise that has yet to be fulfilled.

The reason why actor analysis is not used more often, despite its apparent benefits, is hardly addressed in the existing publications on actor analysis. There are not many scientific publications available on the use of actor analysis in the water sector, as can easily be seen from Table 1.1.

Table 1.1 Scientific publications of water experts, end 2003[1]

	On actor or stakeholder analysis	On actors or stakeholders	On hydrological or hydraulic modelling
ISI Current Contents			
Latest six months	4	46	596
All years	29	288	4940
CSA Water Resources Abstracts			
1998-2003	3	208	4078
1993-2003	3	271	6591

The few actor analysis studies that are available usually make a case for the usefulness of a certain approach for actor analysis by showing that it yields information that is believed to be useful to policy makers, without scrutinizing its actual impact on the work of water experts or policy makers (e.g. Borsuk et al., 2001; Kontogianni et al., 2001; Stone, 2002). There is no systematic reflection on why actor analysis is not used more in the water sector. Nevertheless, some of the publications do offer some insights that help to explain why actor analysis has not yet found widespread applications.

- Actor analysis methods are relatively new to the water sector, where they have been introduced only in the last decade or so (e.g. Grimble and Chan, 1995; MacArthur, 1997). It is not unreasonable to assume that actor analysis needs some time to find its way into the field, just as any new approach.
- Actor analysis methods are generally closer to the social and political sciences than to the engineering disciplines. Unfortunately, water experts are often inadequately skilled and inexperienced in these fields (Holmes and Kuylenstierna, 2003, p. 105); Water experts simply lack the skills and expertise to apply the new tools of actor analysis.
- Actor analysis focuses on the policy process and debates, which are characterized by the presence of ambiguous power structures and hidden agendas. These hidden agendas pose a difficult challenge to analysts and their presence may well limit the analytical potential of the actor analysis (Brugha and Varvasovszky, 2000, p.245). Furthermore, if the actor analysis does succeed in uncovering some of these hidden agendas, it may stir up politically sensitive areas, which may frustrate rather than contribute to a dialogue between water experts and policy makers (cf. Mostert, 2003).

[1] Databases were searched on 10 November 2003. ISI Current Contents Editions covered Agriculture, Biology, and Environmental Sciences (ABES), Social & Behavioral Sciences (SBS), Physical, Chemical & Earth Sciences (PCES), Engineering, Computing & Technology (ECT). Topic/subject was searched, covering titles and keywords, using search terms "water AND ((actor* SAME analy*) OR (stakeholder* SAME analy*))", "water AND (actor* OR stakeholder*)", and finally "water AND (hydrolog* or hydraul*) AND (model*) NOT (actor* OR stakeholder*). Cambridge Scientific Abstracts (CSA) covered the Water Resources Abstracts database, searched English journals for articles and abstracts with keywords featuring "stakeholder* analy* OR actor* analy*", "stakeholder* or actor*" , and "(hydrolog* OR hydraul*) AND model* NOT (actor* OR stakeholder*).

1.2. Exploring the promise of actor analysis in practice

1.2.1. Research questions

The current situation leaves us with the picture of actor analysis as a tool for water experts that is thought to have a high potential, but that in practice is little used and has the status of a promise yet to be fulfilled. This calls for a closer look into the unfulfilled promise of actor analysis and its usefulness for water experts. Why is actor analysis not used more often by water experts who want to support policy development in the water sector? Does the tool live up to its promise if one takes away the practical barriers that might prevent a widespread use of actor analysis, such as lack of skills, funds or time? This leads us to the main question of this study:

1) *What is the practical use of actor analysis for water experts who want to support policy makers?*
   a) *What impacts of actor analysis on the work of water experts can be observed in practice?*
   b) *How can the observed impacts, or the lack thereof, be explained?*

Relatively little use is made of actor analysis in the water sector and there are even fewer descriptions of its impact on the work of water experts. The field of actor analysis itself is rather fragmented and diverse, consisting of various methods and applications, all known under their own labels and terminology. Therefore, before addressing the usefulness of actor analysis for the work of water experts, more insight into the field of actor analysis is required, which leads to a second question:

2) *How should an actor analysis be done?*
   a) *What are the methods for actor analysis that are currently available?*
   b) *What analytical output can be expected from these actor analysis methods?*
   c) *How can these actor analysis methods be applied in practice?*

1.2.2. Research approach

A literature review is the logical starting point for this research, to provide an overview of the available methods for actor analysis and their applications. However, as stated above, relatively little use has been made of actor analysis in the water sector and the few actor analysis studies that are available, usually argue for the usefulness of actor analysis without scrutinizing its actual impact on the work of water experts or policy makers. Therefore, a literature study alone will not be sufficient to get satisfactory answers to the research questions.

The insights from literature have to be complemented by empirical observations to explore adequately the practical use of actor analysis for water experts. Contemporary empirical data for such exploratory research questions may be obtained through different research strategies, of which experiments, surveys or case studies would be the most appropriate (Yin, 1994, pp.3-9). Of these strategies, experiments could be used to learn more about the use and the possible contributions of actor analysis methods under certain controlled conditions. However, the main interest here is in exploring the use of actor analysis methods and their impacts on the work of water experts in the real world. This is influenced by so many different variables that it can never be fully simulated in an experimental setting.

Ex-post analyses of (historic) cases and/or surveys are among the potential research strategies that can be used for research into the use and impact of actor analysis in the real world. Theoretically, one could study the literature on reported actor analyses and supplement the information with surveys among the people who were involved in these actor analyses. Practically, such an approach is constrained by the limited number of reports on actor analyses being used to support water policy development. Furthermore, as these reports tend to present the actor analyses as success stories, the people involved might find it difficult to provide insight into reasons for (partial) failures in the application and the use of the actor analyses.

Therefore, instead of experiments or ex-post case analysis, an action research approach has been chosen. An actor analysis was executed for ongoing analysis projects that aimed to support water policy development and then the application and its impact on the project was evaluated. In this way, actor analyses are used as "intervention experiments" to learn about the practical application and impact of actor analysis (cf. Argyris and Schön, 1991, p.86).

The action research approach enables the use of direct observations and first hand experience. It has the advantage that the researcher gains a thorough familiarity with the specific local setting, which increases his or her ability to generate alternative explanations for the observed use of actor analysis in practice (cf. Campbell, 1988, p.367-368). However, action research also increases the risk of introducing the researcher's own personal bias into the analysis. A researcher might find it as difficult as external informants to admit technical flaws in executing the actor analysis. He or she might be blinded by his or her direct involvement, finding it difficult to take a step back from the case he or she has been involved in to analyse it with sufficient overview. Using an action research approach requires a researcher to define and meet standards of appropriate rigor, while being complete in his or her descriptions (Argyris and Schön, 1991, p.85). Acknowledging this, in this study an attempt is made to describe, in sufficient detail, what happened in the case studies, how they were conducted and evaluated and what the role of the researcher was, in line with recommendations for action research as formulated by Argyris and Schön (1991, p.90-91) and Karlsen (1991, p.156).

1.3. Structure of the study

The use of actor analysis for water experts is explored in this study using the structure depicted in Figure 1.1, which has three main components. The first component consists of a literature review to provide a first answer on the question of how an actor analysis is done in theory. In the second component, the insights from literature are used to explore the use of actor analysis in four different cases. In the third and final component, the results from the literature review and the case studies are combined to address the question of how an actor analysis is done in practice and, finally, to address the main question regarding the use of actor analysis for water experts who want to support policy makers.

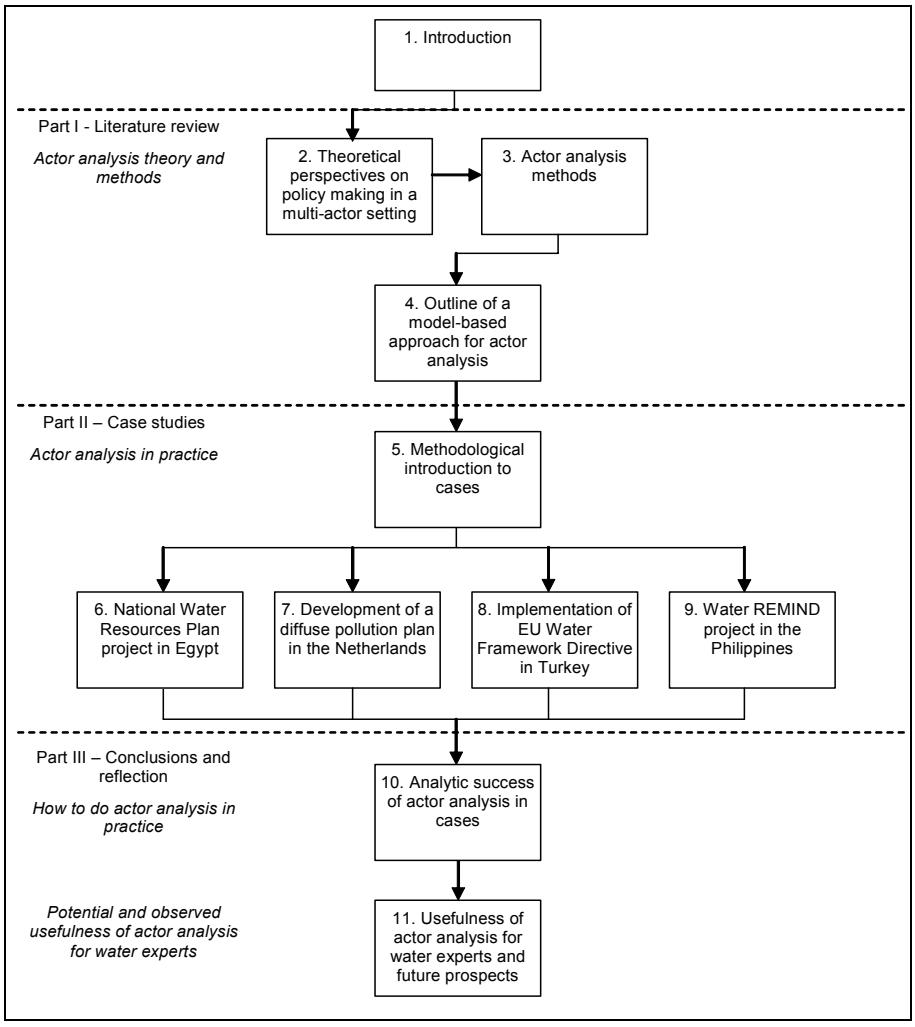


Figure 1.1 Structure of the study

After this introductory chapter, the study continues with a discussion of *what* it is that actor analysis actually analyses. Therefore, Chapter 2 contains a literature review of the theories about actors and their role in policy making. The result is a conceptual framework that can be used to describe the focus of actor analysis. The methods that are available for actor analysis are discussed in Chapter 3. This chapter starts with a discussion of the methods that are currently used the most for actor analysis, which are the methods that are generally known under the label of stakeholder analysis. Then, going further into the literature, other actor analysis methods are explored that can help to improve the application of actor analysis in practice. The main findings of the literature review are summarized in a proposal, presented in Chapter 4, for a procedure for actor analysis.

In the following chapters, this proposed procedure for actor analysis is used to explore its use in different cases. The case study selection is discussed in Chapter 5, together with the framework that is used as a basis for the evaluation of the different cases. The following four chapters, 6 to 9, each contain a description of the results from a case study in which an actor analysis was applied and evaluated for its outcomes and impacts.

The analytical success of the actor analyses used in the cases is discussed in Chapter 10, using case experiences to validate and improve the proposed procedure for doing an actor analysis. Chapter 10 also provides the necessary preamble for Chapter 11, in which the main findings on the impacts of actor analysis on the work of water experts are discussed. Some credible hypotheses are proposed to explain these findings, based on case experiences and some additional literature, and implications for future use of actor analysis are discussed. Finally, Chapter 11 contains a reflection on the research approach that was used for the study and some suggestions are made for further research into the use of actor analysis in the water sector.

2. Theoretical perspectives on policy making in a multi-actor setting

2.1. Introduction

Actor analysis is a potentially promising way to support water experts in designing and executing analyses that are relevant to policy makers. It can be used to investigate the multi-actor policy making setting in which water experts find themselves, which is likely to help water experts to improve the match between their analyses and the needs of the policy makers. Before turning to the methods that can be used for actor analysis, it is useful to take one step back and gain a better understanding of the objects of analysis of actor analysis: the actors involved in public policy making.

An overview of different theories designed to clarify the role of actors in public policy making processes is provided in this chapter. There are many theories that address this subject and there is no single theory that can be selected a priori as the "best" way to describe and explain policy processes (Ostrom et al., 1994, p. 49)[2]. One has to make a choice for a certain theoretical perspective, that includes certain aspects, but excludes many others. The focus here is on theories about strategic level processes in which governmental actors play a prominent role (cf. Brewer and DeLeon, 1983, p. 30; Anderson, 1984, p. 3). This leaves several bodies of literature outside the initial scope of this chapter, such as the literature on the management of public projects or programs, which is on a more operational level, decision making theory, which is confined to more specific choices between alternatives, and corporate strategic management, which deals with the private rather than the public sector.

The focus on actors in public policy making processes suggests that the literature in the field of policy science should be reviewed, as this field contains a "large and diverse scholarship that examines the enormous variety of policy processes" (McCool, 1995, p. 105). In this literature review some of the most influential and often cited theoretical perspectives on policy making in multi-actor environments are featured, and although it is far from complete, it should help us to gain a better theoretical understanding of how actors shape public policy making, of the general characteristics of actors in the policy making process, and of the underlying factors and mechanisms driving their interactions. This theoretical understanding is used as a basis for a conceptual framework that shows the main concepts that fall within the focus of actor analysis.

[2] This point is supported by the overview book edited by prof. Paul Sabatier (1999) and the related debate on theories of the policy process in the Journal of European Public Policy (Dudley et al., 2000).

2.2. A single actor perspective on the policy making process

A classic theoretical perspective on policy making is provided by the "stages approach" (DeLeon, 1999), also known as the "six-phase model" (Brewer and DeLeon, 1983) or the "textbook process" (Nakamura, 1987). In these approaches, policy making is described as a sequence of stages, usually agenda setting, policy formulation and legitimation, implementation and evaluation (Sabatier, 1999, p. 6; Ripley, 1985). Policy making is seen as a rational process, going through certain stages, to end up with a rational choice for the "best" policy to address a certain problem. This rational model is best characterized as a blue print or ideal-type model of how public policies should be made, and the model is mostly referred to for its prescriptive rather than its descriptive value (Lindblom, 1950; Nakamura, 1987).

In situations of multi actor policy making, the assumptions made in the rational stages approach show serious shortcomings, due to the cognitive limitations and 'bounded rationality' identified by Simon (1945, p. 80-84), and due to the involvement of multiple actors. In multi-actor situations, problem perceptions are likely to differ among actors and the necessary information for a well-funded and rational choice is spread over various locations and is difficult to access (Forester, 1989, p. 56). Policy making requires actors to bargain and negotiate in an environment of conflicting interests, making political compromises necessary. Actors differ in their problem perceptions and interests, and in their ability to articulate them and include them in the policy process (their "Artikulationsfähigkeit", Scharpf, 1973, p. 47-49). Actors are not equally powerful, but their power is intertwined with their positions in historical, social, political, and economic structures (Forester, 1989, p. 60). The result is a policy making process in which actors need to compromise and where it is impossible for an actor to know all the relevant details and mechanisms that affect the realization of its objectives. At best, the result is a policy process of "muddling through" where new policy decisions differ only incrementally from previous ones (Lindblom, 1950), and more gloomy perspectives result in pictures of policy making as a "garbage can" (Cohen, March and Olsen, 1972) and as a process that is "capricious and unpredictable" (De Bruijn and Ten Heuvelhof, 1995, p. 21).

2.3. Multi-actor perspectives on policy making

The stages approach is not well suited to describe the capricious and unpredictable policy making processes in multi-actor situations. The stages approach provides a chronological framework for looking at policy processes that has a logical appeal, but: "reality as it emerges in any case may vary significantly from what the stage-based model says 'should' happen in a specific order" (Ripley, 1985, p. 162). Therefore, this section continues with a discussion of a number of theoretical frameworks that have been developed to fit better the reality of policy making in a multi-actor environment. In a multi-actor environment, public policies are not explained by the intentions of one or two

central actors, but are generated within actor networks in which multiple actors are interrelated in a more or less systematic way (Kenis and Schneider, 1991).

2.3.1. Streams of problems, solutions and politics

Kingdon (1984) challenges the notion that policy making proceeds neatly in stages as suggested by the stages framework. Rather, the elements of capriciousness and unpredictability are usually present. His stream model is based on the concept of three separate streams: problems, policies (solutions) and politics (e.g. elections), which exist independently. However, there are times when the three streams are joined and a policy window opens, where policies or problems that fit come to the fore, and others are neglected (Kingdon, 1984, p. 201). These windows are opened by events in either the problem or political streams. A new problem may appear, creating an opportunity to attach a solution to it, or a new political climate after elections may offer opportunities to push certain problems or solutions to the fore (Kingdon, 1984, p. 203).

2.3.2. Advocacy coalitions

The advocacy coalition framework (ACF) developed by Sabatier and Jenkins-Smith (1988) is focused on the interactions between different coalitions that advocate certain problems and solutions within a policy subsystem. A policy subsystem consists of those actors from a variety of public and private organizations that are actively concerned with a policy problem or issue. The advocacy coalitions consist of a variety of actors that share a set of policy beliefs and that often act in concert. Conflicts between various coalitions are normally mediated by another group of actors, policy brokers, "whose principal concern it is to find some reasonable compromise which will reduce intense conflict" (Sabatier, 1988, p. 131, 133).

Policy making is a result of competition between advocacy coalitions within the policy subsystem, but the constraints and resources in the subsystem are influenced by two sets of exogenous variables, one quite stable and the other more dynamic. Examples of relative stable parameters are the basic attributes of the problem area, the basic distribution of natural resources and the basic constitutional structure (rules), whereas examples of the more dynamic external events are changes in socio-economic conditions, changes in public opinion and policy decisions in other policy subsystems, e.g. a decision to change tax law may impact numerous other subsystems (Sabatier, 1998, pp.102-103). The perceived results of policy making, new information and external dynamics may cause a coalition to revise its beliefs and/or strategy (Sabatier, 1988, p. 133).

The focal points for analysis within the advocacy coalition framework are the belief systems of elites in the coalitions and the conditions under which policy oriented learning can occur. Although it is assumed that members of various coalitions have a certain resistance to information that suggests that their beliefs are invalid, "the framework identifies several factors which may nevertheless facilitate learning *across* advocacy coalitions" (Sabatier, 1988, p. 133).

2.3.3. Exchanging arguments – the 'argumentative turn'

The policy belief systems that are prominently featured in the ACF also appear in the argumentative frameworks, which have become known as the 'argumentative turn' in policy analysis and planning (Fischer and Forester, 1993). This argumentative turn emphasises the dialectic aspect of policy making, understanding the process of policy making as the formulation and exchange of arguments between parties with different belief systems or frames of reference. The argumentative frameworks are inspired by philosophical works on epistemology in the tradition of Wittgenstein and Habermas (see Fischer and Forester, 1993, p. 1). Habermas' claims that different people hold different truths, that none of these individual truths has more value than the others, and that people can only attain agreement on truth by means of argument, i.e. by exchanging their views on what they believe to be true. This view is reflected in the argumentative perspective on policy making, where an argumentative process among different parties functions to establish a common truth, which then provides a basis for policy making.

The argumentative perspective on policy making focuses on the logic of arguments and on their practical performance in terms of informing or persuading other parties in a debate (Fischer and Forester, 1993, p. 4).

2.3.4. Networks of actors

The policy network approach is specifically focused on policy networks as a useful explanatory variable (Marsh and Smith, 2000, p. 4). This approach gained increasing attention in the late 1980s and early 1990s, especially in Britain, but also in Europe and America (Dowding, 1995, p. 136). Scientists study policy networks using a typology of policy networks as a diagnostic tool. These typologies are based on such characteristics as the number of actors and their types of interests within a network, the frequency and nature of interaction between these actors and the distribution of power within the network (see for example Rhodes and Marsh, 1992, p. 187; Van Waarden, 1992). These typologies help to describe policy processes, but "the concept of policy networks does not provide an explanation of policy change" according to Rhodes and Marsh (1992, p. 196). In fact, "the explanatory work is largely done at the micro-level in terms of properties of the actors and not in terms of properties of the network" (Dowding, 1995, p. 141). The network approach can therefore be seen as an attempt to add the context to the descriptions of the policy process in theories such as Kingdon's stream model and Cohen's garbage can: "Problems, actors and perceptions are not chance elements of policy processes but are connected with the interorganizational network within which these processes occur" (Klijn, 1997, p. 16). An overview of the application of the network perspective for water policy is provided by Bressers, O'Toole Jr and Richardson (1995).

Policy network theory has been used as theory to describe and explain past policy processes, and it has inspired the development of rules and guidelines for the management of policy processes in networks. Overviews of such guidelines for "network management" or "process management" can be found in Kickert, Klijn and Koppenjan (1997) and De Bruijn, Ten Heuvelhof and In 't Veld (2002).

2.3.5. Games and institutions

In policy network theory, it is recognized that the network is just one level, while within networks, other important mechanisms are at play. The game metaphor is often used to describe these mechanisms within networks, for example by Ostrom et al. (1994), Klijn and Teisman (1997) and Scharpf (1997). This use is inspired by game theory, which was initially developed by Von Neumann and Morgenstern (1944) to describe social and economic processes. Game theory is used as a basis to analyse the behaviour of actors in a certain institutional context, for instance in the actor-centered institutionalism framework (Scharpf, 1997), the institutional analysis and development framework (Ostrom et al., 1994) and negotiation analysis (Sebenius, 1992).

In the actor-centered institutionalism (ACI) framework, the institutional context sets the stage for policy making, but within this, the focus is on the "games real actors play": "In our framework, therefore, the concept of the 'institutional setting' does not have the status of a theoretically defined set of variables that could be systematized and operationalized to serve as explanatory factors in empirical research. Rather, we use it as a shorthand term to describe the most important influences on those factors that in fact drive our explanations - namely, actors with their orientations and capabilities, actor constellations, and modes of interaction" (Scharpf, 1997, p. 39).

The institutional analysis and development (IAD) framework is similar in the sense that game theory is also used to analyse the behaviour of actors in a given situation. However, the IAD framework is more focused on the institutional context that shapes the situation and the behaviour of actors, more specifically, on the relationship between rules and games. The IAD framework is designed to help us "understand how rules combine with physical and cultural worlds to generate particular types of situations" (Ostrom et al., 1994, p. 37).

Negotiation analysis has a more specific focus than the ACI and IAD frameworks. Its specific focus is on the subset of co-operative games, which are those games in which actors may chose their strategies jointly, by binding agreement. Using this agreement, the involved actors can realize outcomes that they expect to be more attractive than the outcomes that they could expect without agreement. However, in contrast to game theory, negotiation analysis assumes bounded rationality, a lack of common knowledge and a focus on perceptions of zones of possible agreement rather than a focus on analytical equilibrium solutions (Sebenius, 1992, pp.19-21). Negotiations are essentially processes for creating, claiming and sustaining value among actors. This introduces the negotiator's dilemma, as cooperation is required for the joint

search for solutions that have more value for all the actors involved (creating value), while the distribution of this additional value requires a competitive approach, where the actors claim as much as possible from the created additional value (claiming value) (Sebenius, 1992, p.30).

2.4. Conceptual framework for the multi-actor context of policy making

The above review of some of the important theoretical frameworks for actor analysis points to certain fundamental concepts that are present in one form or another in most of the frameworks. These concepts may be used to construct a conceptual framework for the multi-actor context of policy making. The aim of this framework is not to provide a starting point for a new theory or to synthesize the different theories into one overarching theory on policy making, but rather to provide an overview of the basic underlying concepts in the various theories of policy making processes. This supports a better understanding of the object of analysis of actor analysis methods: What are the concepts related to actors and their interactions that can be analysed using actor analysis?

Two conceptual levels can be distinguished in policy making in a multi-actor context: the *network level* and the *actor level*. The fundamental concepts used on these two levels are depicted in Figure 2.1 and are discussed below.

2.4.1. Network level concepts

Policy networks are "more or less stable patterns of social *relations* between interdependent *actors*, which take shape around policy problems and/or policy programmes" (Klijn, 1997, p. 30, italics added). On the network level, the fundamental concepts are actors, relations and rules. Together, these factors are used to describe the structure of the network that provides the environment for the interactions among actors, which eventually result in policy outcomes.

Actors are defined as "persons, groups, organizations…that are capable of making decisions and acting in a more or less coordinated way" (Burns et al., 1985, p. x), in other words, they are "action-units" (Klijn and Teisman, 1992, p. 8; Bots et al., 2000).

A satisfactory definition of the concept of **relations** is more difficult to find, but here the description provided in the context of social network theory will be adopted: "Actors are linked to one another by social ties…The defining feature of a tie is that it establishes a linkage between a pair of actors…The collection of ties of a specific kind among members of a group is called a relation" (Wasserman and Faust, 1994, p. 18, 20). Examples of relations, i.e. specific kinds of ties among actors, are exchange relations, hierarchical relations or consultative relations (Rhodes and Marsh, 1992; Van Waarden, 1992).

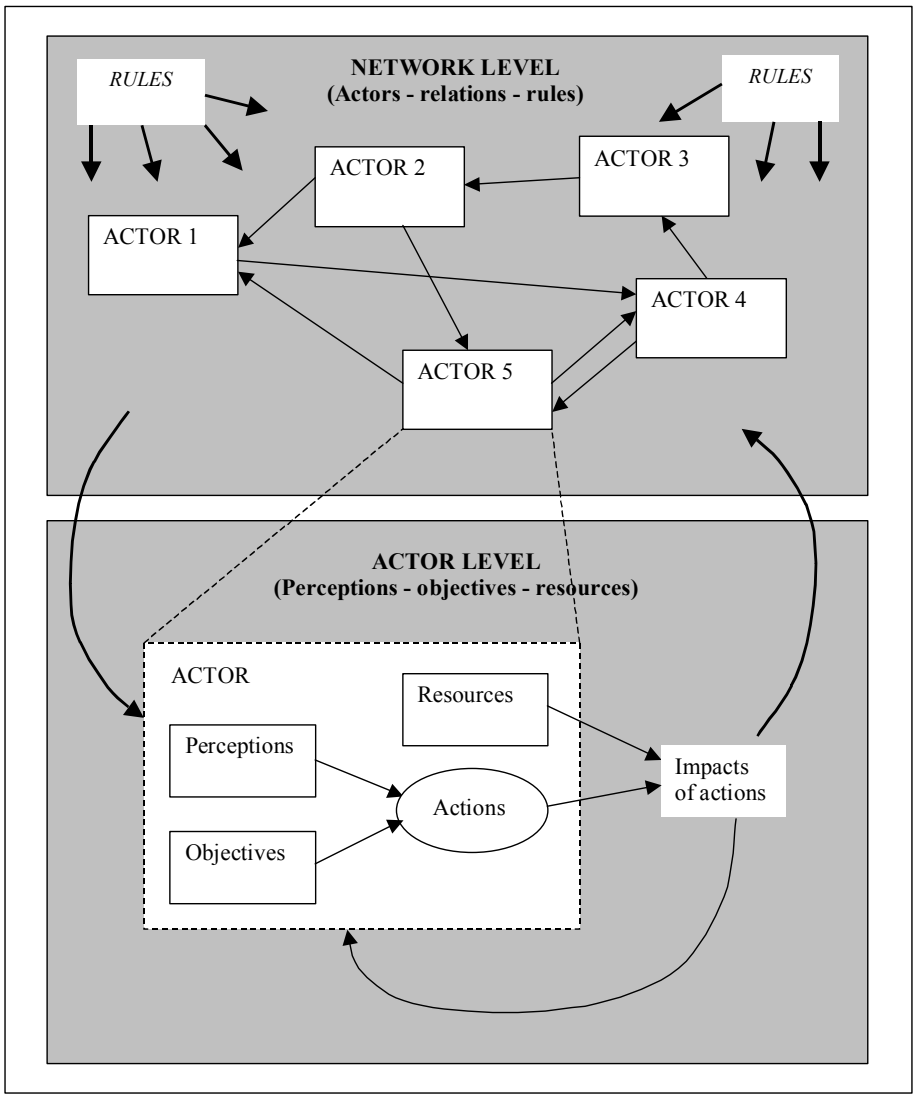


Figure 2.1 Conceptual framework for the multi-actor context of policy making

Rules are socially constructed agreements and prescriptions; they refer to common knowledge among actors in specific networks on how to behave (Scharpf, 1997, p. 39). As such they limit and structure the possible range of activities within networks: "Rules…are prescriptions that define what actions (or outcomes) are required, prohibited, or permitted, and the sanctions authorized if the rules are not followed" (Ostrom et al., 1994, p. 38). Rules affect the way actors behave and achieve outcomes.

2.4.2. Actor level concepts

The fundamental concepts on the actor level are perceptions, objectives and resources. Together, these factors result in actions by actors. Although the labels might differ, these three concepts can be recognized in various theoretical frameworks. The actor centered institutionalism frameworks states that: "Actors are characterized by specific *capabilities*, specific *perceptions*, and specific *preferences*" (Scharpf, 1997, p. 43). The advocacy coalitions framework includes belief systems, consisting of normative and causal beliefs (cf. objectives and perceptions), and resources as the main internal forces that drive the behaviour of coalitions of actors (Sabatier, 1988, p. 131-132). Jobert identifies three dimensions of policy making: cognitive, instrumental and normative (Jobert, 1989, p. 377).

Perceptions and similar concepts such as belief systems, frames or cognitions refer to the image that actors have of the world around them, both of the policy making context consisting of actors and networks, and of the policy problem and its substantive characteristics (cf. Bots et al., 2000; Bennet et al., 1989). Perceptions are here defined in the narrow sense, focusing only on causal beliefs (cf. Sabatier, 1988).

Objectives are used to express the directions in which actors would like to move: What is the problem they would hope to solve? What is the goal they would like to achieve? Related concepts such as *values* and *interests* function on a more abstract level that underlies more specific objectives. *Preferences* and *positions* are usually used to refer to a more specific level, translating objectives to a (relative) *preference* ordering over specific solutions or policy outcomes, with a *position* being the most preferred solution or outcome.

Note that the concepts of perceptions and objectives/values/interests are closely linked, as in Sabatier's notion of belief systems, which include causal beliefs, i.e. perceptions, and normative beliefs, i.e. sets of value priorities (Sabatier, 1988, pp.131-133). A similar connection of perceptions and values is present in the description of framing as the "processes by which people construct interpretations of problematic situations, making them coherent from various perspectives and providing users with evaluative frameworks within which to judge how to act" (Rein and Schön, 1993, p. 147).

Resources refers to the practical *means* or *instruments* that actors have to realize their objectives. Resources are the "things over which they have control and in which they have some interest" (Coleman, 1990, p28). Resources may be material, related to monetary resources and budgets, but they may also be immaterial, for instance *positions* in a network, which associate actors with an authorized set of actions in a process (Ostrom et al., 1994, p.30). Resources enable actors to influence the world around them, including other actors, relations and rules in a network. Therefore, the concept of "resources" has an important link to the network level concepts. Resources may be embedded, meaning that resources are only relevant within specific networks, such as knowledge of specific topics, or they may be disembedded, meaning that the resources are independent of a specific context and time, such as money (Klijn

and Teisman, 1997, p. 104). Resources are closely related to *power*: "Control over resources determines the power of actors" (Stokman and Zeggelink, 1996, p. 78), or: power is the "ability to mobilise resources" (Klijn and Teisman, 1992, p. 7).

When combined, the three concepts of perceptions, objectives and resources lead to **actions**. Resources can be used to act, but objectives are used to determine if the resulting actions are indeed useful to an actor, whereas perceptions are used to indicate whether an actor also recognizes this link between the use of resources and realizing its objectives. If an actor takes action, it will be likely to have an *impact,* be it large, small or even insignificant, on other actors or on its physical environmental, i.e. through actions an actor interacts with its environment. Thus, the **action** links the actor to its outside environment, to other actors and to the actor networks, as will be discussed below.

2.4.3. Interactions among levels and with external factors

The network level and the actor level are interrelated levels that influence each other. The network level sets the conditions for actions of the individual actors, while the actors that constitute the network can shape and change the network of which they are a part. Through education or propaganda activities, actors can influence the perceptions of other actors, seeking to come perhaps towards more shared perceptions. Actors can also share values or objectives, and, when they have conflicting objectives, these are likely to shape their mutual relations, i.e. they may not communicate as frequently or openly as they would if they had shared objectives. Rules may give actors control over resources, and resources can in turn be used to change the rules in a network.

The conceptual framework given in Figure 2.1 has as its focus the multi-actor context of policy making and therefore it does not explicitly show the relation of this multi-actor context with any outside objects of policy making. Policy making takes place in interaction with a physical problem environment and a wider public community from which it gets input and which will be changed and transformed by the actions of actors. For example, water resources management policies are made in relation to a physical water system in which water of a certain volume and quality is present at a certain time. General public opinion influences the interest that actors take in water resources management policy, and economic development influences the funds available for the implementation of possible policy alternatives. Similarly, the actions of actors may alter the physical environment, for instance when a decision is made to divert water from a stream, to construct a dam or to upgrade a wastewater treatment plant.

2.4.4. Positioning policy making theories using the conceptual framework

The conceptual framework for describing actors and networks helps us to position the different theories in Section 2.3, based on the different explanatory variables that are used. In line with the categories identified by Fenger (2003, p. 130), the conceptual framework supports the distinction of three main theoretical perspectives. These three perspectives all take policy making to be a process of interactions among actors, but they use different foci to describe these interactions, which are described below.

1. *Focus on networks:* the focus of these theories is the network level, where the relations between actors and the institutional context are analysed as important explanatory variables in the description of interactions among actors. Examples of such theories are the institutional analysis and development framework, policy network theory and important parts of actor centered institutionalism;
2. *Focus on actors' perceptions:* the focus of these theories is the actor level, dealing with the perceptions of actors and commonly including the perceptions and objectives of actors. Exchanging arguments and learning are key aspects in describing the interactions of actors. Examples of such theories are the advocacy coalition framework, and parts of Kingdon's stream model. The perspective of the "argumentative turn" also fits within this focus.
3. *Focus on actors' resources:* the focus of these theories is the power of individual actors, linking actors' resources and objectives to their interactions in networks. In these theories interactions among actors are viewed as games of strategic behaviour or exchange of resources. Parts of actor centered institutionalism theory fit in this category, as do parts of the institutional analysis and development framework and Kingdon's stream model.

As can be seen from the above, it is not always possible to fit every theory into one category. The categories are simplifications and usually the theories are more sophisticated and address more factors than will fit in any one category. Nevertheless, often there is an emphasis on certain aspects of policy making, and therefore the focuses described in these categories help us to clarify the basic mechanisms that are receiving most attention in current literature on policy making in a multi-actor environment.

3. Actor analysis methods

3.1. Requirements for actor analysis

A basic description of the theoretical perspectives on actors and their interactions in public policy processes was given in the previous chapter. This provides a good basis to review the literature on the methods that are actually available for actor analysis, the methods that water experts might use to explore the actors in the policy making environment in which they work. However, before turning to the literature, it is necessary to give a brief outline of three basic requirements that these methods should meet.

Actor analysis methods should focus on the actors and their interactions in public policy processes. The overview of theoretical frameworks in Chapter 2 shows that there are many different frameworks and that one has to select a certain perspective from which to describe a multi-actor policy making process. Three different theoretical perspectives can be used to describe actors and/or their interactions, focusing either on networks, perceptions or the resources of actors. An actor analysis should cover at least one of these perspectives. An actor analysis that combines two or even all three perspectives would of course be ideal, but if there are no theoretical frameworks available that integrate these three perspectives, it may be hard to find methods that facilitate such integration.

An actor analysis should be analytically sound and produce trustworthy and valid insights, in our case into the policy environment of water experts. An actor analysis that produces insights that cannot be trusted to be valid, will not provide experts with a valuable basis for action. Therefore an analysis has to be done in a transparent manner that is internally consistent and that has external validity. This requirement for analytical soundness is further operationalized in Section 3.3.2.

Actor analysis is intended as a tool to support experts in their ongoing policy analysis activities, however, and this often means that only a limited amount of time and resources is available for the analysis. An actor analysis that requires a team of analysts to work on the analysis for several months may put too high demands on available resources and will have a limited scope for application. Furthermore, in an actor analysis certain actors and actor networks are mapped at a certain moment in time, assuming relative stability for these actor networks. If the analysis takes too long to complete, the results are likely to be outdated before they are available for use in a policy analysis project. Therefore, to be practically feasible and useful for a wide range of situations, anyone carrying out an actor analysis should make efficient use of time and the resources available for analysis.

3.2. Stakeholder analysis as a practical approach to actor analysis

3.2.1. Roots of stakeholder analysis

A logical starting point for a review of the actor analysis approaches that are practically applicable in the field of water resources management, is the literature on stakeholder analysis, in which most of the analysis methods that are currently being applied are described. Stakeholder analysis is the most wide-spread approach for analysing actors, which are called stakeholders in this approach, and there is a significant body of literature on stakeholder analysis approaches and applications.

Stakeholder analysis has its roots in (corporate) management literature, but it is nowadays also applied in the field of public policy making. Analytical frameworks that include stakeholders as an important element began to be developed in the 1970s and early 1980s (Ackoff, 1974; Mitroff, 1983; Freeman, 1984). The concept of "stakeholder" rather than "actor" is used, and defined as "any group or individual who can affect or is affected by the achievement of the organization's objectives[3]" (Freeman, 1984, p. 46). The use of the term "stakeholder" emphasises the "stake" or interests of the parties in the process and it has a similar sound to such concepts as "shareholder" and "stockholder", referring to the owners of private corporations that have long been recognized as important players in this field (cf. Mitroff, 1983, p. 4).

As can be seen from its definition, the stakeholder concept expands the traditional view of a corporation, which included only a small group of internal and directly involved stakeholders such as owners, customers, employees and suppliers, into a broader view which also includes the external environment of the corporation (Freeman, 1984, p. 24; Ackoff, 1974, p. 63; Grimble and Wellard, 1997, p. 183). This expansion of the traditional view was facilitated by insights from various fields, such as corporate planning, systems theory, organization theory, and corporate social responsibility (Freeman, 1984, p. 32).

This resulted in a number of analysis methodologies designed to support strategic management and the solving of other problems in which stakeholders, and their associated properties, are the core of the analysis (cf. Mitroff, 1983, p. 8; Freeman, 1984). A well-known and often cited example is Freeman's work, which includes a "stakeholder strategy formulation process". This stakeholder strategy formulation process includes a number of analyses that should be done to gain some understanding of stakeholders: analysing the actual behaviour of stakeholders, their cooperative potential and competitive threat, analysing stakeholders' objectives and beliefs, coalition analysis and developing strategic programs to help the client organization to maximize cooperative potential and to minimize competitive threat (Freeman, 1984, pp.131-152).

[3] An almost identical definition of stakeholders is provided by Mitroff (1983, p. 4): "stakeholders are all those parties who either affect or who are affected by a corporation's actions, behavior, and policies."

3.2.2. Stakeholder analysis for public policy making

Particular attention is given in most of the management literature to practical analysis methods and possible strategies for managing stakeholders. These methods and strategies have inspired people in other fields, and in this way the stakeholder analysis approach gradually found its way to a wider audience, including public policy making. Its use has expanded into fields such as public policy and health policy (Brugha and Varvasovszky, 2000), international development projects (MacArthur, 1995) and natural resource systems (Grimble and Wellard, 1997). In these public policy applications, insights drawn from corporate management are mixed with knowledge from other fields such as policy theory, project management and rapid rural appraisal techniques, to obtain useful analytical tools.

Several overview articles are available on the use of stakeholder analysis in public policy (see for example: Crosby, 1992; Grimble and Chan, 1995; ODA, 1995; Grimble and Wellard, 1997; MacArthur, 1997; Brugha and Varvasovszky, 2000; Varvasovszky and Brugha, 2000). The stakeholder analysis approaches described in these overview articles have a practical orientation and are meant to provide a better understanding of the role of stakeholders active in specific policy problems and in the practical implementation of policy projects. Their purpose is to offer practical support to policy makers and public sector managers, using a range of different methods rather than a single tool (Crosby, 1992). These approaches have evolved, for an important part, from practical experience and can be characterized as “eclectic and pragmatic” (Grimble and Wellard, 1997, p. 182, 185). This makes it possible to use such stakeholder analysis approaches in a flexible manner and to cover a range of possible applications.

Stakeholder analysis can be used for the preparation and evaluation of projects (ODA, 1995; Grimble and Chan, 1995), for the facilitation of stakeholder involvement in participatory projects or in cooperative resource management (MacArthur, 1997; Grimble and Chan, 1995), for strategy development by project managers to assure the implementation soundness of projects or policies (Crosby, 1992; MacArthur, 1997; Varvasovszky and Brugha, 2000), for understanding the general issues related to conservation and degradation of natural resources (Grimble and Chan, 1995; Grimble and Wellard, 1997), and for a comprehensive analysis to understand better past policy making processes or to assist in formulating new policies (Varvasovszky and Brugha, 2000).

Table 3.1 Procedure for stakeholder analysis: literature sources and general steps

Grimble & Chan, 1995	**Varvasovszky & Brugha, 2000**	**ODA, 1995**	**Crosby, 1992**	**MacArthur, 1997**
General purpose of stakeholder analysis				
Dealing with and understanding natural resource management issues	*Understand how policies have developed & assess feasibility future directions*	*Assess project environment and inform negotiation position in aid projects*	*Support for analysts or local managers in policy projects*	*Support in project planning situations (mainly for development projects)*
1. Define purpose, questions and conditions for actor analysis				
Identify main purpose of analysis	Identify aim and time dimension of analysis			Define higher objectives of project concerned
2. Preliminary scan of actor network and practical preparation				
Develop understanding of system and decision makers	Assess culture, context, level of analysis. Form analysis team	Decide who should do the analysis and how much time should be spent		
3. Identify stakeholders				
Identify principal stakeholders	Identify and approach stakeholders	Identify and list all potential stakeholders	Draw initial ample list of stakeholders and relative importance	List the stakeholders
4. Collect primary input data				
Investigate stakeholder interests & characteristics – data collection	Data collection using interviews and secondary sources	Identify stakeholder interests	Use local informants to complete stakeholder table	Determine interests of stakeholders in project objectives
5. Structure and analyse data				
Identify patterns and contexts of stakeholders' interactions	Organize and analyse data Present findings, using tables and matrices	Assess likely impact of project on stakeholder interests Indicate relative priority of meeting stakeholder interests Assess power and importance of stakeholders	Fill in stakeholder tables / matrices	Assess stakeholders' importance to project objectives Assess power of stakeholder to influence project outcome
6. Interpretation of results and translation into stakeholder management strategies				
Options for managing stakeholders and conflicts	Determine strategies for managing stakeholders	Identify risks & assumptions which will affect project design & success Identify appropriate participation of stakeholders in different project cycles		Consider whether additions to project design are required Consider which stakeholder interests should be allowed for during different project stages

3.2.3. General procedure for stakeholder analysis

Despite their wide range, the different applications of stakeholder analysis have more in common than just a focus on stakeholders' interests. The different overview articles all describe stakeholder analysis procedures that follow similar steps. In some reviews only a few steps are covered, while in other articles the authors discuss some steps in more detail than others. Taken together the body of literature on stakeholder analysis offers a useful overview of guidelines and known pitfalls for each step. A general outline of the different steps is presented in Table 3.1.

The description of stakeholder analysis methodologies as sequences of steps taken in line with practical guidelines is similar to the pragmatic character of the stakeholder analysis approaches. They are oriented on practice, rather than theory and not much room is provided for the elaboration of theoretical frameworks and models of stakeholders' behaviour. Instead, tables and matrices are proposed that contain the key characteristics of stakeholders and that should be filled in by analysts to support the structuring and analysis of data, and the interpretation and communication of results. Popular concepts in such tables are, for example, stakeholders, their interests and influence, their importance for the project or organization and their positions related to certain issues, as shown in the examples below.

Table 3.2 Example 1 of a blank stakeholder analysis table

Stakeholder	**Interests**	**Potential project impact (+ or -)**	**Relative priorities of interests (scale 1 to 5)**
Primary stakeholders			
First			
Second			
Third			
Secondary stakeholders			
First			
Second			
Third			
External stakeholders			
First			

Source: ODA, 1995; MacArthur, 1997.

Table 3.3 Example 2 of a blank stakeholder analysis table

Group	**Group's Interest in Issue**	**Resources**	**Resource Mobilization Capacity**	**Position on Issue**

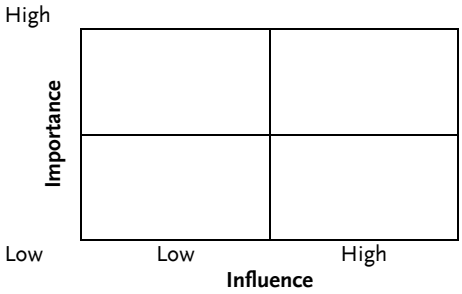
Source: Crosby, 1992

Table 3.4 Example 3 of a blank stakeholder analysis table

Stakeholder	Involvement in issue	Interest in issue	Influence / power	Position	Impact of issue on actor

Source: Varvasovszky and Brugha, 2000.

Table 3.5 Example of a stakeholder classification matrix



Source: ODA, 1995; MacArthur, 1997.

Table 3.6 Example of a blank stakeholder participation matrix

	Type of Participation			
Stage in cycle	Inform	Consult	Partnership	Control
Identification				
Planning				
Implementation				
Monitoring & Evaluation				

Source: ODA, 1995; MacArthur, 1997.

The tables often contain fairly abstract factors such as "interests", "resources" or "influence" that are difficult for an analyst to assess in practice. The abstract factors are in most cases not connected to underlying factors that can be observed more easily and there are no clear cut procedures for assessing them: "Assessments of levels of influence, support or opposition…are provisional…. Explicit criteria for making such assessments can assist in reducing research biases" (Varvasovszky and Brugha, 2000, p. 342)[4]. Grimble and Chan (1995) provide sample interview questions and checklists as an intermediary between abstract factors such as conflict and cooperation and factors that can be more easily observed in practice; but these checklists do not show how covering the items on the list results in filled in tables and explanations of stakeholder behaviour.

The analytical core of the stakeholder analysis procedures is therefore formed of different tables and "laundry lists" (Mitroff, 1983, p. 9, 46), which more or less float around and are not clearly connected to each other, to underlying theory or to real world observations. These connections have to be

[4] Note that the explicit criteria mentioned in this quote are not addressed further in the article.

made and explicated by the analysts and therefore the questions remain: How do analysts derive the input for their tables? And how do they translate these tables into conclusions on stakeholder behaviour and promising stakeholder management strategies? There is no underlying theoretical framework to provide guidance, internal logic and consistency and to support "truth" claims for external validity. The framework and its accompanying logic have to be developed by the analyst. This provides the analyst with room for flexibility, but it also requires more effort to be made to guarantee analytical soundness and to prevent personal bias.

When the stakeholder analysis methodologies discussed in this section are used for quick and dirty scans of the stakeholder environment, they require relatively little effort and expertise, and the risk of lower analytical quality may be accepted by their users. When a more elaborate and thorough analysis is required, stakeholder analysis does not meet the requirements for analytical soundness unless considerable time and effort are devoted to developing and explicating more detailed analysis schemes.

3.3. Actor analysis models

3.3.1. Models as a link between theory and practice

Rather than using the "laundry lists" of stakeholder analysis, existing policy theory can be used as a starting point. Existing theoretic frameworks can be translated into operational factors and relations that can be observed in practice to gain insight into actors and their networks. This is likely to improve the analytical quality of an actor analysis, as these theoretic frameworks are generally internally consistent and have a certain scientific validity.

Actor analyses based on specific theoretic frameworks are described, for example, by Teisman (1992), Bressers et al. (1995), Ostrom et al. (1994, see p. 26 for additional references), Grünfeld (1999) and Klijn, Van Bueren and Koppenjan (2000). Such analyses are conducted by policy scientists for scientific purposes, aimed at theory development or at a better understanding of certain types of policy making processes. The analyses require a significant amount of effort and expertise on behalf of the analyst, because the theoretical framework has to be translated into operational models and methods for empirical observation. The time and expertise required to conduct properly such analyses are often not available to water experts that are interested in practical support for ongoing analysis projects.

Fortunately, once theoretic frameworks have been operationalized to enable empirical study, this work can be used again for future studies, leading to models. A model provides a representation of a specific situation and it is usually much narrower in scope, and more precise in its assumptions, than its underlying theory. Theoretical frameworks, theories and models are part of a continuum involving increasing interconnectedness and specificity, but

decreasing scope[5] (Ostrom et al., 1994, Sabatier, 1999, p. 6). Models provide operationalizations of theories, in which the basic concepts to be observed are described, as well as a way to structure the concepts and interpret results. Usually, tools and techniques for data collection and/or analysis have been developed and are described together with these models, which offer a useful starting point for an actor analysis. Such actor analysis models combine a sound theoretical basis with a more modest requirement regarding the time and expertise needed for such a model to be applied. Models are typically developed within a certain theoretical line of thinking about policy processes and have been derived from past scientific studies of policy processes.

3.3.2. Selection of actor analysis models

The policy literature was scanned for previously developed models that could offer a good starting point for an actor analysis. One difficulty in identifying suitable models for actor analysis, is that most of the models are not usually recognized under the label of actor analysis approaches. There are a number of different models with different labels, based on the use of different theoretical frameworks and the literature here is rather fragmented. A literature survey resulted in an initial overview of models that seemed to be promising for the analysis of the multi-actor context of policy processes. This overview is not meant to be exhaustive, but rather it is intended to provide sufficient understanding of how a model-based approach can be used for actor analysis.

The following criteria were used, while scanning the literature for suitable actor analysis models, to identify models that offer an analytically sound basis for actor analysis.

- Underlying theory of multi-actor policy processes: the selected models should have a clear link with theories of multi-actor policy processes, based on a view of the policy process that is expressed in a model and that is either explicitly grounded in, or otherwise can be traced to, accepted theories of policy processes.
- Explanatory power: past applications of the models have proven the use of these models for analysing and explaining the behaviour of actors in and/or the outcomes of policy making processes.
- Scientific validity: the models must have been subjected to scientific scrutiny, illustrated by scientific peer reviewed publications of model development and/or use.
- Accessible for future use: the models must be described in sufficient detail to reproduce their use. This is the case when a model is embedded in a methodology, in which model construction and analysis are described as a sequence of steps, or when descriptions of past model applications are sufficiently detailed to allow a reader to reconstruct their use.

[5] Note that in this chapter some of the theoretical frameworks and the models on this continuum are discussed, but hardly any theories. This matches the situation in policy science literature; there are numerous models and frameworks, but theories are scarce (Sabatier, 1999; Dudley, 2000)

Table 3.7 Overview of models for actor analysis

Focus	Analysis model	Useful output (insights) for water experts / policy analysts
Networks		
Network analysis	Dynamic access models	Power and influence of actors; importance of issues for actors; predicted outcome of decision making.
	Configuration analysis	Groups of actors and their shared perceptions; interaction (communication) patterns.
	Social network analysis	Groups of actors, central/isolated actors, linkages between actor groups, strong/weak ties, interaction patterns.
Perceptions of actors		
Discourse analysis	Argumentative analysis	Different arguments used in discourse; bases for claims of actors; (dis)agreement; underlying values and moral judgments; incompatible beliefs.
	Narrative policy analysis	Stories told in discourse; perceived roles of different actors ("villains" and "heroes"); problem/injustice to be addressed; underlying values; (dis)agreement among actors; incompatible beliefs; possible shared basis in meta-narratives.
	Semiotic analysis	Key concepts that define fundamental positions in discourse; underlying values; (dis)agreement among actors possible ways to bridge differences among actors.
	Q-methodology	Groups of actors sharing similar perspective; shared basis for these perspectives.
Cognitive mapping	Strategic Options Development and Analysis	SODA produces a shared problem perception for a group of actors that offers instrumental insights: what actions help to realize objectives according to the actors?
	Self-Q interviews	Factors and causal relations in actors' perceptions; merged perceptions of actor groups, possibilities to address policy problems through actors' rationale.
	Dynamic Actor Network Analysis	Perceptions of actors: objectives, instruments, factors and causal relations; (dis)agreement; potential conflicts; perceived problem solving potential; overlap in perceptions among actors, etc.
Resources and objectives		
Conflict analysis	Analysis of Options	Interests and options of actors; conflict and agreement; control over issues of actors; likelihood of certain possible outcomes; possible coalitions and areas for bargaining.
	Metagame analysis	As above, in addition: preferences of actors for possible outcomes; prediction of stable outcomes; possible coalitions of actors; room for bargaining.
	Graph Model for Conflict Resolution	As metagame analysis, in addition; impact of different risk management strategies of actors on stability of outcomes and possible coalitions and bargaining.
	Hypergame analysis	Policy games as perceived by different actors; (mis)information of actors; probability of strategic surprise in conflict; possible contribution of communication among actors, etc.
	Expected utility model	Prediction of actors' behaviour in conflicts; interests, power and positions of parties in a conflict.
Transactional analysis	Transactional process models	Interest in issues of actors; control over issues of actors (power); potential for exchanges of control over issues between pairs of actors; configurations of actors that have high exchange potential.
	Vote exchange model	As above, but control over issues specified as voting power; prediction of exchanges and outcome of voting procedure.

An overview of models that have been found in literature and that meet the above criteria is given in Table 3.7. This overview is by no means intended to be exhaustive, but it contains sufficient models to provide a solid starting point for further review of the use of models for actor analysis.

The models in Table 3.7 have been categorized using the three basic theoretical perspectives on multi-actor policy processes: focussing on networks, perceptions or resources of actors. Some models cover more than one category, but still the emphasis in these models is on one of the categories. As an ideal type, the categorization allows for a typology of models that seems to be useful for initial characterisation.

Models can be used to produce certain insights, to answer certain questions or even to make certain predictions. This possible analytical output of models is an important characteristic for their use by water experts, and therefore the last column in Table 3.7 summarizes the analytical output a model can generate. Details of the models outlined in Table 3.7 are described in the coming sections, taking into account the underlying approach and conceptualization, the reported purposes for which the models have been used, and might be used, the conditions for their use and their limitations.

3.3.3. Models focusing on actor networks

Part of the complexity of policy problems is caused by the fact that different actors are involved, and that none of these actors has the capability to determine the outcomes of policy processes without at least some co-operation from the other actors involved. Actors depend on each other for the realization of their objectives and this introduces interdependencies among them. The network models stress that interactions among actors are determined for an important part by the structure of their relations and the institutional rules. This focus is summarised in Figure 3.1 in terms of the conceptual framework introduced in Section 2.4.

Network analysis

In policy network *theories*, explanations for the observed policy processes are often found on the level of the individual actor, not on network characteristics per se (Dowding, 1995, p. 137). In line with this observation, the explanatory *models* for network analysis such as the dynamic access models (Stokman and Zeggelink, 1996) and configuration analysis (Termeer, 1993) combine network characteristic with characteristics of the individual actors. The focus of social network analysis is limited to network characteristics, but unlike the other models in this section, no assumptions are modelled as to *how policies* are made. Rather, the structural characteristics of actor networks are modelled, to provide policy analysts with important concepts and methods for the analysis of policy networks in empirical studies (Kenis and Schneider, 1991).

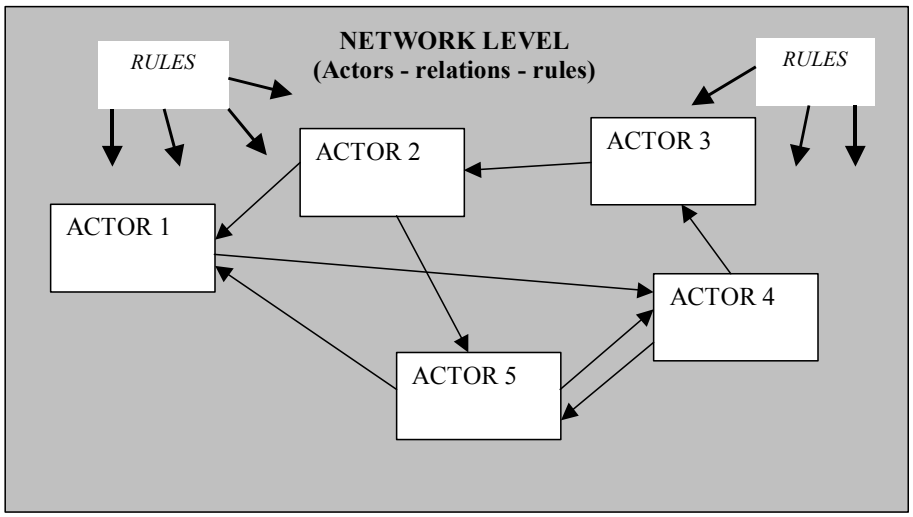


Figure 3.1 Focus of network level analysis methods

In the dynamic access models discussed by Stokman (1994) and Stokman and Zeggelink (1996) the use of network concepts is combined with actor level concepts based on a resource-oriented perspective. These dynamic access models can be linked to the transactional models discussed in section 3.3.5, using a similar rationale of transactions among actors as a basis for decision making, but through a network focus, emphasising the concept of access to actors and decision making centres. Algebraic equations are used in the models to explain or predict the outcomes of formalised decision making situations. In these situations, power of actors is modelled as (final) voting power, and as access to decision makers and the resources required to convince the decision makers to follow a certain course. If and how actors actively participate in decision making is determined by their interest in a decision, the expected outcome of the decision making process and whether or not the actors expect that their activities will have a positive of negative influence on this outcome.

Configuration analysis combines a network perspective with a focus on the perceptions of actors (Termeer, 1993). As with other models discussed below, the perceptions of actors are considered to influence their behaviour, but in addition, these perceptions are also related to the social interaction processes among the actors in networks. In policy processes, one can identify social-cognitive configurations of groups of actors that interact with a certain frequency and intensity, and that show a considerable overlap in their perceptions (cf. Termeer, 1993, p. 34). Configuration analysis is used to analyse these social-cognitive configurations, based on standardized statements on a policy issue to enable a quantitative comparison of actors' perceptions. The results of this analysis are combined with a statistical analysis of the interactions among actors. In this way, configuration analysis resembles a combination of Q-methodology (see section 3.3.4) and social network analysis. Configuration

analysis, as described by Termeer (1993), can be used to reconstruct network dynamics and to explain (a lack of) policy changes through the social configurations of actors and the role of actors within those configurations. Termeer uses these insights to make recommendations for the management of interaction processes in networks that should stimulate development and learning processes (Termeer, 1993, p.40).

Social network analysis can be linked to policy network models because both contain the assumption that actors participate in social systems involving many other actors, and that the relationships a given actor has with other system members may affect that actor's perceptions, beliefs and actions (Knoke and Kuklinski, 1982, p.9). In social network analysis "neutral" mathematical techniques such as discrete graphs, multidimensional scaling and block models are used to analyse relations and social configurations in networks (Scott, 1991). Networks are depicted as sociograms in graphs, and translating these graphs in corresponding matrix notations allows for various (algebraic) computational analyses. Relations between actors are described using concepts such as reciprocity, intensity, durability, direction, and frequency (Scott, 1991, p.32). Network structures can be further analysed by identifying cliques, sub-groups of actors, and the actors that have a central role in the network. Network analysis can be used to identify structural obstacles or failures in policy networks, such as lack of co-ordination or co-operation in certain policy processes (Kenis and Schneider, 1991, pp.44-47). If used to analyse historic data, social network analysis can help analysts reconstruct network dynamics such as the entry of new actors or the repositioning of actors over time[6] (Kenis and Schneider, 1991).

In the explanatory network models concepts for the actor level are combined with concepts for the network level, and as a result, the models contain more variables than most of the other models discussed here. The construction of these models usually requires a considerable amount of specific data, and it might be difficult to obtain the required relational data with sufficient accuracy. It will take time and effort to assess accurately who talks to whom, who has authority over whom or who has access to whom. For large networks, one might be tempted to use sampling to ease data collection, but when doing so, one should realize that sampling does not produce data that can be used at the level of the individual actors, it only results in indications of structural network properties such as density in networks (Knoke and Kuklinski, 1982, p.27).

The dynamic access models described by Stokman (1994) and Stokman and Zeggelink (1996) are only applicable when decisions are made by voting. Their models formalize the relations between a relatively large number of input variables and the outcome of policy processes. The advantage is that this offers a very transparent and consistent model, resulting in predictions of expected policy outcomes. However, such models work by limiting the scope of the

[6] In fact, this application is also an important part of the historic configuration analysis described by Termeer (1993), which is used to analyse how social cognitive configurations of actors have changed over a twenty year period.

model to a specific subset of policy making situations. Voting power is an important concept in the models, and this confines their use to situations in which decisions are made by voting. The configuration analysis described by Termeer (1993) has the potential to cover a broader scope of policy making situations, but here the interpretation of the model's output is less formalized. When using this model, there is no clear-cut recipe for the translation of analysis results to expected policy outcomes (cf. Termeer, 1993, p.277).

3.3.4. Models focusing on perceptions of actors

The focus of the models in this category is the perceptions of the actors and underlying values and norms are often included when delineating these perceptions, thus providing a link to the objectives of actors (see Figure 3.2). Such models are in line with the theoretical perspectives offered by the advocacy coalition framework and the argumentative turn, both theoretical perspectives in which perceptions, belief systems or frames of reference, are considered to be some of the most important factors for explaining policy development (e.g. Sabatier and Jenkins-Smith, 1999; Fischer and Forester, 1993). The perceptions of actors in a policy process can be analysed at the level of the *public discourse*, focusing on the perceptions shared by different groups of actors, or at the level of individual actors, by constructing *cognitive maps* that take the perceptions of individual actors as a starting point for analysis.

Discourse analysis

Discourse analysis models are based on a view of policy making as a process that takes place through the exchange of arguments. Actors try to win others for their position using arguments and reason to persuade the others of the value of their position. Some theories underlying this type of discourse analysis are inspired by a normative notion in which the quality of policy processes is believed to increase if different belief systems are confronted within one and the same policy process; others focus on discourse simply because it shows what drives the different parties in a policy debate.

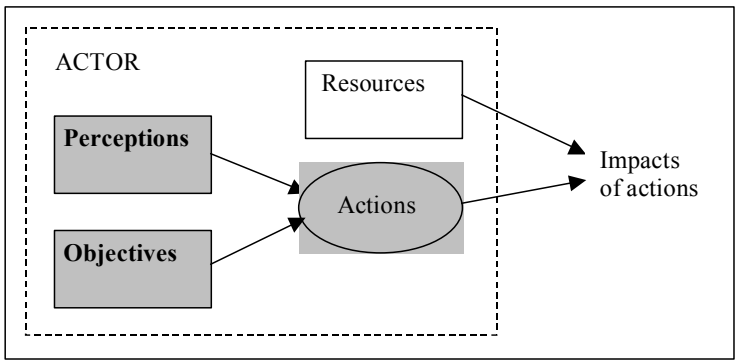


Figure 3.2 Focus of perception oriented analysis models

Examples of methods that are used to analyse the perceptions or belief systems in public discourse are argumentative analysis (Toulmin, 1958; Dunn, 1993; Bras-Klapwijk, 1999, pp.211-235), narrative analysis (Roe, 1994; Van Eeten, 1999) and the similar semiotic analysis (Fiol, 1990), and Q-methodology (McKeown and Thomas, 1988; Van Eeten, 2001).

The lines of reasoning of actors in policy debates may be modelled in different ways, using the arguments that are used, as in argumentative analysis, the stories that are told, as in narrative analysis, the statements with which people agree or disagree, as in Q-methodology, or the fundamental positions and their negation and contrary, as in semiotic analysis. The tools used to analyse debates may be statistical tools such as Q-sorts and factor analysis used by Q-methodology, or predefined structures that can be used by the analyst, such as argumentative or narrative structures and semiotic squares.

Discourse analysis is typically used to clarify the positions of groups of actors and their perceptions of the relation between problems, solutions and other elements that they frequently refer to in policy discussions. Structuring and explicating arguments and reasoning will help an analyst to identify those assumptions and claims that are critical in shaping different positions in a policy discourse. Discourse analysis can be used, for instance, to identify agendas for policy analysis by recasting policy issues in terms that are more amenable to analysis (Roe, 1994; Van Eeten, 1999); or to identify underlying critical assumptions that can be the focus of analysts or scientists who can contribute knowledge to either support or contest those assumptions (cf. Dunn, 1993, p.283); or to derive criteria that cover the concerns of the different groups (Steelman and Maguire, 1999, p.380). Discourse analysis seems especially useful in those complex cases where incompatible beliefs, values and moral judgements cause deep-rooted value-laden conflicts in the policy debate. In these situations discourse analysis offers methods to analyse controversial or highly polarised policy issues (Roe, 1994, p.4; Bras-Klapwijk, 1999, p.213).

A limitation of the scope of discourse analysis models lies in the perspective taken in the models on policy making as a communicative process that revolves around arguments and persuasion. This does not take into account the other two perspectives on policy making, i.e. it does not include the network structures and the power that actors derive from controlling certain resources. A practical limitation in applying the methods is that written input information for the analysis may be difficult to obtain, as “major actors in a debate usually don’t write about their involvement” (Roe, 1994, p.159). This means that the analysts may have to invest a considerable amount of time in data collection, either through interviews, surveys and interactive workshops or thorough document searches. Once collected, the data then has to be structured into the chosen format, which may also require quite some effort. The latter has caused some researchers to doubt the cost-effectiveness of using discourse analysis, questioning whether or not such an analysis yields any surprising insights beyond the “qualitative picture that would emerge directly from interviews” (Weimer, 1999, p.429; see also Van Eeten, 2001, p.408 for a response).

Cognitive mapping

The models with a focus on the perceptions of individual actors are based on the idea that the behaviour of actors is driven by their perception of the situation they find themselves in. Analyst may consider these perceptions to be incomplete or incorrect, but in policy problems, these subjective perceptions are the reality with which analysts have to deal (Bots, Van Twist and Van Duin, 2000). Cognitive mapping methods are an attempt to capture the perceptions of actors in causal relations diagrams, modelling the most important factors and the causal relations among these factors. Such diagrams were used in policy studies in the 1970s by Axelrod (1976) and since then have provided the basis for analysis methodologies such as Strategic Options Development and Analysis (SODA, Eden, 1989), Self-Q interviews (Bougon et al., 1990) and Dynamic Actor Network Analysis (DANA, Bots, Van Twist and Van Duin, 2000).

Cognitive maps help us to identify conflicts and disagreements among actors, problem solving potential and relevant problem issues. The maps of the individual actors may be merged into a single strategic map to arrive at some level of agreement among actors about the nature of the problems. This approach is used in SODA and Self-Q interviews to help create a basis for further action. As such, the modelling process is used in SODA and Self-Q interviews as a basis for learning and communication among actors about the substantive policy problems rather than as a basis for actor analysis. In contrast to this approach, individual maps are not merged in DANA, but rather are used as a basis for a comparative actor analysis, extracting implications for the interactions among actors: What are the issues on which actors agree? What conflicts are there? Where is additional information required? What actors are perceived to have most problem-solving potential? Practically speaking, a method like DANA might be more useful in cases of very diverging perceptions that are not easily merged into one strategic map, whereas merged maps can be used in processes where there seems to be a general basis for agreement between perceptions. Cognitive mapping may be applied during interactive workshops, where actors themselves are modelling their perceptions, as is typically done when using SODA and related approaches (Eden and Ackermann, 2004), or in desk oriented analysis studies, where analysts construct cognitive maps based on input obtained through interviews, workshops or a literature search (Axelrod, 1976; Borsuk et al., 2001).

Cognitive mapping can be used to create a basis for action, as is the case for SODA, which is not aimed at providing the 'right' answer to a problem, but rather at reaching a point at which people feel confident to take action (Eden, 1989, p.22). It can also be used to analyse and forecast some likely behavioural patterns in actor networks (Eden, 1989; Bots et al., 2000) and to indicate in which field additional research and policy analysis studies are necessary (Eden, 1989). Finally, the process of modelling and analysis is also a means to better understanding a situation (Bots et al., 2000) Modelling and analysing helps an analyst to prepare, explore and/or facilitate interaction processes; either by

providing a shared basis for action, or by providing more insights into (likely) negotiation processes and knowledge gaps. Cognitive mapping methods are suited to model perceptions of complex problems where (scientific) uncertainty is involved (Borsuk et al., 2001, p.359) and to analyse situations for which policy makers require an understanding of how the other actors involved "think, reason, and feel" (Bots et al., 2000).

Collecting and coding the input information for cognitive mapping might require quite some effort and incur costs, similar to the difficulties discussed for discourse analysis. Again, written data sources may be limited because "discussions were too unimportant to keep records of or, conversely, too sensitive to keep records of" (Axelrod, 1976, p.257). In all cases, open interviews are often a good way to obtain input information, but conducting such in-depth interview requires time and in the case of the Self-Q method three interview sessions are required with each respondent. One can also question the sincerity of the assertions that actors make (Axelrod, 1976, p.253), because most actors probably are not willing to share their private thoughts with an analyst and to reveal the real factors that drive their actions. The use of cognitive maps to model perceptions requires a high level of analytical skills from the analyst, because if the analyst produces sloppy cognitive maps, their use is seriously limited.

One analytical limitation is that a cognitive map only deals with the most straightforward cause-effect relationships, which limits the variety of cognitive processes that can be modelled. However, permitting fewer distinctions between types of relationships helps to increase the reliability of the approach (Axelrod, 1976, p.258). With cognitive mapping an analyst records the perceptions of actors at a certain time, whereas the perceptions of actors are dynamic and subject to change; these changes and learning mechanisms are not covered by current cognitive mapping methods and, in addition, the influence of structural network characteristics is not taken into account. Finally, making very precise models of actors' perceptions increases problems with complexity, due to the large number of different factors that must be included in the cognitive maps.

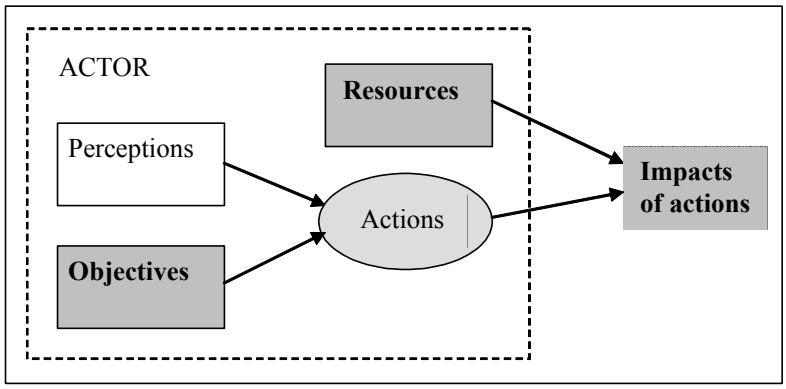


Figure 3.3 Focus of strategic behaviour oriented analysis methods

3.3.5. Models focusing on actors' resources and objectives

The analysis methods listed in Table 3.7 that have a focus on the processes of strategic behaviour among actors start with the assumption that actors control different resources that they can use to achieve their objectives (see Figure 3.3). Through interactions with others, actors try to realize their objectives and maximise their utility. Actor analysis methods related to two theoretical perspectives have been found: game theory and social theory. Game theory has resulted in a number of methods commonly known as conflict analysis (Fraser and Hipel, 1984). Researchers working on social theory have produced methods that are labelled as transactional analysis, in line with the terminology used by Coleman, who developed the foundations of social theory: "Actors are not fully in control of the activities that can satisfy their interests, but find some of those activities partially or wholly under the control of other actors. Thus pursuit of one's interests in such a structure necessarily requires that one engage in transactions of some type with other actors" (Coleman, 1990, p.29).

Conflict Analysis

Conflict analysis emerged as the practical application of game theory, using the theoretical notions of game theory to analyse real world conflicts (Fraser and Hipel, 1984). In conflict analysis actors are assumed to be players in a game, more or less rational agents whose behaviour is guided by a combination of their objectives and the actions under their control, called options. Conflicts are thus analysed by investigating the actors, their preferences, binary options (i.e. yes/no options) and the "rules of the game". The preferences are usually incorporated in the analysis through the ordinal preferences of actors for certain outcomes over other outcomes.

Examples of conflict analysis approaches are the analysis of options approach and metagame analysis (Howard, 1971, 1989), hypergame analysis (Bennett, Cropper and Huxham, 1989) and the Graph Model for Conflict Resolution (Fang, Hipel and Kilgour, 1993) and the "expected utility" model of Bueno de Mesquita (Stokman, 1994). Analysis of options is the most basic method and it is commonly used to provide the input to the other three methods. In analysis of options, the analyst uses the basic concepts of actors and their options to formulate possible outcomes of a conflict, called scenarios, which can be represented in a strategic map[7]. Metagame analysis is used to expand the analysis of options in that it provides mathematical procedures to analyse outcomes for stability. Stable outcomes are those in which none of the actors can, on its own, change the outcome into another, more preferred one. Stability analysis enables a better explanation of possible strategies that actors might employ. The Graph Model for Conflict Resolution (GMCR) extends metagame analysis by incorporating the different risk management strategies that actors may have and by adding some more sophisticated stability concepts to improve

[7] The term "strategic map" is also used in the cognitive analysis method of SODA, but in this case, it refers to another diagram that does not show factors, but possible outcomes/end situations.

the mathematical analysis. Hypergame analysis extends metagame analysis by adding the notion that actors typically have different perceptions of the games they are involved in. In effect this means that according to hypergame analysis, there are separate games for each player, which links it to cognitive mapping models like DANA that take the separate perceptions of actors as starting point for analysis. The expected utility model models conflicts as situations where one party challenges another party if it expects this to be useful. Whether this other party will accept the challenge depends on its perception of the utility of doing so (Stokman, 1994, pp.178-180). A game-tree representation of both party's options is used in the model to list the expected utilities at the end point of each sequence of decisions, using the extensive form for the representation of games that is used in game theory (see Howard, 1971, p.12).

Conflict analyses are often used to give strategic advice to one actor, which can be a party in a conflict, a mediator or an interested third party, by identifying promising courses of action that might lead to favourable and stable outcomes and by anticipating the possible actions of other actors (Hipel, Fang and Kilgour, 2002, p.290). Conflict analysis is used to indicate how interests conflict, what possible compromises there are and on where to focus any bargaining. It also provides decision makers with strategic support in that it can be used to identify opportunities for creating coalitions and to identify coalitions of other actors that should be avoided (Kilgour et al., 1996). The advantages of conflict analysis methods are that binary options are usually relatively easy to define, that analysis can be done in an iterative process, and that even very incomplete assumptions often allow some conclusions to be drawn (Bennet, 1998, p.466).

The models used in conflict analysis are based on the assumption of a closed system, which ideally requires the identification of all relevant factors. For the game theory models these are actors, their complete range of options, the complete range of possible outcomes and a correct estimation of the actors' preferences for all these outcomes. This information can be difficult to obtain, because not all actors will be willing to share information on their options and preferences with the analyst; also to analyse the strategic maps of outcomes, all feasible combinations of options need to be considered, which easily causes the complexity of the model to explode[8]. Software can be used to help to manage this combinatorial complexity, but this might result in models that can "easily leave one feeling more overwhelmed than enlightened" (Bennett, 1998, p.467). Therefore, these approaches are usually applied to conflicts that can be described using a limited number of actors and options. One of the primary guidelines when using conflict analysis methods is to "keep the underlying model as simple as possible" (Hipel et al., 2002, p.298). Hypergame analysis requires an analyst to identify the different perceptions that the actors have of the conflict, something that will often only be possible afterwards during an ex-post analysis. Nevertheless, even with incomplete or simplified information, a

[8] GMCR is supported by GMCR-software, and when using this package, a maximum of approximately twenty different options for all actors can be modelled, to allow the software to make the necessary computations.

structured conflict analysis helps analysts to produce useful insights based on the information that *is* available (cf. Howard, 1989).

Transactional Analysis

The importance of transactions between actors in social processes is emphasised in transactional analysis. Similar to conflict analysis models, transactional models are based on the assumption of actors as rational agents, who choose their actions to maximise utility. The power of actors stems from their control over important resources, and their interests and expectations determine whether or not they will use this power. Transactional methodologies and models are inspired by Coleman's social theory (Coleman, 1990). Algebraic models are used to capture the causal relations in actor networks and to explain or predict the outcomes of negotiations or conflict situations.

Transactional models contain mathematical descriptions of conflicts and policy making and can be used to analyse such processes and to make predictions about the outcomes. The vote-exchange model of Stokman and Van Oosten, models exchanges of voting power between actors. In this model actors are willing to vote in line with the preferences of another actor on a certain decision, in exchange for a similar shift in the voting behaviour of the other actor on another decision (Stokman, 1994, p.181). The other models used by Pappi and Knoke (1991), Stokman and Van Oosten (Stokman, 1994), Timmermans and Beroggi (2000), Schouten et al. (2001) and Timmermans (2004) are fairly similar. These are more abstract models of the exchange of control over issues of interest among actors. They are mainly used to produce insights into interdependencies between actors (Schouten et al., 2001), as well as into an actors' actual power in relation to other actors and important issues, and the power that actors would like to have (cf. Pappi and Knoke, 1991, p.180, 206). Another use is explored by Timmermans, who uses transactional models as an instrument to support policy processes by identifying promising configurations of actors that might co-operate to find creative solutions on specific issues and to facilitate discussions among actors (Timmermans and Beroggi, 2000; Philipsen and Timmermans, 2001; Timmermans, 2004).

The mathematical character of the transactional methods increases their transparency and enables analysts to translate observations into well grounded conclusions, but it also introduces some limitations. The use of transactional models requires quantification of input variables such as power, interest, control over resources, and salience of issues. As with game theory models, it is often difficult to assess the numerical value of these input variables, and of course these values also change over time. Some of the limitations that stem from the need for quantitative input data can be solved by interactive applications such as the ones discussed by Timmermans (2004), where workshops are used to get direct input from the actors. Another limitation is that, due to the use of predefined mathematical models, transactional models can only be used for a certain range of situations. The transactional process models used by Pappi and Knoke (1991), Timmermans and Beroggi (2000), Schouten et al. (2001) and

Timmermans (2004) only include the control that actors have over policy issues and the control that actors would like to have over those issues. Potentials for exchanging control among actors are identified based on the actual control and the desired control. However, the models do not incorporate the important notion that the purpose for which control is sought, can be contradictory between actors (cf. Stokman and Zeggelink, 1996, p.79). For instance, an environmental actor might seek control over the issue of water quality because it wants to reduce pollution from industrial sources, while an industrial actor has "excess control" over this issue, but still does not want transfer this to the environmental actor because it wants to maintain low costs for wastewater treatment facilities. In such situations, the model may indicate that there is a high potential for exchange, but in reality, exchange of control is unlikely to take place. In such situations, the application of these more abstract transactional models is less useful. The vote-exchange model of Stokman and Van Oosten suffers from another limitation, as the emphasis on voting power confines its use to situations in which decisions are made by voting.

A theoretical limitation of transactional methods is that they are based on a view of exchange of control between actors similar to an exchange of goods in an economic market, but political arenas often do not resemble economic markets (cf. Pappi and Knoke, 1991, p.206). Actors are not equal as are parties in a market, actor networks are far from transparent and may create structural distortions (cf. Scharpf, 1973). A final limitation worth noticing is due to the rather abstract character of transactional methods. The abstract level of the models reduces their complexity, but this does not enable very detailed conclusions to be drawn. For example, transactional models may be used to identify actors that might be expected to exchange control, or actors that should be influenced to realize more desirable outcomes, but the question of how this can be done in practical terms is not addressed. Using the models does not offer us clues as to what the negotiation or influence strategies might look like.

Similar to the other models discussed, transactional models can only be used to model policy processes using information taken at a certain moment in time. The results of negotiations will affect all the actors in the network, and ideally new situations should be re-modelled after every negotiation round.

Table 3.8 Overview of actor analysis models, their conceptualization and procedural characteristics

Analysis model	Conceptualization	Procedural characteristics
Network analysis	**Policy making through structured actor networks**	
Social network analysis	Relational graphs with actors as nodes, relations as ties.	Use of mathematical graph models and statistical analysis of relations between actors
Dynamic access models	Voting power, access to other actors and interests of actors influence voting process	Algebraic models to depict phased voting procedures
Configuration analysis	Debate among groups of actors, changing over time	Analyse perceptions and interactions of actors at different times
Discourse analysis	**Policy making through exchanging arguments**	
Argumentative analysis	Debate as arguments, chains of reasoning	Coding input info to fit argumentative structure
Narrative policy analysis	Debate as narratives, stories told by parties	Coding input info to fit narrative structure
Q-methodology	Debate as positions (shared opinions on statements)	Questionnaires with set of statements, factor analysis
Cognitive mapping	**Policy making through problem solving, based on problem perceptions of individual actors**	
DANA	Same for DANA, Self-Q interviews and SODA: perceptions	Cognitive maps for individual actors as basis for comparative analysis
Self-Q Interviews	modelled as cognitive maps, causal relations diagrams, for	Cognitive maps of actors made through three interview sessions
SODA	individual actors and possible groups of actors	Cognitive group map made in participatory effort with actors/clients
Conflict analysis	**Policy making through strategic games**	
Analysis of options	Actor, options, preferences and feasible outcomes	Game models, analysis of certain feasible outcomes
Metagame analysis	As above, plus strategic maps of possible outcomes	As above, including ordinal preferences of actors, enabling construction of strategic maps and mathematical analysis of all feasible outcomes
GMCR	As metagame analysis, including risk strategies of actors	As metagame analysis, but including info on risk strategies of actors
Hypergame analysis	Separate games as perceived by each actor	Construction of different games, one model for each actor
Expected utility model	Actors, positions, power, challenges and expected utility of possible outcomes	Construction of game trees depicting challenges and expected utilities
Transactional analysis	**Policy making through exchanging control**	
Transact. process model	Actors exchange of control over issues	Can be done in interactively with all actors involved or as desk-study
Vote exchange model	Actors exchange voting power	Algebraic modelling of pair-wise exchanges among actors

Table 3.9 Overview of actor analysis models, their purpose, requirements and specific limitations

Method	Purpose	Conditions / requirements	Specific limitations
Network analysis			**Relatively high data requirements**
Social network analysis	Insight into structural characteristics of actor networks	Sufficient data on relations between actors	Structural characteristics alone cannot explain outcomes of policy processes
Dynamic access model	Prediction of outcomes of conflicts	Situation resembles decision making by voting	Limited scope of models
Configuration analysis	Insight in actor groups and in history	Need sufficient historic and relational data	Relatively loose causality in model
Discourse analysis	**Understanding debates on controversial issues**	**Actors fairly consistent in their positions**	**Data collection can be distorted by hidden agendas**
Argumentative analysis	Insight into assumptions and values	Access to arguments used in debate	
Narrative pol. analysis	Agenda for debate, possibilities to use knowledge in debate	Access to stories told in debate	
Q-methodology		Data for statement sample, access to survey respondents	
Cognitive mapping	**Insight into actors' perceptions of complex policy problems**	**Skilled analyst that makes sound causal relations diagrams**	**Data collection can be distorted by hidden agendas**
DANA	Comparative insights actors' perceptions	Access to causal reasoning of individual actors	
Self-Q Interviews	Insight into actor perspectives	Access to actors for three interview sessions	Demanding data collection procedure
SODA	Shared problem formulation as basis for action	Participation of actors in analysis, analyst with good group facilitation skills	Analytic quality is subordinate to reaching shared basis for action
Conflict analysis	**Insight into role and interdependencies parties and outcomes conflict**	**Limited number of actors and binary options. Analyst has complete information**	**Data collection can be distorted by hidden agendas**
Analysis of options		Lower data requirements but less specific outcomes & analytical rigor	
Metagame analysis GMCR		Input on ordinal preferences of actors for all feasible outcomes is required	Limited number of actors and options
Hypergame analysis	Insight into conflicts with actors with different information.	Conflict perceptions of actors known to analyst	Conflict perceptions difficult to assess, often only available after conflicts
Expected utility model	Prediction of outcomes of conflicts.	Assessment actor's position, power & expected utility.	Limited to two party conflicts?
Transactionl analysis	**Insights into interdependencies actors**	**Quantification of input factors required**	
Transact. process model	Facilitation of interactive process		High level of abstraction, direction of interests not specified
Vote exchange model	Prediction of outcomes of conflicts	Situation resembles decision making by voting	Limited scope of models

3.3.6. Summary of actor analysis models and their characteristics

Specific characteristics of the models

The discussion of actor analysis models has shown us that each model has certain specific characteristics that distinguish it from the other models. This information is summarised in Table 3.8 above. This table contains a column covering the conceptualization used in the models, as a lot of the specific conditions, benefits and drawbacks of the models can be logically derived from the boundaries set by the conceptualizations. In addition, sometimes other important conditions for use are added due to certain characteristics of the analysis procedures that accompany some of the models, i.e. the methods and related tools typically used in the analysis, which is also contained as a column in the table. Information on other relevant characteristics of the models, such as their reported purpose for policy analysts, conditions and requirements for applications and their reported limitations is given in Table 3.9.

Common characteristics of actor analysis models

Actor analysis models also have certain characteristics in common, which are discussed briefly below.

Underlying assumptions and limited focus

As with any analytical model, the actor analysis models provide an incomplete representation of reality, focusing on some aspects that are considered essential and leaving out irrelevant detail (cf. Dunn, 1981, p.110; Quade, 1989, p.139-140). The actor analysis models are based on underlying conceptual models of policy processes and therefore, the policy making process that is analysed should fit the underlying assumptions. For instance, when using Dynamic Actor Network Analysis, the assumption is that actors use causal reasoning to structure their thoughts and to guide their actions. When using the Graph Model for Conflict Resolution, a crucial assumption is that policy making resembles a strategic game, and so on.

The conceptualization of a model determines its focus, resulting in a clear focus for most models. This has the benefit that an analyst can also focus his or her attention on a certain aspect, but the drawback is that it excludes aspects outside the analyst's direct focus, or at best leave them in the background. In some cases this will be acceptable, but in others, it might mean that crucial explanatory factors are excluded from the analysis. A final shared consequence of the use of models as a basis for analysis is that empirical data always have to be structured in the format of the chosen model, which requires additional effort, and may call into question the cost-effectiveness of using the model.

A limitation that has been noted for almost all the models is that they produce static pictures. Their use provides the analyst with a snapshot of a situation at a certain point in time. The models are not fit for using in very dynamic conditions, except when one is willing to make different analysis

models for different points in time. This means that an analysis is only meaningful when the situation is relatively stable, and when important conditions are not likely to change every few days. In highly dynamic situations, the models discussed above will produce analysis results that are outdated by the time they are presented.

Data availability as a limiting factor for use

Data availability is an important limiting factor for most models. The translation of a policy process into a certain analysis format often requires specific data, and since rich literature sources are not always available or accessible, this means that data have to be obtained using interviews, surveys or workshops. Data collection often has to be done "on-site", access to actors for communication is crucial and data collection is likely to require a substantial amount of analysis time and resources. Another feature that most models share regarding the input data, is that the strategic behaviour and hidden agendas of actors are likely to influence the reliability and availability of data and the results. Strategic behaviour may cause actors to present distorted information to the analyst, or to withhold information that they do not wish to see made public. The influence of strategic behaviour can, to some extent, be limited by using multiple data sources, and cross checking information provided by certain respondents with information available from written sources or from other respondents. In historical cases, when disclosure of confidential information is less likely to have negative impacts on the actors involved, the role of strategic behaviour is also likely to be lower. Nevertheless, a certain influence of strategic behaviour can not be ruled out, and it is a factor that analysts have to take into account in using their data. This implies that the validity of analysis results needs to be checked and that the analyst has to be careful when presenting and distributing analysis findings; some of the information might upset certain actors or might disrupt ongoing interaction processes.

Tools and techniques for data collection

Going from theoretical frameworks of multi-actor policy processes to actor analysis models for more specific situations, a logical next step would be to address the analytical tools and techniques used by analysts to help them to apply actor analysis models for empirical analysis. This next step is not discussed here, but nevertheless it is mentioned because the tools and techniques are sometimes also reported as methods for actor or stakeholder analysis. For example, the tools used to assess the preferences of actors, such as multi-attribute assessments, the analytic hierarchy process and various types of surveys used to assess the preferences of stakeholders. These analysis tools are commonly used to support the inclusion of general public opinion in methodologies for environmental impact assessments or social impact assessments (Kontogianni et al., 2001; Ramanathan, 2001; Stolp et al., 2002). Such tools can be used to provide an analyst with useful support for assessing

actors' preferences and the concepts influencing these preferences. As such, these tools can be used to provide input for actor analysis models that incorporate preferences as a practical operationalization of the interests or objectives of actors. The tools can also be used to enable empirical studies using a certain theoretical framework, when more time and expertise are available or when the transparency of analysis is considered to be of less importance.

3.4. Conclusions on methods and models for actor analysis

The available methods for actor analysis, based on three basic requirements of an appropriate focus, analytical soundness and practical feasibility, were reviewed in this chapter.

The methods known under the general label of stakeholder analysis provided a logical starting point for this review, as stakeholder analysis methods have been used to support public policy making in the field of natural resources management since the early 1990s. Based on this review, a general procedure for analysis was outlined that requires relatively little effort and expertise to provide a quick scan of the actors in a policy making environment. However, the analytical core of the stakeholder analysis methods consists of different tables or "laundry lists" of items that are neither clearly connected to each other, nor to underlying theory or real-world observations. This does not help analysts to derive input for these tables and to translate these tables into conclusions on stakeholder behaviour.

Therefore, the chapter was continued with an examination of how the available theory on policy making processes might be used to improve analytical soundness. The conclusion was that using models of policy making would improve analyses. A model is a representation of a specific situation and it is usually much narrower in scope, and more precise in its assumptions, than the underlying theory. A model's clearly defined and logically consistent concepts and propositions can be used by analysts to help to guide empirical observations and the interpretation of data, while the underlying theoretical framework is likely to trigger the analyst's thinking, forcing him or her to resolve inconsistencies and ambiguities in the analysis, to reflect on the limitations of the used theory and to identify the particularly interesting peculiarities where reality cannot be captured using the selected perspective. Furthermore, the use of models enables a transparent presentation of findings and analysis procedures, making it easier to discuss results with peers and to identify flaws and possible improvements.

There are different models that can be used to describe the role of actors in policy making processes and they can be categorized according to their main focus: a focus on the influence of network structure on the interactions between actors, on the perceptions of actors that fuel the policy debate and that drive the actions of actors, or on the actors' resources and objectives that drive their interactions. As all these models have a rather limited scope, it is important to

select a model for actor analysis that is appropriate for a specific situation. Therefore, the relevant characteristics of seventeen models were described.

Models provide a good basis for analysis, but in using them, the analyst should be aware of three potential risks: their cost-effectiveness, the availability of sufficient data and the need for relatively stable network conditions. When an analyst takes care regarding managing these needs and potential risks, and when they select a model that suits their specific situation, the use of actor analysis models is considered to be a good way to balance the three requirements of appropriate focus, analytical soundness and practical feasibility of actor analysis. The actor analysis models can be used to provide analytical rigour, while putting relatively modest demands on time and resources for analysis and therefore their application is supported as an addition to the general procedures used for stakeholder analysis.

4. Outline of a model-based approach for actor analysis

4.1. Introduction

In this chapter the literature of the previous chapter is used to describe a procedure for actor analysis that meets the requirements of an appropriate focus, analytical soundness and practical feasibility. A model-based approach for actor analysis is described here as the proposed answer to the question: How should an actor analysis be done? This chapter forms the basis for the exploration of actor analysis in practice described in the next part of this book.

The general procedure for stakeholder analysis (Table 3.1) is used as a basis for an improved procedure that allows for the use of actor analysis models. The resulting procedure consists of six general steps (see Figure 4.1).

1. Define purpose, questions and conditions for actor analysis
2. Preliminary scan of actor network, including the identification of actors
3. Select a model for actor analysis
4. Data collection
5. Structure and analyse data
6. Interpretation and presentation of results, translation into conclusions and recommendations

The steps of such a model-based approach to actor analysis, and some guidelines for their use in practice, are discussed in more detail in this chapter. Their use is expected to produce information that can feed into the policy analysis activities carried out by water experts, helping water experts to identify how they could contribute useful knowledge to ongoing policy processes.

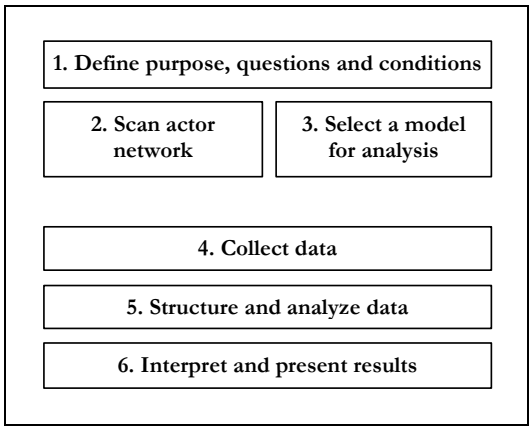


Figure 4.1 Procedure for model-based actor analysis

4.2. Description of steps for model-based actor analysis

4.2.1. Step 1: Define purpose, questions and conditions for actor analysis

As a logical first step in preparing an actor analysis, one should establish the purpose of the analysis and the specific questions that the actor analysis should address to meet this purpose. In addition, one should reflect on the conditions for the analysis, such as the available time and resources, and the general context within which the analysis is done.

From the discussions, in Chapter 3, of the literature on stakeholder analysis and actor analysis models it can be seen that actor analysis can be used for various purposes. In our case, the general purpose of actor analysis is to support the policy analysis activities of water experts. Actor analysis is used to provide insights to help water experts to position themselves in their policy making environment in a way that improves the match between their analysis and the policy making process.

Still, this general purpose leaves room for several more specific purposes, and related to this, numerous analysis questions and conditions. Is one interested in finding out how the actors view a certain water problem, or is one interested in the patterns of their interactions, or in learning about their interdependencies? These specifics are not addressed further at this point, but take shape as the cases are selected and executed in the coming chapters.

Often, the relevant questions to be addressed using actor analysis will be quite well known by the water experts that are working to support policy making. These questions will depend on the character and the phase of the policy analysis activities in which the water experts are involved and the knowledge that is already available on the actor networks. What additional knowledge about the actors in their environment would help the water experts in their policy analysis activities?

Theoretically, several phases can be distinguished in policy analysis activities of which a gross distinction is made between policy analysis activities related to problem analysis and solution analysis (cf. Weimer and Vining, 1989, p.183). Generally, questions related to the perceptions of actors are more likely in problem analysis activities in the earlier phases of policy analysis, while questions related to the means and willingness of actors to contribute to, or frustrate, the implementation of solutions are more likely in the later phases related to solution analysis.

4.2.2. Step 2: Preliminary scan of actor network

Scan of information that is readily available

In this second step, the actor analyst scans the information available from sources such as policy documents and project reports, as well as information available from the water experts involved in the execution of policy analysis activities. This should produce a picture of the main actors and the actor network. At what administrative level is the actor network located? What types

of actors are involved, i.e. local government agencies, sectoral government departments, private industries, farmers, NGOs etc.? What appear to be the main problems and conflicts between actors? In addition, in this step the relevant cultural and practical aspects that are likely to influence possibilities for data collection and analysis activities are reviewed. Is information on the actors available from written sources? Is it possible to have open interviews, to conduct a large scale written survey, or to involve actors in a workshop or group discussion?

Initial selection of a limited but balanced set of actors

The selection of a first set of actors is an area where the first trade-offs between practical feasibility and analytical soundness surface. The general advice of most authors is not to be too restrictive in the identification of actors to prevent a premature focusing on a limited number of actors (Crosby, 1992, p.5; Varvasovszky and Brugha, 2000, p.341). This certainly is good advice for drawing up an initial long-list of actors, but to keep the remainder of the analysis feasible, one subsequently needs to limit the number of actors to keep the time and resources required for the analysis within reasonable limits (cf. Grimble and Chan, 1995, p.119). Therefore, the guideline suggested here is to combine a thoughtful first identification of actors with a first selection of the most important ones, while leaving room for changes later on in the analysis procedure.

A first broad selection of actors can be made using the actor identification approaches discussed by Mitroff, in particular the positional, reputational and social-participation approaches (Mitroff, 1983, p.33-34). In the positional approach the existing policy making structures are reviewed to identify actors with a formal position in policy making. In the reputational approach key informants related to the policy analysis project are asked to identify important actors. In the social participation approach, in our case, an inventory is made of actors that have already participated in the preparation or execution of the policy analysis project.

The resulting list of actors should then be streamlined to include the most important ones. Suggestions for how to do this streamlining are not easy to find. One guideline is to take into account that the resulting list of actors should cover a balanced set of interests and positions. Ideally, all the important interests and positions within a policy making situation should be represented in the initial actor selection. If possible, at least two or three actors with different roles should be identified for each interest. For instance, when local agriculture is an important interest, one could identify the local office of the Ministry of Agriculture, a farmers' cooperative and an agri-business branch organization as important actors. This will be useful because sometimes the identified actors turn out to have slightly different interests than initially thought, or because the interviews with some actors are simply more successful than with others. Covering each interest with at least two different actors is likely to increase the chance of a well-informed and broad picture in the analysis.

In addition, room for iteration through "snowballing" should be built in, meaning that during the data collection, actors can be asked to identify important actors, which might introduce the need to expand or amend the initial selection during the following analysis phases.

4.2.3. Step 3: Select a model for analysis

If the analyst has defined the purpose of the actor analysis and has a general view of the actor network and analysis conditions, the next step is to select a model to be used for the actor analysis. There are a number of different models, each with its own focus, conditions and requirements for use, and therefore the analyst must take care when selecting a model that is appropriate for the situation at hand. Three steps are proposed to further guide the selection of an appropriate model.

Determine the most appropriate focus for analysis

In the overview of actor analysis models in Chapter 3 the available models are categorized according to their focus, which can be either on the network level of actors, on the perceptions of actors or on the resources and objectives of actors. The selection of an appropriate focus for analysis provides a first step in narrowing down the set of promising models. The appropriate focus for actor analysis is mainly determined by the specific purpose of the analysis and the questions that the analysis is expected to address. Generally, perception oriented models are more likely to be appropriate early in policy analysis studies when the focus is on problem analysis, while resources and objectives oriented models, and to a lesser extent network oriented models, are more likely to be used in later phases that focus on solutions analysis. Nevertheless, the proper focus for analysis can be different when one takes into account the information that is already available within the team of water experts that are executing the policy analysis.

Assess the possibilities for data collection

Once the focus for the analysis has been determined, the selection of appropriate models will have been narrowed down, but there will still be several possible models to choose from. Meaningful use of a model means that sufficient data of acceptable quality should be available to construct a model for analysis. Most models require quite specific data and are more or less compatible with certain data collection strategies. For example, Dynamic Actor Network Analysis can be very well combined with the use of open, semi-structured interviews, even when little information is available in advance. However, using Q-methodology does not require in depth interviews, but it does require that the analyst prepares a structured survey with statements that represent the policy debate. This can work well if sufficient time and information is available to prepare the data collection techniques that will be used.

Take analyst experience and preference into account

The analyst that is going to execute the actor analysis may have experience with the application of one or more models or approaches. Using these models again may mean that the application can be done more efficiently and with a higher quality, as certain pitfalls can be circumvented and certain procedures can be streamlined. Similarly, a policy analyst might be familiar with certain models, or might prefer a certain way of data collection or analysis methods. These preferences should not lead to the selection of a model that is inappropriate when viewed from the above two perspectives, but they are certainly relevant when making the final selection for a model.

4.2.4. Step 4: Collect data

The collection of good quality data is of crucial importance for the construction of valid actor analysis models. Often, written information sources will not allow for sufficient detail or focus and it will be necessary to approach experts and/or actors directly to obtain additional data using interviews, surveys or interactive workshops.

Experts or actors?

Some of the texts studied for the literature review given in Chapter 3 recommend actor analysts consult external experts such as journalists, leaders of political parties, university professors and others with "on the ground experience" (Crosby, 1992; ODA, 1995, Box 2). Another strategy is to retrieve information directly from the actors themselves, based on the notion that the best source of information on the interests and ideas of an actor might be the actors themselves (MacArthur, 1997, p.262).

The latter strategy, to "let actors speak for themselves", is favoured here as this is expected to increase the transparency of the analysis procedure and to reduce the bias of the analyst. The analyst restricts him or herself to merely translating the information gathered from interviews or surveys, directly into actor analysis models. This strategy puts higher demands on the data collection methodology, especially on the selection of actors to be included in the data collection efforts, as one cannot rely on a few experts to explain the interests and perceptions of a large number of actors. This strategy is expected to increase the analytical soundness of the actor analysis, but it may increase the costs of an analysis and one should be careful not to compromise practical feasibility when using this strategy.

Use of models to design questions for interviews or questionnaires

In the existing publications on stakeholder analysis, various lists of questions and checklists of concerns and issues are suggested that ideally should all be covered by questionnaires or interviews with actors (see for examples Mitroff, 1983; Grimble and Chan, 1995; ODA, 1995). However, actors usually have

only a limited amount of time available for interviews or questionnaires and it is impossible to cover *all* the questions that are suggested. Analysts have to make a selection and focus their data collection efforts on certain key aspects. The use of analysis models helps the analyst make this selection, as using a model prescribes the type of information that is needed to construct these models. Using an appropriate model is expected to help analysts design questionnaires and/or determine the general structure of issues to be covered for the interviews.

Selection of respondents

Once a set of questions and an appropriate sample of actors to be interviewed have been chosen, the next issue is the identification of the individuals who can represent the actors during an interview or a survey. Ideally, the people that are questioned should be able to express the opinions of their organization, they should be knowledgeable about the substantive policy problems, and they should be willing to answer the analyst's questions. Unfortunately, such ideal respondents are hard to find in reality. Most people do not know all the relevant details of both their own organization and the substantive policy problems that are being discussed, they are likely to not only represent their organization's best interest, but also their own personal interests, and to protect their own positions, which may distort their answers (cf. Varvasovszky and Brugha, 2000, p.345). The literature only hints at these problems, but does not propose any strategies to deal with them.

The issue of representativeness of respondents should be addressed through the careful selection of respondents, especially when in-depth interviews rather than questionnaires or surveys are used. At least three strategies seem possible, One, one can select people with a certain level of seniority, because people at a more senior position are likely to have a better overview of the entire organization, to have more authority to speak on behalf of their organization and to be more skilled in communicating their organization's position to outsiders. In addition, people that have already been assigned to represent their organization in the policy analysis project can be selected, as these people have been nominated by their own organization as representatives and are likely to be most knowledgeable about the subject.

The more senior staff members are suitable representatives from a certain perspective, but they are also likely to be more skilled in the use of strategic and rhetoric tricks to promote their organization's and their personal positions. Their distance from field practice may be large, and sitting behind their desks they might have little knowledge about the practical day-to-day problems their organization faces. They are usually more difficult to access for data collection and they might not be used to or willing to adjust themselves to the question format set by the actor analyst.

Two, professional staff lower in an organizational hierarchy is more likely to have a good knowledge of the substantive problems and is less likely to be influenced by political considerations. However, they might be restrained in the answers they want to give, fearing problems with their superiors if they state

something that is not in line with the official policy. They are likely to be less informed about the organization's official policy position and to have less overview about its complete range of activities. Therefore, they are more likely to reflect sectoral or personal opinions rather than those of the entire organization.

Three, if time is available, it is worthwhile to interview a number of different representatives per organization. In the cases where only one representative can be covered due to time constraints, senior officials are preferred, as their view is likely to match better with policy level issues, and they are likely to have more influence on the actual position of their organization in policy making processes.

4.2.5. Step 5: Structure and analyse data

Structuring and analysing the collected data depends primarily on the models that are used for the actor analysis. As discussed above, the data collection principle that is adopted here is to let actors speak for themselves as much as possible and this principle is also applied to the construction of actor analysis models. This means that models should be constructed as much as possible using the explicit input from interviews or surveys, rather than using assumptions about what actors might have said or might have agreed to.

The answers given by the respondents are therefore used as the main input for analysis, but this does not mean that all the results of the interviews should be used without cross checking them with other sources of information about the actor. These sources might be documents, other respondents or knowledgeable local informants such as well-informed water experts in the policy analysis team and other local contacts.

The validity of the constructed models should be assessed, even if this might be very difficult (cf. Brugha and Varvasovszky, 2000, p. 342, 345). This can be done by presenting the models to knowledgeable informants for feedback and validation. These could be the initial respondents, the water experts on the project or a wider audience of actors or local experts.

4.2.6. Step 6: Interpret and present results

Once the basic actor analysis models have been prepared, they should be interpreted and translated into conclusions and recommendations that can be used to support the ongoing policy analysis activities of water experts.

Model's internal logic supports interpretation of results

The underlying theory and the internal logic of the models are used to make the step from models to outcomes. This step is more transparent and easier to validate when the internal logic of a model is further developed and outcomes follow logically from the models. For example, Dynamic Actor Network Analysis (DANA) is based on the construction of diagrams of the perceptions of different actors and DANA contains some algorithms which are used to

structure the analysis so the outcomes follow logically from the constructed diagrams. Therefore, if the different diagrams are valid, the analysis outcomes are also valid. For metagame analysis, the outcomes follow logically from the constructed metagame model, and therefore, if this model is valid, the outcomes are valid also logically. For the less rigid models such as analysis of options and argumentative analysis, the link between models and outcomes is less tight, although there are also some general principles that can be used here to identify conflicts, critical actors and critical parts of an argument.

Models provide focus but do not replace an analyst's interpretation

The models used help to provide focus, but they do not replace the analyst interpretation in arriving at the final conclusions and recommendations. In the end, the analyst still has to interpret the models to see what insights are most meaningful and how they can be translated to recommendations that are "actionable" for his or her clients.

Outcomes bring out the differences among (groups of) actors

Given the fact that actors have different objectives, resources and perceptions, an actor analysis that focuses on these aspects is likely to bring out these differences. However, bringing out these differences may work in a divisive manner rather than in a stimulating way. This means that analysts should take care in the representation of their analysis results, especially when presenting their findings to the circle of actors outside the policy analysis team. It might be good to stress differences and possible conflicts among groups, to clarify the different positions of actors, but it might also disrupt fragile cooperation structures among actors. Therefore, it is advisable to discuss presentation and reports with the policy analysts before presenting them to a wider circle of actors.

Outcomes show perceptions of actors, not necessarily the real situation

A logical implication of the data collection strategy to let the actors speak for themselves is that the outcomes of an actor analysis will provide a model of the policy environment as the interviewed actors see it, rather than an "objective" model of the real world. This applies to the perception-oriented models and to the resources- and network-oriented models.

Actors are the main source of information and this information is thus distorted by *their* worldview. The resulting models represent actors' perceptions, which can be used to identify areas of concern and any need for further research or discussion, but which should not be treated as a replacement for expert knowledge. For instance, actor analysis may show that concerns about water pollution are considered to be very important by a majority of actors, whereas the information available to water experts indicates that pollution is not a big threat to water quality in the particular case at hand. Nevertheless, in the existing policy making debate, the disagreement among actors about water pollution may

lead to important conflict or deadlock, frustrating agreement on appropriate policy measures. This shows how actor analysis complements rather than replaces expert analysis.

Another implication of the use of actors as the main source of information, is that one should be careful when interpreting actors' opinions on issues that were *not* covered during interviews or surveys. Issues that respondents mention as being important can be assumed to be (relatively) important, but issues that they did not mention might actually also be considered important if one confronts actors with those issues.

4.3. Overview of proposed procedure for model-based actor analysis

The six basic steps and the main guidelines that are proposed for the application of a model-based actor analysis that will provide the basis for the execution of actor analysis in the case studies are shown in Figure 4.2.

The general steps and specific guidelines sketched above should ensure the analytical soundness and practical feasibility of an actor analysis. However, they can not be expected to guarantee "perfect" applications and they cannot take away all the threats that might compromise analytical soundness. Some of these threats are related to fundamental issues that limit the possibilities for a complete and objective analysis of actors' behaviour and its implications. For instance, one can never completely neutralise the influence of hidden agendas and the role of analyst's interpretation in translating models to implications for policy analysis. Some other threats are related to practical barriers that limit possibilities for data collection and analysis in practice. For example, it may be difficult to access all the relevant actors, which can make it difficult to cover a perfectly balanced sample of actors.

These threats are inevitable and, although they can be partly addressed through the validation of analysis results by knowledgeable experts, actor analysts should always be aware of the analytical limitations in their analysis.

1. Define purpose, questions and conditions for actor analysis

- Identify purpose of actor analysis in relation to the PA activities
- Identify main questions to address
- Assess time and resources available for analysis, timing
- Assess support among clients

2. Preliminary scan of actor network

- Scan information at hand for main characteristics of actor network
- Review cultural context and its implications
- Review available data and possible methods of data collection
- Pre-select a limited but balanced set of actors –balanced representation of interests
- Leave room for some expansion through "snowballing" later on

3. Selection of a model for analysis

- Determine the most appropriate focus for analysis based on analysis questions
- Compare analysis environment with requirements actor analysis models
- Take analyst's experience into account

4. Data collection

- Design data collection and questionnaires based on selected analysis models
- Select key informants: preferably let actors speak for themselves if feasible
- Select actor representatives for data collection. Preference: 1. management, 2. representatives proposed by actors themselves, 3. additional professional staff.
- In case of interviews, 10 or so interviews is likely to be sufficient for first overview
- Use key-informants to advise on data collection specifics

5. Structuring and analysis of data

- Fit collected data into model structures and logic
- Use only the statements of actors, avoid taking analysts' assumptions about actors as starting point for analysis
- Cross-check collected primary data with data from other sources
- Present constructed models for feedback and validation

6. Interpretation and presentation of results

- Use underlying theory of models as starting point for interpretation
- Acknowledge that model is a lens and does not replace analyst's interpretation
- Review issues that were *not* mentioned by the actors but be careful in interpretation
- Be careful in presenting differences and possible conflicts / disagreement –discuss results first with clients
- Remember that, when actors "speak for themselves", results reflect their ideas, not necessarily the real situation

Figure 4.2 Guidelines for the application of a model-based actor analysis

5. Methodological introduction to cases

5.1. Role of cases in the research

Cases were used to study the practical use of actor analysis for water experts who want to support policy makers. An action research approach was used, which means that an actor analysis was executed for ongoing policy analysis studies by water experts. The cases studied provided the empirical basis to address the two main research questions introduced in Chapter 1:

1. What is the practical use of actor analysis for water experts who want to support policy makers?
2. How should an actor analysis be done?

In the previous chapters a preliminary answer was given to the second question, in the form of a proposed procedure and guidelines for model-based actor analysis. These are considered to represent the best available procedure and guidelines based on a literature review. The procedure and guidelines were evaluated using practical experiences drawn from case applications.

The cases were also intended to provide insight into the usefulness of actor analysis for the work of water experts. Therefore, the impact of actor analysis on the work of water experts was also assessed in the cases, evaluating to what extent, and how, the output of the actor analysis was used by water experts. Furthermore, the experiences gained in the execution of the cases were used to formulate some explanations for the observed impacts of actor analysis. One of the advantages of using an action research strategy is that it provides the researcher with sufficient insight into case specific circumstances, which is required to generate alternative explanations for the case observations.

This indicates that cases served a dual purpose in this research: they were used to evaluate the actor analysis guidelines and to evaluate and explain the usefulness of actor analysis output for water experts. This might introduce some tension into the framework for the analysis of case study experiences, encompassing both evaluation and explanatory aspects. However, although both aspects were included in the analysis of case experiences, the emphasis was placed on the *evaluation* aspect. A thorough evaluation of impacts is a prerequisite for any explanation with a solid grounding in empirical evidence.

5.2. Case evaluation framework

5.2.1. Evaluation perspective: actor analysis as an information provider

A fairly simple evaluation framework was used to enable a comparative analysis across different cases. This framework was based on the expectation that actor analysis provides information that supports water experts in their work, providing water experts with insight into actors, their interests, relations, influence, problem perceptions, preferred solutions etc. This view of actor analysis as an information provider means that it is considered to be a specific kind of policy analysis (see Thissen and Twaalfhoven, 2001, p.628). Therefore, the basis for the evaluation framework for the cases was provided by existing evaluation frameworks for policy analysis described by Goeller (1988) and Miser and Quade (1988).

The framework described by Goeller (1988) provides a good starting point to incorporate the two different questions that are addressed in this research. Goeller distinguishes three kinds of success that can be used to evaluate policy analysis studies, and which can be translated to the evaluation of actor analyses in the cases. One, *analytic success,* the focus of which is on how the actor analysis was performed and if it yielded output of sufficient analytic quality. Two, *utilization success,* here the impact of actor analysis on the work of water experts is evaluated, focusing on the use of the output of the actor analysis by water experts. Three, *outcome success,* which implies that in the end using the actor analysis also helped to improve the work of water experts, in particular by reducing the gap between water experts and policy makers. Note, outcome success will not be assessed in this research. This is partly due to the difficulties faced when trying to establish outcome success (see Goeller, 1988, p.604) and partly because the evaluation of outcomes generally requires a longer timeframe than the time that was available for this research.

The framework proposed by Miser and Quade is structured along three modes for the appraisal of policy analysis activities: an input, output and process mode. This framework partially overlaps with the one proposed by Goeller, but it adds the notion of the *input* mode, which makes it more useful for explanatory uses. *Input* consists of the wide variety of material that enters the study, such as data, assumptions, analysts etc. Generally, if the input is poor, the output is also likely to be poor: "garbage in, garbage out" (Miser and Quade, 1988, p.630).

5.2.2. Operationalization of the case evaluation framework

Introduction to the evaluation framework

Combining the frameworks of Goeller and Miser and Quade resulted in a long list of factors that should be reviewed for the evaluation of the actor analyses in the case studies. However, not all of these factors were particularly relevant and therefore some of them were excluded from the case evaluation framework. Furthermore, two new factors were added to the list, based on insights from the literature review of actor analysis approaches viz: "quality of collected data" and

"efficiency of analysis process". A complete list of factors and an explanation for their selection or exclusion is provided in the Appendix.

The selected factors were structured to give the evaluation framework, shown in Figure 5.1. The starting point is the assumption that the proposed guidelines for model-based actor analysis, together with an adequate identification of the purpose and starting assumptions for the actor analysis, provide the basis for analytical success of the actor analysis. An important part of this analytical success consists of a proper application of the actor analysis, expressed in terms of technical validity, selection of a suitable model and an efficient analysis procedure. A successful application of the actor analysis in turn is expected to produce output and insights that are credible, relevant and new to the water experts. Such output is more likely to have an actual impact on the work of water experts, which can be assessed in terms of the actual users, with water experts being the main target users, the elements they have used and the purpose for which they have used the elements, i.e. types of use.

The framework used is similar to the framework for the evaluation of policy analysis presented by Thissen and Twaalfhoven (2001, p.629), but more emphasis is put on analytical success. The arrows in the diagram indicate the assumed relations between the success-elements, signifying that a sound application is likely to produce more valuable output, which makes it more likely that this output is utilized by water experts. This is not to say that a failure in one of the first parts of this chain will necessarily imply a failure in utilization success at the end of the chain. However, when a lack of utilization success is observed, the factors depicted in this chain offer the most logical starting point to look for an explanation.

Application of actor analysis

Quality collected data

In most evaluation frameworks for policy analysis, the quality of the *available* data is considered as an input factor for analysis, but for actor analysis, it seems more appropriate to speak of the quality of the *collected* data. This stresses the importance of data collection as a crucial part of the execution of an actor analysis, which covers both the collection of data available prior to the main analysis activities, and additional data collected through surveys or interviews.

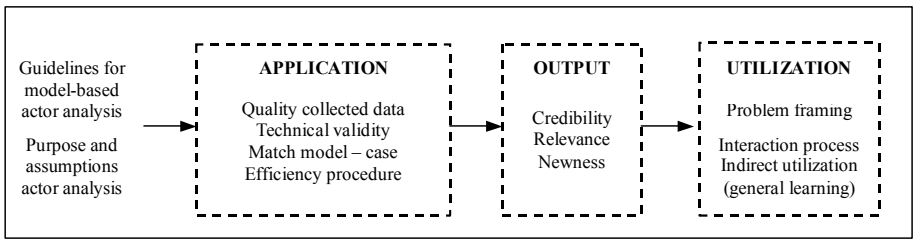


Figure 5.1 Evaluation framework for cases

The quality of the collected data is assessed by looking at the scope and the richness of the collected data, using indicators such as the number of actors and respondents covered, the number and type of interviews, the number and type of relevant background reports, and the existence of possible communication barriers related to language and cultural differences. All these indicators can be assessed relatively easily and objectively using the case study material.

Technical validity

The technical validity of the application of actor analysis refers to the analytical quality of the analysis procedure. Technical validity requires that there are no technical flaws in the analysis, which should take into account the relevant actors and issues, be internally consistent and have findings that follow explicitly from the analysis (Goeller, 1988, p.587). The use of a model-based approach to actor analysis is thought to increase the technical validity in the cases, although it is no guarantee.

The technical validity of the analysis in the cases was assessed using indicators such as the acceptance of analysis results by water experts and professionals in the project environment, acceptance of results as basis for peer reviewed publications, and explicit validation by water experts as part of the evaluation interviews conducted after each case.

Match model – case

There are several available models for actor analysis, and this makes it important to select a model that matches with the case environment. This means that the characteristics, conditions and limitations of the used model(s) should be in line with the purpose and assumptions underlying the actor analysis, the available data and possibilities for data collection, and the time, expertise and technical support available for different analysis activities.

The match between model and case can be assessed using the information contained in Table 3.8 and Table 3.9 as a checklist. Are the conceptualization and the procedural characteristics of the selected model in line with the case environment? Is the general purpose for which the model has been developed and used in the past in line with the problem formulation for the actor analysis? Are the conditions for the model's use sufficiently met in this particular case, such as access to data and specific skills required of analysts? Are the specific model limitations not problematic in a given case?

The insights of this check were complemented with comments and insights obtained from discussing results with the water experts involved and with scientific peers when preparing and discussing papers.

Efficiency of analysis procedure

Although efficiency is not a necessary condition for analytical success and the usefulness of the ongoing policy analysis activities of water experts, it is

important for the practical feasibility of actor analysis; to be practically feasible, actor analysis should put only modest requirements on time and resources.

Efficiency was assessed by asking the involved water experts whether or not they would use the approach in future projects if they had to pay the full costs of its application.

Output of actor analysis

It was important to assess the potential usefulness of the output of actor analysis for further use by water experts. The output was evaluated from a "client perspective" by assessing whether or not the analytical findings were credible, relevant and new according to the involved water experts (cf. Goeller. 1988, p.591). Did the water experts believe that the actor analysis provided a *credible* picture of their policy environment and did they see its *relevance* for their own work? If this is the case, the outcomes are at least potentially useful to the experts. If not, the outcomes are not very likely to be used. In addition to credibility and relevance, an important question is if the analysis produces insights that are *new* to the water experts.

The potential usefulness of the output was assessed by at least two members of the water project teams, usually those water experts involved in the project management. They were asked to identify what they consider to be new and useful insights produced by the actor analysis. In addition, the specific conclusions and recommendations of the actor analysis were evaluated for their credibility, relevance and newness by the water experts. The assessments of these water experts, who act as key informants, were complemented by participant observations during the meetings and workshops where the actor analysis output was presented and discussed, and by comparing the output with previous project documents.

Utilization by water experts: types of utilization

The evaluation of the utilization of the actor analysis output by water experts was done by addressing the questions of *who* uses *what part* of the actor analysis for *what purpose*. These three parts are all covered in the case evaluation, but the focus of the evaluation framework is on the purpose for which the actor analysis output was used, the type of utilization. The types of utilization are specific for this research and are not covered by the existing evaluation frameworks for policy analysis, but a starting point is offered by the expected utilization outlined at the start of this book, in Chapter 1. This indicates that the insights generated by actor analysis can help water experts in: (i) problem framing, broadening the basis for analysis and evaluating the feasibility of different policy options, and (ii) designing and implementing appropriate interaction structures for the interaction between policy makers and water experts. In addition, there are also more fuzzy and indirect contributions through general learning that can be expected.

Utilization for problem framing

The insights from the actor analysis should give an indication of the policy making context within which the water experts operate: the mechanisms that drive water policy making, the types of questions that worry policy makers and the kind of answers that are likely to offer useful support for these policy making processes. Thus, the actor analysis output can be used to support the framing or reframing of problems by offering information on the questions that are relevant and worthwhile to address in an analysis study or, in other words, to identify the problems that are worth solving (cf. Wildavsky, 1992). This can be an important contribution, because in policy analysis, the definition of problems is a critical part of their solution (Wildavsky, 1992, p.57; Thissen, 2000).

In policy analysis projects carried out by water experts a system perspective is generally used to analyse water-related policy issues; the basis for analysis is a regional or local water system, which is analysed over a certain time period or at a certain moment in time and which contains elements such as certain pressing problematic issues and promising alternatives. These water systems are then analysed using different perspectives, for example a hydrological, social, economic or an institutional perspective.

Different types of adjustments to this problem framing can be logically distinguished:

1. Narrow down the scope of the policy analysis:
   a. suggestions for looking at a smaller part of the world, including less factors, a shorter time-frame, or a smaller geographical area.
   b. suggestions for reducing the number of "angles", or analysis perspectives, for example, a suggestion in a particular case could be to get rid of a water quality perspective, when water quality is not really a problematic issue.
2. Expand the scope of the policy analysis:
   a. expand the problem formulation to take a larger part of the world into account, for example by looking across the borders of the initial administrative systems, applying a longer time frame, or including more actors and their concerns in the problem formulation.
   b. include more perspectives, more disciplinary angles, such as adding for example, a geohydrological perspective if groundwater proves to be an important part of the problem, or also analysing the problems from an institutional reform perspective.

   Note: combining contributions of types 1 and 2, i.e. expanding the scope of the policy analysis study in certain directions and narrowing it down along other directions, would result in a "shift" in the problem framing.

3. Adjust the importance of the components of the policy analysis:
   a. Suggestions to increase the importance of certain parts of the initial system, for example, if the initial problem definition covers different regions in a river basin system, the actor analysis might suggest that within this system, the upstream regions should receive more attention in the analysis because the actors in this part of the system control an important part of the solutions.
   b. Suggestions to reassess the weight of certain analytical perspectives, for example, the initial problem framing and project planning includes both economic and hydraulic analyses of a river system, but puts most emphasis on the hydraulic analysis. The actor analysis might suggest that more attention should be paid to the economic analysis of the costs and benefits of water uses and the distribution thereof in the river system.
4. Confirm/verify that the current problem framing is the right one. If none of the above three contributions apply, then the actor analysis can be considered to confirm, that the existing problem framing used by the policy analysis team is the right one and need not be changed.
5. Describe a part of the initial problem in more detail, opening up part of the black box in line with the existing problem formulation: show what that part of the world looks like. For actor analysis this means describing the parts related to the actors and their networks.

These five types of possible utilization for problem framing are visualized as shown in Figure 5.2. In this figure the problem framing by water experts is represented in terms of problem systems and perspectives, depicted by rectangles and arrows. The rectangle represents the system that is being studied, while the arrows going into this system reflect the disciplinary angles of inquiry or analysis perspectives.

Utilization for interaction processes

Often, policy analysis plays a role that goes beyond only gathering, integrating and structuring information for the policy debate. Policy analysis may also help in facilitating policy processes and in stimulating cooperation, communication and collective learning (Thissen and Twaalfhoven, 2001, p.634, 636). Likewise, actor analysis may also support water experts in this broader sense, supporting water experts in designing and facilitating interaction processes to enable the participation of the various actors in project activities Mostert, 2003). Actor analysis output can be used to help to identify the actors that need to be involved, and how to involve them. Contributions to interactions among the actors themselves or to interactions within the project team might also be observed.

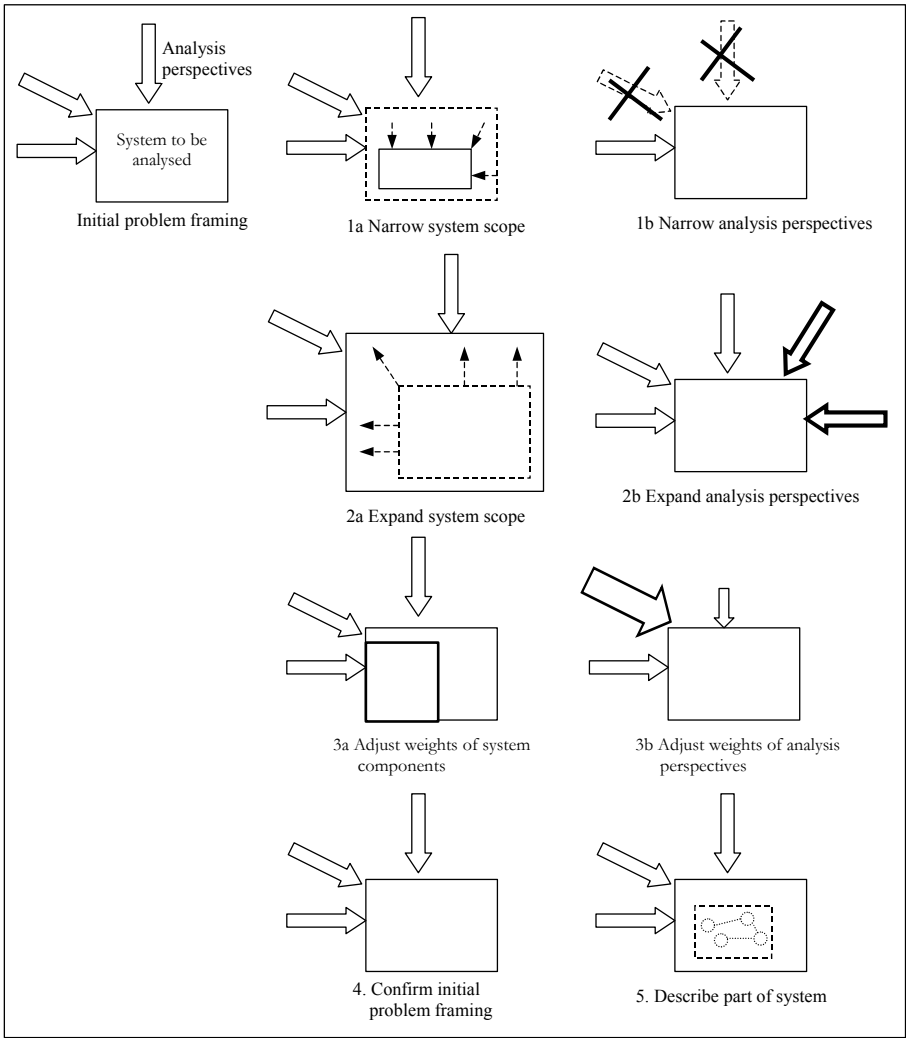


Figure 5.2 Possible contributions of actor analysis in reframing policy analysis problems

Indirect utilization through general learning

The last type of utilization is the indirect utilization related to "general" learning. The observation of utilization for problem framing and interaction processes are an indication that learning has occurred and has had an impact on some specific issues, but in addition to this "specific learning", "general learning" may also have occurred with impacts that are less readily observed. Such general learning might be difficult to link to specific impacts on problem framing or interaction processes, but it might nevertheless be meaningful to the

water projects, for instance inducing a change in the mindsets of the people involved that might indirectly lead to adjustments in activities.

Utilization of actor analysis by water experts: assessment

The utilization of an actor analysis by water experts was assessed in a similar way to that of the potential usefulness of the output of the actor analysis. The water experts who reviewed the *potential* usefulness of the analytical output of the actor analysis, were also asked to review the *actual* impact of the actor analysis on their work. These assessments were done three months to more than a year after the presentation of the final results of the actor analysis, to allow for sufficient project developments to take place and to enable the water experts to put the impact of the actor analysis in a proper perspective. The assessments of these water experts were complemented by information from project documents, comparing project documents and discussion notes prior to the actor analysis with documents that were produced after the actor analysis had been conducted.

5.3. Selected cases

5.3.1. Selection criteria for cases

Four cases were chosen, in each case an actor analysis was executed to support water experts in their ongoing policy analysis projects. A broad selection of cases was used to reflect the variety of situations in which water experts find themselves in practice and and where actor analysis might be useful. Nevertheless, all the cases were selected based on common criteria, to ensure that the four cases allowed for a meaningful comparison of experiences. All the selected cases met the requirements outlined below.

Ongoing policy analysis project in which water experts aimed to support policy makers with useful information

Each case should consist of an ongoing policy analysis project, executed by water experts. The aim of the project experts should primarily be to support policy makers by providing sound and useful information. This is not to say that the selected projects could not include any process-oriented or interactive aspects in the project designs, but merely that the main focus of the projects should be on the analytical contributions made, rather than for instance, on creating new interactive policy processes or innovative platforms for policy debates.

A meaningful purpose of the actor analysis could be identified

An important condition for case selection was that a meaningful purpose of the actor analysis could be identified beforehand during discussions with the water experts involved in the policy analysis projects.

Water experts in the project were receptive to the results of the actor analysis

Additionally, the water experts involved in the selected projects should also be receptive to the results of the actor analysis, and express a willingness to use the insights generated by the actor analysis. The water experts should further show commitment by contributing time, project facilities and staff to enable a proper execution of the actor analysis and by offering room for the presentation of results to a wider audience of actors during workshops or meetings. All these conditions should be met to prevent the actor analysis being considered merely window-dressing for the project, but not being seen, in any substantive way, to be connected to the other project activities.

Project was of sufficient size to allow for efficient application of analytically sound actor analysis

The last selection criterion is related to the size of the policy analysis projects, which should be sufficiently large to make the execution of a model-based actor analysis a credible exercise that would be feasible for similar projects in the future. The policy analysis projects should have a time-span of several years and should involve several water experts. Such projects are considered to be sufficiently large to accommodate a model-based actor analysis, which is thought to require two or three months to execute, and to balance it with the other policy analysis activities.

5.3.2. Selected cases

The above criteria were supplemented with pragmatic consideration of timing and accessibility of cases, as projects had to be accessible and available at the right moment for the research and had to offer sufficient opportunities for data collection. The resulting selection of cases used for the research discussed in this study is shown in chronological order in Table 5.1.

The first case study was the National Water Resources Plan (NWRP) project for Egypt, a four year project supporting the development of a new water resources management plan for Egypt. The second case was a provincial level project in the Netherlands, concerning the development of a new diffuse pollution policy for the Province of North-Holland. The third case was a regional level project covering several provinces, supporting the development of a river basin management plan for the Büyük Menderes river basin in Turkey. This case concerned a regional pilot that was part of a broader project to support the implementation of the European Union Water Framework Directive in Turkey, the Implementation of the Water Framework Directive (IWFD) in Turkey project. The fourth case was the Central Cebu Water Resources Management through Integrated Development (Water REMIND) project in the Philippines. This five-year project aimed at supporting the development of integrated water resources management in the central part of the province of Cebu.

Table 5.1 Overview of selected cases

Case / Location	Project focus	Policy level	Project Duration
NWRP Egypt	Water resources management	National	1999-2003
Diffuse pollution Netherlands	Water quality management	Provincial	2001-2003
IWFD Turkey	River basin management, esp. institutions and water quality	River basin (meta-province)	2002-2004
Water REMIND Philippines	Water resources management, watershed management	Regional (within province)	2003-2008

5.4. Additional remarks on case selection and analysis

5.4.1. The influence of culture on the application and impact of actor analysis

The selected cases were located in different countries and regions and the resulting diversity of cultural characteristics is likely to influence the applications and uses of actor analyses across the cases. The influence of the cultural context can not be ignored in this set of cases and therefore the cultural context is included at the end of the case chapters as a factor that might contribute to an improved understanding of the outcomes of the case evaluations. This was done using the five cultural dimensions identified by Hofstede (1991):

1. Power distance: social inequality, including the relationship with authority. In cultures with a large power distance, inequalities among people are both expected and desired.
2. Collectivism versus individualism: the relationship between the individual and the group. In a collectivist culture, the social network is very important for one's identity, harmony should be maintained and relationships prevail over tasks.
3. Masculinity versus femininity: in masculine cultures, dominant values are material success and progress, there is sympathy for the strong and conflicts are resolved by fighting them out rather than through compromise and negotiation.
4. Uncertainty avoidance: ways of dealing with the unknown. Cultures with strong uncertainty avoidance fear ambiguous situations and unfamiliar risks and feel a need for rules, even if these will never work.
5. Long term orientation versus short term orientation: orientation on a purpose rather than own reputation ('face'), perseverance towards slow results rather than expectation of quick results, and concern with Virtue rather than Truth.

Table 5.2 Index scores on cultural dimensions for the countries included in case selection

Country	Power distance	Indivi-dualism	Mascu-linity	Uncertainty avoidance	Long-term orientation
Arab countries[9]	80	38	53	68	NA
Netherlands	38	80	14	53	44
Philippines	94	32	64	44	19
Turkey	66	37	45	85	NA
USA	40	91	62	46	29

Source: Hofstede, 1991.

The scores on these five cultural dimensions for the countries covered by the case studies in this book are provided in Table 5.2. The index scores in the table are relative scores and they were obtained in a way that puts the highest scoring countries on the complete list close to 100 at the high end of the continuum and close to 0 at the low end. To help with the interpretation of these scores, the scores for the United States have been added.

5.4.2. Using western theories and models for non-western countries

The selected cases were all located in different countries, with different cultural environments. However, the actor analysis models that were used are all based on theories of the policy making process that were developed with the western world in mind. One could question if the related models are suitable for use in developing countries, which bring different cultural and historical aspects into policy making. However, there are several reasons to suggest that the combination of these actor analysis models and cases is justified in this research.

Actor analysis and stakeholder analysis have an important application domain in developing countries. Methodological background papers on stakeholder analysis have been published by the Overseas Development Administration (ODA, 1995) and USAID (Crosby, 1992), while applications of actor analysis models and their underlying theories have been reported for developing countries. This suggests that these models and theories have an explanatory power that covers different countries across the world[10]. Examples are discourse analysis of water policies in India (Raina and Sangar, 2002) and Jordan (Jägerskog, 2002), and application of Coleman's transactional model for coastal zone management in Indonesia (Schouten et al., 2001).

[9] In Hofstede's research, Egypt is contained in a group of Arab countries, which also includes Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, and the United Arab Emirates.

[10] One could still argue that this explanatory power is only possible through a "western" perspective and might actually miss the essential factors that drive policy making in nonwestern countries. But even if this were true, then the western theories still help western analysts to frame these "exotic" policy making situations in ways that make sense to them.

5.4.3. Personal bias in case study implementation and evaluation

The actor analyses in the studied cases were all executed by the same person and this introduces the risk of personal bias. Although the use of a model-based approach is expected to reduce this influence of personal bias, it can never be fully removed. In this research, the potential bias is likely to be towards a more positive rather than negative evaluation of the potential usefulness and the utilization of actor analysis output for several reasons.

The working relations between the researcher and water experts were experienced as good in all four cases (at least by the researcher) and therefore key informants may have been more likely to provide positive rather than negative answers. In three of the four cases, the 'collectivist' culture of some of the key informants may provide a further positive bias, with key informants being hesitant to damage the relationship with the researcher or other people involved in the actor analysis (see Section 5.4.1 above). Finally, one is more likely to overlook one's own mistakes, which introduces an additional risk of positive bias.

Personal bias in both application and evaluation of the actor analysis in the cases is inherent to the use of an action research strategy. Subjectivity and personal bias are the price for access to direct observations and first-hand experiences and as such they are difficult to eliminate when doing action research. Besides the above sources of bias, there are likely to be additional sources of bias involved, but it is virtually impossible to pinpoint all of these. However, their influence can be somewhat reduced and can be made more transparent by a well-structured and complete presentation of the empirical data and the steps followed to come to conclusions. Therefore, the case studies are described in some detail in the coming chapters, in the hope that this will allow the reader to identify the possible role and impact of this personal bias on the research findings.

6. Linking actors and models: the National Water Resources Plan project in Egypt[11]

6.1. Case study background

6.1.1. Water resources management in Egypt

"Water affects nearly every aspect of life. In the extreme it is the sine qua non of life on Earth…For centuries, but much intensified in the past 100 years, humanity has had a free ride in the use of water. Those days are over." (Guercin et al. for WWC, 2003, p.20). This claim by the World Water Council, an international water policy think tank, is clearly illustrated in Egypt, "the gift of the Nile". The existence of ancient civilizations can still be traced by their monuments and remains along the course of the Nile River, while modern society still stretches out as a relatively small strip along the borders of this majestic river. Since ancient times, the Nile has enabled and inspired the development of culture and civilization, and this heritage is deeply embedded in Egypt's social, cultural, economic and political life. In this time and age, the days of a free ride are over, and Egypt faces critical challenges to ensure the continued availability of water resources in the future.

The Nile River is by far the most important water resource in Egypt, accounting for an annual inflow of 55.5 BCM on a total of 58.3 BCM of renewable water resources in Egypt (FAO, 2004). The majority of Egypt's population live in the Nile valley and the Nile delta, where more than 95% of the country's population lives on less than 5% of the available land (NWRP, 1999, p.9). The construction of the High Aswan Dam in the 1960s has enabled Egypt to control the flow of the Nile and restrict flooding, and this has facilitated impressive economic growth.

The government of Egypt has to find ways to cope with the increasing population pressure in the Nile valley and to enable continued social and economic development. The availability of freshwater is an absolute prerequisite for the success of the plans, but unfortunately Egypt faces a serious threat of water stress in the future (Cosgrove and Rijsberman, 2000). The use of Nile water is fixed by a bilateral agreement with Sudan and currently Egypt is fully utilizing its share. In addition, Egypt is effectively re-using drainage water, treated waste water and shallow groundwater to meet existing water demands

[11] Parts of this chapter have appeared as L.M. Hermans, N. El-Masry and T.M. Sadek: "Linking Actors and Models for Water Policy Development in Egypt: Analyzing Actors and their Options" in *Knowledge, Technology, & Policy*, Winter 2002, Vol.14, No.4, p.57-74, and as L.M. Hermans and P.W.G. Bots: "Metagames: Exploring participatory stakeholder analysis for water management in Egypt", in I. Mayer and W. Veeneman (eds.) *Games in a World of Infrastructures*, Eburon Academic Publishers, pp.205-223.

(NWRP, 1999). Therefore, to enable sustained social and economic development, the careful management of available water resources is of vital importance to the future of Egyptian society.

6.1.2. The National Water Resources Plan project

The National Water Resources Plan (NWRP) project was established to support the preparation of a new national policy document for the sustainable management of water resources in Egypt. It was implemented by the Planning Sector of the Egyptian Ministry of Water Resources and Irrigation (MWRI), which is responsible for water policy, in collaboration with the Netherlands Directorate General for International Cooperation (NWRP, 1999). The NWRP project started in October 1998, and resulted in a new national water resources plan in 2005. The project implementation was done by a team of approximately seven Egyptian engineers from the Ministry of Water Resources and Irrigation, supported by a consortium of Dutch consultants led by Delft Hydraulics. Three Dutch consultants were based at the Ministry for a period of several years, while a dozen of additional consultants provided advice and support during short missions of a few days to several weeks.

Figure 6.1 Location map of Egypt

In the project's first years, the development of various hydraulic, hydrologic and water quality simulation models played an important role. The NWRP project also recognized the importance of the political and procedural aspects of drafting a policy document and it initiated three inter-ministerial committees to involve the important actors early in the analysis process (MPWWR, 1998). In these committees, representatives of different ministries were kept informed of the project's progress and had the opportunity to contribute to the analysis activities. Apart from these committees, a base-line survey of the institutional arrangements in different regional governorates was executed. Nevertheless, reaching a real involvement of all actors and institutions in a complicated decision making process proved to be a difficult challenge.

6.1.3. Timeline of actor analysis for the NWRP project

The contacts with the NWRP project for this research were established in the fall of 1999 through the project's co-ordinator and the team leader who were both working for WL|Delft Hydraulics. Both this PhD research and the NWRP project were just starting up and it seemed that the NWRP project could benefit from the incorporation of an actor-oriented perspective.

A first actor analysis was executed for the NWRP project in the spring of 2000. During the first visit to Cairo, background documents were studied, a small number of interviews were conducted and a report was prepared using a general stakeholder analysis approach. Back in Delft, the collected data were used to explore the application of models for actor analysis, specifically argumentative analysis and metagame analysis. This was a learning experience for both the researcher and the NWRP project, exploring the use of models for actor analysis as compared to a stakeholder analysis approach. This first model-based analysis focused on the national level political debate on water resources management. It did not produce very specific recommendations for the NWRP project, but a general picture of the national water policy arena was drawn (see Hermans, 2001).

These first experiences indicated that a model-based approach for actor analysis held sufficient promise to warrant further use in the NWRP project. It was decided to explore the use of metagame analysis in a participatory application. Such a participatory application of metagame analysis was rather new, especially in the Egyptian situation. Therefore a test workshop was used to explore the approach and its use for the NWRP project. This test workshop was followed by a desk-oriented analysis, using analysis of options. Both the test workshop and the analysis of options were implemented in Egypt one year after the first visit there, in May 2001, and this is the experience described in this chapter. An overview of relevant dates related to the actor analysis for the NWRP project is provided in Table 6.1 below.

Table 6.1 Timeline of actor analysis for NWRP project

Date (y-m-d)			Event
1998	Oct		Start of NWRP project
1999	Sep		First contacts on possible link PhD research - NWRP
2000	Mar	26-16	Data collection in Egypt for first actor analysis
	Jun		Reporting results first actor analysis
	Jul		Evaluation first actor analysis
	Sep		Exploring possibilities for metagame workshop
2001	Mar	26	Proposal to develop test-workshop on drainage re-use
	Apr		Preparation of metagame on drainage water re-use
	Apr	24	Test workshop with NWRP Team
	May	2	Plenary evaluation of test workshop NWRP team
	May	5-9	Interviews with actors for analysis of options
	May	10	Presentation of preliminary results to external actors
	Jun		Report actor analysis (analysis of options)
	Dec		Evaluation by email
2002			Publications on actor analysis
2003	Jun	23	Final evaluation with team leader NWRP project

6.2. Description of the actor analysis

6.2.1. Preparation

Purpose of actor analysis

During the first two years of the NWRP project, the project team collected data and developed simulation models. By the beginning of 2001 the project team was completing these activities and wanted to make the transition to a next phase, in which the attention should shift from building simulation models towards the procedural aspects of drafting a policy document.

In the new project phase, the NWRP project staff wished to intensify the discussion with the main actors and wanted to "clarify which policy changes are acceptable for further discussion and what is the position of the various players with respect to these policy changes" (NWRP email 30/07/2000). The actor analysis was intended to support the project by linking the different water policy options and their consequences to the objectives of the actors. Insights into the issues that actors were interested in and the objectives that influenced their behaviour would help to identify the trade-offs between objectives that had to be made when developing a water policy.

Actor analysis was also expected to help the experts to assess the influence that different actors might have on water resources management, by taking stock of their interests, means and resources. In addition, it was expected to increase

awareness among actors of the choices, trade-offs and potential conflicts that must be dealt with when developing a water policy (NWRP email 06/11/2000).

Summarizing, the actor analysis was intended to start up new processes with the actors on policy formulation, to provide insights into important issues and areas of agreement and conflict, and to help participants gain and share these insights (interviews NWRP team, 22/04/01).

Selected method and approach

Motivation for the selection of metagame analysis and analysis of options

Metagame analysis, including the analysis of options method, was selected for application to the NWRP project. Experience had already been obtained with the application of this approach in the first exploration of actor analysis for the NWRP project, in spring of 2000, and therefore both the project team and the analyst were familiar with this approach. After these first experiences, the NWRP management indicated its preference for an actor analysis focusing on the strategic behaviour of actors, analysing how actors might use their resources to protect their interest and further their objectives (NWRP email 30/07/2000).

Metagame analysis specifically includes actors, their interests and options, and since the NWRP project was focusing on the analysis of possible measures, this conceptualization fitted well with the concepts used in the project. Metagame analysis and the analysis of options, which is also included in the first stages of metagame analysis, were therefore identified as a promising approach. It was expected that, for the other conflict analysis approaches, GMCR and hypergame analysis, there was not sufficient data available and that they would be too complex to implement in a participatory way.

Theoretical background of metagame analysis and analysis of options

Metagame theory was developed as a reconstruction of game theory on a non-quantitative basis in the hope that it would thereby make more practical and intuitive sense (Howard, 1971, p.xi). The practical application of metagame theory is based on the analysis of options, which typically starts with the following three steps (Howard, 1971, 1989):

1. Review the *issues* to be decided
2. Ask *who* controls the issues, either directly or indirectly
3. Ask *how* actors control the issues, resulting in an inventory of policy options

Issues are not further defined in the primary literature on analysis of options, but they provide the basis for further analysis and they should be connected to the important decisions that have to be made (Howard, 1989, p.240). The options are related to the means that actors have to control the issues, and they are to be stated as yes/no choices. For each actor, the *options* can be listed and the possible *strategies* can be formulated by indicating which combination of options this actor decides to implement. The individual strategies of actors can

be combined to form possible outcomes of the game. These possible outcomes are called *scenarios* in metagame terminology. The *positions* of different actors are their preferred scenarios, i.e. the scenarios that they would like others to agree to. Scenarios are analysed to see if they are stable. Generally, a scenario will be unstable if it is possible for at least one actor to change one of its options unilaterally to transform the scenario into another scenario that better matches the actor's preferences (Howard, 1989).

The output of metagame analysis usually consists of strategic advice to a certain actor or group of actors (the analyst's clients), consisting of guidelines on their course of action and insight into the actions that can be expected from other actors. It can be used to indicate possible bargaining points, what kinds of potential or actual conflicts exist, and if there are possible compromises that might be made to deal with conflicts. The output can be used for coalition analysis, to see if there are possible coalitions of actors that might change the expected outcomes in a desirable or undesirable way. Metagame analysis can also be used to help explain past or present situations, to identify stable situations that seem promising for a particular actor and to identify those situations that should be avoided.

Participatory application of the actor analysis

The initial idea was to apply the actor analysis in a participatory way, involving the NWRP project's actors in a systematic analysis of the different policy options and their respective roles and interests in the implementation of these options. This participatory application was explored, followed by a more 'classic' application of the analysis of options method based on interviews and other sources of information. These two approaches differ substantially in their scope and in their application process and therefore can be used to provide complementary insights into the use of actor analysis. The two approaches were implemented in the same period, during the visit made to Egypt by the researcher in April/May 2001, and this made it difficult to separate their final impacts on the NWRP project. Thus, for these reasons, both applications are discussed in this chapter.

6.2.2. Application of participatory metagame analysis

Approach: preparation and implementation of a test workshop

Preparation of a metagame model as a basis for discussion

The conceptual structure of metagame analysis can be used to support a discussion of promising options between actors, based on available knowledge of possible options and their estimated impacts. Metagame analysis provides a suitable structure for such a discussion, thus helping to streamline communication among the NWRP analysts and the actors. However, the use of a participatory application of metagame analysis to facilitate dialogue is rather

new, existing literature mainly reports its use in a "desk-oriented" analysis application (see Chapter 2). Therefore, the application of the metagame analysis approach in a participatory style, with the actors actually participating in the analysis, required further development. To test this new participatory application, a test workshop was designed and implemented to explore the approach and its use for the NWRP project. This test session covered one of Egypt's water management issues and was executed with the members of the NWRP team, who played the roles of the actors.

A metagame model of the selected water management issue was prepared prior to the workshop, based on the analysis of options format. This model consisted of a set of actors and their options, and a specification of the relationships between these options, e.g. "option A can only be implemented if option B is also implemented", "option C excludes option D", etc. This model provided the first basis for discussion and hence it had to include all the actors and the options that participants found to be of relevance. Therefore, the metagame model was formulated in consultation with the participating NWRP team members. The complexity of the model was limited to allow the users to explore the use of participatory metagame analysis in a relatively simple form and to provide the participants with good insights into the actors and their mutual relationships and interdependencies.

Organization of the test workshop

The participatory metagame was tested in a three hour workshop with the NWRP team's engineers in Cairo. These engineers were consulted while the metagame model was constructed, so they were already familiar with its concept. Each of the actors in the metagame model was represented by one or two team members. The workshop was structured in three phases: introduction and preparation, discussion and evaluation.

At the start the objective of the workshop was introduced and the metagame model was explained. The actors then started their preparation for discussions with the other actors. This process was guided step by step using pre-structured preparation forms. This was done to assist participants in devising a strategy for negotiation and to obtain the actor preference information that would be needed for the analysis of the session. The preparation stimulated the participants to reflect on their objectives, the ways in which these objectives were influenced by the different options, and the actors with whom they should negotiate to promote their objectives. Actors were asked to score their relative preferences for all available options and to state which positions they expected other actors to take.

Next, negotiations took place, structured as a sequence of rounds, with each round divided into three short blocks. The first two of these blocks were used for discussions in small groups of either two or three actors. In the last block of a round all the actors met in a plenary discussion to come to their final decisions. The actors were not asked to announce publicly what option they had exercised, to allow them to behave strategically. Instead, the actors could inform the

facilitator of their decision by submitting one or more of the option cards that were issued to them at the beginning of the game. The facilitator reviewed the submitted option cards and announced the resulting outcome.

The evaluation phase started with a brief presentation and analysis of the negotiation results. The basis for this analysis was formed by the preference scores provided by the actors during the preparation phase. Using these scores, the preference of actors for different outcomes could be indicated and a strategic map could be drawn to determine the stability of the feasible outcomes. The remaining time was used to evaluate the test session by summarizing and discussing the comments that were made during the session.

A more elaborate evaluation of the test session was carried out in the following days, in discussion with NWRP team members and in a plenary session with the entire team a few days later. This evaluation focused on the use of participatory metagame analysis for the NWRP project. Could it be used to support a participatory analysis covering all relevant water policy issues? How would it work with real actor representatives, such as for example the members of the project's Technical Committee?

Results of the test workshop

Preparation of a metagame model on drainage water re-use

The issue of drainage water re-use was selected for the exploratory test session because it is an important issue in Egyptian water management and has many challenges attached to it. There are two separate water systems in the Nile Delta and Lower Egypt. There is an irrigation system that carries fresh water for irrigation, drinking water plants and industry, and there is a drainage system that collects and transports wastewater and agricultural drainage to the sea. Currently, the water collected in some of the larger drains of the drainage system does not flow into the sea but is pumped back to the irrigation system to meet the high water demands. The quality of the resulting mixed water in the irrigation system poses limitations on its use and can create health problems.

A metagame model for the re-use of drainage water was constructed in consultation with the NWRP engineers. The resulting model included five actors that together controlled a total of sixteen options. It covered only the most important actors and options on national level to limit the complexity of the model.

Proceedings of the workshop

The test workshop proceeded as planned. The structure of the metagame was such that there was no obvious outcome and the issue of drainage water re-use gave the participants sufficient reason to negotiate.

The actors could request with whom they wanted to enter into bilateral negotiations, and in the first round these requests involved only three of the five actors: the Ministry of Water Resources and Irrigation (MWRI), the Ministry of Agriculture and Land Reclamation (MALR) and the Ministry of Health and

Population (MHP). No one requested consultations with the other two actors, the National Organization of Potable Water and Sewage Disposal (NOPWASD) and the Egyptian Environmental Affairs Agency (EEAA). At the end of the first round, not all the actors were aware of the other actors' intentions, which led to a somewhat unpleasant surprise for the Ministry of Water Resources and Irrigation (MWRI) and the Ministry of Agriculture and Land Reclamation (MALR). They wanted to maximize the re-use of drainage water, but could not do so because two of the other actors did not want to co-operate with this strategy. The Ministry of Health and Population (MHP) could not allow the re-use of drainage water because water quality standards could not be met. Meeting water quality standards would require the National Organization of Potable Water and Sewage Disposal (NOPWASD) to invest large sums of money in improved wastewater treatment, which it could not do because of a lack of funds.

In the second round, the other actors recognized that the cooperation of NOPWASD was required for a desirable outcome, as three of the four actors wanted to consult with NOPWASD. The participants exhibited their creativity by identifying new options outside the model, searching for compromise. MALR agreed to reduce pollution from agriculture and to invest in wetland purification methods for more advanced treatment, in return for more advanced treatment provided by NOPWASD. MWRI and the EEAA agreed to optimize instead of maximize re-use. Re-use would be maximized where possible, and limited in cases where that was needed. This compromise marked the end of the negotiation phase

The evaluation phase consisted of an analysis of the outcome of the game, based on the preference scores obtained in the preparation phase. The analysis showed that the outcome had a positive utility for the group of actors as a whole, but not for each of the actors separately. The benefits for the Ministry of Water Resources and Irrigation (MWRI) and the Ministry of Agriculture and Land Reclamation (MALR) were high, whereas those for the Ministry of Health and Population (MHP) and the National Organization of Potable Water and Sewage Disposal (NOPWASD) were low. Within the rationality of the metagame model, one would have expected NOPWASD to disagree with the proposed compromise, and MHP to prohibit all re-use to minimize health impacts.

Evaluation of the workshop for further use in the NWRP project

After the discussion of the outcomes of the metagame, there was a discussion on the use of this method for the NWRP project. This discussion was started as the last activity during the workshop and was elaborated upon in the following days. Despite some apparent contributions, also important practical drawbacks were identified in this evaluation (see Section 6.3 below), and the decision was made to not further pursue the participatory application of the metagame approach for the NWRP project. Instead, it was decided to use the underlying analysis of options method as a basis to identify actors, their options and interests.

6.2.3. Application of analysis of options

General approach for the analysis of options

The analysis of options method was used to cover the complete range of water management issues and to assess the options that seemed to be important and the important criteria required to evaluate options.

An important part of the information for the analysis was obtained using interviews with representatives of the most important actors. As the time alloted for data collection was limited to only a little more than one week (see the timeline in Table 6.1), the interviews were limited to the circle of actors that were represented in the NWRP project's Technical Committee. This committee consists of the national government organizations that were identified as the most important actors in a previous stage of the project. Interviews were held with representatives of the Ministry of Industry; Ministry of Health and Population; Ministry of Agriculture and Land Reclamation, Ministry of Housing (NOPWASD), Ministry of Planning, Ministry of Water Resources and Irrigation, Ministry of Local Development and the Egyptian Environmental Affairs Agency. The information from the interviews was used as a basis for the analysis, and was supplemented and cross-checked with information from project documents such as meeting minutes, project memos, reports and policy documents.

The interviews were structured using a predefined list of questions that covered the different steps in options analysis: the general water management objectives of the actors, the issues they found to be of importance, and the options that were available to influence these important issues. The objectives of the actors had already been listed during a previous project workshop, and this predefined list was used to enable a relatively quick selection of objectives and to check if the list was still up-to-date. This identification of objectives was used to estimate the actors' preferences and to identify criteria that could be used to evaluate options in the NWRP project.

The actors were also asked to identify their most important issues, in a similar way to the identification of objectives, but this time without the use of a predefined list. These issues could be anything that actors considered to be important in relation to decisions for a new water resources management policy. The resulting list of issues was used to cut-up the decision making into smaller pieces that were considered to be relevant to the actors. The actors discussed promising options that could influence issues in a direction that would better match their objectives for each of the issues identified. Finally, the actors were asked to discuss the involvement of the different actors in the implementation of the options that were discussed.

After the interviews, the issues that were identified by the actors were grouped into five main categories and for each of these categories, analysis of options tables were constructed, showing the preferences of the different actors involved. These tables provided the basis for further analysis.

Overview of main results of the analysis of options

The results of the interviews showed that the actors could be grouped according to their objectives, resulting in five main groups: public and environmental health, with an emphasis on water quality; availability of water, with an emphasis on water quantity; agriculture; social development and economic development. These groups of actors with similar objectives provided a first indication of possible coalitions.

The issues identified by the actors could also be structured into five categories that were considered to be most relevant. These categories covered different interrelated and partially overlapping aspects of water resources management: water quality, re-use of wastewater, agricultural water management, public water supply and water quantity. These categories were used to cut-up the decision making into smaller pieces for the construction of analysis of options tables. The use of these tables is illustrated here for one particular issue: "re-use of wastewater", which covers re-use of agricultural drainage and municipal and industrial wastewater. A discussion of this issue will illustrate the use of analysis of options tables and enable a comparison of the desk-oriented approach reported here with the participatory workshop discussed in the previous section, in which the issue of wastewater re-use was also modelled.

An indication of the actors' view of the issue of re-use of wastewater, based on the input produced by actors during the interviews, is given in Table 6.2[12]. The table provides a basis to explore the most important options involved in drainage and wastewater re-use, although it is unlikely that it represents the complete and comprehensive picture. The first column of Table 6.2 contains the options and the subsequent columns contain the preferences of actors for certain options, inspired by, and adapted from, the format suggested by Howard (1989). In the cells, "y" indicates that an actor prefers the corresponding option to be executed by the controlling actor, while "n" indicates that an actor prefers that the option is not executed. Grey cells are used to indicate that an actor has (partial) control over an option. Empty cells indicate that the preference of actors is not known and is assumed to be of minor importance for an option. Question marks are used either to indicate that the preferences of an actor are not known but are important, or to indicate assumptions of actors' preferences for options, when preferences on these options could not be derived with complete clarity from the interviews. Note that because the interviews with actors were used as the main source of information for the preparation of the table, the options contained in the table are not all on the same operational level. For instance, "Optimize use of chemicals in agriculture" can be seen as an operational option, while "Prioritize pollution reduction for black spots" refers

[12] This table consists of the "re-use" table in the initial analysis of options report, complemented with options from the "water quality" table in that report. Both issues are closely related and partially overlapping as the re-use problem is simultaneously a water quality and water quantity problem.

to a prioritization strategy for implementing more operational level options for pollution reduction.

The results of the interviews showed that the re-use of wastewater was approached from two sides. There were options in which actual ways to re-use wastewater were identified, and there were options that should help to improve the water quality of the waste and drainage water, to enable more re-use. As can be seen from Table 6.2, the water users and their ministries, i.e. the Ministry of Agriculture and Land Reclamation and the Ministry of Industry, played an important role as they controlled the options related to actual re-use and to pollution reduction. This illustrates once more that the main water users were also the main polluters. If appropriate health standards and sufficient wastewater treatment are considered to be key requirements for increased re-use of wastewater, then the Ministry of Health and the NOPWASD also controlled critical options.

Possible problems among actors can be derived from Table 6.2 based on the indicated preferences of actors. For example, the re-circulation of process water to increase wastewater re-use in industries was favoured by the Ministry of Industry, indicated by "y" in the corresponding cell, but would probably be disliked by the industries, as it would require them to make certain changes to their industrial plants, indicated by "n?" in the corresponding cell.

Table 6.2 Preferences for wastewater re-use options

OPTIONS	**PREFERENCE OF ACTORS** Environm.Agency (EEAA)	Min Agr & Land Recl (MALR)	Min. Health (MHP)	Min Local Developm. (MLD)	Min Planning (MoP)	Min Water Res.& Irr (MWRI)	NOPWASD	Min. Industry (MI)	Farmers	Industries
Apply health standards that allow certain reuse		y	y							
Increase budget for wastewater treatment					n?		y			
Increase number/capac wastewater treatment plants	y	y	y	y?		y	n-y	y		
Optimize use of chemicals in agriculture	y	y	y			y	y		y	
Prioritize pollution reduction for "black spots"	y					y				
Re-use for certain (non-consumer) crops		y	y						y	
Re-use for land reclamation ("flushing")		y								
Re-use in industries (re-circulation process water)								y		n?

An important potential problem concerned the increase of wastewater treatment plants. The preferences showed that most actors would like the controlling actor, NOPWASD, to implement this option. Providing more wastewater treatment to enable reuse required NOPWASD to provide more treatment and more advanced treatment than they would otherwise have done, and therefore they were not in favour of this. If the additional expenses needed for increased wastewater treatment were not covered, NOPWASD would not be happy with this option, but if the costs were met, NOPWASD might take a different position. However, additional funds for an increased capacity for wastewater treatment were not very likely, because the Ministry of Planning, which administered funds, indicated that the funds for the implementation of a water policy were currently one of the main bottlenecks.

Conclusions and recommendations for the NWRP project

Analysis of options tables similar to the one above were constructed and analysed for the other issues. Several conclusions and recommendations were drawn based on this analysis and reported in the actor analysis report (Hermans, 2001). The four main conclusions and recommendations are summarized in Table 6.3 and are explained below.

A first conclusion from the analysis was that the benefits were emphasized in describing the impacts of options, while the costs were often neglected in the initial discussion. If funds and other resources were not a problem, perhaps all the objectives could be satisfied simultaneously. It is only when (financial) resources are limited, that problems occur. Costs and the cost-effectiveness of measures need to be estimated, and the approximate sum of investments that is available for the implementation of a new water policy determined. This would enable the NWRP project to come up with policy options that are within a realistic range to be seriously considered by the final decision makers.

Table 6.3 Main conclusions and recommendations actor analysis for NWRP project

Conclusion	Corresponding recommendation to NWRP
Benefits of options are emphasized, costs are usually neglected	Estimate costs and cost-effectiveness of options as well as approximate sum of investment available for new water policy
Apparent agreement among actors, no clear areas of conflict	Cost-benefit estimations to link options to objectives and to gain insight in trade-offs
Mainly national government agencies involved in NWRP activities	Expand group of actors involved to include also local level and private sector representatives
Nation wide debate going on about institutional reform	Address water policy development as part of broader debate on institutional reform

The analysis further showed that there were not many clearly opposing positions among the actors in the direct circle around the NWRP project. This apparent agreement was supported by the observation that the specific costs and benefits of options were often not touched upon by the actors. There might be an agreement on the general objectives for water management, but it was not self-evident that this agreement also held for the options through which these objectives should be realized. Furthermore, it would probably not be possible to satisfy all objectives, and disagreement would emerge when certain objectives had to be sacrificed to enable the realization of others. Therefore, it was again important to have more specific information on the costs and benefits of the options, and their distribution among actors: Who benefits from an option? And: Who pays a price? This would help to link the options more clearly to the objectives and to gain more insight into the trade-offs between objectives.

So far, mainly national government actors had been involved in NWRP's activities. The implementation and the consequences of certain measures identified by these actors pointed to other actors that are also important. Governmental actors on a national level might reach an agreement on a package of measures, but new difficulties will surface when these measures have to be implemented and other actors will suffer the consequences. Therefore the group of actors involved in the formulation of strategies should be expanded to include representatives of other actors such as farmers, industries, citizens and members of parliament. Including these actors in the discussion would help the experts to assess their willingness to co-operate with certain measures and to assess the possibilities to compensate such actors for the use of less preferred measures.

The analysis of issues related to agricultural water management and public water supply showed that institutional reform played an important role. Decentralization, privatization and liberalization were mentioned several times by various actors. These topics were part of a nation-wide debate, which would have important consequences for water resources management and the water policy being prepared. This required attention and careful discussions between different agencies and it offered opportunities to address water policy development as part of a broader debate on institutional reform.

6.3. Evaluation of actor analysis for NWRP project

6.3.1. Evaluation of participatory metagame analysis

Application of participatory metagame analysis

Quality collected data for the participatory metagame analysis

The metagame model used in the test-workshop was constructed using input from discussions with the members of the NWRP project team. The data for the analysis were obtained during the workshop, through the actions of the participants and the forms they filled. The participants were the same members of the project team that had also been involved in the preparation of the model

structure and this meant that data collection only covered the project team. This made its scope somewhat limited for external applications, but it was considered to be sufficient for an application that was to be tested first within the project team.

Technical validity of the participatory application of metagame analysis

A *participatory* application of metagame analysis was a new way of using metagame analysis models. In a participatory application, the underlying analytical metagame model provides the starting point for discussion and therefore the quality of this model is an important aspect of the technical validity of the application. A model of the issue of drainage water re-use was developed prior to the test workshop. This should ideally be a realistic model that provides a good basis for discussion. The construction of a good model in advance will help the facilitator avoid confusion and ineffective discussion during the workshop, and will facilitate mutual learning and a search for compromise during the workshop.

The proceedings of the test workshop showed that, together with the outline of activities, the model provided a good basis for discussion. It was developed in consultation with the workshop participants, so they were already familiar with the main features of the metagame model and they accepted its validity throughout the workshop. Although this suggests that the model that was used was fit for its purpose and sufficiently valid, the test workshop revealed that the model only covered the existing situation from a limited perspective, as is discussed below.

Observations related to the validity of the participatory metagame analysis

The first relevant observation related to the validity of the participatory metagame approach is that the workshop outcomes were not in line with the stability analysis of the metagame model. The preferences stated by the actors prior to their negotiations suggested that two of the actors in the game, the National Organization for Potable Water and Sewage Disposal (NOPWASD) and the Ministry of Health and Population (MHP), were not satisfied with the final outcome. Nevertheless, they did agree with this outcome in the test workshop, showing behaviour that could not be explained by the metagame model and stability analysis. A possible explanation for this seemingly irrational behaviour could be that NOPWASD and MHP changed their preferences during the negotiations. However, it is more likely that they felt that the final compromise was the best achievable result. The fact that NOPWASD and MHP did not exercise their blocking power suggests that the participants in the test workshop viewed the other actors, especially the Ministry of Water Resources and Irrigation (MWRI) and the Ministry of Agriculture and Land Reclamation (MALR), as more powerful. Indeed, in reality, MALR is perceived to be a powerful entity in Egypt's public sector.

A second relevant observation is that the eventual outcome of the game, the compromise to optimize re-use, did not come as a total surprise. NWRP team members were already aware of the option of MHP to be flexible in applying the official water quality standards, allowing more re-use in areas where somewhat lower quality standards would also be sufficient to protect public health. In fact, this policy was already being practiced. However, it was not included as an option in the metagame model, because officially it was not allowed. As Egyptian team members explained, this option would therefore never be selected by participants, not even in a game setting[13].

A third observation that has implications for the validity of the tested approach is that during the participatory session, the actors showed politically correct behaviour. The actors' behaviour was in line with the formal model and presumably inspired by official practices. However, in reality, both the options and the behaviour during negotiations are influenced by implicit and ambiguous power structures, hidden agendas and cultural sensitivities. Real negotiations would be different from the ones simulated in the participatory metagame (NRWP meeting, 02/05/2001).

Implications for validity: Informal and ambiguous power structures

The above three observations suggest that the tested metagame approach only represented the formal and officially acknowledged situation, but not actual daily practice. Real negotiation processes are not always conducted "by the book", but are influenced by ambiguous and informal factors, hidden agendas and culturally determined sensitivities. Often these aspects are difficult to grasp in advance, and even if they are known, the experience in Egypt suggests that they cannot always be incorporated in a formal model. For the tested workshop, it would probably not be wise to include MALR's power in the model, for instance by giving it a veto option, just as it was not feasible to model explicitly MHP's pragmatic behaviour by including the option of "bending the rules". Informal power is by definition implicit and ambiguous. Capturing it in formal models is difficult, and when it is done this might upset the real actors.

This points to an inherent limitation of the use of metagame analysis in participatory settings: informal power structures and procedures are difficult to grasp, and when they are known, it is not always wise to include them in a formal model as this might upset the actors. When using it to analyse historic conflicts or to give strategic advice to a single client, the risk of upsetting other actors and disrupting the policy debate is not such a concern, but when applying it to facilitate interaction among actors, explicating informal power and looming conflicts may well be counterproductive. Therefore, one should be aware of the

[13] What is interesting to see is that, despite this comment in the preparation of the metagame model, during the test workshop, this actual happened in the final compromise. This might be explained by the fact that the team members who played MHP forgot their "role" as the workshop proceeded, or that their attention weakened. Another possibility is that a more indirect and discrete introduction of this option was acceptable, but that an explication of this option in a formal model was not – just as the option was acceptable in practice, but not as part of an official policy.

restrictions of the model and use it merely as a starting point for discussion, to be used in flexible way, rather than as the analytical truth.

This analytical limitation of participatory use of metagame models certainly does not mean that the approach is useless. An analyst using a participatory metagame analysis might not be able to include the various implicit and ambiguous preferences and power structures in a model, but when the actual interactions between actors are simulated in the participatory session, the hidden power structures surface. Comparing the interactions that are simulated during the game with the interactions one would expect based on the formal metagame model, helps to identify the presence of informal power structures and to gain some understanding of the mechanisms involved. For example, the application in Egypt pointed to the presence of hidden power of MALR and helped the people involved to understand the rules for official debates. However, these lessons may have been more valuable for the researcher and the Dutch consultants than for the Egyptian engineers, who probably knew this all along.

Match between model and case environment

Metagame analysis was chosen as a model to be used for a participatory application of actor analysis in Egypt. Such a participatory application was tested through an internal workshop with the project team. This internal test workshop was supported by a fairly simple model of one particular issue, to allow for a good communication of the insights generated by the model to the workshop participants and to enable learning on the general feasibility of the approach for the NWRP project by the project team and the analyst. However, an external workshop with the NWRP project's real actors, which should follow the internal test workshop, should cover more issues and in greater detail. For such a more encompassing participatory application, metagame analysis turned out to be less useful.

The main constraint here was caused by combinatorial complexity, a constraint that is inherent in metagame analysis, as described in Chapter 2. A complete metagame analysis requires that all feasible combinations of options are considered, which easily causes the complexity of the model to increase exponentially. Due to this complexity, an important guiding principle in the development of formal conflict models is to "Keep It Simple, Stupid!", sometimes called the KISS principle (Hipel, et al., 2002, p.298). The relatively simple metagame model for the test workshop covered five actors and sixteen options and this already makes it relatively large compared to similar conflict analysis models (cf. Fang et al., 1993; Hipel, et al., 1997; Hipel, et al., 2002; Obeidi et al., 2002).

The use of this model was appropriate for the development of the test workshop, but not for the full scale application that was the aim of the project team and that should include all the relevant issues. Using a similar level of abstraction as in the tested metagame workshop, a full scale application would require the construction of a model covering probably more than one hundred different options. This goes well beyond the size of the models currently

described in the literature on the use of metagame analysis and similar conflict analysis methods. Using metagame analysis for such a full scale application application would only be feasible if certain adaptations would be made such as, for instance, the use of a modular approach, using different models for different issues that could be analysed independently. However, in the field of integrated water resources management, where everything influences everything, this would prove to be a very difficult challenge.

Efficiency of procedure

The efficiency of the procedure is seriously limited by the above discussed combinatorial complexity. The tested participatory metagame took quite some time to prepare and it covered only a small part of the relevant water policy problems that the NWRP project would have to address. Based on the experience gained, it was doubtful whether the expected results of developing and using a full scale participatory metagame analysis would justify the huge effort this would require. This was an important reason to call off the development of a full scale application of a participatory metagame analysis for the project, thus, the tested approach did not meet the project's efficiency standards. Some further details related to the decision are discussed below in the section on the contribution of the participatory approach to the NWRP project.

Conclusions on the application of the participatory metagame analysis

The participatory metagame analysis was based on the use of a predefined metagame model. The validity of the model used for drainage water re-use was limited as it only covered the formal and officially acknowledged situation and not the actual daily practice, which was influenced by hidden agendas and ambiguous power structures. This limitation is inherent to the use of actor analysis and therefore it does not affect the technical validity of the application. In fact, the participatory application made it possible to gain a better understanding of the impact of the hidden power structures, which makes the metagame model a useful starting point. The match between the selected modelling approach, metagame analysis, and the case environment was good for the test workshop, but insufficient for a follow-up application with real actors, due to the limitations caused by combinatorial complexity. This combinatorial complexity also affected the efficiency of the procedure, which was deemed insufficient to warrant further use of the approach.

Output generated by participatory metagame analysis

The main objective of the participatory metagame analysis was to gain and share insights into the interests of actors and the interdependencies between them. The project experts could then use these insights to design policy alternatives that included the concerns and ideas of actors and that had wider support. The discussion was also aimed at stimulating learning by participants, increasing their awareness of the interdependencies between actors and the necessary

choices to be made in water policy development. The preparation and evaluation forms that the participants filled in during the workshop were used to indicate to what extent these objectives were met during the test workshop.

Prior to each discussion round, participants were asked to make a request for the actor with whom they would like to hold a discussion. Reviewing these requests showed that actors, from the beginning, were aware of the need to achieve a compromise with the Ministry of Health, as three requests were filed for bilateral discussions with this actor. However, the actors did not seem to be aware of the "bottleneck" position of NOPWASD, as initially none of the actors requested a small-group discussion with this actor. For the second round, the number of requests for a discussion with NOPWASD increased, illustrating the fact that most of the actors seemed to have learned about NOPWASD's position during the workshop.

The impression that actors learned from the discussions during the first round, was also strengthened by the number of actors that correctly estimated the most preferred option of the other actors. In general the percentage of correct estimations was higher for the second round, indicating that after the first round, the actors had a better knowledge of each other's interests and positions. Another indication that new insights were gained was the fact that the actors were stimulated to identify compensation as they moved towards agreement during the discussion, which resulted in new options for compromise.

The metagame workshop further facilitated learning by the analysts on the metagame model that was developed prior to the session. As discussed above, the seemingly irrational outcomes of the workshop negotiations pointed to the existence of informal and hidden power structures. This enabled some hypothesis to be developed on the informal power structures that were not incorporated into the initial metagame model, such as for instance a more powerful position of MALR. In addition, the second round of negotiations in the workshop resulted in new options that had not been included in the initial metagame model.

The outcomes of the test workshop showed that the approach had the potential to contribute to the NWRP project in terms of generating new and relevant insights and in facilitating communication of these insights among actors. The construction of the metagame model prior to the workshop led to the identification of more and less important actors involved in the issue of drainage water re-use. In playing the game, both the analysts and participants gained new insights into each other's preferences, the interdependencies between actors and the necessary trade-offs, and they were inspired to identify forms of compensation, resulting in new options for compromise.

Utilization by water experts involved in NWRP project

No direct utilization by water experts involved in the NWRP project

The evaluation of the participatory metagame approach pointed to certain positive contributions and some shortcomings, largely in line with the potential contributions and the limitations discussed above. In this evaluation, the limitations related to the applicability and the efficiency of the tested metagame proved crucial. A metagame workshop with real actors was only considered useful if it covered all water management issues. An incomplete model like the tested model for drainage water re-use was considered to be too much like a "game" and this was expected to disappoint some of the senior officials in NWRP's project committees (NWRP meeting 02/05/2001). In addition, incomplete models introduced the risk of sub-optimizing strategies within the game, providing a distorted picture of real interactions and compromises (NWRP meeting 02/05/2001).

Developing a more encompassing metagame model was not expected to do too well in terms of procedural efficiency, and its feasibility was not guaranteed at the start, given the method's inherent limitations related to combinatorial complexity. In addition, the current state of knowledge within the NWRP project was not considered to be sufficient to allow for the construction of a promising starting model and a well-informed discussion among actors during the metagame session. This increased the risk that the participatory session would result in "negotiated nonsense" rather than a meaningful compromise, or a persistent disagreement among the actors. Further use of the participatory metagame approach would therefore require a long term effort, lasting for more than a year (NWRP meeting 02/05/2001). As a result, the decision was made not to pursue further the use of the participatory metagame approach with the project's real actors.

Indirect utilization through general learning

Although the direct usefulness of the participatory metagame analysis to the NWRP project was limited because the approach did not evolve beyond the test stage, it is likely that the insights that the NWRP team gained through their participation in the metagame analysis did have an indirect impact on the project. However, it is difficult to separate the indirect impacts of the participatory metagame analysis from those of the analysis of options, and therefore their joint impact is evaluated in Section 6.3.3, after an evaluation of the application and output of the analysis of options is given in the next section.

6.3.2. Evaluation of analysis of options

Application of analysis of options

Quality collected data

The main data for the analysis of options were obtained in a limited number of interviews which were relatively small in scope. The broad field of inquiry, water resources management in Egypt, did not allow for a complete coverage of the subject during individual interviews and due to time constraints only eight actors could be interviewed. Furthermore, the need for translation during most interviews limited the depth of the discussion, reducing the richness of the collected data. However, the selected respondents were considered to be appropriate and all proved capable of providing the necessary input for the analysis during the interviews.

The quality of the collected data is therefore believed to be sufficient for the data that were collected, but constrained by the limited scope and richness of those data. A larger sample of respondents and more time for each interview would have improved the application.

Technical validity

The results of the analysis of options were presented to and approved of by the external actors, the NWRP team and scientific peers. The belief of the NWRP team in the technical validity of the analysis of options was confirmed by its decision to publish the analysis report as an official project document (NWRP Technical Report 22) and in a later stage, to contribute to a scientific article reporting the results of this analysis (Hermans, El-Masry & Sadek, 2002).

However, this does not mean that the technical validity of the analysis could not have been better. For example, it is clear that the used categorization of issues mentioned by the actors does not form a very homogenous set, as they merely represent the categories of issues as they emerged from the interviews with the actors. These categories were instrumental in the analysis, used mainly to cut-up the decision making into smaller pieces for the construction of analysis of options tables. The categorization provides a snapshot only, a known limitation of most actor analysis models (see Chapter 3). In reality, the different issues are related, overlapping and subject to change. Actors may reformulate issues, new issues may emerge and existing issues may be solved.

The technical validity of the analysis of options is further limited by the limitations in data collection discussed above. However, the acceptance of the results by both the NWRP analysts and other reviewers makes it safe to say that the analysis meets the necessary standards for technical validity.

Efficiency of analysis procedure

The analysis of options described in this chapter was executed within a limited period of time. The analysis was not part of the original planning prior to the field visit to Egypt, in which the analyst focused solely on the participatory metagame analysis. When it became clear that the participatory metagame analysis would not be pursued beyond the testing stage, two weeks were left for preparation, data collection and the preliminary analysis for the analysis of options. This time pressure allowed for only a limited number of interviews to be conducted, but it also resulted in a rather quick analysis procedure, which was finalized within a month after the analyst returned to the Netherlands.

After the analysis of options was finished, the NWRP project continued to use the interview questions and approach to conduct further interviews with additional representatives of actors. The consulted NWRP team members stated that they would be willing to use this approach in future applications, although they would like to improve it by applying it in an earlier project stage and covering more interviews (NWRP emails 02/12/2001 and 05/12/2001).

All in all, the efficiency of the procedure used for the analysis of options was evaluated positively.

Match between model and case environment

The analysis of options did not produce quantitative input information for further detailed analysis of strategic maps and stability calculations, the way the method is usually applied. Instead, the analysis served to explore the perceptions of, and the ongoing debate between, actors. There are other methods designed specifically for this, such as cognitive mapping or discourse analysis (see Chapter 3), but nevertheless, the analysis of options approach offers some advantages for the NWRP project.

The focus of the analysis of options method is on the link between actors and options, which was precisely what the NWRP project was interested in. Furthermore, the procedural advantages that followed from its structured approach were very helpful in the setting of the NWRP project, especially in preparing and conducting the interviews. These interviews were complicated by language and cultural differences and some of the respondents were not used to formulating their opinions in ways that would be appropriate for actor analysis. In this setting, the clear structure provided by the analysis of options approach offered a way to conduct interviews in a structured way, providing more guidance than a simple check-list or open questions would. The approach also offered procedures for the analysis of information and presentation of results, which facilitated the analysis being done within a reasonable period of time.

The application of the analysis of options also revealed that some characteristics of the method matched less well with the Egyptian setting. Due to the method's conceptualization, it frames interactions among actors in terms of conflict rather than cooperation. For projects on important but sensitive issues,

such as water resources management in Egypt, a clear-cut presentation of conflicts may not be of help for policy development. Pinpointing (possible) conflicts increases the risk that actors firmly adhere to their initial positions and that conflicts increase rather than disappear. Therefore, a careful presentation of the results is required when communicating with the public outside the direct circle of analysts involved in a project, to obtain the benefits of the analysis of options, such as stimulating cooperative tendencies by pointing to (partial) win-win opportunities, possible coalitions between actors and intertwining of interests.

Concluding, the match between the model and the case environment of the NWRP project was considered to be sufficient. The main benefit of the selected model was the structure of the analysis of options that enabled efficient data collection and analysis, while the main drawback was the focus on conflicts. The latter could be dealt with by taking care with regard to how the results are communicated to outsiders.

Output generated by analysis of options

The analysis of options was intended to provide information on important issues, options, criteria, possible conflicts and coalitions. The report with the final analysis results contained a list of main conclusions, which were believed to be of relevance for the NWRP project. These conclusions were reviewed by two key members of the NWRP project team for their credibility and relevance, and to see if they provided them with new insights (Emails 02/12/2001 and 05/12/2001).

Three of the four conclusions stated in Table 6.3 in Section 6.2.3 were considered to be new, relevant and credible. These were the conclusions on the need to articulate not only the benefits but also the costs of options in more detail, the general agreement among government actors on the water management objectives, and the importance of the ongoing institutional reform debate for the development of a new water policy. In addition, the NWRP reviewers valued the list of options that the actors identified, as they could use this list to complete and review their own list of options.

The above four insights met the standards for credibility, relevance and they were new to the NWRP team. Together with the accompanying recommendations, they indicate the potential of the output of the analysis of options to make a useful contribution to the NWRP project.

6.3.3. Evaluation of utilization of both actor analyses by water experts involved in the NWRP project

It was not easy to separate the participatory metagame and the analysis of options when reviewing the utilization of outputs by the water experts of the NWRP project team. Both were conducted within the same time frame and therefore only their joint utilization is evaluated in this section. The basis for this

evaluation is provided by the response of the NWRP team members on evaluation questions (Emails Dec. 2001, Feb. 2002, Meeting June 2003).

Utilization for problem framing

In line with the identified potential usefulness, the actor analysis made the position of the various actors more clear and built confidence in and enriched the list of policy options and criteria compiled by the NWRP project members (NWRP email 02/12/2001).

The insights from the analysis of options related to the importance of the costs and benefits of options and of institutional reform issues have also been found to be useful for the problem framing in the project, although their impact cannot easily be isolated from other influences on the project. The costs and benefits of options received more attention in the following project phase, the project team specifically addressed the costs and benefits in the discussion of various policy alternatives in a subsequent strategy document and specific efforts were made to improve cost estimations with the help of the project's Technical Committee members (Meeting 23/06/2003; NWRP 2002). After the actor analysis, the project also launched an important new effort to address the institutional reform issues as part of the project, including hiring a long-term expert from the Netherlands. However, the credit for these new project activities cannot be attributed to the actor analysis alone, as institutional and financial aspects were already mentioned in the project's initial Terms of Reference (Delft Hydraulics, 1998; NWRP emails 02/12/2001, 19/02/02). Nevertheless, the actor analysis focused attention on the importance of costs and benefits of options and on institutional reform issues at a time when these issues had yet to be addressed within the NWRP project.

In terms of the types of possible types of utilization identified in Chapter 3, the actor analysis helped to describe a part of the system in line with the existing problem formulation of the NWRP team, providing insights into criteria, policy options and the positions of the actors. In addition, it showed the increased importance of two analysis perspectives, the institutional and the economical, in the strategy formulation activities.

Utilization for interaction processes

The analysis of options offered the project a tool that could be used to continue consultation with the actors, because the NWRP project members used the analysis of options approach to conduct further interviews with additional representatives of actors (NWRP email 05/12/2001).

The actor analysis, consisting of both the participatory metagame and the analysis of options, also helped the project team to organize the communication in the project's technical committee, as the team used the results to communicate the insight that the technical committee was not meant to be merely a platform for social meetings, but that committee members were expected to serve the interests of their Ministries and to identify possible

compromises. Therefore, the NWRP team required committee members in a later project stage to explain the position of their Ministries related to water management options in a committee meeting and the way of thinking introduced by the actor analysis certainly contributed to this (NWRP team leader, 23/06/2003).

General learning and other indirect impacts

In the end, no participatory metagame workshop was organized for the project's real actors and the main practical use of the tested approach lies in insight gained by the participating members of the NWRP team into the issue of drainage water re-use and into the use of the metagame approach and its associated way of viewing policy development.

The actor analysis described in this chapter seems to have helped the NWRP team members to make a mental shift, going from the first analysis-oriented preparation phase towards the more policy oriented phase of developing promising strategies. The actor analysis offered a mental frame to deal with these policy aspects, framing them in terms of actors with options and interests. The focus of the models used is the interdependencies among actors, and this focus made the NWRP team more aware of the need to deal with conflicting interests of actors and the possibilities to do so through exchanging options (NWRP team leader 23/06/2003). This will have been a rather new view on water policy development for the water engineers in the NWRP team. The exact impacts of the participatory metagame approach cannot be separated from those of the analysis of options, as both were conducted consecutively. Nevertheless, the participatory metagame analysis might have been especially useful for learning about the interdependencies among actors, because the majority of the team members participated in the analysis and because the analysis was kept relatively simple with a focus on a single issue, which provided a clear illustration of the underlying interdependencies among actors.

The need for more information on costs and benefits of policy options also played a role in the insights gained by the NWRP team, providing the members of the NWRP project with "food for thought" (NWRP email 05/12/2001, NWRP advisors 14/03/2002). The output of the actor analysis underlined that there were choices to be made, not as part of a free-floating discussion, but real policy choices with costs and benefits. The application of the participatory metagame and the output of the analysis of options made the people involved in the NWRP project more aware of the fact that the development of promising policy strategies requires negotiations, exchanges and support among actors, and that the different actors have different roles and interests. This awareness grew among the members of the NWRP project team and the team members also succeeded in communicating these insights to the members of the project's technical committee (NWRP team leader, 23/06/03). However, even though the perceptions of the NWRP analysts shifted in the period after the actor analysis, the exact usefulness of different activities is difficult to assess.

Conclusion on utilization of actor analyses by the NWRP water experts

Reviewing the utilization of the actor analyses by the water experts of the NWRP project, the most worthwhile impact is that the two actor analyses introduced a new perspective to the water experts involved in the project, viewing policy making as a process between actors with different interests and different options. In this perspective the importance of negotiations, compromises and exchanges among actors were stressed, and related to this perspective, the need to specify better the costs and benefits of various policy options was indicated, to enable a better assessment of possible compromises and negotiation strategies. Additional specific utilization of the output generated by the actor analyses is more difficult to establish. In the output of the actor analyses, the importance of project activities related to the institutional perspective was stressed and a list of options was generated that helped to complete the inventory of options made previously by the project team. Nevertheless, the impact on further project activities of these findings was rather modest.

6.3.4. Cultural context and additional aspects that influenced the usefulness of actor analysis

The observed utilization of the output of the actor analyses by the NWRP project team is partly explained by the factors contained in the evaluation framework. The participatory metagame analysis was not used as initially planned because it suffered from an insufficient match between model and the case environment. The analysis of options did not suffer from such insufficiencies and new insights were produced that met the requirements of relevance and credibility, but still the utilization of these insights was limited. This justifies a short review of some additional aspects that have not yet been covered in this chapter, but that might explain the case observations.

Cultural context NWRP project in Egypt

The cultural differences between the Netherlands and Egypt are significant and they played a significant role in this case. Although one should be careful in using generalizations to explain cultural influences, some of the literature on Egyptian culture helps to offer some further explanations for the limited utilization of actor analysis insights by the NWRP projec team.

Egypt has a collectivist culture, which means that harmony with one's social environment is a key virtue and that direct confrontation and conflict is considered rude and undesirable (Hofstede, 1991, p.58; Palmer et al., 1988, p.96). Combined with a relatively high score on uncertainty avoidance, this means according to Hofstede that "such countries will tend to eliminate intergroup conflict by denying it" (Hofstede, 1991, p.129). Finally, Egypt scores high on the power distance index and this means that hierarchy and centralization are very important mechanisms in policy making (Hofstede, 1991, p.35; Palmer et al., 1988, Ch.4).

Analysis of options and metagame analysis are part of the "conflict analysis" family of models, meaning that conflicts among actors are used as a starting point for analysis. The cultural dimensions show that generally policy makers in Egypt are not comfortable with pinpointing conflicts bluntly and openly, but are more likely to deny conflicts and to either repress them or to deal with them in a more indirect and subtle way. This means that the presentation of analysis results has to be done with care, not emphasizing the potential conflicts, but rather placing the emphasis on the room for compromise.

Another aspect related to the specific cultural setting in Egypt, is the observation that priority setting for policy making is not an easy task. Generally, *all* the important problems are addressed, only one problem is solved faster than the other (personal communication). This is also likely to be related to the relatively high scores on the cultural dimensions of power distance, collectivism and uncertainty avoidance. If other members in a social group have established the importance of certain objectives, it is not appropriate to argue against their importance and dismiss some of those objectives at the expense of others. Therefore, in the end, the finding regarding the neglect of the costs of options and the general agreement among actors, might be explained at least partly by the characteristics of Egyptian culture.

Culture and support within user group

The development of computational simulation models of the water system played a dominant role in the NWRP project. The project team also recognized the need to address the aspects related to actors in the policy process, but at the same time, most team members were cautious in matters related to the actor analysis, especially if it involved approaching external project actors.

This caution can be explained by the fact that most of the experts involved in the NWRP project had relatively little experience in dealing with actor-related aspects and that the NWRP project was firmly positioned within the Egyptian bureaucracy. A survey among Egyptian bureaucrats showed that the vast majority of the 796 respondents agreed that "In making new decisions, it is probably best to see what was done in the past", and that "It is better to delay decisions than to risk making a mistake" (Palmer et al., 1988, p.96) [14]. The prevalent culture within Egyptian bureaucracy helps to explain the high standards that were used to evaluate the participatory metagame and the decision not to continue its use fearing that it might disappoint the project's external actors who were also all part of the bureaucracy.

[14] This behaviour is also in line with the relatively high score (68) of Arabic countries on Hofstede's dimension of uncertainty avoidance (Hofstede, 1991, p.113) Hofstede characterizes uncertainty avoidance with the phrase: "What is different is dangerous".

7. From thinking to action: diffuse pollution in the Province of North-Holland[15]

7.1. Case study background

7.1.1. Diffuse pollution in North-Holland

The Province of North-Holland is located in the north west of the Netherlands and consists of rural and urban areas, including Amsterdam, the capital of the Netherlands (see Figure 7.1 on page 98). The quality of the province's inland waters has improved considerably over the past years, when water quality managers effectively addressed the pollution from industrial sources and municipal wastewater treatment plants. The new challenge for water quality managers is the pollution produced by numerous small sources, called non point source pollution or diffuse pollution. Although they are quite small individually, together the diffuse sources account for a substantial part of the water pollution. Diffuse sources are responsible for the majority of loads of heavy metals in surface waters (RWS-FWVO, 2000, p.4) and more than half of the annual emissions of the nutrients phosphor and nitrogen (CIW, 2000).

The reduction of diffuse pollution requires a new approach, substantially different from the approach used for the large point sources in the past. Diffuse pollution is produced by various sources and addressing these sources requires co-ordination and co-operation among a wide range of institutions, organizations, and individuals, all of whom control a part of the problem and its solutions. In North-Holland, just as in the other provinces of the Netherlands, the different public agencies involved in water quality management co-ordinate their activities in a co-operative body, called the Regional Project Organization for Diffuse Pollution in North-Holland (PODP). This project organization consists of representatives of the provincial government, which also acts as a secretariat for the organization, the three regional water boards that are present in the province, the Regional Directorate for Public Works and Water Management, and the Association of Municipalities in North-Holland.

[15] Parts of this chapter have appeared as L.M. Hermans: "Dynamic Actor Network Analysis for Diffuse Pollution in the Province of North-Holland" in Water Science and Technology, Vol.49(3), pp.205-212, IWA Publishing, 2004.

Figure 7.1 Location of North-Holland in the Netherlands

7.1.2. The development of a provincial diffuse pollution policy

The Regional Project Organization is responsible for periodically developing multi-year plans, stating the issues that have priority in the province and the way in which they will be addressed, identifying specific activities for the government organizations to undertake in the planning period to address diffuse pollution. Previous multi-year plans were established for 1996-1998 and 1999-2001 (PODB-NH, 1999). In 2001, the Project Organization for Diffuse Pollution (PODP) was planning a new periodic review and evaluation of the priority issues to support the development of the subsequent multi-year plan for 2002-2005. This evaluation was based on a review of the important pollutants in the surface waters, the main sources of these pollutants and the feasibility and expected impact of activities by the PODP. As an important first step in the review process, the PODP planned a "polluting sources" study ("*bronnenstudie*" in Dutch), in which the main pollutants and their sources would be identified, based on monitoring data for water quality standards, calculations and estimations of polluting sources and their loads.

Along with this physical picture of water quality standards and polluting loads, the various actors involved in producing and addressing diffuse pollution needed to be taken into account to form an effective policy. The cooperation of other actors would be critical for accomplishing a reduction in pollution and therefore the actor context also needed to be considered.

7.1.3. Timeline of actor analysis

In spring/summer 2001, contacts for this research were established with the Regional Directorate for Public Works and Water Management and the Project Organization for Diffuse Pollution in North-Holland. These contacts were established after prior discussions with the Ministry of Transportation, Public Works and Water Management, more specifically its Functional Working Group Surface Water Pollution (*FWVO* in Dutch[16]) and a project group that was exploring the possibilities for renewing the toolbox of policy instruments for water quality management through the implementation of pilot projects (Project L3: "A different approach").

The working group and project group had overlapping interests in the area of diffuse pollution and were both interested in making the transition from "thinking to action" in this field. They were interested in exploring the use of actor analysis as a tool in this area and decided to plan a pilot project with one of the Ministry's Regional Directorates for Public Works and Water Management, for which the Regional Directorate in North-Holland was selected ("*Rijkswaterstaat Noord-Holland*", in Dutch, hereafter referred to as the Rijkswaterstaat or RWS-NH). Because the Rijkswaterstaat is only one of the government agencies responsible for addressing the problems of diffuse pollution in North-Holland it was decided to take the Project Organization for Diffuse Pollution in North-Holland as the main starting point. In consultation with the provincial co-ordinator of the PODP, it was decided that an actor analysis would be done aimed at supporting the preparation of the multi-year plan 2002-2005.

The actor analysis was planned for the early fall in 2001, in parallel with the polluting sources study. Conducting these two studies in parallel was expected to allow for the optimal use of information from both studies for the development of the new multi-year plan, and it was thought it would increase the use of the results of the actor analysis study. The actor analysis was executed in two subsequent parts. The first part consisted of an actor analysis that covered the complete range of diffuse pollution issues but only for group of actors that was represented in the Project Organization. In the second part one specific aspect was covered in more detail in an attempt to explore the possibilities for the transition from thinking to action for a specific issue.

The eventual implementation of the actor analysis was kept more or less in line with the ongoing planning process and the polluting sources study, which was tendered to an external consultant. Because these other processes suffered some delays, the execution of the actor analysis was also somewhat shifted in time. The second part of the actor analysis especially was considerably delayed in comparison with the initial planning.

[16] This Dutch abbreviation stands for Functionele Werkgroep Verontreiniging Oppervlaktewateren.

Table 7.1 Timeline of actor analysis for diffuse pollution North-Holland

Date			Event
2001	Mar	12	Initial contacts with the Rijkswaterstaat
	Jun	1	First meeting on actor analysis with RWS North-Holland
		20	First draft proposal for actor analysis RWS-NH
	Jul	10	Meeting with represent. Regional Project Organization
			Preparation for interviews
	Aug/Sep		Interviews for first part - water quality managers
	Oct	1	Draft report actor analysis part 1
		2	Presentation of results first part to RWS project L3
	Nov	7	Progress meeting with represent. RWS and reg.proj.org.
		15	Discussion results part 1 and follow-up with project org. NH
	Dec		Preparations part 2
2002	Jan		Publication of final version report part 1
	Feb	6	Finalization preparation part 2 (planning memo)
	Feb/Apr		Interviews second part - use of herbicides in public space
	Apr	16	Progress meeting with represent. RWS and reg.proj.org.
	May	7	Presentation of prelim. results to RWS project L3
		24	Draft report actor analysis part 2
	Jun		Publication final version report par 2
	Nov	7	Discussion results part 2 with reg. project org. NH
2003	May	15-19	Evaluation of actor analysis with key informants
		27	Presentation of results to RWS working group FWVO

7.2. Description of the actor analysis

7.2.1. Preparation

Purpose

The actor analysis was executed as a part of a pilot project within the Rijkswaterstaat and therefore its broader purpose was to explore the use of actor analysis as an instrument to support water quality management, especially the transition from "thinking to action" (meeting 01/06/2001). The more practical purpose of the actor analysis in North-Holland was to support the development of a new diffuse pollution policy, which was to be formalized in a new multi-year plan for 2002-2005. The actor analysis was expected to complement the polluting sources study that already had been commissioned by providing insight into the perspectives of the various actors regarding a new diffuse pollution policy (meeting 10/07/2001, meeting PODB 03/12/2001).

A more specific purpose of the actor analysis for the Regional Project Organization was to learn more about the perspectives of the member organizations. It seemed that sometimes the representatives gave personal statements during the meetings of the project organization, but that they were

rather isolated within their own organizations. Therefore, the PODP representatives considered it useful to gain more insight into the objectives and priorities of the different member organizations, and the implications for co-operation in the Regional Project Organization (meeting 10/07/2001).

Another purpose of the actor analysis was to gain insights in how to make the transition from "thinking to action". Diffuse pollution policy in North-Holland was characterized by the development of a lot of new policy initiatives, platforms and agreements, but these new initiatives had not resulted in significant progress in terms of pollution reductions (cf. Enserink and Mayer, 2002 for the Netherlands). Furthermore, it appeared difficult to obtain the necessary cooperation of actors, outside those responsible for water quality management, in reducing diffuse pollution. Therefore, there was an urgent need for tools that could be used to help to make the step from intentions on paper and in policy documents to real actions and results (meeting 01/06/2001). The rationale for the actor analysis was to identify promising ways in which different actors could be motivated and supported to put "thinking into action", by providing guidelines on how to start a fruitful dialogue among the various actors involved.

Summarizing, carrying out the actor analysis should serve two different purposes. One was to obtain an overview of the priorities of the different organizations and the position of diffuse pollution problems within their complete range of activities. This overview could be used to help the experts prepare a new multi-year plan. Two, using carrying out an actor analysis was expected to provide insights that could be used by the members of the PODP to initiate a process in which different actors would jointly work towards the actual implementation of policy resolutions.

Selected method: Dynamic Actor Network Analysis

The purposes for using an actor analysis stated above do not suggest a specific model or method a priori, but they do point towards a need to explore the perceptions of actors, to get a better picture of their interests, priorities and opinions on diffuse pollution problems in North-Holland. Any analysis model used would, preferably, cover these perceptions at the level of the individual actors, to gain a good insight into the perceptions of the members of the Project Organization.

Dynamic Actor Network Analysis (DANA) was selected because this method allows a comparative analysis of the perceptions of individual actors. DANA is based on the use of causal relations diagrams which are used to represent the perceptions of the individual actors; for each actor, a diagram is constructed that shows the factors and instruments that they find to be of relevance, together with the causal relations they assume to exist between these elements. Constructing such diagrams is supported by DANA software, which is linked to a database that supports further analysis of the acquired data.

In DANA qualitative input information is used to derive various analytical concepts. The perceptions of actors are shown, from which the analyst can

derive insights into the perceived issues of importance, useful measures, problem-solving potential, conflicts and disagreement between actors. In addition, the process of modelling the actors' perceptions offers a means for the analyst to gain a better understanding of the situation, and sometimes surprising insights are provided that trigger further investigations (Bots et al., 2000a).

Design of actor analysis procedure

The actor analysis was designed as a two-step procedure. In the first step the priorities and perceptions of the actors that were represented in the Project Organization were addressed. In the second step the possibilities to start a joint process with several actors to address one specific pollution issue were explored. To keep the total work load of the analysis within reasonable limits, it was decided to base both analyses on literature research using available policy documents, combined with approximately ten interviews for each part, resulting in a total of twenty interviews.

7.2.2. Application of DANA for part 1: priorities of PODP members

General approach

Interviews were scheduled with representatives of the members of the Project Organization for the first part of the actor analysis. Two different interviews were conducted with each member organization: one with the decision makers, usually elected officials, and one with the administrative staff who represented the organization in the PODP's project group meetings. The following organizations took part in the interviews: the Rijkswaterstaat North-Holland, the Province of North-Holland, the three regional water boards, and the Association of Municipalities in North-Holland. For the Province of North-Holland and the Association of Municipalities, only administrative staff members were interviewed, resulting in a total number of ten interviews. Official policy documents were studied in preparation for the interviews and were used as an additional source of information for the analysis.

The interviews were structured using a predefined list of open questions, starting with the general priorities of the organizations and then moving to the position of diffuse pollution issues in their priorities, the means and willingness to address these issues, their opinion about co-operation with the other actors and the role of the regional project organizations. Interviews were usually conducted one-on-one and transcripts of the interviews and the related DANA diagrams were mailed back to the respondents for corrections and approval.

The input information was analysed using DANA and its accompanying software in the weeks after the interviews. The results were modelled into individual diagrams, which could then later be combined in overview diagrams that showed the "group perspective" for different aspects. An example of a DANA diagram of one of the interviewed staff members is shown in Figure 7.2

in the next section. Important factors in this diagram are represented as ovals while rectangles show important instruments, together with the actor who is thought to control the instrument. The DANA software uses colours for the arrowheads to indicate the nature of the relation: a positive influence (orange), negative (blue), or unknown (black). Objectives are also represented using colours: orange to indicate a desired increase, blue to indicate a desired decrease. Comparative analysis of these DANA diagrams provided the basis for the actor analysis. For instance, an overview of the frequency with which different respondents mentioned certain factors together with an overview of how often respondents expressed specific objectives containing these factors, was used to get an impression of the main issues in diffuse pollution (cf. Bots et al., 2000).

The results of the first part of the actor analysis were reported in a written report, which was presented and discussed during a staff level meeting of the regional Project Organization's members. The presentation of the results in this meeting was followed by a discussion on the selection of a suitable issue for more detailed study in the second part of the actor analysis (meeting 15/11/2001). The report of the first part was also made available to the decision makers in the Steering Group of the PODP. They addressed the report briefly in their meeting, where they formally decided to use it as input for the multi-year plan in addition to the polluting sources study (meeting 03/12/2001).

Overview of main results

Main water quality problems

An analysis of the relevance and priorities of the different factors by the interviewed actors showed that agricultural pollution was considered to be an important problem, mainly because of its contribution to the pollution loads of pesticides, herbicides and nutrients. Related to pesticides and herbicides, and additional source of concern was the use of these chemicals in public spaces such as along roads, on pavements, in parks and in gardens. Another important concern was pollution from domestic wastewater through untreated discharges in the rural areas, sewage systems' spills and the discharge of the effluent of wastewater treatment plants. Polluted water coming from other areas also contributed significantly to the pollution of surface water in North-Holland according to half of the interviewed of actors. Additional sources of concern, but with a somewhat lower priority, were pollution due to the use of construction materials in buildings and due to commercial and recreational shipping.

Position of different actors in relation to diffuse pollution problems

The DANA diagram shown in Figure 7.2 depicts the perception of only one respondent, but it contains several aspects that also emerged in other diagrams. From this figure it can be seen that water quality problems were explained in quite technical terms and that the final objective of good water quality, i.e. concentrations below the official norms, was expressed rather vaguely with

reference to ecosystems. Similar tendencies were observed in other interviews, which seemed to explain why the regional water management agencies had difficulties with communicating the importance of diffuse pollution reduction to external actors. The use of ecological values such as variety in species and stability of ecosystems would probably not appeal to the majority of the general public, companies, and other government agencies.

The analysis of the DANA diagrams further showed that the main polluters and some of the actors that control important instruments were not represented in the Project Organization. Only the water quality management organizations were actively participating in the Project Organization and the analysis showed that they did not have sufficient problem solving potential to address the water quality problems on their own, cf. the role of municipalities in some of the instruments mentioned in Figure 7.2.

Finally, it can be seen from Figure 7.2, that the discussion on water quality often took a system-perspective. Within this system perspective, actors paid attention to diffuse pollution and to point source pollution, e.g. the wastewater treatment plants shown in Figure 7.2. This indicated that it might be more logical to consider both diffuse pollution and point source pollution when developing priorities to improve water quality in the region.

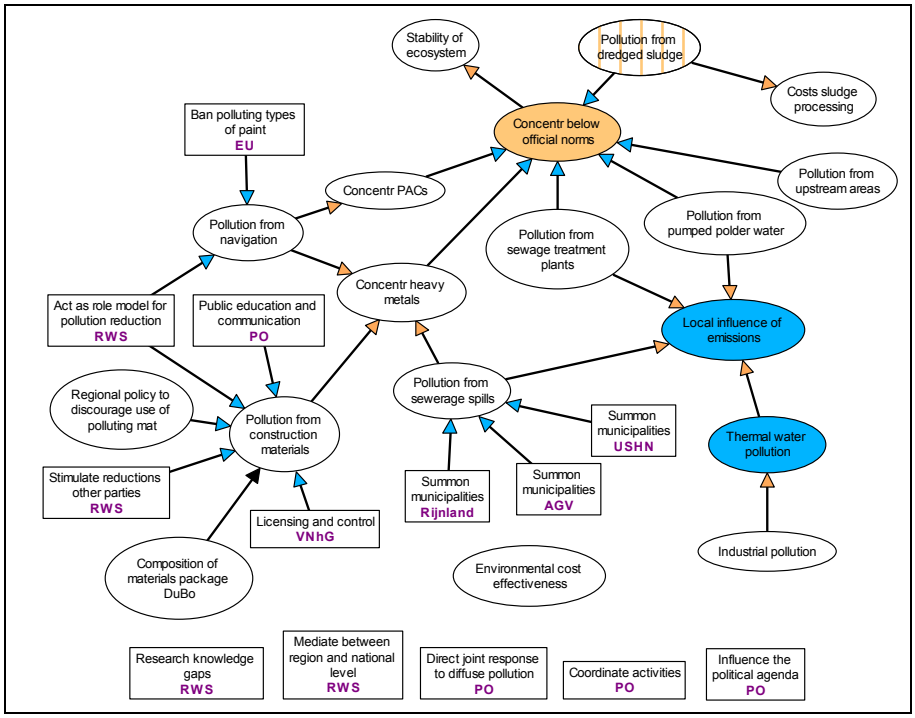


Figure 7.2 DANA diagram of staff representative of a member organization of the PODP

Role of Regional Project Organization and Rijkswaterstaat North-Holland

During the interviews and the analysis, specific attention was given to the perceptions and positions of the actors related to the role of the Project Organization (the PODP). The results indicated that the PODP was seen to be a good platform for the co-ordination of diffuse pollution activities in North-Holland and for mediating among the regional actors, national agencies, political arena and the general public. The Project Organization could also stimulate its members and other actors to reduce the emission of polluting substances. In short, there was a consensus that the PODP had to play a role in the collection and distribution of information and the development and communication of knowledge, again illustrated in Figure 7.2 through the instruments mentioned for use by the PODP. The Project Organization might also take up other activities, but there was no consensus regarding these activities at the time of part one of the actor analysis.

With respect to the role of the Rijkswaterstaat North-Holland in the PODP, it was observed that the Rijkswaterstaat focused mainly on its responsibility for the national water bodies in the province, i.e. coastal waters and the North-Sea Channel. These national water bodies were different from the inland waters on which the other PODP members focused, both in terms of priorities and in the ways to address problems arising with them, which made it sometimes difficult to find a common ground of interests. The Rijkswaterstaat North-Holland also had a mandate to represent the Dutch national Ministry of Transportation, Public Works and Water Management in the province, which included the national policies for inland water management. However, this aspect was not really emphasised by the Rijkswaterstaat in its involvement with the PODP.

Summary of conclusions and recommendations

A summary of the main conclusions and recommendations that followed from the first part of the actor analysis is shown in Table 7.2, which contains conclusions and recommendations in line with the analysis findings discussed above.

Table 7.2 Main conclusions and recommendations of the first part of the actor analysis

Conclusion	Corresponding recommendation
Objectives of PODP members for diffuse pollution are not framed in way that appeals to outside public	Translate objectives for outside public by identifying specific consequences of diffuse pollution that link to their concerns
Members of PODP lack problem solving potential	Broaden cooperation to include also actors outside the public actors with a responsibility for water quality management, starting with municipalities
PODP members see diffuse pollution as part of broader water quality management	Include both diffuse and point source pollution in developing priorities, include point sources in "polluting sources" study
Priority issues are agriculture, domestic wastewater, maintenance public space, and inlet of polluted water from other areas	
Agreement on PODP's role in coordination, communication and knowledge development, less on other activities	Start with further developing PODP's role as platform for communication and knowledge development
Rijkswaterstaat emphasises only part of its mandate, for national water bodies, in PODP	For Rijkswaterstaat: focus more on role as national representative in the region to increases common ground within PODP and to improve link between PODP and national level policy makers

7.2.3. Application of DANA for the use of herbicides in public spaces

General approach

The use of herbicides in public spaces was selected as the issue for further detailed study in the second part of the actor analysis. The use of herbicides in public spaces refers to the use of chemicals for the maintenance of public roads, pavements, parks and gardens. The actor analysis was intended to provide useful insights to be used for preparing a dialogue with water quality managers and with the main users of herbicides, with the intention of producing a joint action plan.

The issue of herbicide use in public space was selected during a meeting of staff members of the Project Organization. Several reasons were given for this choice by the participants.

- It was an intriguing issue because the use of herbicides to control weeds in public spaces was continued despite a general consensus about the desirability to stop using chemicals.
- The first part of the actor analysis showed that the use of pesticides for weed control was an important issue, and that pesticide use in public spaces was an important source of diffuse pollution.

- The municipalities played an important role in the use of herbicides in public spaces, thus addressing this issue offered a good starting point to learn more about their perceptions and to involve them more in the activities of the PODP.
- The issue appeared to be less complex than some of the other issues in diffuse pollution and therefore it was seen as a promising area to gain first experiences with making the transition from "thinking to action".

The procedure for data collection was similar to that used for data collection in the first part of the actor analysis. A preparatory review was done of available literature coupled with expert interviews, because, especially in other parts of the Netherlands, there was already experience available from other authorities that had addressed this issue. The direct input for DANA was obtained from interviews with the three main groups of actors involved: the five largest municipalities, the province's three water boards and three private companies active in weed control in North-Holland. Transcripts of interviews were made and were sent back, with the DANA diagrams, to respondents for correction.

The input information was analysed using DANA. The results of the analysis were made available to the Rijkswaterstaat and the Regional Project Organization in a written report in June 2002. The results were also presented and discussed during a staff level meeting of the regional Project Organization's members in November 2002 (meeting 07/11/2002).

Overview of main results

Identification of relevant factors and instruments

An impression of the relevant factors according to the actors can be obtained by reviewing the frequency with which different respondents mentioned a factor. The results, shown in Table 7.3, were in line with the information from available literature on reduction of chemical herbicide use, which highlighted the importance of factors such as costs and the budget available for public space maintenance, the neatness of the street scene and the co-ordination between planning, design and management of the public space (cf. Kortenhoff, 2000). In addition, as can also be seen from Table 7.3, the health and safety conditions for workers in public space maintenance, and sufficient insight into the impacts of different maintenance practices were also considered to be important.

The information on the relevance of *factors* was complemented by assessing the relevance of *instruments*. The results indicated that an official ban on the use of chemical herbicides was widely considered to be a very effective measure. The herbicides used were all officially authorized by a national level Committee[17] and the users indicated that they would stop the application of herbicides if this official authorization was withdrawn, as this would make continued use illegal.

[17] College voor de Toelating van Bestrijdingsmiddelen, CTB (in Dutch).

Table 7.3 Relevance of factors

Name of factor	**Relevance** (% respondents that mentioned factor)
Costs of weed control	100
Co-ordination between planning, design and management	73
Budget for weed control	64
Neatness of street scene	64
Necessary workforce and time for weed control	55
Health and safety conditions of workers	45
Insight into harmful effects of herbicides	45
Acceptance of green street scene	36
Nuisance and damage to direct environment	36
Political support for non-chemical weed control	36
Damage to the environment	36
Damage to organisms in water and soil	27
Concentration of harmful chemicals in surface water	27
Co-operation of citizens	27
Conc. exceeding standards for herbicides in surface water	27

Information and extension activities were widely recognized as useful instruments, with the regional water management organizations providing information on the specific harmful effects of herbicides and the need to reduce their use, and placing this information within the wider context of environmental considerations. There was no specific need for knowledge extension on the application of non-chemical weed control methods, as both municipalities and private companies indicated that they were familiar with the alternative methods, referring to past experiences and test-applications.

Accents in perceptions

The relevance of factors was also assessed for specific groups of actors, to assess the differences in the perceptions between groups of actors. This revealed that municipalities emphasized the practical consequences that a shift from the use of herbicides to non-chemical weed control would have for their own organization. The use of non-chemical weed control could be difficult to fit into the schedule of activities of those municipalities that had not yet contracted-out their weed control activities. Non-chemical weed control consumes considerably more time than the application of herbicides, with a peak-pressure on personnel during a relatively short period of the year. Municipalities further recognized that more attention should be paid to the co-ordination between planning, design and maintenance of the public spaces within their organizations,, as these were typically done by different municipal departments. They also pointed to the importance of having sufficient insight into the specific harmful impacts of using herbicides. Municipalities indicated that their insight into this matter was

inadequate, which made it difficult for them to make a well-informed decision on either the use of herbicides or the use of non-chemical weed control methods. This decision would have to be based on a trade-off between the good cost-effectiveness ratio of herbicides, against the environmental benefits of non-chemical weed control methods. In this trade-off, the costs and the effectiveness were well-known variables for municipalities, whereas the specific impacts on water quality were largely unknown. An example of a DANA diagram for one of the municipalities is depicted in Figure 7.3.

The private companies that were active in weed control in the public space in North-Holland recognized the negative impacts of using herbicides, but they also pointed to the broader picture of environmental impacts in public space maintenance. They stated that public space maintenance in a densely populated country like the Netherlands would always have negative environmental impacts and that the challenge was to find the right balance. The companies felt that, given the biodegradability of the applied herbicides and their efficient and selective use, using herbicides was still the best option available, also from an environmental perspective. These private companies further identified personnel aspects as being important, as using non-chemical methods was expected to cause less good health and safety conditions for their workers, while requiring more time for a proper application. This meant that the availability of good and skilled personnel was likely to become a bottleneck, which would make it impossible to satisfy the demands of all their current customers.

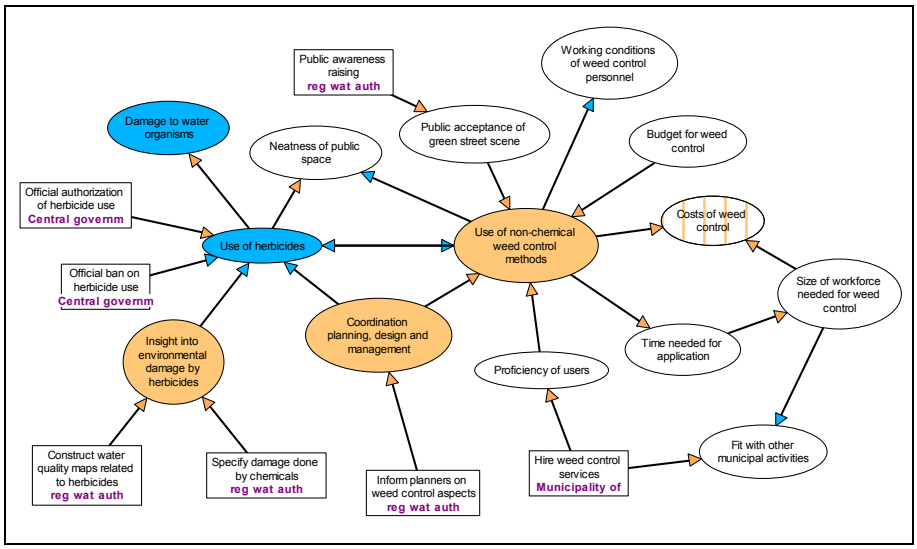


Figure 7.3 DANA diagram of perception of a municipality

The perceptions of the regional water board members focused on official water quality standards. The water boards were responsible for upholding these national standards and they trusted the standards to be adequate. In line with their official mandates, they did not specifically address the question of possible damages caused by exceeding the standards. However, this did not ease the communication with the users of herbicides, as they could not explain to them why exceeding the standards would be such an important problem. In fact, two of the three water boards indicated that they could not even say if water quality standards were exceeded due to the use of herbicides in public space. Their monitoring efforts focused on locations where they could monitor agricultural herbicides, but not herbicide use in public space and urban areas.

Findings of the actor analysis on ways to reduce the use of herbicides

The different actors put a strong emphasis on official standards and regulations, either to defend the use of herbicides or to argue for a ban on the use. Different regulations were used to support these different claims, and it was not easy to decide which was the better argument. This implied that water management organizations could not refer to their official standards to convince other actors that they should stop their use of herbicides, as these actors would counter their arguments with other official regulations that were equally valid.

Most actors found it far easier to describe the specific drawbacks of reverting to non-chemical weed control than to describe the negative impacts of using herbicides. In some of the other provinces in the Netherlands where they had made some progress in reducing the use of herbicides in public space, an important argument had been the negative impact on drinking water sources. However, this argument was not valid in North-Holland, as there was no runoff to water bodies that were used for drinking water production. Without this specific problem, there was an imbalance between the awareness of the negative effects of using herbicides and of the negative effects of *not* using herbicides. Furthermore, the negative effects of *not* using herbicides would affect the municipalities directly, in contrast to the negative effects of herbicide use. This did not make it any easier to convince sceptical municipalities of the need to reduce their use of herbicides.

Each of the currently available non-chemical methods had important drawbacks for the municipalities, mostly in terms of well-known bottlenecks such as costs, personnel and effectiveness. Most actors did not expect that this would change in the near future, which meant that the water management authorities could not ignore these negative impacts, as the municipalities and private companies would surely take them into account when making their decisions.

Conclusions of the analysis and resulting recommendation

The main conclusions and recommendations of the second part of the actor analysis for the PODP in North-Holland are summarized in Table 7.4 and are explained briefly below.

The conclusions and results discussed above, indicated that it would be more difficult to reduce herbicide use in public spaces than initially thought. There was no consensus about the desirability to stop using herbicides, at least not among their users, and addressing the problem of herbicide use appeared to be at least as complex as addressing other diffuse pollution problems; because of these complexities, the actor analysis did not result in specific recommendations for a follow-up discussion with the different parties involved, rather it was concluded that the PODP members would first have to go through some preparatory steps before entering into a joint process that might result in action regarding the use of herbicides.

The water management authorities had to start to clarify and specify the problems related to the use of herbicides. They had to develop well-grounded and clear arguments to convince the other parties of the urgency of the problem and to provide the municipalities with sound arguments that they could use to justify decisions to spend more budget on weed control in return for clear environmental benefits. As long as the benefits were not well-articulated, some municipalities could not reasonably be expected to make a rational choice for non-chemical weed control. For the same reason, the water management authorities needed to work on their own function as role models for other actors. Some water management authorities still used herbicides to maintain their properties, and although their own use was, in quantitative terms, far less than that of municipalities, such use would not support their argument. The water management authorities would be in a weak position to request considerable efforts and investments from municipalities, if they were apparently not willing to make similar efforts.

Table 7.4 Main conclusions and recommendation of the second part of the actor analysis

Conclusion	Corresponding recommendation
Both supporters and opponents of the use of herbicides base their claims on official rules and regulations	Develop well-grounded and clear arguments, based on empirical evidence, i.e. monitoring and external studies
The costs of shifting to non-chemical weed control are far more apparent than the benefits	
	Reduce own use of herbicides as role-model

7.3. Evaluation of actor analysis for diffuse pollution in North-Holland

7.3.1. Application of Dynamic Actor Network Analysis

Quality of collected data

The first part of the actor analysis covered only a limited sample of respondents, but this limited sample was justified as the focus of the analysis was on the members of the Project Organization. In the second part of the actor analysis a limited sample of actors was also used, which included only the five largest municipalities in the province. The choice to focus on the larger municipalities was made to get a good coverage of the province with a limited number of interviews, but this choice is likely to have introduced some bias into the outcomes, as practices in small municipalities might be different from those in large municipalities such as Amsterdam and Haarlem. This bias is also present for the private weed control companies interviewed, because they were identified by the respondents of the large municipalities who contracted these companies to outsource a part of their work.

There was no need for translation during the interviews and there were no significant cultural barriers that might distort and complicate the interviews. As a result, the richness of the data was sufficient for the analysis, as illustrated by the relatively large DANA diagrams and the length of the interview transcripts, which covered three to five pages of single-spaced text for each interview.

Technical validity

There are several indications that suggest that the application of DANA was sufficiently valid in this case. The DANA diagrams that were the basis for the analysis were validated by sending them to respondents together with interview transcripts. The resulting analysis was accepted by several audiences, such as the members of the Regional Project Organization, the participants in the Rijkswaterstaat project L3 (exploring a new policy approach) and the Rijkswaterstaat's functional working group on diffuse pollution (FWVO-D). Two key informants, a representative of the Rijkswaterstaat North-Holland and a representative of the Province of North-Holland, were interviewed after the completion of the actor analysis and they also judged the results of the actor analysis to be valid (interviews 15/05/2003 and 19/05/2003). Another indication of the trustworthiness of the results is that they are compatible with known insights from literature on diffuse pollution policies in the Netherlands, although the actor analysis added certain new insights and perspectives. Finally, a paper based on the second part of the actor analysis was accepted for presentation during an international scientific conference and selected for publication in a journal.

A limitation to the validity of the actor analysis that is inherent in the use of DANA is that it only covers perceptions and that the diagrams only represent the results of the interviews with the actors. This means that the results are limited

to the sample of actors that were interviewed and to the issues that were discussed during interviews. Respondents might have skipped certain issues in the interviews, but this does not mean that they do not think that these are important. For example, in the first part of the actor analysis, the decision makers did not mention PACs as a problematic pollutant, but other discussions with them indicated that they are aware of this problem (interview 15/05/2003). The consequence is that DANA results can provide a basis for discussion and further investigation, but that they should be complemented by data that are obtained from more direct, empirical observation of problems and their impacts. In the case of North-Holland, such data were provided by the "polluting sources" study.

Match between model and case environment

The data requirements for DANA matched quite well with the case environment, as data could be obtained through semi-structured open interviews that were not hindered by cultural or language barriers and as it was possible to get access to respondents that could represent their organizations. The focus on perceptions produced new insights, even though a lot of shared information was already available on the problem of diffuse pollution (see evaluation of outcomes in next section). However, it is difficult to say if other methods would have worked less well in retrospect. A focus on the network level or on the strategic behaviour of the actors might have produced similar results, although one can not be sure. An advantage of using DANA is that input information for the analysis could be obtained quite easily whereas input information for other methods, such as the quantitative information required for social network analysis, might have been more difficult to obtain.

Efficiency of analysis procedure

The application of the two parts of the actor analysis in North-Holland covered about twenty interviews and required a few weeks time for preparations and analysis. The total exercise required two to three months of full time work for the analyst, approximately one month per part, which means that it stayed within the time limits set for an actor analysis prior to the case studies.

The efficiency of the analysis procedure was also assessed by asking two key respondents from the Rijkswaterstaat and the Province of North-Holland if they would consider doing another actor analysis on a truly commercial basis in a future situation. Doing another actor analysis in future was a serious option for both key respondents, but it would probably be too expensive on a completely commercial basis, if done in the same way. It would be necessary to decrease the costs somewhat by reducing the scope of the analysis or the involvement of some relatively cheap support for the analysis. The latter could be done for example through the involvement of university (PhD) students, very much like the construction for the analysis reported here (interview 15/05/2003). The Project Organization considered actor analysis to be a potentially useful tool for

future applications, as illustrated by the proposal of one of its Working Groups to conduct another actor analysis, to cover another issue in more detail, in the coming year (interview 19/05/2003).

Summarizing, the efficiency of the actor analysis was sufficient to make actor analysis a promising option for future studies, although some improvements would be needed.

7.3.2. Output generated by Dynamic Actor Network Analysis

Key informants from the Rijkswaterstaat and the Province assessed the credibility and relevance of the output and stated whether or not the generated insights were new in their opinions. This assessment was done some time after both parts of the actor analysis were completed. By then, more than one-and-half years had passed since the *first* part of the actor analysis was finished, which made it somewhat more difficult to assess whether or not the insights of this first part were new at the time they were presented. Therefore, additional literature was used to complement the evaluation by the two key informants.

Evaluation of output of first part of actor analysis

The priority issues that emerged from the first actor analysis were an important eye opener, especially the detailed results that showed the priorities of the interviewed decision makers (interviews 15 & 19/05/2003). These priorities were not the same as the priorities one would expect based on the actual pollution loads when expressed in "kilograms". This showed that decision makers apparently took into account political considerations in addition to merely technical considerations (interview 15/05/2003). The overview of priorities further showed that the focus of activities within the regional project organization was on sources that had a relatively low priority, which led the provincial representative to reflect on the organization's activities (interview 19/05/2003). This insight into the differences in the perceptions of decision makers and staff members was relatively new, although in the same period it also surfaced in external advise regarding the communications strategy used by the regional project organization (interview 19/05/2003).

The first part of the actor analysis further pointed to the need to position the diffuse pollution problems within the broader context of water quality management and to consider both point and diffuse sources of pollution when developing new water quality plans. This insight was relatively new at the time it was presented, although it had also cropped up in other places (interview 15/05/2003). For example, although a statement on the need to integrate diffuse sources with point sources is not contained explicitly in previous policy reports, one can pick it up reading between the lines in some documents (e.g. Mayer and Enserink, 2000). This output from the actor analysis was part of an upwelling insight that gradually surfaced in the period during and after the actor analysis. It is impossible to assess what triggered this development, but the findings of the

actor analysis were definitely part of an emerging stream of thought (interview 19/05/2003).

The participation in the Project Organization was limited to the problem owners, the polluters or potential "problem solvers" were not included. The results of the actor analysis suggested that it would be worthwhile to include a stronger representation of actors with problem solving potential, starting with the municipalities. This insight was considered credible and relevant by both key informants. Whether it was new at the time it was presented could not be assessed, as it was considered to be new by the Rijkswaterstaat's respondent, but not by the respondent from the Province (interviews 15 and 19/05/2003). Nevertheless, the fact remains that the municipalities were not actively involved in the Project Organization at the time of the actor analysis.

Evaluation of output of second part of actor analysis

The actor analysis on the use of herbicides in public space mainly helped to explicate and clarify tacit knowledge that was previously floating around in a less articulated form (interviews 15/05/2003, 19/05/2003). The results of the actor analysis confirmed that communication with actors outside the Project Organization was an important bottleneck and clear starting points were provided for improving this communication (meeting 07/11/2003).

The existence of different official standards and regulations led to the situation that, on the one hand the use of herbicides was officially approved of by the regulating body for the use of herbicides, while, on the other hand, the water quality managers argued for a ban on their use because official water quality standards were being exceeded. The formulation of this problem in the actor analysis explicated tacit knowledge and in this way made the different positions more clear (interview 15/05/2003). However, although it was true that there was no complete match between different regulations, and that this created difficulties for the water quality managers, this did not mean that there is no co-ordination whatsoever of the different regulations (interview 19/05/2003).

7.3.3. Utilization of output by water experts in North-Holland

The above discussion shows that the actor analysis produced several credible and relevant insights, some of which were also new at the time. The actor analysis output thus seems to be potentially useful for the water experts involved in the development of a new diffuse pollution policy in North-Holland.

Utilization for problem framing

The expected utilization here is mainly related to the analytical studies that were conducted to support the development of a new multi-year plan for diffuse pollution in North-Holland. A very clear recommendation resulting from the actor analysis was to widen the scope of the ongoing polluting sources study to also include point sources. This recommendation was not followed.

Another relevant conclusion drawn in the actor analysis was that there was a lack of sufficient information for a clear assessment of the impacts of the use of herbicides in public spaces. This was partly due to the fact that existing monitoring efforts did not target the use of herbicides in urban areas. This finding triggered the representative of the Regional Directorate of Rijkswaterstaat North-Holland to verify if the Rijkswaterstaat's current monitoring efforts were sufficient and led to the resolution to adjust the monitoring package for next year (interview 15/05/2003). Other impacts of this finding were not observed. Apparently, no new studies were started to clarify the impact of herbicide use in public spaces on water quality or to link these impacts to concerns that exist with the general public outside the circle of water quality managers.

Utilization for interaction processes among water management agencies and with external actors

The actor analysis resulted in several recommendations related to the interaction among actors that were expected to support the process towards cooperation among actors to reduce diffuse pollution.

One development in line with actor analysis recommendations was that representatives of the municipalities of North-Holland joined the decision making body of the PODP, the steering group (interview 15/05/2003). The municipalities' representation was also strengthened in the executive body, the project group, by the appointment of a new representative (interview 19/05/2003). These developments might be explained by the results of the actor analysis being acted upon, but at least as likely are explanations that stem from the fact that the Project Organization had begun to address more issues that were directly related to municipalities (interview 15/05/2003), or by individual differences in the persons that represented their organizations in the PODP.

Another development was that the Regional Directorate of Rijkswaterstaat in North-Holland expressed its intention to put more emphasis on its role as a representative of a national level department (interview 15/05/2003). This changing role of the Rijkswaterstaat was a direct result of a steering group discussion, which was not directly triggered by the actor analysis report, although the actor analysis might have planted the seed, or strengthened the support, for this idea (interviews 15 and 19/05/2003 – see also the indirect impacts discussed below).

The second part of the actor analysis was specifically focused on the "interaction" aspects related to a "transition from thinking to action", action that should reduce the use of herbicides in public spaces. The importance of the issue of herbicide use in public spaces was still supported in the Project Organization, based on the actor analysis and the polluting sources study (interview 15/05/2003), but specific actions had not yet been planned and therefore the actual impact of the actor analysis recommendations could not be determined at the time of the evaluation. This evaluation was done one year after the report on the second part of the actor analysis was made available, but at that time the

official priority issues had not been established due to a delay in the execution of the polluting sources study. Therefore at the time of the evaluation no follow-up actions had been planned in relation to the use of herbicides by the PODP.

Summarizing, some developments occurred that were in line with the recommendations of the first part of the actor analysis, but these developments did not seem to be triggered primarily by the actor analysis. As for the second part of the actor analysis, no impacts of this part could be observed, as the PODP was not yet ready to address the new issue arising regarding the use of herbicides for weed control in public spaces.

Utilization for general learning and other forms of indirect utilization

The direct utilization of the actor analysis output by water experts was modest at best, but in addition to the direct utilization, there was also some indirect utilization.

The actor analysis triggered decision makers and staff of the regional water management agencies to reflect on and express their thoughts about their roles and cooperation in the Project Organization. This was done through the interviews, in which they had to answer questions on these issues, and with the presentation of the results. This contributed to a process that eventually led to an evaluation of the functioning of the Project Organization in a steering group meeting in 2003 (interview 15/05/2003). Among the results of this meeting was the decision to integrate diffuse pollution within the broader context of water quality management and to focus future cooperation on water quality management and not just on diffuse pollution (interview 19/05/2003; meeting 07/11/2002). Another result was the decision of the Rijkswaterstaat to focus more on its role as a representative of the national Ministry, as discussed above. The actor analysis was not the direct trigger for this steering group discussion, but it is likely to have contributed indirectly to the process.

The water experts who prepare the policies and implementation plans stated that they were trying to take the political perspectives of their decision makers more into account. This was mainly based on insights gained from two studies, the actor analysis and a communication study (interview 19/05/2003). However, it proved difficult to apply these insights in reality, as political priorities could change after elections were held for the province and two of the three water boards.

Conclusions on utilization of actor analysis

The actor analysis was intended to feed information into the development of a new multi-year plan, by adding the actor context to the physical picture gained from a polluting sources study. Its relevance was recognized by both of the staff level key informants (interview 15/05.2003) as well as the decision makers in the Regional Project Organization's steering group (meeting 03/12/2001). The outcomes of the actor analysis were of sufficient quality and offered relatively new and relevant insights.

The first part of the actor analysis especially provided clear insights and recommendations that could have been used by the Regional Project Organization to prepare for emerging developments. These included suggestions to integrate diffuse and point sources of pollution, to have a stronger representation of municipalities and, for the Rijkswaterstaat, to consider changing its role. Although formulated in the fall of 2001, these suggestions were only taken up a year or more later, when they also surfaced in other policy developments and debates.

The actual utilization of the actor analysis output by water experts in the Project Organization, although hard to assess, was less than hoped. Subsequent developments related to diffuse pollution policy in North-Holland came into line with the output of the actor analysis, but this result can not easily be linked to the actor analysis. Most of these developments seem to have been triggered more by external developments.

Concluding, the actor analysis produced analytically interesting output, which is likely to have played some role in the discussions and activities of the Project Organization in North-Holland, however this role was not decisive.

7.3.4. Additional influences on utilization of actor analysis output

The impacts of the actor analysis were only observed after considerable time had elapsed, and when the insights generated by the actor analysis were echoed by other sources. This could be due to the time needed for the insights gained from the actor analysis to sink in or for the need of a certain critical mass of supporting ideas from other sources before the recommendations were actually taken on board. However, it could also be due to some additional aspects related to the history of the actor analysis and the specifics of this case.

Cultural context: diffuse pollution policy and the science of muddling through

In a seminal paper, Charles Lindblom characterized policy making as an incremental process of "muddling through" (Lindblom, 1959). Policy makers are limited in their capacities to address complex policy problems by limited intellectual capacities and information sources and by limited time and resources that can be allocated to a policy problem. This results in an incremental process of policy making that builds out from the current situation, making step-by-step progress by small degrees (Lindblom, 1959). Policy making in the field of diffuse pollution in the Netherlands fits this image of "muddling through".

Although the rhetoric in the official policy documents suggested a high priority for diffuse pollution issues, the reality was that the issue of diffuse pollution was relatively low on the political agenda. Consequently, the time, budgets, personnel and other means allocated to the development and implementation of diffuse pollution policy were limited (Enserink et al., 2001; Enserink and Mayer, 2002).

In the case of North-Holland, the development of a new multi-year plan for diffuse pollution was co-ordinated by the Project Organization. Due to the

limited time available for policy development there was a low frequency of meetings and when the project group met, the agenda was more than full and not all issues could be covered in a timely and adequate fashion. Moreover, the resources within most member organizations to follow-up on decisions made during those meetings were scarce, which meant that the progress of activities was generally slow. For instance, delays in the development of the new multi-year plan led to the decision to extend the 1999-2001 plan for another year (meeting 03/12/2001).

The result was an endless process of consultation and discussion, without much action in between meetings. This can be considered an example of the typically Dutch "polder model", in line with the "national passion for discussion and debate" (White and Boucke, 2001, p.71) and the small power distances and femininity of Dutch culture (Hofstede, 1991). If the general level of priority, progress and activity in a policy field is relatively low, it is perhaps not realistic to expect an actor analysis to cause significant change in ongoing processes or to initiate new ones, at least not within a limited period.

Support within user group

The actor analysis was started as a pilot study for the Rijkswaterstaat, but its practical purpose was to support policy development by the Project Organization and therefore, the execution of the actor analysis was linked to the Project Organization. However, due to the above mentioned time and resource constraints for diffuse pollution issues, the members of the Project Organization had a tight and busy schedule. This made it difficult for them to become actively involved in the actor analysis as this was yet another activity on top of their existing commitments and obligations. In addition, diffuse pollution issues are not well anchored in the public authorities that are responsible for water resources management (Enserink et al., 2001; Enserink and Mayer, 2002). This results in a high rate of turn-over among the persons assigned to diffuse pollution issues. Within the two years of the actor analysis, three of the people that played a key role in initialising the actor analysis within the Rijkswaterstaat moved to another position, as did the representative of the Province of North-Holland and the project chair for the related Rijkswaterstaat project L3.

As a result, it was difficult to establish a strong ongoing commitment for the use of the actor analysis outcomes among the intended users, i.e. the members of the Project Organization. The actor analysis had some enthusiastic and committed supporters within the Rijkswaterstaat, but much fewer within the Province and other members of the PODP. This lack of commitment within the Project Organization is illustrated by the regret expressed by the initial representative of the Province, who had an important coordinating role in the activities of the staff level representatives in the project group. He stated that in retrospect he would have liked to have confronted the decision makers more clearly with the results of the actor analysis. The results were discussed with the staff level representatives, but at the decision making level they were merely presented for notification. Afterwards, he found that there were a number of

outcomes that were very relevant for the decision makers and that could have been presented for discussion in the steering group meetings (interview 19/05/2003).

One or more committed supporters of the actor analysis outside the Rijkswaterstaat, especially in the Province, would have been helpful to ensure a follow up on the outcomes of the actor analysis in the Project Organization. The absence of committed "advocates" within the Province probably offers an additional explanation for the relatively low impact of the actor analysis.

8. Participatory plan development: implementation of the EU Water Framework Directive in Turkey

8.1. Case study background

8.1.1. The EU Water Framework Directive in Turkey

The European Water Framework Directive (WFD) was established in 2000 as a framework to harmonize the water policies in the EU Member States. The WFD requires Member States to pay considerable attention to water quality management, stating as its purposes the protection and improvement of the quality of aquatic ecosystems and the general aquatic environment, the promotion of sustainable water use through the long-term protection of available water resources, the protection of groundwater quality, and the mitigation of the effects of floods and droughts (EU WFD, 2000, Art.1). The WFD prescribed the establishment of River Basin Districts as the administrative units for water management based on the natural boundaries of river basins (EU WFD, 2000, Art.3). Member States must produce River Basin Management Plans (RBMP) for these River Basin Districts, stating among others the general characteristics and human-related pressures in the River Basin District, the existing monitoring network and giving an overview of the measures that have been adopted to meet the objectives and requirements specified in the various articles of the WFD (EU WFD, 2000, Art.13 & Annex VII).

The establishment of the WFD triggered many new policy developments in European Union (EU) Member States and candidate Member States. They had to establish River Basin Districts, collect the information required under the WFD, review and adjust the monitoring networks and prepare River Basin Management Plans, which should be published at the latest nine years after the entry into force of the WFD. As one of the candidate Member States of European Union, Turkey also aims to adopt EU legislation, including the WFD.

8.1.2. Implementation of the Water Framework Directive in Turkey

The IWFD Project

The Netherlands government supported the Implementation of the Water Framework Directive in Turkey project (hereafter: IWFD project). The purpose of the IWFD project was to support Turkey with the implementation of the WFD through the introduction of the necessary institutional and administrative arrangements on both the national and the regional level (Senter, 2001). On the national level, the IWFD project was expected to result in the establishment of a national platform to define the Turkish River Basin Districts and in an action

plan for the implementation of the institutional changes required by the WFD. A pilot River Basin Management Plan was to be prepared for a selected River Basin District, to serve as an example to be applied on a wider scale in Turkey. The experiences gained in this pilot were to be recorded in a methodology handbook to support the implementation of the WFD guidelines in Turkey. Finally, the IWFD project was expected to improve the knowledge of the WFD within the relevant Turkish institutions, and the results of the project were expected to be made available to interested public and to a broad group of policy makers (Senter, 2001, p.11; IWFD Turkey Newsletter, 2002).

The project duration was two years, from January 2002 to December 2003. The project was executed in close cooperation between the Turkish government, external consultants, and Dutch government agencies, and in the spirit of a "two-way learning" process. The consultant's project team was a Dutch-Turkish consortium led by Grontmij Consulting Engineers. The Dutch partners included two consultants (Grontmij and Ecorys-Netherlands Economic Institute), two government agencies (Directorate-General of Public Works and Water Management and Waterboard Hunze and Aa' s) and an academic institute (UNESCO-IHE Delft). These were all working from their bases in the Netherlands, combining short-term missions to Turkey with short-term training for members of the Turkish government institutions in the Netherlands. The Turkish consultant, Kentkur Consultancy, worked from its base in Ankara and maintained the day-to-day contacts with the Turkish government institutions on both the national and regional level. Various Turkish government institutions were involved as the project's beneficiaries, the two most important being the Ministry of Environment (MoE) and the General Directorate for State Hydraulic Works (DSI).

A regional pilot for the Büyük Menderes river basin district

One of the key-components of the IWFD project was the preparation of a River Basin Management Plan for a pilot region. To prepare the River Basin Management Plan, a Regional Working Group (RWG) was formed, consisting of representatives of relevant agencies in the river basin. The project team would provide training to the members of the Regional Working Group and help them through the steps for the establishment of a River Basin Management Plan in line with the requirements of the WFD. Due to the limited time and budget available for the project, the regional pilot was not intended as a complete implementation of the WFD guidelines, the focus was on the WFD's requirements until 2004 (presentation IWFD, 3 Sep. 2002). This meant that the project participants concentrated on mapping the present situation and the existing human pressures on the river basin, mapping the monitoring network, executing an economic analysis, and formulating environmental objectives.

Figure 8.1 Location of Büyük Menderes river basin in Turkey

The Büyük Menderes river basin was selected as the pilot region for the River Basin Management Plan. The Büyük Menderes, known in ancient times as the Meander, is located in the south-western part of Turkey (see Figure 8.1). The river has its source in the Anatolian plateau, then it expands into a broad flat-bottomed valley, where it meanders, finally discharging into the Aegean Sea. Its length of almost 600 km makes it the longest river in the Aegean region. The river basin catchment area covers almost 25,000 km^2 across six different provinces and contains approximately 2.5 million inhabitants. The main land uses are agriculture and forestry, and economic activity is mainly related to agriculture, textile and leather industries and tourism. The delta of the river basin is a wetland with international importance for wildlife (IWFD Turkey Newsletter, 2002).

8.1.3. Timeline of actor analysis for the IWFD Turkey project

The establishment of the WFD initiated new water policy activities in several European countries, which offered a link to possible case studies for this research. In February 2002, the Dutch project team of the IWFD Turkey project was contacted to explore the possibilities of carrying out an actor analysis. At the time of these first contacts, the IWFD project had just started and the project management, consisting of the project director at Grontmij and the team leader at Ecorys-NEI, agreed on the potential usefulness of an actor analysis to support the problem formulation for the regional pilot. It was decided that this actor analysis could best be executed prior to the first stakeholder workshop in the region, in co-operation with a project consultant from Kentkur in Ankara. The Büyük Menderes catchment area was selected as a pilot area for the IWFD

project in May 2002, shortly before the actor analysis, and therefore not much background information was available on this area.

A timeline with the main events that occurred in the process of doing an actor analysis for the project IWFD project in Turkey is shown in Table 8.1.

8.2. Description of the actor analysis

8.2.1. Preparation

Purpose

The main purpose of the actor analysis was to support the development of a widely recognized problem formulation that could provide a good basis for the participatory development of a River Basin Management Plan (RBMP). As such, the actor analysis was expected to provide insight into the main problems and solutions according to the various actors, their main interests and objectives, the areas of agreement and disagreement, the priority of issues to be addressed in the regional pilot, and ideas on how to structure the participation of actors in the development of a RBMP.

Table 8.1 Timeline of actor analysis for IWFD Turkey project

Date			Event
2002	Jan	1	Start of Implementation WFD Turkey project
	Feb	12	Meeting with project manager Ecorys-NEI
	Feb/Mar		Project team short mission to Turkey
	Apr	11	Meeting with project manager and director in Rotterdam
	Apr	12	Email introduction to Turkish project consultant
	Apr	19	First proposal and planning for actor analysis in Turkey
	Apr/May		Change of pilot project area to Buyuk Menderes basin
	Jun	4	Meeting with Turkish project consultants at IHE Delft
	Jun	14	Meeting with project consultants at Grontmij Houten
	Jul	11	Detailed planning emailed to project team NL and Turkey
	Aug	12	Start data collection in Turkey
	Aug	13-16	Interviews actors in Aydin
	Aug	19-22	Interviews actors in Denizli
	Aug	23-30	Constructing DANA models and analysis of results
	Sep	2-5	Preparing / conducting project workshops in Aydin
	Sep	13	Written report actor analysis results (emailed from Delft)
	Dec	10	Evaluation with Regional Working Group at IHE Delft
		12	Evaluation with project team at IHE Delft
2003	May	13	Evaluation with project manager at Ecorys-NEI

The project team did not have much information on the pilot region, and therefore, in addition to its main purpose, the actor analysis was also intended to provide the project team with background information on the institutional structure and the relations between actors in the Büyük Menderes river basin. It was also expected to support the preparation of a training programme for actor-representatives in the Netherlands, through supporting the selection of participants and the assessment of their background knowledge on integrated river basin management (meeting 14/06/2002).

Selected modelling approach: Dynamic Actor Network Analysis (DANA)

Motivation for the use of DANA

The use of a perception-oriented model seemed most appropriate for the main purpose of the actor analysis, to support the development of a problem formulation from a multi-actor perspective. Because the project team had little documented information about the project region and its actors, the team's preference was to obtain a good picture of the perceptions of the different individual actors. Background information to trace the public discourse on water resources issues in the basin was not available from the project team and language barriers made the use of any background documents that might be available in the region itself infeasible. Therefore open interviews with the individual actors were considered to be the most appropriate data collection strategy, and usingcognitive mapping models would be preferable to using discourse analysis models.

Three cognitive mapping approaches were identified in Chapter 3: Self Q-method, SODA and DANA, of which the Self-Q method and SODA were considered to be less appropriate. There was no time available to have three separate interview rounds per actor as required for the Self-Q method, and the interactive use of SODA was considered to be unfeasible due the lack of an experienced facilitator for such interactive modelling and due to expected language problems during such an exercise. Dynamic Actor Network Analysis (DANA) was expected to be the most suitable approach for the regional pilot in Turkey because its visual models offer a good basis for discussion and because it does not require too much pre-structured input information. Furthermore, using DANA was expected to provide a good insight into the differences and agreements among actors, by taking their individual perceptions as a starting point for analysis. The use of DANA also seemed practically efficient, due to the experience gained with its use by the researcher in a previous case study in North-Holland (see Chapter 7).

Introduction to the use of DANA

Dynamic Actor Network Analysis (DANA) uses the perceptions of the individual actors as a starting point for analysis. The perceptions of each actor are modelled by constructing a cognitive map. The DANA models show the perceptions of actors as a combination of factors and instruments, which are

linked by arrows that depict the assumed influences among the elements. The construction of the models can be done in a specific DANA software environment, which links the different models to an underlying database. This database is then used as a basis for a comparative analysis of the different perceptions of the actors in a network (Bots et al., 2000).

An illustration of a DANA model is provided in Figure 8.2. Additional information on the interpretation of DANA models and additional technical background information on the use of DANA can be found in Chapter 7, which describes its use for the case of diffuse pollution in North-Holland.

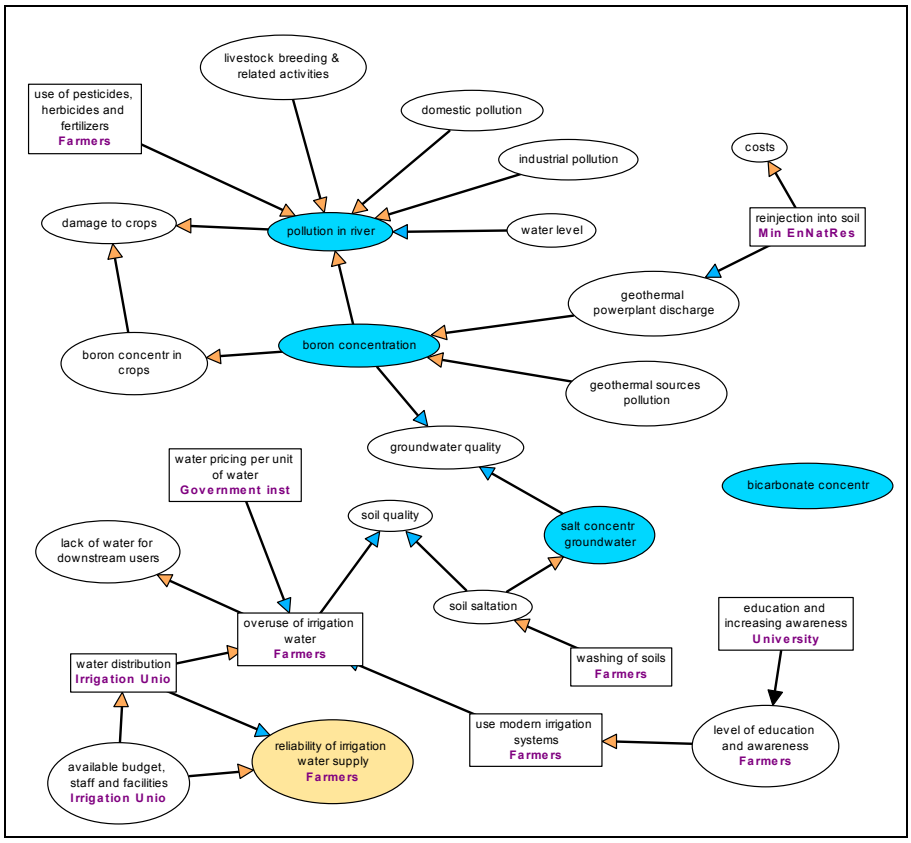


Figure 8.2 Example of DANA model constructed for the regional pilot for the IWFD project

8.2.2. Application of DANA in Büyük Menderes river basin

Application process

Data collection activities

The practical preparations for the actor analysis were made in consultation with the Dutch and Turkish members of the project team in June and July of 2002, and the data collection through interviews was done in August 2002, supported by the Provincial Directorates of the Ministry of Environment (PDoE) in the provinces of Aydin and Denizli and by the Regional Directorate of DSI in Aydin. The interviews for the actor analysis were done together with a Turkish consultant on the IWFD Project team[18], who provided the translation into English during most interviews and who participated in the preparation of English transcripts on the same day.

A key issue in the case of the Büyük Menderes basin was the selection of actors to be interviewed. The Büyük Menderes basin covers six different provinces, and most actors are organized according to provincial boundaries. Because of the time consuming character of interviews and the limited time available for data collection (two weeks), not all the actors in all the provinces could be interviewed. Therefore, interviews were only held in two provinces that are located (almost) entirely within the river basin and that cover the larger part of the river basin. Twelve interviews were done in the province of Aydin, to cover the downstream actors in the basin, and seven interviews were done in the province of Denizli, to cover the upstream actors. More interviews were done in Aydin, as this Province also contained some Regional Offices of some government agencies that cover more than one province, such as the Regional Directorates of DSI and Forestry. Aydin had previously been selected as the focal point for the regional pilot.

Nineteen interviews were held with selected actors, who represented several interests and sectors in the river basin, such as the Chambers of Agriculture and of Commerce and Industries, the provincial Governor, Irrigation Unions and several Provincial and/or Regional Directorates of government agencies. The selection of respondents was done together with the consultant from Kentkur and the Provincial Directorates of the Ministry of Environment (PDoE) in Aydin and Denizli. It was not possible to interview a representative of the municipalities in the province of Aydin, and it was only possible to get a brief interview with the Mayor of the city of Denizli[19].

The interviews were conducted using a short structured list of open questions, asking the actors for their views on water resources management in

[18] Interviews were done together with Çağri Muluk, who worked for Kentkur in Ankara and who also made the practical arrangements for the field visit to the pilot area.

[19] Aydin and Denizli are both provinces, as well as the largest cities in these provinces. During the period of data collection, there were upcoming elections. In Turkey, all candidates running in these elections are required to quit their public offices, which meant that for Aydin no good representative was available for an interview.

the Büyük Menderes basin. The questions covered issues such as the objectives of the actors related to water resources management, their ideas about the important problems, the causes of, and potential solutions they saw for, these problems and their views on the role of different actors in these problems. In addition, some questions were asked that were not intended as input for DANA models, but to gain some insights into the institutional issues that played an important role in the IWFD project. These final questions covered the opinion of actors related to the establishment of a river basin management organization and their relations with other actors.

In Aydin, most respondents had already been informed about the project by the PDoE and the interviewers could quickly focus on the questions for the actor analysis. However, in Denizli most respondents had to be told about the project before the interviews could start and as a result not all the issues could be covered as fully in all the interviews.

Analysis and presentation of results

The interview transcripts were translated into DANA models in the week after the interviews in Ankara. These DANA models were used as basis for analysis and were presented to the actors for validation during a regional stakeholder workshop on the 3rd of September 2002 in Aydin. At this stakeholder workshop, the project was introduced to a broad audience and the results of the actor analysis were presented during the morning. In the afternoon, group discussions were held and members of a Regional Working Group (RWG) were appointed. This RWG was informed in more detail about the project in a separate meeting on the 5th of September 2002. During this last meeting, also the use of causal relations diagrams as a technique for problem formulation was explained to the RWG to support their first activities in problem formulation and to stimulate use of the DANA models in these activities.

A written report on the results of the actor analysis was finalized in the Netherlands and was made available to the project via email in September 2002.

Overview of main results

Main problems in the river basin according to the actors

A first step in the actor analysis was to review the main factors that play a role in river basin management according to the actors. This was done by looking at the relevance of the mentioned factors, based on the number of actors that mentioned a factor in the interviews. The results of this are shown in Table 8.2, which contains a sorted list of categories of factors, summarizing the information in the DANA models made for each actor. The different categories are shown in the first column, while their overall relevance is shown in the second column, expressed as the number of actors that mentioned factors related to a category as a fraction of the total of nineteen actors. In the last two columns the relevance for respectively the twelve actors from Aydin and the seven actors

from Denizli is specified, to see if there is a difference in the perceptions between the downstream and upstream actors.

The first category in the table is a special category, "Pollution at large", which is used to indicate that every actor mentioned some type of pollution related factors. In fact this category comprises the different types of pollution specified in the separate categories given in Table 8.2, such as industrial, agricultural, and domestic pollution, and boron pollution from the geothermal power plant in the basin.

Administrative and institutional issues were also mentioned often, referring to problems such as the lack of co-ordination between organizations, limited budgets, staff and facilities of government institutions and the influence that politicians have on the development and the implementation of water related policies and regulations. The importance of agriculture and irrigation was also acknowledged by a majority of actors, which might be explained by the fact that agriculture was by far the largest water consumer in the basin. General water and soil quality factors were mentioned by slightly fewer actors, but still by more than half of the total. This category comprises general issues such as water quality but also more specific issues such as nitrate concentration, soil siltation, and sediment carried by the river. These are mostly influenced by factors such as pollution or other human activity such as agriculture or tourism.

Categories that were mentioned by a minority of actors, but that nevertheless might play an important role in water management in the basin, were "impacts on water and soil quality outside pollution", referring to erosion and the natural geo-morphological structure of the soil. "Water quantity (other than agriculture)" referred to water shortages, water losses, upstream and downstream equity, groundwater abstraction and flooding.

Table 8.2 Relevance of problem categories (fraction of respondents that mentioned a problem)

Name of category	Total	Aydin	Denizli
Pollution at large	1.00	1.00	1.00
Administrative and institutional factors	0.95	1.00	0.86
Industrial pollution factors	0.95	1.00	0.86
Agriculture & irrigation factors	0.79	0.75	0.86
(Agricultural pollution)	*0.37*	*0.35*	*0.57*
(Other factors related to agriculture)	*0.68*	*0.58*	*0.86*
Domestic pollution factors	0.74	0.83	0.57
General water and soil quality	0.68	0.58	0.86
Geothermal boron pollution factors	0.63	0.75	0.43
Impacts on water & soil quality outside pollution	0.37	0.58	0.00
Water quantity (other than agriculture)	0.37	0.42	0.29
Nature conservation	0.16	0.17	0.14
Tourist activities	0.11	0.17	0.00
Rest category	0.53	0.75	0.14

Nature conservation was mainly important for the Ministry of Forestry, as this department was responsible for protecting forest areas and national parks such as the wetlands that are located downstream in the basin. The Ministry of Tourism was the main actor that identified tourist related factors, expressing a concern that bad planning and insufficient attention for environmental issues and water quality might harm future tourist activities in the region. The "Rest" category in Table 8.2 contains a variety of factors that were mentioned by only one or two actors, related to issues such as sand mining from the river bed, illegal settlements, drinking water treatment, and direct discharge to surface water by boats.

There were differences in the characteristics of the upstream and downstream regions of the Büyük Menderes river basin. An important part of the polluting industrial activities were located in the upstream provinces of Denizli and Uşak, while downstream there was more tourism and there were some vulnerable internationally recognized wetland-areas. Despite these differences, the perceptions about the main water management issues largely overlapped among actors located in Aydin and Denizli. The actors in Denizli also recognized the pollution problems, even if the downstream actors suffered most from these problems.

Instruments to address problems

The three main categories of pollution, agriculture and irrigation and administrative and institutional issues represented the largest part of the human-related pressures on the water system in the Büyük Menderes river basin. Different instruments were identified through which actors could influence these water management issues, either because these instruments might allow them to contribute to a possible solution of problems, or because they used these instruments to cause or increase problems. An overview of the instruments that were modelled in the DANA diagrams and that were mentioned by at least three different respondents is given in Table 8.3. Only instruments related to the three main problem issues are shown, sorted according to the issue. Note that some instruments are mentioned more than once in the table, as they refer to more issues, e.g. administrative instruments can be used to reduce pollution.

The most "popular" solutions, i.e. instruments that were mentioned by six or more different actors, were (financial support for) wastewater treatment for industrial and domestic (point) sources of pollution, improved monitoring and control of the implementation of laws and regulations, and agricultural improvements through developing larger agricultural plots using land reconsolidation and addressing the use of pesticides, herbicides and fertilizers. Providing education and increasing awareness were also mentioned often as part of a solution, but it should be added that these activities cover a wide range of subjects and a wide range of actors.

Table 8.3 Instruments per category and the frequency with which respondents mentioned them

Instrument categories and names	Freq	Instrument categories and names	Freq
Pollution		**Agriculture & Irrigation**	
industrial wastewater treatment	8	land reconsolidation & development	7
financial support wastew. treatment plants	7	(limit) use agro-chemicals	7
(limit) use of agro-chemicals	7	use modern irrigation systems	4
domestic wastewater treatment	6	stimulate modern agricult. techniques	3
pollution standards based on next water use	4	volumetric water pricing	3
re-inject geothermal water into soil	4	**Rest category**	
advanced (chemical) wastewater treatment	3	education and increasing awareness	7
share treatment plants for industrial areas	3		
Administrative and Institutional			
monitoring & control of law implementation	8		
land reconsolidation & development	7		
pollution standards based on next water use	4		
establish and enforce land use plans	4		
development of new laws	3		
volumetric water pricing	3		

The overview of the instruments that were mentioned most often indicated that the actors in the pilot region focused mainly on operational instruments to address practical problems and law enforcement rather than institutional reforms and the development of new laws and regulations. Technically, most of the instruments would not be difficult to implement, but finding the necessary funds, people and equipment would be more difficult. This indicated that the main bottlenecks in water resources management according to the actors were on the operational level rather than on the institutional level. However, the WFD Turkey project had a strong focus on institutional reform and development, as it aimed to introduce the (new) institutional structures and procedures prescribed by the new European Union Directive.

Opinions on co-operation in river basin district

The idea of co-operation and co-ordination among actors in the River Basin District through a river basin management organization was widely supported, although there also seemed to be a consensus about certain conditions and requirements that should be met to ensure its proper functioning. A river basin management organization would need a legal basis along with certain (implementing) powers to ensure an independent position and it would also need an umbrella organization at the national level. Furthermore, a river basin management organization would be a good institution to form in the long run, but for the short-term it would be better to use the existing institutional structures in the basin. Finally, some respondents mentioned that if co-operation between institutions and the implementation of existing laws and regulations

was improved, the need for a new river basin management organization would decrease.

The actors had different opinions on the members of a new river basin management organization. Some respondents wanted to include a wide range of actors, others favoured a more limited selection to keep the size of the organization manageable, for example, including only the government organizations with decision making powers on water management issues. For all the issues, but especially for the required institutional changes, there was a need for regular communication with national level actors, for example through the national water management platform that was established as part of the IWFD project's national level activities.

Summary of conclusions and recommendations

The main outcomes of the actor analysis are summarized below in Table 8.4. Most outcomes have been discussed in the previous sections, except for the outcome on the awareness and knowledge of actors in the basin. This outcome resulted from the general impression obtained through the interviews and workshop regarding the knowledge of the regional actors about water resources management. It helped the project team to develop a training program that would build upon the existing knowledge, rather than starting from scratch.

Table 8.4 Main conclusions and recommendations actor analysis for the IWFD project

Conclusion	Corresponding recommendation
Pollution, institutional development and agricultural issues are considered most important by actors in basin	Include these three issues specifically in further analysis activities
General agreement among upstream and downstream actors	(Promising starting point for future co-operation in basin)
Actors focus on technical and practical options for their problems, while project has strong institutional focus	Ensure a clear link between attention for institutional aspects and their practical consequences in the region
Support for cooperation within the river basin, initially through existing institutional structures	Reconsider the need to establish completely new institution, start with existing structures
Actors generally well aware and knowledgeable about water management issues in the basin	Training can build upon existing knowledge on integrated water resources management

8.3. Evaluation of actor analysis for Büyük Menderes river basin

8.3.1. Application of Dynamic Actor Network Analysis

Quality of collected data

The actor analysis was almost entirely based on the interviews with selected actors, due to the absence of written (English) information sources. Nineteen actors were interviewed, covering different interests and roles in the river basin. This sample of actors was sufficiently large and wide in scope, except for the representation of municipalities, which was a weak spot in the data collection.

The interviews were influenced by the need to translate from English to Turkish and, in some cases, by the need for a lengthy introduction of the IWFD project. In certain interviews, the influence of the personal characteristics of the actor-representative was also visible in the results. Some representatives appeared to be more open and less constrained by political sensitivities than others and with some of the high level officials, the interviewers had less control over the conversation. As a result, some of the interview transcripts were not very rich. Nevertheless, they were always sufficient to construct at least some simple DANA diagrams.

Technical validity

The constructed diagrams were translated into Turkish and were handed back to the actors that were present at the stakeholder workshop in Aydin, to validate the DANA diagrams that provided the main basis for the analysis. Not all the interviewed actors were present at this workshop, but from the feedback of the actors that did review their diagrams, came the impression that the diagrams provided a good basis for an accurate analysis. The final outcomes of the analysis were validated in external evaluations with the members of the IWFD project team (meetings 12/12/2002 and 13/05/2003) and members of the Regional Working Group (meeting 10/12/2002). Based on these validations, the interview data, the constructed DANA models and the resulting outcomes of the actor analysis appeared to be sufficiently valid to warrant further use by the IWFD project.

Match method with case situation

The language and cultural barriers were identified beforehand as the main risks for the application of DANA in Turkey, as they could hinder data collection using open interviews. Translation plays a crucial role in such situations, and preparatory meetings with the Turkish project team members fostered sufficient trust in the possibilities to obtain sufficient data using interviews (meetings 4 & 14 June 2002). In the end, the DANA models were less rich than those produced for the North-Holland case (see Chapter 7), but the collected input data were still of sufficient quality to enable a good analysis. The DANA models also proved useful for communication purposes, as is discussed below.

Concluding, the use of DANA was appropriate for the case, but a "simpler" analysis method, more in the direction of the stakeholder analysis approaches discussed in Chapter 3, would probably also have worked.

Efficiency of analysis procedure

The actor analysis required about six weeks of full time work by the researcher and approximately three to four weeks of work by a Turkish project team member. As for the other cases, the efficiency of the used approach was evaluated by asking the members of the IWFD project team whether or not they would do a similar exercise in a future project if they had to cover the full expenses for the actor analysis, including the expenses for an actor analyst.

The institutional expert of the project stated that the procedure followed was in line with the textbooks, but that in reality it would not be efficient enough. A one or two day stakeholder workshop would still be preferred over a more extensive actor analysis, although this also depends on the project budget (meeting 12/12/2002). A workshop probably would yield less detailed analysis results, but it also would require fewer resources from the project team and it would be more likely to create more commitment among the actors for the outcomes (meeting 12/12/2002).

The project team leader mentioned that projects like the IWFD project in Turkey often have a bias towards "hard analyses" in their budgets, where technical advice is valued higher as output than a good problem description and actor analysis. Therefore, an actor analysis such as the one done in this case might fit better in the phase where the commissioner of a project is preparing a project's Terms of Reference (meeting 13/05/2003).

Concluding, the responses of the team members indicate that they considered the actor analysis approach used, to be relatively expensive and that it would be difficult to apply on a commercial basis in similar future situations.

8.3.2. Output of the actor analysis

The potential usefulness of the analytical output for the IWFD project was assessed by reviewing whether the output was credible, relevant and new at the time it was presented to the people involved in the project. The water experts of the project team and the actor representatives of the Regional Working Group assessed the credibility, relevance and newness of the output in separate evaluation meetings (meetings 10 & 12/12/2002, 13/05/2003).

Evaluation of the main conclusions of the actor analysis by water experts

All of the five main conclusions of the actor analysis were considered credible and relevant, but not always new, except for one. The conclusion on the agreement in perceptions among upstream and downstream users was considered to be new by the water experts, but they also doubted its credibility, stating that a much stronger representation of upstream water users rather than

(semi) public organizations in the actor analysis might show more disagreement in perceptions.

The results of the actor analysis indicated that there were important problems on the operational level. These problems were outside the initial focus of the project and therefore their identification was an eye-opener to at least a part of the project team (meeting 12/12/2002). The IWFD project had an important focus on institutional development, this focus was also used to structure an important part of the discussion in the first stakeholder workshop. The workshop results confirmed that there were important problems in the institutional structure, whereas the actor analysis added the operational problems to the perspective of the project. These outcomes confirmed that problems on an institutional level and an operational level are related and that one needs to find a balance between the necessary long-term and short-term investments (meeting 13/05/2003).

The actor analysis showed that the actors had a good level of technical expertise, and a good knowledge of concepts related to integrated river basin management. This was not expected beforehand and was important information for the water experts in the project team (meeting 12/12/2002; preparation email 15/07/2002). Another new piece of information was the good co-operation, especially among government actors, that was already in place in the river basin, which was also not expected beforehand based on the experiences on the national level (meeting 12/12/2002).

Evaluation of main conclusions of the actor analysis by actor representatives

The actor representatives in the RWG considered all the main outcomes to be credible and relevant, but not very new. What they valued most was the insight into each other's priorities, as they did know the problems and the situation in the river basin, but they were not aware of each other's priorities (meeting 10/12/2002).

Additional valuable output according to water experts in the project team

In addition to the main conclusions that were emphasized in the actor analysis report, and which are discussed above, some other parts of the actor analysis also provided new, relevant and credible insights to the water experts in the project team.

The actor analysis indicated that geothermal power generation and the resulting boron pollution were an important concern in the river basin. This was not known beforehand, because the expectation was that the river basin was more similar to other river basins (meetings 12/12/2002, 13/05/2003). However, although the importance of the boron problem was credible to the actors and experts involved, it remained difficult to assess the real size of its physical. An inventory of polluting sources and impacts should show how important the boron problem was, and if it was not over-emphasised in the actor analysis (meeting 13/05/2003).

The actor analysis also indicated that water shortage problems were considered more important than the project team thought beforehand. Initially, the expectation was that pollution and tourism were the main issues in the river basin (meeting 12/12/2002; preparation meeting 04/06/2002). The water experts also expected that this insight on water shortage problems was not only new for the project team, but also for Turkish actors from other regions (meeting 12/12/2002). The concern over water shortage problems indicates that the Water Framework Directive, which focuses mainly on water quality, does not provide all the instruments needed for integrated river basin management (meeting 12/12/2002).

The wide scope of the problems that surfaced through the actor analysis and the DANA diagrams was considered another useful analytical outcome of the actor analysis (meeting 13/05/2003).

Conclusions on the evaluation of output

Concluding, the actor analysis results were sufficiently rich in scope to provide a good basis for a problem formulation based on the input from the different actors involved. For the actors in the Regional Working Group, the actor analysis output did *not* contain very much new information, except for the information on the priorities of the different actors. For the water experts in the project team, the actor analysis output contained more new information, but they started with virtually no information on the project area beforehand. Such a starting point of course makes it easier for any analysis to provide new insights. Therefore, the output of the actor analysis may have been mainly a means to overcome the information-deficiency of the project team relative to the actors in the RWG.

8.3.3. Utilization by water experts for regional pilot project

Contribution to problem framing

The IWFD project team did not have too much background information on the pilot area, and therefore, for them, prior to the first stakeholder workshop, almost all the information on the Büyük Menderes basin was new. They could use the DANA diagrams that were made available to them prior to the first stakeholder workshop to get a good first impression of the situation in the river basin (email 27/08/2002; meeting 12/12/2002). The models cover a surprisingly broad scope of issues and problems, and as such provide a useful checklist of factors, their importance and the opinions of actors (meeting 13/05/2003).

The output of the actor analysis indicated that actions outside the scope of the WFD might in fact be very useful, such as attention for water quantity issues or a focus on the, possibly urgent, problem of boron pollution, possibly after a quick-scan of its importance in physical terms. Water quantity issues were not included in the project as the WFD focuses mainly on water quality, while the issue of boron pollution was included but not with any particular emphasis. The WFD requires a full inventory and assessment of the current state of the water

system and its human impacts before specific issues are prioritised and measures are developed. As it turned out, the IWFD project did not have the freedom to act upon these specific insights related to water shortage and boron pollution because that would cause the project to deviate too much from the guidelines and requirements specified in the project's Terms of Reference, which put the WFD requirements as central.

Concluding, the actor analysis' main use for problem framing by water experts was its use to describe a part of the system under study, providing an overview of the problems and positions in the Büyük Menderes river basin. This helped to provide information to the project team members and provided the members of the Regional Working Group with a good starting point for their work. Although the actor analysis also offered suggestions to adjust the weights of certain components such as boron pollution, and to expand the analysis to include water quantity aspects, these suggestions were not taken up in the project.

Utilization for interaction process

The actor analysis was useful to facilitate a quick start for the pilot project after a new pilot area was assigned at a relatively late stage (meeting 12/12/02). The interviews for the actor analysis were a good way to introduce the project to the actors and a way to start the process of awareness building and creating support among actors for the project (meeting 12/12/2002). The output of the actor analysis was used to support the preparation of the first regional workshop.

The actor analysis also provided useful information on the technical expertise of the actors in the basin. The insight that actors had a good level of awareness and knowledge about water resources management meant that the training component of the IWFD project would not have to focus on technical capacity building, but much more on aspects related to the development, implementation and enforcement of River Basin Management Plans.

The visual DANA diagrams were expected to offer a good basis for communication among the members of the RWG and to be used to support their work on the development of a RBMP. The idea was that the members of the RWG might use the construction of causal diagrams as a basis for their problem analysis. Therefore, the use and construction of DANA diagrams were explained to the members of the RWG in their first meeting on September 5, 2002. However, during the evaluation interview, the participating members of the RWG indicated that they had not replicated the use of causal diagrams, because their construction proved to be too complicated. They did use the DANA diagrams and the analysis tables as input to construct their own matrices on problems and solutions, which they found easier to make (meeting 10/12/2002).

Utilization for general learning and other indirect utilization

The actor analysis contributed mainly to learning by the project team and to starting up a participatory process in the pilot area, as discussed in the above sections. A subsequent indirect impact could not be observed.

Conclusion on the utilization success of the actor analysis

An actor analysis was done for the IWFD project in Turkey, using DANA to explore the actor context in a new pilot project area and to support the problem formulation for the development of a river basin management plan in line with the requirements set by the EU Water Framework Directive.

There was not much information on the pilot region and its actors, and therefore open interviews were used for data collection. The limited time available and the need for translation during the interviews did not allow for a very detailed discussion and consequently, the actor analysis resulted in a general overview of the perceptions of the actors. This was useful information for the project team members, who needed to explore a relatively unknown project area, but it was hardly new information for the actors in the river basin.

The actor analysis provided useful support in starting up the pilot project, introducing the project to the actors and offering the project team a quick overview of the main problems in the area. This contribution was valued by the project team, but given the amount of effort required for the actor analysis, it seems rather limited. This raises questions about the efficiency of the implemented actor analysis, specifically whether the effort put into this actor analysis was really necessary, or if a "quick and dirty" stakeholder analysis or an interactive workshop might have been just as useful.

Revisiting the purpose and scope of the actor analysis in light of the WFD

The actor analysis did not lead to any major changes in the IWFD project, even though some of its outcomes suggested making a change in its initial problem framing, such as a focus on boron pollution or water scarcity concerns. The task to introduce the WFD in Turkey required the project to work according to the framework for activities set out in the WFD. The WFD, the limited budget and tight planning for the IWFD project left little room for flexibility and limited the possibilities to make shifts in the project's design or focus. This could have been recognized beforehand, which might have implied that, even though the water experts were receptive to the results, perhaps this case did not sufficiently meet the selection criterion that "a meaningful purpose for the actor analysis can be identified", as project requirements were quite limiting.

Given the focus of the WFD, the purpose of the actor analysis might have been defined more narrowly, referring only to water *quality* and leaving out the water quantity concerns in the river basin. However, the WFD is a framework for water policy (EU WFD, 2000), and the Terms of Reference for the IWFD Project mention integrated water management, river basin management and public participation as three key elements for the project (Senter, 2001, p.7). Despite these references to water management in the broader sense, the WFD and the IWFD project in fact concerned mainly water *quality* management[20].

[20] Note that this indicates that the EU WFD does not offer all the instruments that are necessary for integrated water resources management.

9. Agenda setting in policy analysis: the Central Cebu Water REMIND project[21]

9.1. Case study background

9.1.1. The growing concerns over water in Central Cebu

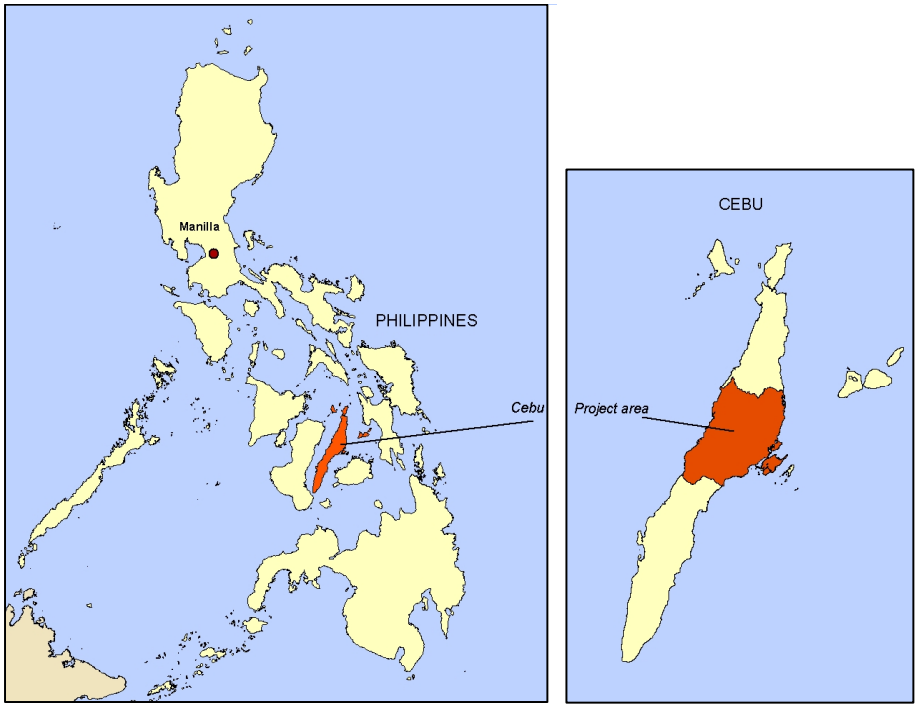
The Republic of the Philippines consists of various islands located in between the South China Sea and the Pacific Ocean. The mountainous and densely populated island of Cebu lies in the center of the archipelago. The island contains 3.5 million people on a 5,000 km^2 area and it includes Cebu City and the surrounding Metro Cebu area. This area has a population of about 1.7 million and it is the Philippines' most rapidly developing industrial center (Rakels et al., 2002). The Metro Cebu area, sometimes referred to as "Ceboom", includes Cebu City and Mandaue City and it extends from the urban area on the coastal plain on the east of the island well into the more rural parts in the center of the island (Figure 9.1).

Although most commercial and economic activity on the island is concentrated in the Metro Cebu area, the mountainous inner parts of Central Cebu have also seen rapid population growth over the years. These rural inner parts, also referred to as the inland watersheds, are for a considerable part designated protected areas under a national environmental law, the NIPAS Act (Republic Act No.7586, 1992, on the National Integrated Protected Areas System). The status as protected area puts restrictions on the permitted human activities in these inland watersheds, which affects the social and economic development opportunities.

The main source of water for Metro Cebu is groundwater that is pumped from the coastal aquifers. The rapid economic development and continued population growth over the last two decades have resulted in over-extraction from these aquifers, which has caused increased salt-water intrusion. Furthermore, the population growth in the inland watersheds has increased land use and soil erosion, which reduces the recharge capacity of the groundwater aquifers (Rakels et al., 2002). Therefore, the future availability of fresh water from these coastal aquifers is seriously threatened.

[21] Parts of this chapter appeared as L.M. Hermans: "Agenda Setting in Policy Analysis: Exploring Conflict for a Case of Water Resources Management in the Philippines" in the *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, October 2003, pp.3314-3321.

Figure 9.1 Location of the Water REMIND project area in Central Cebu



The inland watersheds of Mananga, Kotkot, and Lusaran are critical to the water supply of the Metro Cebu area. Not only because they are critical to the recharge of the coastal aquifers that are currently the main source of water supply for Metro Cebu, but also because they have been identified as an area for additional sources of water supply in the future (Letter to the President, December 2001). Therefore, the sustainability of Metro Cebu's water supply depends on the conservation and rehabilitation of these watersheds. However, watershed conservation is being threatened by recent property developments in Metro Cebu that have encroached onto the watershed areas, and by the need to combat rural poverty in the growing watershed population (Letter to the President, 2001; Griffioen, 2002).

9.1.2. The Central Cebu Water REMIND project: Water REsources Management through INtegrated Development

Awareness of the seriousness of Cebu's water situation has grown among local organizations in Cebu since 1975, the year when the University of San Carlos Water Resources Center (WRC) first detected increasing intrusions of seawater into Metro Cebu's aquifer system. On January 15, 1995, a local stakeholder platform, Cebu Uniting for Sustainable Water (CUSW) was established to voice the growing concerns of the civil society of Cebu regarding the water situation. In 2000, CUSW and WRC requested the Royal Netherlands Embassy (RNE) for

support in addressing the water issues in Cebu. After a multi-stakeholder workshop on Cebu's water resources problems (CUSW, 2000), the Governor of the Province of Cebu submitted a project proposal to RNE, which eventually lead to the formulation of the Water Resources Management for Integrated Development in Central Cebu (Water REMIND) project.

The Water REMIND project is a joint effort of the various organizations in Cebu to develop an integrated water resources management approach to ensure "the continuous availability of water of good quality to all existing and future water uses and users in Central Cebu at an affordable cost and in an environmental friendly and sustainable manner" (Rakels et al., 2002, p.4-2). The five year project is supported by the Provincial Government of Cebu, the Cebu City Government, the Department of Environment and Natural Resources (DENR), the Metro Cebu Water District (MCWD), WRC, CUSW, and the RNE. WRC, as a local expert center in Cebu, is the lead executing agency for the project, which also encompasses participation from CUSW, DENR and MCWD (Rakels et al., 2002).

The Water REMIND project consists of two parallel tracks: an analysis track designed to support the development of a regional water policy, and an implementation track in which small-scale pilot projects are used to explore the possibilities for practical improvements. The analysis component consists of data collection activities, database development and model building to support policy makers. A systems analysis approach is to be followed for the analysis activities, to obtain models that cover aspects such as water quantities and flows, water quality, erosion rates, biodiversity and costs of measures. Socio-economic aspects such as family income, employment, access to public utilities and conditions of health and sanitation will also be included in the analyses (Rakels et al., 2002).

9.1.3. Timeline of actor analysis for the Water REMIND project

Delft University of Technology (TU Delft) has a long standing cooperation with the University of San Carlos. Over the past years, several staff members and graduate students of TU Delft have worked on projects with USC and WRC. TU Delft, together with WRC and the USC Civil Engineering Department (CED), has been working on the WaterPLUS project since 1995, to strengthen research and education in civil engineering at the University of San Carlos. This cooperation motivated the proposal for the Delft Cluster consortium, of which TU Delft is a member, as a technical assistance agency for the Water REMIND project, with an important role for the Delft Cluster members TU Delft and WL|Delft Hydraulics.

The first contacts with the Water REMIND project for this research were arranged in spring 2002, at a time when the project was expected to start within a few months. These first email contacts with the deputy director of the USC-WRC and the TU Delft liaison for the WaterPLUS project in Cebu were initiated through the people involved in the preparation of the project at TU Delft and WL|Delft Hydraulics. At the time of these first contacts, the Water

REMIND project still had to be formally approved by the RNE for funding of the technical assistance. This approval was formally given in November 2002, and the project could then officially start the tendering procedure for the technical assistance contract.

In February 2003, data collection for the actor analysis and preliminary analysis were done during a five week stay at the WRC office in Cebu, the Philippines. At this time, the Water REMIND project was starting up, and making the necessary practical and organizational arrangements. The contracts for the technical assistance had not been signed at this time and therefore the project counterparts from the Netherlands still had to arrive in Cebu. The stay at Cebu was concluded with the organization of the first stakeholder workshop for the Water REMIND project, where the project was introduced and where the actors held a discussion in which the preliminary results of the actor analysis were elaborated.

After the stay in Cebu, the actor analysis report was finalized in Delft and sent by email to the Water REMIND project team. The evaluation of the actor analysis was carried out via email in September 2003, when the resident expert for the project from WL|Delft Hydraulics had just arrived in Cebu. The main events for the actor analysis in this case are shown in Table 9.1.

Table 9.1 Timeline of actor analysis for Cebu Water REMIND project

Date			Event
2000	Aug	31	Future search workshop: shared vision on water management in Cebu
2001	Oct		Formulation mission to draft project document Water REMIND
2002	Jan		Draft project document for Water REMIND project
	Feb	14	First meeting on actor analysis for Water REMIND in Delft
	Mar	8	Written proposal for actor analysis sent to Cebu
	Mar		Informal approval "technical" part project document Water REMIND
	May	1	Planned start of Water REMIND project
	Nov	7	Formal approval Water REMIND project by Royal Neth. Embassy
2003	Jan		Meetings with Delft Cluster contacts for actor analysis Water REMIND
	Jan	20	Draft "terms of reference" for actor analysis
	Feb	4	Data collection for actor analysis at USC-WRC in Cebu
	Feb	7	Start interviews with actors in Cebu
	Mar	3	Last interviews with actors in Cebu
	Mar	6	Report preliminary results actor analysis
	Mar	7	Water REMIND stakeholder workshop
	Apr	2	Draft final report actor analysis Water REMIND
	May	12	Final report actor analysis Water REMIND
	Aug/Sep		Arrival resident expert for Technical Assistance to Water REMIND
	Sep		Evaluation of actor analysis (via email)

9.2. Description of the actor analysis

9.2.1. Preparation

Purpose

Ensuring the availability of water of good quality to all water users in Central Cebu requires a co-ordinated effort by different parties that cuts across sectors and administrative boundaries. The success of the Water REMIND Project critically depends on the willingness of different actors to contribute to the project, which makes a structured analysis of the different actors and their ideas and suggestions particularly useful in the first phase of the project. Therefore, an actor analysis was executed to support the project team in developing an agenda for analysis activities and pilot projects. The aims were to identify what the relevant water management questions were according to the actors involved, and how these questions could be addressed in the project, and to support the involvement of the actors in the project from an early stage.

Selected methods: Analysis of options and Argumentative analysis

Desired focus of actor analysis

At the time of the actor analysis, in February 2003, a reasonable amount of background information was already available on the actors, their views and their activities, and most of the actors had already been involved in the preparatory activities for the Water REMIND project (see CUSW, 2000; Rakels et al., 2002; Griffioen, 2002). With the available information, a good impression could be obtained of the general problems related to water resources management and the values and objectives of the various actors. Apparently, there was a broad agreement on the urgency of the need to address Central Cebu's water resources management problems (CUSW, 2000), but not on the priorities of the different problems and not on the solutions that might be used to solve them (Formulation Mission Team member, 09/01/2003).

A well-known acronym on Cebu is NATO: "No Action, Talk Only", as problems are discussed in length before any action is taken (CUSW, 2000). In the water management discussion prior to the Water REMIND project, different arguments were used to suggest different solutions for the main water problems, referring to different facts and figures (FMT member, 9 Jan 2003). From this perspective, it was useful to focus the actor analysis on the different solutions being proposed, to ensure that the actor analysis provided new insights and did not merely repeat previous discussions. Combining this focus on solutions with attention for the arguments that were being used, was expected to ensure that the actor analysis would also offer insights to help the Water REMIND project experts in further developing an agenda for analysis and pilot activities. The results of the actor analysis were expected to help the experts determine what solutions were promising for further research, what issues were most

controversial, where there were opportunities for joint gains among actors, who were considered to be the critical actors, etc.

The focus on promising solutions and the argumentation used by the actors pointed to a need to use a combination of two different actor analysis models, one with a focus on the resources and objectives of actors and another one with a focus on the perceptions of actors. Therefore, the models analysis of options and argumentative analysis were selected for the actor analysis. The analysis of options approach was taken as the starting point for analysis, argumentative analysis was used to analyse the arguments of actors in favour of the different water management options.

Analysis of options

The analysis of options model was selected as a means to structure the solutions that actors proposed and to analyse the role of different actors in their implementation. This model was selected because of its focus and its suitability for a flexible application. Furthermore, previous experiences of the researcher with analysis of options in Egypt (see Chapter 6) indicated that using this model could yield useful insights even if it would cover a broad range of issues in a rather fragmented way. The other models that focus on actors and their resources and objectives either require a much more focused and strict analysis of the actor system (metagame analysis, GMCR, hypergame analysis, vote exchange models), or they can only be used to analyse resources and objectives of actors at a rather high level of abstraction, focusing on interests and control over rather generic issues rather than specific solutions (transactional models, expected utility model).

In an analysis of options model, decision situations are modelled as games between actors. The analogy between decision situations and games is based on the assumption that there are certain decision areas in which different actors with different objectives interact with each other according to certain rules. Analysis of options typically covers the *issues* to be decided, the *actors* who control the issues, and the policy *options* through which actors can exercise their control. The results can be structured using analysis of options tables for the various issues, which consist of actors, their options and preferences Howard (1971, 1989). Further background information on the application of analysis of options can be found in Chapter 6, where a similar application is discussed for the Egyptian case.

Argumentative analysis

Argumentative analysis was selected as the model to use for the analysis of the different arguments used by actors in the water debate because of its compatibility with the use of analysis of options. Argumentative analysis does not require a specific predefined format for data collection, except that there should be sufficient data that show the arguments and reasoning used by actors. Therefore, the interview structure for the analysis of options could be used quite

easily also to obtain the data for an argumentative analysis, provided that the actors were sufficiently stimulated during the interviews to motivate and explain their answers. Argumentative analysis can be done based on the input data obtained for the analysis of options and it allows for an easy presentation of analysis results in tables or figures.

The argumentative analysis was based on the argumentative structures developed by Toulmin (1958), and described in more detail by Toulmin et al. (1979). This logical model contains six elements for the analysis of (policy) arguments, as shown in Figure 9.2: ground (G), claim (C), warrant (W), backing (B) rebuttal (R), and modality (M). It is based on traditional formal logic, premises and conclusions, which is translated in Toulmin's structure into ground, warrant and claim. This structure is supplemented by three elements to make the structure more in line with the practical use of arguments: a backing, rebuttal and modality. In the backing information is described that is used to certify assumptions expressed in the warrant. In the rebuttal, conditions under which the adequacy of the claim might be challenged are specified, while in the modality the degree of force attached to the claim is stated.

9.2.2. Application of actor analysis in Cebu

General approach

Data collection for the actor analysis was done in thirty-one in depth interviews, supplemented by a review of relevant reports and policy documents, together with personal communication from project staff. The actor sample for the interviews represented as many as possible of the variety of actors involved in the management of Central Cebu's water resources.

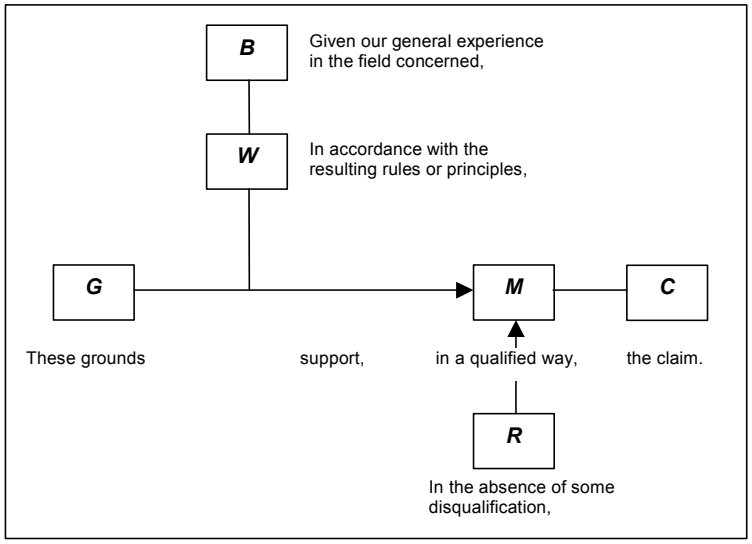


Figure 9.2 General structure for argumentative analysis

Interviews were held with representatives of sectoral government agencies, local government units and non-governmental organizations (NGOs); urban based industries, land development corporations, rural communities and farmers' organizations; and agricultural departments, city planners and the water district. For most actors, more than one representative was interviewed, at least one of which held a management position. This was believed to increase the validity of the actor analysis results because it should provide a better picture of an actor's view. It was also done to see if there were any significant difference in the type of response given by different actor representatives, and if this would provide insights into the issue of selection of respondents for actor analysis interviews.

Interviews were done using a semi-structured questionnaire, using open questions that followed the general steps of the analysis of options format. Additional questions were asked on motivations and reasoning to obtain the information needed for the argumentative analysis. Most of the interviews were done together with a staff member from the WRC[22], who also provided translation in a small number of interviews. The larger part of the interviews could be conducted in English, which is one of the official languages in the Philippines.

Interview transcripts were made as much as possible on the same day as the interviews to minimize analyst's bias in representing the opinions of the different actors. The transcripts provided the basis for the actor analysis, as they were translated into analysis of options tables, using an approach similar to the one discussed in Chapter 6, and translated into argumentative models, using a tabular structure for analysis and categorization.

After the interviews, four days were available for preliminary analysis and for the preparation of a stakeholder workshop in Cebu. The results of the preliminary analysis were reported in a preliminary report and were used to prepare a presentation and a group discussion for Water REMIND's first stakeholder workshop. The morning of this workshop consisted of presentations and questions, while the afternoon consisted of group and plenary discussions among the stakeholders, using a discussion format based on the preliminary actor analysis results to guide the session. After the workshop, the actor analysis was finalized in the Netherlands and a written draft final report was submitted to the WRC via email in April 2003. Based on feedback from WRC, the report was finalized in May 2003.

Important issues in water resources management in Cebu

The main issues to be addressed in water resources management in Central Cebu were quite well known and most actors agreed upon their importance. Therefore, an overview table of the central objectives taken from the Water REMIND project document was used as a basis for the interviews (Rakels et al., 2002, Table 4.1, p.4-7). The initial list in the project document contained a variety of

[22] This staff member was Ms. Presentacion Rapliza, the community development expert of the WRC.

broad objectives, some of which were related, and as a result the list of issues used also contained a mix of problems, causes and objectives. However, it did cover the main issues that actors seemed to find relevant, based on previous discussions and debates.

Respondents were asked to review this list of issues to see if they agreed that it was a representative set of water issues. They were also asked to identify the three issues that were most important in their opinion. These three issues were then further discussed in the interviews.

The results of this inventory of issues are tabulated in Table 9.2 below, which shows that there was considerable concern over the issues of environmental protection and livelihood for the rural population in the upland watersheds, and the role of government. The issues of water supply and economic activity in Metro Cebu were selected less often, even though they are the underlying reasons for the existing concern over water in Central Cebu. This might be due to a focus on behalf of respondents on solutions rather than problems, on ways to enable both water supply and economic activity in Metro Cebu. Apparently most actors thought that such solutions were to be found through environmental protection and sustainable livelihoods in the watersheds, with a crucial role for government planning and management.

Results of the analysis of options

Summary table for the analysis of options

The analysis of options was done using analysis of options tables. A summary table is discussed here briefly to clarify and illustrate the main results of the analysis of options. Elements of the tables that were constructed for the issues of environmental protection and livelihoods in watersheds and the issue of water supply for Metro Cebu are combined and tabulated in Table 9.3 on the next page. The cells are used to show the preferences of some of the relevant actors for some of the options that were mentioned during interviews to address these issues.

Table 9.2 Issues selected by respondents

Selected issues	Times selected
Environmental protection	21
Livelihood in watersheds	20
Government planning and management	20
Water supply	11
Economic activity Metro Cebu	7
Health and sanitation	7
Cost of water management measures	5

Table 9.3 contains information on the actors in the group of local government units (LGUs), such as cities and barangays[23]; the Metro Cebu Water District (MCDW), which is responsible for the public water supply in the Metro Cebu area; the local residents of the watersheds; the regional directorate of the national Department of Environment and Natural Resources (DENR), which is responsible for managing the Protected Areas; the large landowners and land development corporations who own land in the watersheds and who operate from Metro Cebu; and the NGOs that are active in the watersheds for environmental protection and community development.

The options are shown in Table 9.3 in the rows and the actors in the columns. The cell entries indicate the preferences of actors for a certain option. These preferences are presented in a binary notation, where "y" means that an actor prefers the corresponding option to be implemented, while "n" means it prefers that the option is not implemented. "n-y" means that the preference will differ according to a further specification of how the option will be implemented, an empty cell indicates that the preferences are not known. Grey shading is used in some cells to indicate an actor has (partial) control over an option.

Table 9.3 Summary table analysis of options – selected options

	Local government units	Metro Cebu Water District	Watershed residents	Dep. Envirn & Natural Resources	Absent land owners / developers	NGOs in watersheds
Allow commercial activity PAs	n-y		y	n	y	
Compensate loss of rights in PA	n-y		y	n	y	
Construction of dams	y	y	n		n	
Controlled developm. *and* protection	y		n-y	n	y	n
Ease relocation, assign reloc. sites	n-y		n		y	
Equity in water prices	n-y	y				
Get water outside Metro Cebu area	n-y	n-y		n	y	n
Income nature conserv. (incl reforest.)	n-y		n-y	y	n	y
Livestock breeding	y		y	n	n-y	
Locate development in areas with water	n-y	y				
Pay LGUs for water extraction	n-y	n-y				
Protected area around water sources		y	n			
Put limits on growth Metro Cebu	n		n-y		n	n-y
Reduce population pressure watersheds	n-y	y	n	y	y	y
Settle land tenure and property rights	n-y		y	y	n-y	y
Support areas with water sources	y					
Sustainable farming			n-y	y	n-y	y
Use water pricing to control demand	n-y	y	n			

[23] Barangays are the lowest level of local government in the Philippines, administratively under the city, and both barangays and cities have substantial autonomy.

Interdependence and equity considerations

The tensions and interdependencies between the urban and the rural areas in Central Cebu are depicted in Table 9.3. The urban part of Metro Cebu is the engine for the social and economic development on the island, but it also uses and exhausts the island's resources to do so. Economic growth in the Metro Cebu area increases the water demand and thus the need to protect the inland water resources. Water resources protection requires good soil quality in the watersheds to improve the recharge capacity of aquifers, and possibly also the construction of dams to increase water availability. The best way to obtain good soil protection is to have rich soil cover and a low population pressure. Constructing dams would require relocation of some of the local residents and loss of land for other uses.

The importance of questions related to equity and fairness in the identification of options for water supply can clearly be seen from Table 9.3. The option to "get water outside Metro Cebu" was favoured by the Metro Cebu LGUs, but not so much by the LGUs elsewhere on the island as they would be expected to deliver this water: they rather favoured "locate development in areas with water sources" arguing for balanced economic development on the island. Equity concerns among regions, water consumers and urban/rural inhabitants raise questions such as: What is fair sharing of the costs and benefits of economic development among groups of actors and among regions? What is the economic value of water, and who should compensate whom for the use of water?

Different actors identified water pricing as a promising instrument to promote equity among parties through financial flows, it was also seen as a means to reduce budgetary problems and to promote water saving by consumers. The option to "pay LGUs for water extraction" is favoured by those LGUs who currently have wells for the Metro Cebu Water District (MCWD) in their area, such as the Talisay City: "according to the law, we have the patrimonial rights to the resources in our area, so they (MCWD) have to share their benefits from that water and pay the city". The LGUs who do not have these wells but who benefit from the water that is being pumped there, such as Cebu City and Mandaue City, and MCWD, are less happy with the idea of such water payments, arguing that water resources should not be considered the property of certain cities: "Cebuanos should not think they are from places like Liloan, Compostela or Talisay, but consider themselves as Cebuanos or Filipinos."

Even if all the actors would agree, in principle, on water payments, they would still be likely to disagree on the amount of such payments. MCWD seems to accept the idea of payment, but they propose to stick to "a royalty tax, somewhere between 1 and 3% of gross receipts for water extraction, based on the local government code", which is less than some of the LGUs have in mind. "Equity in water prices" and "use water prices to control demand" means that certain groups of water users will have to pay more for their water use, which is favoured by MCWD, but less so by LGUs. Raising water prices is not a popular

measure and the political leaders of the LGUs will be hesitant to support this as it is likely to affect the votes they win in subsequent elections.

Protecting areas around water supply wells is important for MCWD to ensure a stable production and to protect water quality. However, local residents usually have other ideas: "Once you operate the water supply well, people will start flocking to the area because they then know there is water." This raises the question of whether it is fair to take water from local sources without making proper arrangements for the local watershed residents.

Environmental protection, livelihoods and land security in watersheds

Most actors agree that the issues of rural livelihood and environmental protection in the watersheds are of crucial importance and that the issue of livelihood needs to be resolved before that of environmental protection can be addressed. However, underlying this agreement, there is a disagreement on the best way to resolve the livelihood problems in the watersheds. Some actors support agriculture-based livelihoods, such as raising livestock or sustainable agriculture, but others suggest that it is better to replace agriculture by livelihood options that are directly linked to nature conservation, such as ecotourism or park management, and that the rural population should be stimulated to find a livelihood outside the watershed area. Other actors believe that controlled development in the watersheds, such as low-density housing or golf courses for the urban population, offer good environmental friendly possibilities to realize a flow of money from the cities to the watersheds.

The lack of land tenure and the property rights with absentee landlords form an important barrier for environmental protection and livelihoods in the watersheds. It makes watershed residents reluctant to invest in sustainable livelihood options, as these investments are connected to specific pieces of land. Some absentee landowners are reported to have obstructed the adoption of sustainable farming practices by their tenants, as this is costly initially and often means reduced yields from the fields during the transition period.

Both DENR and local watershed residents are in favour of settling the issues of land tenure and property rights, but again, opinions differ on how this should be done. DENR follows the NIPAS Act, which allows tenure rights only in multiple use zones, whereas watershed residents would like to establish tenure rights based on previous occupation, also in restricted zones. The (absentee) landowners are in favour of establishing property rights only if this means they get recognition for their ownership claims. *Not* granting ownership rights in their opinion would be "almost confiscatory" (interview), with the government taking the land that landowners (thought they) owned. Most landowners are not in favour of establishing tenure rights, they would rather find a good solution for easier relocation of tenants in cases when they want to use their land for other purposes. The LGUs are reported to be reluctant to take unpopular decisions, and if land use rights are to be established, this will involve some difficult decisions in cases where land ownership or land use is disputed by several parties.

Results of the argumentative analysis

Perspectives on watershed management

Reviewing the options that actors suggest was one way to gain insight into the actors' perceptions of water management in Central Cebu. Reviewing the arguments that actors use to ground and back their choice for or against certain options was another way to gain complementary insights that would be equally useful for the purpose of identifying an agenda for the Water REMIND project. The options for watershed management provided a useful start for this argumentative analysis, as all parties considered the watersheds to be important for sustainable water resources management for Central Cebu. Watershed management options were discussed by most of the interviewed actors, thus enabling a comparison of the arguments used by different actors.

The analysis of the arguments used by respondents indicated broad support for the argument that the challenges of providing sustainable livelihoods and environmental protection go hand in hand in the watersheds (illustrated in the diagram in Figure 9.3). However, a number of different lines of reasoning could be distinguished in the argumentation regarding how this two-faced challenge should be addressed. These lines of reasoning differed for instance with regard to the roles that different actors should play in meeting these challenges, which was especially clear for some of the respondents, who could be considered the "archetypical" representatives of these perspectives. Therefore, these lines of reasoning were used as a basic framework, into which (most of) the arguments of the other actors could be fitted.

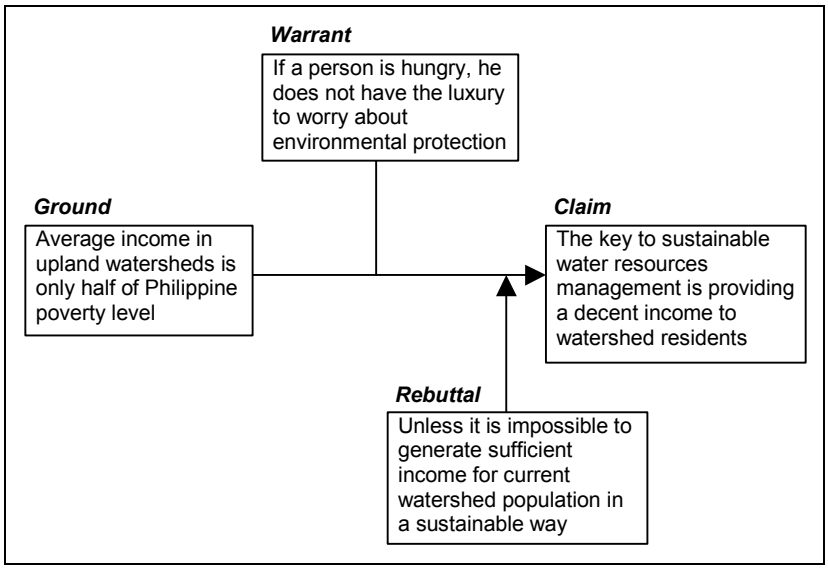


Figure 9.3 Argumentation to link environmental protection and livelihoods

In the first perspective the emphasis was on the importance of long-term planning for effective protection of water resources and socio-economic development. Government actors were considered to be the only ones capable of carrying through such a long term perspective, because other actors would be more tempted to opt for short-term benefits. Adequate government planning was considered to be the key to watershed management and often, but not always, DENR was identified as the agency that should take the lead, in accordance with its mandate from the NIPAS Act on the protection of environmentally sensitive areas. This line of reasoning could be found in interviews with DENR's senior management and some of the other government actors.

In a second perspective, the leading role was given to the local watershed residents, who were considered to be the de-facto resource managers because their activities directly influenced the resources in the watershed, and because their cooperation would be critical for the implementation of any plan in the watersheds. Giving local residents control over the natural resources in the upland watersheds would enable them to set up a sustainable system for the management of natural resources in which their livelihood and environmental protection would be intertwined. If this was done, local residents would be expected to guarantee good protection of natural resources, as these provided the basis or their (future) livelihood. Clear examples of this line of reasoning were provided by the NGOs and the stakeholder platform CUSW.

In a third perspective an important role was claimed for the urban private sector, in particular the land development corporations. The idea was to give land developers and large landowners the possibility to develop their land commercially, subject to strict conditions and restrictions. For example, they would pay a high tax for the development of houses or recreational resorts and would have to compensate for every hectare of developed land by maintaining a certain amount of hectares under forestation. If private land developers had a commercial interest in the area, they were expected to ensure the protection of the land. The urban private sector was considered to have the financial resources and other means necessary to protect water resources, whereas past experience had illustrated that government and local residents could not establish a sustainable scheme. Clear examples of this argumentation were provided by the Aboitiz Land corporation and the Cebu City mayor.

Actors and their positions in the watershed management debate

An overview of the key arguments from each perspective enabled a categorization of the various actors over the perspectives. Although the perspectives were not necessarily mutually exclusive and actors might agree with parts of one perspective and parts of another, the emphasis in their argumentation often differed. The actors that supported the different lines of reasoning, with three or four key-arguments to typify each line of reasoning. are tabulated in Table 9.4. The columns consist of the actors that supported these arguments, categorized according to the perspective with which they had most arguments in common. Note that some of the actors listed in Table 9.4 appear to have supported an

equal amount of arguments in two different perspectives. These actors were classified using secondary arguments that are not shown in the selection in Table 9.4. Several actors appear twice or even three times in the table, because for these actors two different representatives were interviewed in separate sessions. The Governor of Cebu Province and one of the local villages representatives do not feature in the table, because their arguments did not allow for a classification within the three distinguished lines of reasoning[24].

The two groups of actors that supported the government and local resident perspectives were relatively large and showed some overlap, whereas the group of actors that supported the urban private sector perspective was more isolated and only included a small number of actors. The small size of this urban private sector group was partly due to the sample used for interviews, but it also indicated that the private sector had a relatively isolated position in the water management debate, which was dominated by environmentally oriented government agencies and NGOs related to the watershed residents. Despite their small size, this group of actors was quite important as they controlled important economic and political resources and represented a considerable part of the local elite that control most of Cebu's business sector and local politics.

Table 9.4 Key arguments and actors in perspectives on watershed management

	DENR	MCWD	MCWD	Local City	PA Managmt Board	Agric Dep	Provinc Planning	Cebu City	MCWD	Agric Dep	Local village	Local city	Local city	WRC	Farmer Coop	Agr/Env NGO	CUSW	Local village	DENR	Landowner	CUSW	WRC	Local village	Social NGO	Agr/Env NGO	Cebu City Mayor	Land Developing Co.	Ch. Commerce Indust	Landowner
Improved gov planning needed then the rest will follow	1			1				1						1															
Existing laws give leading role to gov agencies		1	1	1		1	1		1				1	1													1		
DENR should take up its leading role	1	1	1		1		1		1	1	1				1					1									
Governm coordination needed			1		1	1												1											
NIPAS Act frame for water management	1	1	1	1			1		1		1							1	1	1	1								
Need for tenural security for local residents				1											1		1	1		1	1	1	1						
Watershed residents are de facto decision makers / need their cooperation	1															1	1		1					1					
People who control resources are best managers / Bottom up govern needed															1	1	1					1		1					
No touch protected area is chasing illusions																									1	1	1		
Market for low density development of lands enables private investments								1																	1	1			
Private sector is best capable to control and protect land: see experience in					-1																				1	1			1

Explanation: "1" in a cell indicates that an actor used the corresponding argument or claim in the interview (the one "–1" indicates that the actor expressed disagreement with a claim).

[24] The Governor of Cebu did not address the issue of the watersheds in detail but mainly discussed water supply issues on the level of the island, whereas the Council member of the Barangay Pung-ol Sibugay discussed watershed problems by addressing specific livelihood options, without linking them to watershed protection. This makes it difficult to trace arguments related to a more encompassing view on watershed management in these interview reports.

The largest group of actors, those who supported either the "government" or the "local residents" perspectives, referred to the NIPAS Act as the legal basis for proposed watershed management instruments. The NIPAS Act gave a leading role to government (DENR), but also contained the legal basis to increase the land security of local tenants and to settle land ownership claims. This could make the NIPAS Act a useful legal instrument, although both parties emphasised different parts of the Act and might have had a different interpretation of some of its subtleties. For instance, for those cases where the NIPAS Act offered the legal instruments to settle land ownership issues while at the same time restricting the permitted land uses to a minimum for reasons of environmental protection.

Finally, the existence of these three perspectives, and the different strategies proposed for the watersheds, illustrated that the key issue of sustainable livelihood for watershed residents was still unresolved. Each perspective was based on different assumptions about the best way to reconcile environmental protection with sustainable livelihoods for watershed residents, but the impact and feasibility of the different livelihood strategies they proposed were not yet known and needed further research. Would a sustainable livelihood be possible for all the current watershed residents, or would at least part of the local residents have to move out of the watersheds? And who should lead the development of livelihoods: the urban based private sector, government, or watershed residents themselves?

Combining analysis of options and argumentative analysis

The argumentative analysis indicated that the urban based private sector was relatively isolated in the water management in Central Cebu, but the analysis of options showed that this group of actors, land owners and the Cebu City Mayor, controlled some of the resources that were crucial for a successful water resources management strategy. Therefore the water debate had to include all three perspectives, as leaving out any of them might alienate important actors from its outcomes. Since the urban based private sector perspective was the most controversial and underrepresented in the current water debate, including this perspective and its representatives would require a special approach to stimulate participation and to build confidence.

Government organizations played an ambiguous role in water resources management in Cebu. They had an important responsibility for the protection of water resources and for finding ways to reconcile the different interests in the region, but they also displayed important shortcomings, such as a lack of coordination among government organizations and a lack of sufficient knowledge and skills in the field of water resources management. Therefore capacity building and increased coordination among government agencies were needed, for sectoral agencies like DENR and MCWD, and for local government units.

Conclusions of the analysis and resulting recommendations

The actor analysis discussed above, and based on the analysis of options and argumentative analysis, pointed to certain conclusions that were expected to help the experts of the Water REMIND project to set its agenda for future activities. These conclusions and some corresponding recommendations were presented in the actor analysis report for possible use by the project. The main conclusions are summarized in Table 9.5 on the next page.

Representatives of all three perspectives had to be included in the Water REMIND project and the solutions proposed by them needed to be further explored to see what might work, and how different views might be reconciled in practice. The small scale pilot projects might offer a good way to carry out such an exploration, defining pilots that are in line with the three different lines of reasoning, e.g. a government co-ordinated watershed management program, a rural sustainable livelihood and resource protection program, and a sustainable recreational facility to be exploited by the urban private sector.

The importance of equity and the emergence of water pricing as a realistic option to regulate water transfers among regions and users, pointed to the need to include an economic perspective. Therefore, economic expertise should be included in the Water REMIND project team, more so than had been planned.

The government agencies that were already interested in the project, like DENR and MCWD, and also local government units such as cities should be actively involved. Learning, sharing experiences and establishing a coordinated approach was needed in the public sector and should be stimulated by the project experts. One way to ensure this would be to establish an active core group of actor representatives to ensure that experiences gained during the Water REMIND project would also be shared with the actors outside WRC and CUSW.

Table 9.5 Main conclusions and recommendations actor analysis for Water REMIND project

Conclusion	Corresponding recommendation
There are three perspectives on watershed management, actors in all three groups control part of the solution, but one group is absent in the water debate	Include all three perspectives in the project, e.g. through pilot projects
Equity is an important concern. Emergence of water as economic good and water pricing	Include economic analysis and add more economic expertise to project team
Key issue of sustainable livelihood in the watersheds is still unresolved although it has been high on the agenda for years	Continue research into sustainable livelihood options, but also address question: What if there is no sustainable livelihood for all watershed residents?
Land use, ownership and secure tenure are key to sustainable watershed management	Continue with plans for database and record of land use claims as first step towards clarification of ownership and user rights
Government actors play ambiguous role. They are critical for successful water resources management but show important shortcomings in the execution of their tasks	Government actors should be actively involved in project, e.g. through intensive project-group

9.3. Evaluation of actor analysis for Water REMIND project

9.3.1. Purpose of the actor analysis

The initial purpose of the actor analysis was to support the Water REMIND project experts in developing a research agenda using an open and exploratory actor analysis approach. This purpose was identified in consultation with the experts involved in the preparation of the Water REMIND project and with the project management of USC-WRC, the lead executing agency. Nevertheless, in the evaluation of the actor analysis, the Water REMIND project management reported that, with hindsight, they would have been in favour of a somewhat different goal. They suggested that an actor analysis that could be linked more directly to a quantitative multi-criteria analysis might have been more appropriate (email 25/09/2003 and memo 29/09/2003). This suggests that in retrospect, the purpose of the actor analysis should have been different, more oriented towards the facilitation of a participatory multi-criteria analysis procedure rather than towards an exploration of the actor network to support agenda setting for the project.

As the initial purpose was discussed with all parties involved, it is believed that this shift in goals is due to the changing insights of the Water REMIND project management, possibly combined with lack of insight into what to expect exactly from an actor analysis. This is further discussed in the last section of this chapter, where the influence of " timeliness" is discussed. However, as the remainder of this evaluation will show, this shifting of goals does not mean that the performed actor analysis was considered to be completely useless by the project management.

9.3.2. Application of actor analysis

Quality of collected data

The analysis of options and the argumentative analysis were mainly based on interviews. Thirty different in-depth interviews were held, mostly without the need for translation, resulting in a relatively large and rich set of empirical data for analysis, which could be cross-checked with the information available from background reports and official documents that were available in the WRC library, or that were obtained from interviewees. The sample of interviewed actors was sufficiently large to warrant representativeness of the results at the level of the actor network. Two different representatives were interviewed for some actors, which enhanced the representativeness of results at the level of the individual actors. The richness of the available data from different sources, is believed to be sufficient to cope with the cultural barriers that had to be overcome between the Dutch actor analyst and the Philippine actors.

Nevertheless, it proved difficult to gain access to land developers and (absentee) landowners, and therefore they are less well represented in the sample. This imbalance in the interview sample provides the only known drawback in the data collection that might affect the quality of the analysis, but

this difficulty was known already at the start of the analysis and was taken into account in the interpretation of data. Therefore, there is no reason to assume that there were serious flaws in the data quality that compromised analytical quality of the actor analysis.

Technical validity of performed actor analysis

The preliminary results of the actor analysis were used as the basis for a project workshop to which a wide group of actors, including those interviewed, were invited (workshop 07/03/2003). During the workshop, the results were presented and a discussion among the forty or so participants addressed issues and questions that emerged from the actor analysis. The response to the findings was generally affirmative and provided a positive indication of the validity of the analysis.

Separate communication with WRC staff (personal communication March 2003; memos WRC 02/05/2003, 29/09/2003) and with a team of external project advisors hired by the Royal Netherlands Embassy (meeting TSG and email TSG, March 2003) further confirmed that the analysis could be expected to be valid. A paper based on the analysis results was accepted for presentation during an international scientific conference (Hermans, 2003).

Concluding, the actor analysis, consisting of both the analysis of options and the argumentative analysis, was considered to be sufficiently valid to warrant further use of its results by the Water REMIND project, although some remarks can be made on the application of the argumentative analysis models.

Argumentative analysis

The argumentative analysis was based on the argumentative structures developed by Toulmin (Toulmin et al., 1979), who gives a logical model that contains six elements that can be used to structure arguments, as discussed in Section 8.2.1. During the analysis, the model used to represent arguments was eventually reduced to the four elements: Ground, Warrant/Backing, note no real distinction between the two was made, Claim and Rebuttal, as these seemed to cover the most useful information. This means that a less detailed model was used to structure the arguments.

The argumentative analysis was used to classify actors into groups that shared a main line of reasoning. This was done by structuring the interview transcripts of actors into statements that were then classified into related arguments that were also used by other actors. The arguments were structured into three main lines of reasoning, as discussed above, which were described based on a set of common arguments, of which three or four were shown in Table 9.4. This means that some of the unique arguments used only by one or two actors were lost in the analysis, simplifying the discourse and reducing its richness and detail in favour of the analysis of the three main perspectives.

The argumentative analysis focused on common lines of reasoning and key arguments within this reasoning. These lines of reasoning were identified based

on the use of "archetypical" respondents, rather than using a statistical factor analysis. This makes the analysis somewhat more vulnerable when it comes to analytical quality, but the results nevertheless seem to be sufficiently valid, as the three resulting perspectives on water management were recognized and confirmed by the local actors at the stakeholder workshop and by the consultants of the RNE Technical Support Group during their visit to Cebu. The insight that the private sector position was not very popular among the actors who were most involved in the public debate on water resources management was further confirmed during the stakeholder workshop in March 2003, where little support for and participation by the urban private sector actors could be observed.

Match method with case situation

The initial purpose of the actor analysis was to support the Water REMIND project team in developing a research agenda through the identification of relevant questions and recommendations for the involvement of actors in the project. The actor analysis models used yielded insights that supported the development of a research agenda for the Water REMIND project, as illustrated by the overview of results tabulated in Table 9.5 at the end of Section 9.2.2. Since no serious constraints in the application of the selected models were observed, the match between the models and the initial purpose and case environment was satisfactory for this case.

The shifted purpose, as it emerged during the evaluation of the actor analysis, would require a more structured approach to yield more quantitative results on the stakes or interests of the actors, which could then be translated more easily into commonly accepted weights and criteria for a multi-criteria analysis. The written background data that were available on water resources management in Central Cebu would certainly allow for a more structure approach, but this was not in line with the original purpose for the actor analysis. If this had been done, a more structured analysis would have been possible, but it would have also required more preparatory time to be spent in Cebu instead of in Delft to prepare a sound questionnaire. It would also have made the combination of conflict analysis with discourse analysis less easy, because using more structured models requires specific, and different questionnaires for the different models and could probably not be done using one questionnaire to obtain data for the two different types of actor analysis.

Efficiency of analysis procedure

The actor analysis took two to three weeks of preparation, which is considered to be within limits that should be allowed for this task, although a bit long. This was partly due to the long period of uncertainty about the start of the Water REMIND project. Data collection and the preliminary analysis were done in five weeks and the final analysis and reporting required another three weeks. During the data collection in Cebu, WRC staff provided substantial support. WRC staff arranged most of the interview appointments, one staff member attended most of

the interviews, and the WRC staff was heavily involved in the preparation and execution of the first stakeholder workshop where the actor analysis results were presented and discussed. This involvement is estimated to have cost three to four weeks of one person's full time workload. This means that the actor analysis required, in total, three to four person-months of full time work from beginning ending. If one considers the length of the Water REMIND project (five years), this can be considered to be within reasonable limits, although perhaps more towards the upper than the lower limit.

In Cebu, two or three interviews were held with most actors for research purposes, but for the Water REMIND project, it might have been sufficient to do just one (group) interview per actor. This would save time on data collection and would make the analysis easier because there would have been less data to structure and analyse. Reducing the number of interviews and shortening the preparation activities might have shortened the required time for the actor analysis, probably by as much as one person-month. However, taking the concerns of the Water REMIND team into account on the representativeness of persons representing the actors, interviewing more than one person per actor seems to have been worthwhile for this case, even though it is not expected to affect the outcomes significantly.

However, for future uses, the project's experts indicated their preference for a more structured and quantitative analysis approach, see Section 9.3.1. Therefore, the efficiency of the used approach was considered to be sufficient when looking at the original purpose of the actor analysis, but insufficient when taking the shift in purpose that occured into account.

Combining two models

The use of two different analysis models required more time for the analysis. The additional time required is estimated to be one week and on a total of three to four months this is considered to be acceptable. The data collection, which was the most time consuming part of the actor analysis, did not require additional time, because the same interviews were used for both models. Adding a second model requires a little more time for structuring and interpreting data, but it also creates an opportunity to use and communicate information that otherwise might have been lost (see also the next Section).

9.3.3. Output generated by actor analysis

The conclusions and recommendations of the actor analysis outlined in Section 9.2.2 should help the Water REMIND project team to develop its research agenda. The potential usefulness of this output was assessed by reviewing whether it was considered to be credible, relevant and new to the water experts involved in the Water REMIND project. The information for this assessment was provided by an evaluation of the actor analysis by the deputy director of the WRC (WRC memo 29/09/2003), supplemented by evaluation notes made by the project's technical support group (TSG) (email 22/03/2003), feedback obtained

during the stakeholder workshop (07/03/2003) and by a review of information that was available prior to the actor analysis (CCLPC 1998; Rakels et al., 2002; Griffioen, 2002; Meeting WRC Director, 04/02/2003).

The actor analysis resulted in a better and structured grouping of actors and their perspective on the issue of water management (WRC memo 29/09/2003). The explicit identification of three perspectives on water management in Cebu's watershed was considered to be relatively new. Even though the international debate among water experts increasingly takes into account private sector involvement and decentralized participatory planning, the clear distinction of the three perspectives provided by the argumentative analysis is absent in previous reports that focused on the actors in Cebu' s watersheds and was confirmed to be new and useful for the project by the TSG (5 March 2003). The credibility and relevance of the three different perspectives were also confirmed by the WRC (memo 29/09/2003) and the wider group of actors (workshop 07/03/ 2003).

The increasing importance of an economic perspective and equity issues in water resources management in Central Cebu were considered to be credible and relevant by both the TSG (email 22/03/2003) and WRC (memo 29/09/2003). They could also be considered to be rather new to the Water REMIND project based on the project document (Rakels et al., 2002). Despite its scope and relatively large size, this document contains few remarks on issues related to equity concerns, and assigns relatively small staff capacity to economic issues in the proposed project staffing, e.g. none of the external experts is required to introduce any specific economic expertise.

The insight that the issue of sustainable livelihood might remain unresolved was only partly accepted. The importance of this issue and the difficulties involved were not questioned and they were known from more extensive studies on this issue (e.g. Griffioen, 2002). However, the question: What if there is no sustainable livelihood for the current watershed population? emerged from the actor analysis but was not accepted by the Water REMIND team members. They had a more optimistic perspective on this issue: "The project will do something about it by identifying good alternatives…there are good practices that are just blossoming and hence monitoring and evaluation is critical." (memo 29/09/2003). If there is a solution to the livelihood problems, the attitude of the WRC will offer a better chance of finding it, but it also entails a higher risk of (perceived) failure for the project.

The actor analysis provided new and relevant information with some of the conclusions, but also as a result of the overview provided of the perspectives of different actors. A large part of the actors did not discuss the issue of the protection of water resources, leading WRC management to conclude that these and similar issues "are in fact at the core and not recognized by the majority". Thus, the actor analysis showed that the concerns over water supply and protection, which WRC considered to be central, were not as central for other actors. This was interpreted as a lack of awareness and concern for water issues by the WRC (memo 29/09/2003). This shows that the actor analysis also

provided the WRC with new information based on what was *not* in the actor analysis report, i.e. the aspects that actors did *not* mention during the interviews.

Combining two models

The two models that were used for the actor analysis offered different insights that partly overlapped and partly supplemented each other. An outcome that can be attributed to the use of analysis of options models is the importance of equity issues in the area, whereas an outcome that can be attributed to the use of argumentative analysis is the insight into three different perspectives on watershed management. The use of two different models thus produced different insights, but also provided different "lenses" for looking at the data, resulting in a more complete picture and stimulating creativity in the actor analysis.

9.3.4. Utilization by water experts for Water REMIND project

The actor analysis produced several insights that were considered new, credible and relevant and this output can be expected to have a certain impact on the subsequent phases of the Water REMIND project. However, the finalization of the organizational arrangements for the Water REMIND project took longer than planned. The actor analysis was done in spring 2003 and at the time of its evaluation, in fall 2003, the project was only just starting to get up to speed. This made it more difficult to establish the impact of the actor analysis on the follow up activities. Nevertheless, certain observations are discussed in this section, although they are more tentative than for the case studies reported in the previous chapters.

Utilization for problem framing

The three different perspectives on watershed management were likely to influence the problem analysis in the remainder of the Water REMIND project, as "the project will endeavour to harmonize the different perspectives into one common goal. This will soon be strategized." (memo, 29/09/2003).

A follow-up on the recommendation to increase considerably the attention for economic issues in the analysis was not very likely. The importance of an economic perspective was acknowledged, but no additional staffing arrangements were made for this and it did not seem to receive any particular emphasis: "under the project this is one of the activities relating to policy review" (WRC memo, 29/09/2003).

Related to the other issues and questions raised by the actor analysis, such as the sustainable livelihood issues mentioned in the previous section, the problem formulation provided in the project document was not affected but was sometimes confirmed by the results of the actor analysis. For example, the actor analysis confirmed the importance of research into sustainable livelihood options for the watershed residents and of establishing a land use database and records of ownership claims, issues that were already high on the project's agenda.

Concluding, the use of actor analysis mainly contributed to the experts' knowledge of the situation in three ways. One, actor analysis was used to describe in detail a part of the actor environment, giving the experts a better overview. Two, it helped to delineate three perspectives on water management in Central Cebu. Three, the actor analysis results confirmed the relevance of certain research questions that were already on the project's agenda. The more politically sensitive outcomes of the actor analysis, which included equity issues, the role of government and questions related to sustainable livelihood, were not adopted by the project team.

Utilization for interaction process

The actor analysis, especially the argumentative analysis, offered a first step for starting up a dialogue. The argumentative analysis and the questions about reasons and motivations gave people the opportunity to voice their concerns and opinions. It provided the Water REMIND project with the opportunity to get the opinions of different parties and to start the interaction process among them, by inviting all of them to a first stakeholder workshop for a focused discussion based on preliminary results.

At the time of evaluation, there were plans for follow up efforts to actively involve actors in the project (Memo, 29/09/2003). The lack of awareness and concern about water resources management issues among actors, as perceived by the WRC, would be addressed in the project through education and information campaigns and through the establishment of a core project group (WRC memo, 29/09/2003). However, it is not known if this core project group covers the necessary range of actors and if their involvement has the necessary intensity.

The plans related to interaction and communication among the water experts of the project team and the external actors were clearly in line with the recommendations of the actor analysis, but it was not clear to what extent the actor analysis results could be credited for the conception of these plans. Developments such as increased experiences gained in the considerable time that was needed to start up the project's activities and the involvement of new experts in the project might have been just as much or even more influential.

It is likely that the interactions with the other actors increased as the project proceeded, but the evaluation of the contribution of the actor analysis to problem framing indicates that it is not very likely that crucial issues such as economic development and equity among different groups of actors were addressed in this interaction.

Indirect utilization and general learning

The indirect impacts of the actor analysis were difficult to observe, but certain indirect impacts can be deduced based on the available evaluation material. First, the way of framing the different arguments in the public discourse on water management into the three perspectives identified, provided a strong and

appealing image that is likely to have further indirect impacts. The aspects that actors did *not* mention during the interviews, and the relative stability of the general opinions of the actors, helped the WRC in determining its position in relation to the other actors. It led WRC to conclude that there was a need for awareness raising and for better communication to educate all actors in the network (Memo 29/09/2003).

As with the more direct utilization of output, the indirect utilization was mainly related to two outputs, the one on the three perspectives on water management and the other on the need for further awareness raising among actors. These were both outputs that fitted well within the original plan and ideas of the WRC.

9.3.5. Additional influences on utilization of actor analysis

Tensions inherent in the broad design of the Water REMIND project

The Water REMIND project design reflected the variety of actors and interests that were involved in the initialization of the project. The research centre WRC and the local stakeholder platform CUSW had a prominent role, but local government agencies such as Cebu Province, Cebu City, MCWD and DENR were also involved in the project formulation. In addition, the Royal Netherlands Embassy, the sponsor of the project, had its own agenda related to this project. The result was a project document that covered research, policy development and implementation. The project document aimed for a solid basis for policy making on the long term through the development of information systems and capacity building across a wide range of actors, but also for short term results using pilot projects. The WRC was assigned the role of lead executing agency, in collaboration with CUSW. Although these organizations possessed the necessary skills for research, community development and mobilizing actors for a public debate, they had no direct mandate for policy development.

This was likely to steer the project more into the direction of " neutral" research than actual policy making. Effectively addressing the sensitive policy questions would only be possible with strong support from the government agencies holding the principle mandate for dealing with these issues.

Another issue related to the project design, is that the project was designed to address water resources management issues, but as the results of the actor analysis showed, these issues were related to underlying questions of regional economic development. The Water REMIND project only focused on the symptoms, whereas the results of the actor analysis pointed more towards the underlying problems. The main parties involved in the initial stages of the project all had an interest in a strong focus on water problems, which made it more difficult to widen the project scope to address effectively the underlying drivers that were causing these water problems.

Timeliness of actor analysis

Timing is likely to have influenced the use of the actor analysis output by the project team. The actor analysis was planned early in the Water REMIND project, at a moment where there would be sufficient room for the project team to use the outcomes of the actor analysis in their project work. When the actor analysis was done, the project had officially been running for a few months, but during those first months, the tendering procedures for the technical assistance (TA) agencies were still not finalized. The contracts with the TA agencies were not signed until after the actor analysis was completed and when the project finally started to gain pace, considerable time had passed since the actor analysis. Another aspect that is likely to have influenced the use of the actor analysis results, is that the TA resident engineer was not present at the time of the actor analysis. This resident engineer had an important role in supporting the Water REMIND project, but he was not involved in the actor analysis and the resulting first stakeholder workshop. The actor analysis was just one of many background reports that he found on his desk at the start of his assignment.

The timing might also explain the observed shift in purpose of the actor analysis. The initial contacts for the actor analysis were started in the preparatory phase of the Water REMIND project, at a time at which WRC people were still relatively inexperienced with a policy analysis project of the size and scope of the Water REMIND project. The initial contacts for the actor analysis with the WRC were made via email and fax and the formulation of the purpose of the actor analysis was strongly influenced by meetings in Delft with the Dutch experts that had been involved in the preparatory activities for the Water REMIND project.

By the time the actor analysis was evaluated, the WRC people had been exposed to the project for a longer period, probably obtaining a better picture of the project requirements. These developments are likely to explain the shift in the purpose of the actor analysis, and thus the evaluation of its utilization.

10. The analytical success of actor analysis in the cases

10.1. Introduction

10.1.1. Evaluation of analytical success in the cases

The analytical success of the actor analyses that are described in the four previous chapters is reviewed in this chapter. This review of the analytical success of the actor analysis in the cases serves two purposes. One, it is used to evaluate the proposed procedure and guidelines for the application of model-based actor analysis (see Figure 4.2 in Chapter 4). The cases add practical experience to the insights obtained from the literature, thus giving us insight into the use of the proposed procedure in practice. Two, an evaluation of analytical success will provide a necessary prelude to the evaluation of utilization success given in the next chapter. Analytical success is important for use of actor analysis output by water experts, i.e. it promotes utilization success. It is not very likely that water experts will use the output of an actor analysis if they do not consider this output to be credible, relevant and new (see Figure 10.1).

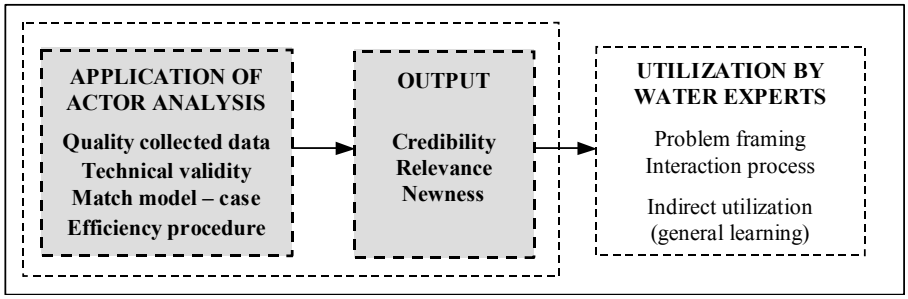


Figure 10.1 Evaluation of analytical success of actor analysis

10.1.2. Summary of analysis conditions for actor analyses in cases

Before turning to the application and output of the actor analyses in the next sections, a short summary is given of the starting conditions for the actor analysis in each of the four cases (Table 10.1). These starting conditions might be useful for understanding the analytical success - or lack thereof - and the actual utilization of the outputs of the actor analyses by water experts.

Table 10.1 Main analysis conditions in the four cases

Case	Purpose actor analysis	Available data prior to actor analysis	Cultural context
NWRP Egypt	Support project in starting new phase of strategy formulation	Materials previous actor exploration and earlier project phases	High power distance, collectivism and uncertainty avoidance
DP North-Holland	Complement technical analysis to enable shift from vision to action	Studies done in other regions in the Netherlands	Low power distance, high individualism and femininity
IWFD Turkey	Support new project through first assessment actor environment	Little data available	High power distance, collectivism and uncertainty avoidance
Water REMIND Cebu	Support new project with research questions and actor involvement	Reports previous projects and project preparation	High power distance, collectivism and masculinity

In each of the cases, the purpose of the actor analysis was to support water experts in ongoing policy analysis projects by providing insight into their actor environment. However, the specific objectives differed per case. The available time was in all cases limited to two to three months, with one month for primary data collection. In all cases the actor analysis was executed by one main analyst, the researcher, with project teams providing input in terms of staff time and project facilities. The cultural context of the projects was different for most cases, although in terms of professional culture the cases were more similar, as they were all water projects executed by teams of engineers who were working in a public policy environment.

The first case for which an actor analysis was applied was a project that was aimed at supporting the development of a national water resources plan for Egypt. The actor analysis was executed when the project had been running for two years and the transition from problem analysis and model development to strategy formulation was being made. The actor analysis was intended to facilitate this transition by producing insights into the issues that had to be considered when developing new water management strategies and the possible influence of actors on the implementation of these strategies. The actor analysis was expected to help the water experts share the resulting insights with external actors.

The second case was an actor analysis for the development of a new multi-year plan to address diffuse sources of water pollution in the province of North-Holland in the Netherlands. The actor analysis was intended to provide insights into the priorities and positions of the different organizations within the project group. Furthermore, it was expected to produce insights into the wider actor environment. These insights were expected to be used to help the regional project organization to move from thinking to action, by supporting the design of plans with a better chance of implementation.

The third case concerned the participatory development of an integrated river basin management plan for the Büyük Menderes river basin as part of a bigger project to introduce the EU Water Framework Directive in Turkey. The actor analysis was the first activity carried out by the project in the Büyük Menderes river basin and preceded the first regional project workshop. It was intended to support problem formulation, to assess the issues that should be addressed in a river basin management plan, and to provide insights into the existing institutional structure in the area and the training needs to be addressed by the project team.

The last case in this research was the Central Cebu Water Resources Management through Integrated Development (Water REMIND) project in the Philippines. At the time of the actor analysis, the project had just officially started and was in the phase of making the necessary practical arrangements. The actor analysis was expected to contribute to the further development of an agenda for analysis and activities to be undertaken by the project experts.

10.2. Application of actor analysis in the cases

10.2.1. Quality of collected data

Data collection is an important element in the execution of most actor analyses, as there are rarely sufficient data available at the start and there is a need to collect additional data through surveys, interviews or group discussions. The quality of the collected data in the cases was assessed by looking at the scope of the collected data as a function of the number of actors that were interviewed, by reviewing the richness of the interview outcomes and the influence of cultural and language differences as possible communication barriers.

The case findings showed that data collection was never exhaustive and perfect, but that the model-based approaches helped the analyst to focus data collection in a way that ensured sufficient quality of the collected data. The quality of the collected data was better in some cases than in others. The language barriers in the cases in Egypt and Turkey proved to be important limitations for collecting a set of data with similar richness and detail as for the cases in the Netherlands and the Philippines. Nevertheless, data collection in all cases was considered to be of sufficient quality to allow for an analytically sound actor analysis.

10.2.2. Technical validity

To achieve a sound application of actor analysis models, it is necessary to carry out the actor analysis in a way that is technically valid, meaning that the analysis should cover the main actors and the main issues in a case, the analysis should be internally consistent, and the results and conclusions should follow logically from the analysis. Using a model-based approach for actor analysis, as outlined in Chapter 4, and which was used for all four cases, was expected to improve the technical validity of the actor analysis results and conclusions.

The technical validity of the actor analysis used in all the cases was considered to meet the standards for a sound analysis. The involved water experts accepted the analysis results as presented to them in the actor analysis reports, and representatives of the actors confirmed the analysis results as presented to them during workshops or meetings. In addition, in three of the four cases, an audience of scientific peers also accepted the analysis results for international peer reviewed publications[25]. This indicates that the procedure identified in Chapter 4 yields results that meet the standards for technical validity.

10.2.3. Match between model and case environment

A number of different models can be used for actor analysis, all of which have their own characteristics, expected contributions and requirements for use. Therefore, it is important to use a model that matches the case situation. In the cases, this match was evaluated by comparing the case situations with information on model requirements and limitations of the various models described in the literature (see Chapter 3). This comparison was complemented by using the results of the discussions of the case results with the involved water experts and with scientific peers.

Considering the benefits and drawbacks of the selected models in each case, the match between the models and the case environment was in all cases sufficient to allow for a valid and useful application, with the exception of one of the two applications explored in the Egyptian case. The participatory metagame application described for the Egyptian case was useful to facilitate learning among the analysis team, but not for a full-scale application with the project's real actors. The combinatorial complexity inherent to metagame models made such models infeasible as an approach to address a broad range of complex water problems with sufficient detail.

For all the other applications there were aspects of the selected models that matched well with the case environment and aspects that matched less well. The analysis of options for Egypt proved to be very helpful, supporting efficient structured data collection and enabling a very quick analysis procedure. Moreover, it the focus of the model was very well in line with the purpose of the actor analysis. However, the fact that the model took conflicts as a starting point for analysis matched less well with Egyptian culture, in which the direct expression of conflicts is undesirable. Therefore, care had to be taken when framing the interview questions and when presenting the analysis results.

The conditions in North-Holland matched well with the use of the Dynamic Actor Network Analysis approach (DANA), since DANA is suitable for covering a broad scope of issues, which proved to be especially useful. However, a number of other models might also have been used due to the good conditions for data collection prevalent in this case.

[25] Only for the Turkish case no scientific publication has been prepared, mainly due to time constraints. For other case publications, see references Hermans (et al.).

In Turkey, the use of DANA was constrained by limitations in the possibilities for data collection, mainly in the form of language barriers as discussed above. However, given the short time available and the absence of information at the start, it is unlikely that using any other model would have helped the actor analyst overcome these limitations.

In the Philippines, the analysis of options and argumentative analysis models were useful, although the developments in the project that occurred after the actor analysis would have made another purpose more suitable for the actor analysis, and thus in retrospect another model more appropriate. The involved water experts mentioned that it was difficult to translate the results of the actor analysis into a quantitative prioritization of issues or activities. This suggested that they were interested in quantitative output from the actor analysis that could feed more directly into their existing analysis activities, rather than in qualitative output that could be used to help them to modify parts of their project agenda to meet the broader interests of the actors. Although with hindsight this might suggest a mismatch, the selected model did match the initial purpose that was established in consultation with the water experts that were available at the start of the project.

The case findings confirm that the focus of a model and its data requirements are important features to take into account when selecting a model to match the analysis environment. The focus of a model was proven to be important for the relevance of the analysis results, in line with the initial purpose of the actor analysis, while data requirements influence the possibilities to collect data with sufficient quality to use a specific model. In addition to those two aspects, the Egyptian case indicates that cultural aspects are also important for the acceptance of the model and analysis approach used. Finally, as can be seen from the case material, there is not just one single best model for any given situation, but there is likely to be a range of models that yield similar results.

10.2.4. Efficiency of actor analysis applications

The evaluation of the efficiency of the actor analysis procedures was done in terms of cost-effectiveness. Certain limits were set for the time and resources available for the actor analysis in the cases to ensure that the actor analysis would meet basic cost and time constraints, and the final evaluation of the efficiency of the actor analysis was provided by water experts involved in the cases. The experts were asked whether or not they would be willing to use a similar approach again in future projects. In three of the four cases, the water experts indicated that efficiency improvements were needed to make the approach feasible for application in future projects. The water experts in the cases in the Netherlands and Turkey indicated that some of the detail and analytical rigour in the actor analysis might be sacrificed to a procedure that required less time from the analyst. In the Philippine case, the purpose of the actor analysis shifted somewhat *after* the actor analysis, influenced by the dynamics in a project that was still taking shape. The involved (and partly new) water experts mentioned that in future projects they would prefer another

approach, producing output that was easier to incorporate within the planned quantitative analysis activities, rather than output that suggested that they should change those activities.

The case experiences indicate that, although the actor analysis stayed within the predefined boundaries for efficiency, efficiency improvements are necessary for model-based actor analysis. User-standards of efficiency were somewhat different than postulated, placing less value on analytical rigour, although basic standards should be met. Water experts in two cases (Turkey and the Philippines) appeared to place more value on analytical output that can be linked relatively easily to ongoing analysis activities, rather than output that suggests substantial changes need to be made to the problem framing and design of projects.

10.3. The output of actor analysis

10.3.1. General introduction to the observed quality of the output

The focus of the cases was on the use of actor analysis as an information provider to water experts, and the output of the actor analysis was required to be *new*, *relevant* and *credible*. The water experts that were the intended users of the actor analysis output were the primary assessors of these qualities. They reviewed the output of the actor analysis, both generally and the specific conclusions and recommendations formulated at the end of the analysis reports.

In all cases, the water experts expressed their appreciation for the insights and overviews generated by the actor analysis. The actor analysis usually partly confirmed insights that were already known while also offering certain new insights. The new insights for the involved water experts were mainly related to the level of awareness of actors, their priorities and interests and sometimes to more specific information about a project site.

The credibility of an actor analysis is related to the technical validity of the analysis, and as this was sufficient in the cases, it is not surprising that the output was also credible to the water management experts. Only in a few instances were there certain specific conclusions that did not match the expectation of the water management experts, and that were therefore considered to be less credible. For instance, in Turkey there remained some questions related to the agreement in perceptions between upstream and downstream actors and, to some degree, the importance of the boron problem. In this case, the lack of credibility of these outcomes pointed to a need for additional data to be used either to support or reject them.

As the actor analysis produced output that was new, relevant and credible, it is interesting to take a closer look at the output. Therefore, a more detailed evaluation of the analytical output and its potential usefulness for *problem framing* and for organizing and facilitating *interaction processes*, is given below.

10.3.2. Potential use of output to support problem framing

Classification of potential uses of actor analysis output

Different potential uses of actor analysis output for problem framing by water experts, identified in Chapter 5, are shown in Figure 10.2. The new, credible and relevant output from the cases can be classified using this structure to see what types of potential uses are covered by the actor analysis output.

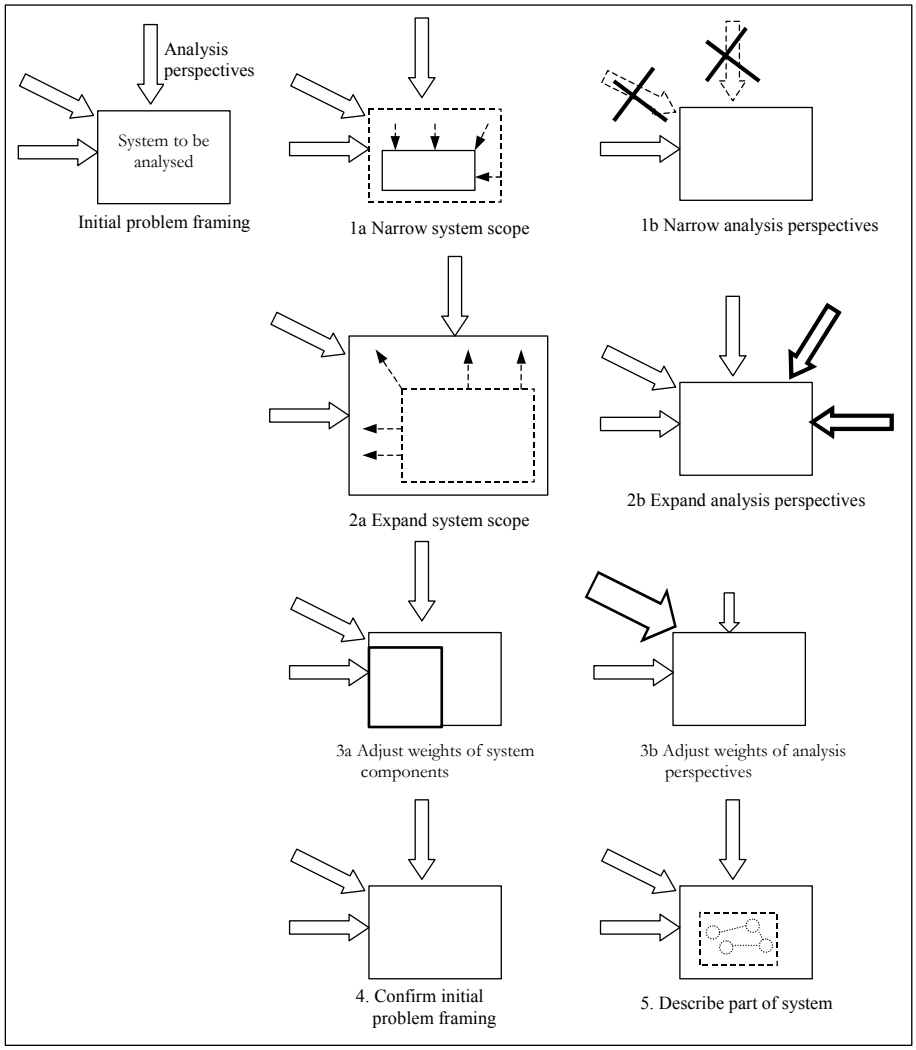


Figure 10.2 Potential uses of actor analysis output for reframing policy analysis problems

Discussion of potential uses of observed output

The specific output of the actor analyses that was identified by the water experts as being new, credible and relevant in the cases is tabulated in Table 10.2. Three sorts of output related to three types of potential uses can be seen in the overview. One, certain omissions in the initial problem framing by the water experts were identified (type 2). Two, some output helped to indicate some of the parts that were included in the problem framing but that should receive more emphasis (type 3). And, three, information about the various actors surfaced, which could be used by the project experts (type 5).

The output related to the expansion of existing problem framing (type 2) and increasing the weights of certain elements in the problem framing (type 3) indicates that actor analysis can be used to link analysis activities by water experts to broader policy developments, in line with the expectations. The emergence of these types of output in the cases was probably, at least partly, due to the data collection method used, asking people for their opinions using open questions. This enabled actors to introduce issues that were not yet emphasized in the existing analysis activities, but that were important for them in the water policy arena.

The recommendations resulting from the actor analyses generally concerned an expansion of the scope of the problem framing and an increased emphasis to be placed on certain elements by the water experts. This implies that actor analysis is most useful if there is room for expansion in the analysis projects, or if the water experts are willing to review their ongoing activities critically to create room for the expansions that are identified as being useful by actor analysis results.

Table 10.2 Output of actor analysis with a potential use for problem framing

	2. Expand problem framing	**3. Adjust (increase) weights in problem framing**	**5. Describe part of the framed problem**
NWRP Egypt	Need to specify costs and benefits of options	Importance of ongoing institutional reform debate	Options identified by actors. Interdependencies among actors
Diffuse Pollution Netherlands	Need to integrate diffuse pollution with point source pollution in policy analysis	Priorities of decision makers in platform	Articulation tacit knowledge on need better communication. Motivations herbicide users
IWFD Turkey	Perceived importance of water shortage problems	Perceived importance of boron pollution. Problems perceived not only on institutional but also operational level.	Expertise and cooperation among local actors. Opinion on new river basin authority
Water REMIND Philippines	Need to address equity issue and use of economic mechanisms in water management	Three groups important for water management, one currently excluded from debate	Three perspectives on water management. Knowledge actors on water issues

Potential uses of output that were not observed in cases

Output that narrowed down (type 1) or confirmed (type 4) the existing problem formulation is not tabulated in Table 10.2. For the type 4 output, confirming the initial problem framing, this is explained by the evaluation procedure that was used. Table 10.2 only includes the output that water experts considered to be credible, relevant *and new*. Thus output that confirmed their initial problem framing is not included. However, such output could also be observed, for example in the Water REMIND case, where the actor analysis confirmed the importance of mapping existing land use and land ownership claims in the watersheds.

Output that implied a narrowing down of the problem framing (type 1) was not observed in the cases. However, this does not mean that the actor analysis confirmed that the policy analysis activities that the water experts had planned in the cases were all relevant and necessary. Given that the focus of an actor analysis is the external environment, it seems logical that an actor analysis will produce insights that suggest that additional items should be included, rather than that items should be removed from, the analysis activities. Some of these items might actually be more worthwhile than some of the planned analysis activities, but this interpretation was left to the water experts in the cases.

10.3.3. Potential use of output to support interaction processes

The output of an actor analysis could be used to support water experts organize the interaction with the actors in their project environment. Actor analysis output could also be used to help to identify whom to involve, why to involve them and what to discuss. It could also be used to suggest how to organize the actors' involvement, what structure to use, the timing of the involvement of the different actors, etc.

An overview of the output that is potentially useful to support water experts in organizing interaction processes, showing the insights that were considered *new* by water experts, is tabulated in Table 10.3. In addition to those insights, the actor analysis often confirmed the existing expectations of the water experts. For example, in Egypt the actor analysis confirmed that local level actors should be more involved in the project, a concern that was already on the agenda of the water experts. In Turkey, the actor analysis confirmed the need to include upstream polluters and downstream users, this was already acknowledged by the project team.

In two of the four cases (the Netherlands and the Philippines), the actor analysis revealed the need to involve additional actors who had been mainly absent in the analysis process up to that moment. In those two cases, the water experts organized their activities mainly around the problem owners, excluding those actors who were considered to be part of the cause of the problem. However, the cooperation of these actors would be essential for any resolution that they could suggest for the problem.

Table 10.3 Output of actor analysis with potential use for interaction process

	Whom to involve, why?	How to involve? What to discuss?
NWRP Egypt	Involve actors because of interdependencies. E.g. the " power" of actors other than Ministries of Water Resources & Irrigation and Agriculture.	Discuss actors' positions and responsibilities related to costs and benefits of options. Link to institutional reform debate.
Diffuse Pollution Netherlands	Involve the actors with control over problem in Project Organization instead of only problem owners, starting with municipalities and private sector.	Discuss both diffuse as well as point source pollution issues in same platform.
IWFD Turkey	Identification on individual level of training participants	Discuss boron and operational problems. Use existing structures rather than a new river basin authority. General knowledge level is good, so education can start at more advanced level.
Water REMIND Philippines	Involve three types of actors, including a group of landowners that is currently excluded from the debate, because all groups control part of the problem.	Educate some of the actors on substantive water issues.

In these cases, the need to involve these actors sprang from pragmatic considerations, rather than from matching perceptions or close relations between actors. Thus, in reviewing *whom* to involve, the 'resources and objectives' aspect of actor analysis proved more insightful than the 'perceptions' or the 'network' focus.

Actor analysis did not only serve to identify which actors to involve, but, perhaps even more importantly, it also offered a motivation for their involvement. As said, this motivation was a pragmatic one, based on the resources that certain actors controlled and that would be critical for the success or failure of any suggested water management policy. A motivation for *why* actors should be involved is important, because it helps to build an argument for their involvement, and because it provides a basis for the subsequent question of *how* to involve them. Related to the latter, the actor analysis did not offer detailed blueprints for the design of interaction processes, but mainly identified issues for discussion. This was based on the insights gained into the existing objectives, opinions, and knowledge of the actors, suggesting that here the 'perceptions' aspect of actor analysis was more useful.

10.4. Implications for guidelines for model-based actor analysis

10.4.1. Summary of findings related to the actor analysis guidelines

The guidelines proposed in Chapter 4 for the application of actor analysis were assumed to be the best guarantee for analytical success based on the available literature. Generally, the adequacy of the guidelines was confirmed by the case observations, as the actor analyses in all cases met the standards for analytical success. However, this is not to say that the guidelines offered a straightforward prescription for analytically successful actor analysis. When presenting the guidelines in Chapter 4, it was acknowledged that these guidelines could not be used to address some of the inevitable limitations to actor analysis, such as the influence of strategic behaviour and the hidden agendas of actors, and the limits to the possibilities for data collection.

The case experiences provided more insight into the practical use of the formulated guidelines and some suggestions for improvements and additions to the guidelines. In summary, the qualitative evaluation of the cases provided the following insights related to the actor analysis guidelines.

- The guidelines are a sufficient guarantee for analytically sound outcomes, but not for perfection.
- The match between model and case environment is influenced by cultural factors in the case environment, in addition to the previously identified aspects such as model focus versus expected contribution and data collection possibilities versus requirements.
- The selection of a specific model is not always very critical, different models with a similar focus might have matched with some of the cases[26];
- The use of a model helped to focus data collection and analysis efforts, increasing the efficiency of the analysis process.
- The efficiency of model-based actor analysis applications needs to be improved to be feasible for wider future uses.
- Data collection is confirmed to be a crucial step, linking technical validity, efficiency, the match between model and the case environment, and the type of outcomes generated by the actor analysis.
- New insights generated by actor analysis generally expand the scope of analysis activities, both in terms of issues and actors to include. This feature is strengthened by the use of open-ended questions in data collection.
- New insights into *whom* to involve in analysis processes are mainly based on an analysis of resources and objectives of actors.
- New insights into *how* to involve them do not result in detailed process guidelines, but rather identify issues to discuss. These new insights are mainly based on an analysis of perceptions of actors.

[26] This is somewhat speculative, as it has not been tested by applying different models independently to analyse the same material. Nevertheless the experiences with different models and different cases provide a basis for this assumption, which is further discussed below.

Combining the last two findings provide empirical data to support the expectation that models with a different focus may yield complementary insights, something that could be expected based on the theory and literature discussed in Chapters 2 and 3. Further supporting empirical evidence is available from the case in Cebu in the Philippines. For this case, two different models with a different focus were used and the findings of this single case suggested that combining models with a different focus yields useful additional insights without requiring too much additional efforts.

The use of different actor representatives for interviews was also explored in the Cebu Water REMIND case, and the experiences here indicated that, in the case of time limitations, the selection of senior officials for interviews is to be preferred.

Finally, although not explicitly discussed above, the case experiences also confirmed that actor analysis, as a specific sub-set of policy analysis methods, is subject to most of the factors, rules and good practices that are known to affect the execution of policy analysis activities in general. This supports the use of an evaluation framework in this research based on evaluation frameworks developed for policy analysis studies.

The implications of the case findings for the formulated guidelines for actor analysis are discussed in the following sections.

10.4.2. Actor analysis preparations and preliminary scan of actor network

The case evaluations do not provide reason to adjust the guidelines formulated for the first two steps of the proposed procedure for model-based actor analysis, but they provide some additional insights into their use. The results stress the importance of clear communication between the actor analysts and the users, in this case the water experts, of expectations and purpose of the actor analysis. Furthermore, several aspects of the preliminary scan of the actor network and analysis environment were confirmed to be very important. The review of available data and possibilities for data collection is crucial because of the importance of data collection in the actor analysis. The selection of a balanced set of actors, especially the representation of a balanced set of interests, is important because the inclusion of actors with opposite interests proved to be crucial for obtaining a good understanding of the dynamics of policy processes.

10.4.3. The selection of a model for analysis

The case experiences confirm that the focus of a model and its and data requirements are important aspects in matching a model with an analysis environment. However, as long as one takes these two aspects into account, the selection of an appropriate model might not be very critical. This warrants a discussion of the importance of model selection based on the case experiences.

The participatory metagame in Egypt was the one case in which the selected model did not match the case environment. In this case, metagame analysis was used, a method in which mathematical algorithms are used to analyse well-

structured models. The use of mathematical algorithms and well-structured models makes the analysis easier to validate, but also limits the number of actors and options that can be included. The rule in its application is to "Keep It Simple Stupid!", to ensure the feasibility of the formal mathematical analysis. Although the metagame analysis did yield some new and useful insights for the water experts in Egypt, the water experts nevertheless found the used model unsuitable for further participatory applications with external actors, as they considered the model to be too simple to offer a convincing representation of the complex set of actors and options and the various nuances that shaped the interactions between actors. Other models that depend on mathematical algorithms and well-structured models for analysis have similar limitations, such as dynamic access models and transactional process models, which require the use of specific models with a limited number of concepts.

In the other cases, analysis of options, dynamic actor network analysis and argumentative analysis were used. These are all methods that are better suited to deal with incomplete input data and that can be applied in a more flexible way, mainly because they are more flexible in their use of mathematics or use no mathematics at all. These models can be used in a larger range of situations and therefore, the selection of a model is less critical if one selects a model that has less strict data requirements and that can be more flexibly applied.

Combining models with compatible data collection requirements but a different analytic focus

Different actor analysis models have a different focus, modelling different aspects of actor networks. Combining models with a different focus, such as models with a focus on perceptions with models with a focus on resources and objectives, will provide a more complete picture. In the Water REMIND case in the Philippines, analysis of options, with a focus on resources and objectives, and argumentative analysis, with a focus on perceptions, were combined in a single analytic effort. The two different models provided different lenses for interpreting the data, providing a more complete overall picture and stimulating creativity in the analysis. The use of two models required more time than a single model, but the additional time required was not as high as one might expect in advance. The most time consuming part of the analysis procedure is the data collection, and since the same interview results could be used for both models, the main additional effort required was for constructing and analysing two different models.

10.4.4. Data collection

Efficiency improvements in data collection activities

Data collection proves to be a crucial step in the actor analysis, in which the trade-off between technical validity and efficiency in the application of actor analyses clearly surfaces. The case evaluations indicate a need to improve the efficiency of model-based actor analysis applications, without compromising

validity beyond acceptable limits. The most time consuming part of the actor analysis procedure in the cases was the data collection using interviews and there seem to be some promising options to reduce the time and costs involved in data collection, when compared to the procedures followed in the cases.

Reducing the number of interviews

In most cases, some twenty to thirty interviews were conducted with actor representatives. While this improved the validity of the analysis, such detail was probably not necessary to arrive at the analysis outcomes. For the analysis of options for the NWRP case in Egypt, only eight actors were interviewed and this still produced credible and useful outcomes. Perhaps as a result of this small number of interviews, this was the only case where no doubts were expressed about the efficiency of the actor analysis. This suggests that a smaller number of interviews, say ten to fifteen, may be sufficient for a valid and useful actor analysis.

The experiences in the other cases are believed to confirm this suggestion. The actor analysis for North-Holland consisted of two parts, and for each part, about ten interviews were conducted. The Turkish case material also suggests that most of the analytical findings could have been obtained by focusing on the twelve actors that were interviewed in Aydin province only, without adding the second set of interviews with actors in Denizli province. In Cebu thirty interviews were conducted, but more than ten of these interviews consisted of interviews with additional representatives of actors that had already been covered. Leaving out the results of these additional interviews would not substantially alter the findings of the actor analysis.

Using group meetings for data collection

Another possibility to increase the efficiency of an actor analysis is to use group discussions, or workshops with multiple actors, as part of the data collection. This helps to save on the time required for interviews and has the additional advantage that it simultaneously creates commitment among the actors for the results of the analysis.

However, there are some risks and drawbacks related to the use of group discussions for data collection. In group discussions not all the actors have an equal opportunity to express their concerns, as persons with certain seniority or with more developed verbal skills are likely to dominate group discussions, and suggestions may be evaluated based on the source rather than on their merits. Furthermore, opinions can not be expressed in the same detail in a group session as in individual interviews[27]. It might also be more difficult to get a clear insight into differences and conflicts in a group session, as it is often socially

[27] Allowing the same amount of detail would require more time for the group interviews, which in the end reduces the effectiveness of group meetings versus individual or small group interviews

unacceptable for participants to distance themselves from others in their presence (Ravnborg and Del Pilar Guerrero, 1999, p.262).

There are ways to address some of these constraints in group meetings, for example through the use of electronic Group Support Systems, which allow for anonymous and parallel communication (Briggs and De Vreede, 1997), or through the use of more parallel discussions in small groups. However, both options require more skilled facilitators to facilitate group discussions and, in the case of GSS, also expensive electronic equipment[28]. Therefore, this might in the end be just as costly as one or two weeks of interviewing by one analyst. The choice between interviews or group meetings therefore should depend on the specific requirements for validity and efficiency, where group meetings offer more efficient ways of data collection and creating commitment and ownership among actors, while somewhat reducing the analytic quality.

The trade-off between efficiency and validity in the use of individual interviews or group meetings is also influenced by the type of model that is used for analysis. When one uses a very focused and structured model that needs specific input, group meetings can offer an efficient alternative to interviews without compromising validity. When a more broad and explorative analysis is used, more elaborate individual interviews are likely to offer the best opportunities for the collection of data with sufficient richness and scope.

Use of closed questions versus open questions

An important part of the outcomes of the actor analyses in the cases were outcomes that expanded the scope of the problem framing and the policy analysis activities, thus contributing to the linking of ongoing policy analysis activities to the external policy processes. These outcomes were at least partly due to the use of open-ended questions for data collection in the cases.

The use of closed questions related to the existing analysis activities of water experts would be more likely to produce output that was easier to connect to existing policy analysis activities and might have been less time consuming. However, it would also be less likely to produce new insights for the involved water experts. The use of open-ended questions has been shown to be a good mechanism for yielding insights into the broader external policy processes, which is often the main purpose of doing an actor analysis.

Culture and the selection of actor representatives

The formulated guidelines for actor analysis suggest selecting senior rather than professional level representatives of actors for interviews. As discussed in Chapter 4, this particular guideline was not based explicitly on existing

[28] In the application of GSS in developing countries, there are likely to be some further practical difficulties. Although the use of GSS has been proven to be feasible and useful in for instance Tanzania, the requirements for a network of computers and specific software will often make its use unfeasible in developing countries. Furthermore, its adoption seems hindered by the willingness of leaders and managers to support such tools (Mgaya, 1999).

literature, but rather on logical reasoning. Therefore, an evaluation of this particular guideline against the case experiences is useful, as some material is available to compare senior and professional level respondents: in two cases, both senior representatives and professional staff were interviewed.

In the Philippine case, separate interviews with different representatives of the same organization were held for ten actors, and for six of those actors one of the representatives held a senior level management position and the other a lower level professional position. In these twelve interviews, both types of representatives covered different issues and selected different priorities, but generally their answers complemented rather than contradicted each other. In line with the expectations, the lower level representatives stayed closer to their own specific task-field, while the more senior level representatives covered more general policy level issues. Both types of respondents proved to be well able to explain their organizations' view on specific water resources management problems, although the professional staff sometimes limited their focus to the specifics that were within their area of work.

In North-Holland, separate interviews with both decision makers and professional staff were held for four actors. The outcomes showed that priorities differed among these representatives, but these interviews also suggested more substantive differences in opinions among the two groups on the best ways to address certain problems.

The agreement between higher and lower level representatives of the same organizations is higher in the Philippine case than in the Dutch case, and although the numbers are too small to warrant general conclusions, this phenomenon is likely to be influenced by cultural characteristics. The large power distance and collectivist culture of the Philippines is likely to cause members of the same organization to conform to the organization's views as they are expressed by those that are high in the organizational hierarchy. According to Hofstede, in a collectivist culture, "'Personal opinions' do not exist: they are predetermined by the group" (1991, p.59). Therefore, in a collectivist culture with a high power distance, the results of interviews with either senior management or professional staff are not likely to lead to real contradictions.

The low power distance, individualist and feminine culture in the Netherlands make it more likely that different members of the same organization entertain and express different views on similar issues. This suggests that the selection of high level or lower level actor representatives may lead to different analysis results, which may have more serious implications. Therefore, in this case, if time is available and both groups play an important role in policy making on the issue at stake, it seems worthwhile to interview different representatives per organization.

In both cases, if only one representative per organization can be covered, senior officials are still to be preferred, in line with the guideline stated in Chapter 4. They have a mandate to represent their organization and are generally more capable of providing the actor analyst with the overall picture.

10.4.5. Analysis, interpretation and presentation of results

Models as a tool to identify presence of ambiguous power structures, implicit assumptions and covert interests

There are numerous factors that limit the validity of the actor analysis models. Some of the resulting limitations seem inevitable, in particular those related to the existence of covert interests, ambiguous power structures and hidden agendas. This is known from literature (cf. Varvasovszky and Brugha, 2000, p.345; ODA, 1995) and is confirmed once more in the cases. Creating a safe environment for participating actors, good interview skills on behalf of the analyst and cross checking of information may lower the impact of hidden agendas, but analysts will never be able to draw out the complete picture of all hidden motivations and informal power structures.

However, the use of actor analysis models at least offers a way to identify the presence and influence of ambiguous or covert factors. Actor analysis enables an analyst to identify anomalies in the collected data by reformulating the collected data to fit the model's logic and by comparing the observed real life processes with the expectations generated by the model. The use of a model helps analysts to notice "strange" and unexpected behaviour that is not in line with the internal logic of the model. The actor analysis model provides observers of policy processes with a lens that enables them to pinpoint surprising and seemingly irrational phenomena, which help them to learn more about the role of hidden agendas and ambiguous power structures.

Hidden agendas in participatory analysis processes

Model-based actor analysis helps analysts to identify some of the factors and processes that were previously hidden, but not all of them. If one expects the actor analysis to provide a definitive picture of what the policy process looks like, the existence of hidden agendas and ambiguous power structures remains a worrying factor. However, when actor analysis is used as a tool to embed the work of water experts in their policy making environment, the existence of these limits to validity is less worrying. Hidden agendas, covert interests and ambiguous power structure *are* part of the policy making environment, but this does *not* mean that actor analysis needs to expose them.

Being part of policy processes means dealing with the implicit and ambiguous. Covert interests and ambiguous power structures are necessary ingredients that provide policy makers with room to manoeuvre and negotiate. In policy processes one can distinguish a "frontstage" and a "backstage", with the political decisions taken on the backstage and the rationalization of decisions communicated to the public on the frontstage (De Bruijn and Ten Heuvelhof, 2000). Bringing backstage information, hidden agendas and covert interests to the public frontstage is likely to disrupt sensitive policy processes (cf. ODA, 1995).

Actor analysis has a role in explicating aspects of policy making that were previously unsaid and ambiguous, but mainly to *enable* different parties to express their concerns and interests better, not to explicate interests or ambiguous power mechanisms that they do not want to spell out to the outside world. Some hidden agendas and ambiguous power structures are not supposed to be discussed in the public policy making debate and water experts are not expected to address them explicitly in their analyses. A good illustration is the participatory metagame for the Egypt case, where everyone knew that there was the informal practice of a flexible application of health standards when the local situation permitted this, but this practice could not be formalized in the gaming exercise, let alone in an official policy document.

10.5. Summary and conclusions

10.5.1. Analytical success of actor analysis in the cases

The case evaluations indicated that in all cases, the conducted actor analyses met the necessary standards for analytical soundness and produced several insights that were considered to be new, credible and relevant by the involved water experts. This means that in all cases, the analytical success of the actor analysis was considered to be sufficient, providing a good basis for the actual use of the actor analysis output by water experts.

Nevertheless, there were also some limitations to this analytical success. The actor analyses were analytically sound, but they could have been improved further. The analytical quality could be improved by improved data collection, covering a wider scope of actors and in more detail. However, efficiency considerations by the water experts suggest that this would not be feasible. They suggested that for future use, a somewhat different balance between analytical rigour and process efficiency is needed, reducing analytical rigour and the time needed for analysis and increasing the practical orientation of the actor analysis.

Finally, the use of a model-based approach proved to have substantial benefits for focusing data collection efforts and analysis, while the selection of a model proved to be mainly important in terms of the focus of the model and its data requirements. Case results showed that models with a different focus might be used to produce complementary insights, using similar data collection efforts.

10.5.2. Guidelines for actor analysis

The case evaluations provided a first practical test for the proposed guidelines for model-based actor analysis. The appropriateness of these guidelines was confirmed by and large although the case experiences also offered some more detailed insights into their application. These additional insights are incorporated into the procedure for model-based actor analysis, through a more elaborate set of guidelines. The resulting procedure and guidelines for model-based actor analysis are shown in Figure 10.3.

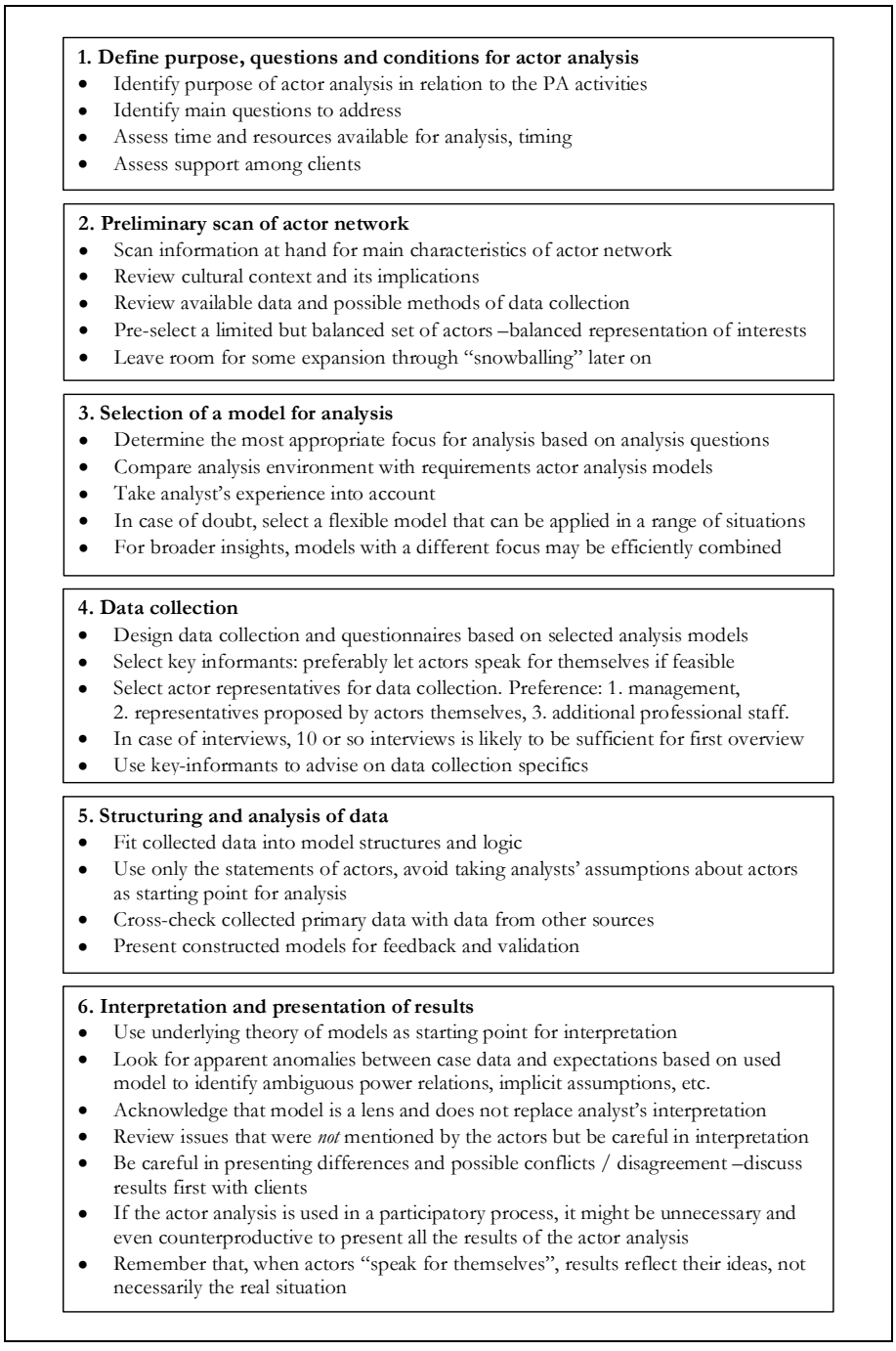


Figure 10.3 Procedure and guidelines for model-based actor analysis

11. Promise, practice and prospects of actor analysis for water experts

11.1. Introduction

The application of the actor analysis in the cases met the standards for analytical quality and the involved water experts considered the output to be credible, relevant and new, which suggests that this output was potentially useful for the water experts. In this final chapter an assessment is made of whether the analytical success of the actor analyses also led to utilization success in the cases (see Figure 11.1). Did the water expert use the analytical output to improve their problem framing or to organize the interaction with the project's actors?

The utilization of actor analysis output by water experts is reviewed in light of the broader case experiences and additional literature to identify possible explanations. Explanations are formulated for the utilization that was observed in practice and some implications for future use of actor analysis are discussed. Finally, a reflection of the used research approach is provided and some suggestions are made for further research on the application of actor analysis in the water sector.

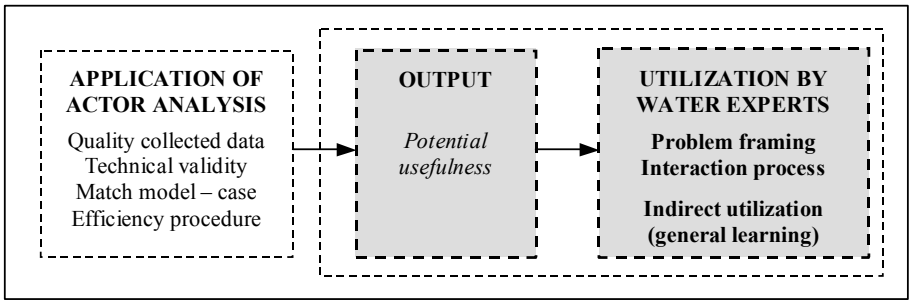


Figure 11.1 Evaluation of utilization success of actor analysis

11.2. Observed utilization of actor analysis output by water experts

11.2.1. Utilization for problem framing by water experts

The actor analyses provided new, credible and relevant insights in all four cases. The actor analyses in the cases also indicated essential points to address in the problem framing by water experts. Some of these points seemed to be critical to the eventual success of the water experts in solving real world problems in a way that would be accepted by all the important actors. The potential usefulness of this output of the actor analyses can now be compared with the utilization by water experts that was actually observed in the cases.

Main observed impacts per case

The results of the actor analysis for the NWRP Egypt project suggested that it was necessary for the water experts to put more effort into the specification of the costs and benefits of options and to link the project activities more closely to the ongoing institutional reform debate. Both aspects received attention in the remainder of the project but it was difficult to assess the role of the actor analysis output in these developments.

In North-Holland, the actor analysis resulted in a recommendation to integrate diffuse pollution sources with point sources in the analysis, as part of an integrated water quality management policy, and a recommendation to expand the project organization to include representatives of actors with problem solving capacity. The subsequent developments in North-Holland were in line with these recommendations, but these developments were more likely to be related to ongoing discussions among decision makers and national level developments than to the output of the actor analysis.

In Turkey, the actor analysis highlighted certain problem areas that should receive attention in the remainder of the project, such as boron pollution, water shortages and operational level problems. However, these suggestions did not seem to have much influence on the course of the project, as this continued to follow the rather strict outline of activities dictated by the EU Water Framework Directive.

In the Philippines, the actor analysis identified three main groups involved in water management and pointed out the need to include the perspectives of all three groups in the project activities, as one of those perspectives was left out of the ongoing water management debate. The actor analysis also highlighted a need for more attention for equity issues and economic questions in the project. In this case, not all relevant project developments were clear at the time of the evaluation of the actor analysis, but feedback from the project's water experts suggested that they would endeavour to include all three perspectives in their analysis activities, but that no additional arrangements would be made to include more attention for equity concerns or economic aspects.

In all four cases, the actor analysis also yielded additional information on the problem system that was being analysed, such as an overview of promising

options in Egypt, articulation of tacit knowledge on the gap in perceptions between water managers and other actors in North-Holland, a quick introduction into the water management situation and the main problems in the project area for the IWFD Turkey project, and an insight into the perceptions of the different actors on water management in Cebu. These insights were considered useful by the water experts as they filled in some gaps within their existing problem framing.

Linking utilization to analytical output

The main potential usefulness of the actor analysis for problem framing was related to the analytical output that highlighted a need for an expansion of the problem framing or for more emphasize on certain aspects. However, in practice, any influence of this output on subsequent actions by water experts was difficult to observe. Addressing additional aspects or even changing the focus of analysis required an important shift from the water experts and apparently the output of the actor analysis alone was not enough to convince them to make this shift.

In some cases some shift in line with the actor analysis could be observed, such as in the North-Holland, i.e. widening the scope of the diffuse pollution debate towards water quality, and in Egypt, i.e. linking more to institutional reform debates. However, in these cases, the actor analysis was just one of the sources that suggested these changes and perhaps not the most influential one. Therefore, the main contributions that could be attributed to the actor analysis in the cases were related to certain pieces of practical information that filled in some of the gaps within the existing problem framing of the projects.

11.2.2. Utilization for interaction process

Main observed impacts per cases

In Egypt the actor analysis introduced a perspective on the roles of, and interdependencies between, actors in water resources management. This helped to clarify the roles and responsibilities of the different parties involved in the project's committees and it provided a format to structure additional consultation of actors.

In the Netherlands the actor analysis output contained a recommendation to increase the involvement of actors with problem solving potential in the project group. Such an expansion could partly be observed through increased involvement of municipalities in the diffuse pollution project organization, although this development could not be attributed solely to the actor analysis. The interviews and presentations that were done as part of the actor analysis triggered the involved actors to reflect on their roles in policy making. This provided one of the stimuli that eventually led to a discussion and changes in the regional project organization.

In Turkey the actor analysis provided the regional actors with a first introduction to the project and provided the team of water experts with insights

that helped them to conduct the first regional workshop and to prepare the training for Turkish participants that was part of the project.

In the Philippines, the actor analysis was used as a basis for the first project workshop, thus starting the interaction between actors and water experts. The identification of the three different groups involved in water resources management led the project to plan specific efforts to include all three groups in the project activities, including the group that was previously isolated in the debate. The actor analysis also helped the water experts to identify certain awareness building activities that would be included in the project.

Impact through the process of executing the actor analysis

The output of the actor analysis provided insights into the actor environment that had the potential to help water experts to improve or start-up an interaction process with actors. Although the water experts valued these insights, their direct impacts were sometimes difficult to see. However, the case observations showed that the *application* of the actor analysis itself had a direct impact on the interaction process. This direct impact was in fact sometimes more useful than the analytical output of the actor analysis. In North-Holland, simply interviewing some actors and discussing the results with them caused them to reflect on their role and position. In Turkey the interviews were a good way to introduce the project to the actors. While in Egypt, the general way of thinking introduced by the metagame and analysis of options models helped the water experts in their subsequent interactions with the actors.

Impact through the identification of actors to involve

In all the cases, to some extent, a trend could be observed to start the design of the interaction process with the inclusion of those actors that were relatively "close" to the team of water experts. This phenomenon was seen at various levels, for instance on the professional level where the water experts of the project teams mainly interacted with the water experts of the other organizations, on the organizational level where public sector actors mainly interacted with other public sector actors, and on the problem level where problem owners first invited their fellow problem owners to the discussion.

It seems a quite logical mechanism to build a core group for participation in the project around those participants that one can easiest communicate and cooperate with. However, if the aim is to really make a contribution to new policy solutions, then it is also necessary to extend the interaction process to cover all the actors that can influence the successful implementation of these solutions. Often, these actors are for an important part to be found outside the existing networks of the water experts.

The output of the case actor analyses pointed to the need to involve such parties more into the interaction process, but apparently it was difficult to act upon these insights. However, by providing a better identification of who the relevant " outsiders" were and why they should be involved, the actor analyses

provided a first step to focus efforts on the expansion of the circle of actors involved in the project' s committees and discussion platforms.

11.2.3. Utilization for learning on policy environment and other indirect utilization

Actor analyses can also be used to support the work of water experts in indirect and subtle ways. The output of an actor analysis can be used to help to establish a change in the mindsets of water experts and/or the actors' representatives, making them more aware of and responsive to the roles of various actors in the policy environment, even though this might not lead directly to observable changes in their working practice.

For instance, in the case of NWRP Egypt, the actor analysis introduced a new perspective to view interdependencies among actors, to link water policy options to actors and the need to more explicitly focus on costs and benefits of policy options. Apart from direct impacts on problem framing and interaction processes, this new perspective helped the water experts involved in their transition to a new project phase. In North-Holland, direct links between the actor analysis output and utilization by water experts were difficult to observe, but nevertheless a certain contribution of the actor analysis seems very likely, as the actor analysis caused actors to reflect on their roles and explicated tacit knowledge on the role of the various actors, making these roles easier to discuss and to address. In Turkey, the actor analysis enabled the project team to learn about a project environment that was previously largely unknown. In Cebu, the actor analysis enabled the water experts to learn and update their knowledge on the perceptions of the other actors, indicating for instance that the water experts still had some education and awareness building to do.

It is clear that the execution of, and the output generated by, the actor analyses supported learning by water experts on their policy environment in all cases. Although it is sometimes difficult to link this "general learning" by water experts to a direct impact on their activities, it does offer an indication for some degree of utilization success, albeit perhaps more modest or of a different type than what was expected in advance.

11.2.4. Discussion of observed utilization by water experts

Summary of utilization success

The utilization success of the actor analysis output by water experts can be summarized in one or two sentences for each case, highlighting the main utilization of the actor analysis by water experts as they appeared from the evaluations by those water experts (see Table 11.1). From Table 11.1 it can be seen that the actor analysis output only had a limited impact on the activities of the water experts. The utilization of the actor analysis output was mainly related to either general learning or to aspects that fitted in relatively well with the existing activities of the water experts.

Table 11.1 Summary of utilization success of actor analysis in the cases

	Main use of actor analysis for water experts
NWRP Egypt	General learning on new perspective of interdependencies among actors
Diffuse Pollution North-Holland	Confirming existing knowledge and new insights that simultaneously emerged from other sources. Small contribution through learning about perceptions of other actors
IWFD Turkey	Quick introduction to the project area for the project team and introduction of the project to the actors
Cebu Water REMIND	Confirming existing project agenda, confirming/indicating need for education and participation of actors.

Case specific factors that help to explain the observed utilization success

The focus of the case evaluation framework was analytical success and the utilization of the analytical output by water experts. However, the case findings indicate that the analytical success of the actor analysis in the cases did not result in major impacts on the work of the water experts. For each case, some specific factors can be identified that help to explain the low utilization success of actor analysis.

Purpose and scope of the actor analysis

In the case of the IWFD project in Turkey, the tight time schedule and the limited resources did not leave much room to deviate from the requirements set out in the terms of reference for the project. To make a more considerable contribution, the actor analysis should been kept closer to the EU WFD requirements, focusing on water quality rather than integrated water resources management. In this case, the purpose and scope of the actor analysis probably did not sufficiently match with the case environment.

In the Water REMIND case in Cebu, the purpose of the actor analysis was also identified as one of the aspects that could have been improved to increase the utilization of its output by the water experts involved in the project. However, in this case, the required purpose shifted during the course of the project, which could hardly have been foreseen at the time when the actor analysis was executed.

Additional factors: Cultural aspects, support within user group and timeliness

In Egypt, the use of the output was made more difficult because it partly ran against the dominant cultural characteristics of a hierarchic and collectivist culture. In addition, the civil engineering background of the water experts in the project appeared to make it more difficult for them to adopt new perspectives and approaches.

In the Netherlands, the analysis activities related to diffuse pollution of water resources took place in an environment that put a relatively low priority on diffuse pollution issues and the dominant processes could be characterized as incremental processes of "muddling through". In such an environment, it was difficult to start new processes or introduce significant changes. Partly due to these characteristics, there was only a limited commitment to act upon the actor analysis output, as the water experts involved could only devote a small part of their efforts to diffuse pollution issues.

The actor analysis output for the Water REMIND project in the Philippines pointed to certain "politically sensitive issues" that should be addressed to enable the development of a satisfactory water policy. However, in the project design, the focus of the project activities was more on technical issues, which would avoid the political turmoil that might compromise the image of the main executing agency as an objective and independent research institution. In addition, changes in the project management led to a shift in expectations, suggesting that a later timing of the actor analysis might have improved its utilization by the new project management.

11.3. Why water experts don't use the output of actor analysis

11.3.1. Explaining the "utilization failure" of actor analysis

The emerging picture across four cases

Taken as a whole, the actor analyses in the four studied cases can be described as an analytical success but a utilization failure. The case specific explanations offered in the previous section are useful to explain the utilization failure in the individual cases, but they do not help us to understand the general picture that emerges across all four cases. This is the picture of water experts who appreciated the output generated by the actor analysis, but who, by and large, did not utilize this output to make significant changes to their work.

The use of actor analysis output was not straightforward and required quite some effort on behalf of the water experts, especially where the output required them to broaden the scope of their activities or to engage in a more participatory analysis process. Nevertheless, the expectations formulated by the involved water experts at the beginning of each case and the analytical success of the actor analyses lead one to expect substantial proof of utilization success in at least some of the four studied cases.

Revisiting literature in search for explanations

The limited use of actor analysis output in all the four studied cases makes one wonder if this was a peculiarity of these four cases or if similar observations can be found in the literature. Therefore, the literature is revisited to identify some of the underlying mechanisms that may help to explain the relatively low use of actor analysis output by water experts.

The bulk of the available literature on the use of actor analysis that is cited in the first chapters of this book does not offer satisfactory explanations for the "utilization failure" of actor analysis in the cases. A part of the literature focuses on the analytical success of the methods but stops short of utilization success, in some cases only expressing the expectation that the analytical insights will be useful for the intended audience (Borsuk et al., 2001; Kontogianni et al., 2001) [29]. Some of the literature touches upon the subject of utilization of the analytical output but only in rather vague terms (Brugha and Varvasovszky, 2000; Varvasovszky and Brugha, 2000). Articles that more explicitly address the utilization aspects report successes only in general terms (Stone, 2002)[30], or acknowledge that actual contributions remain ill-understood and are difficult to observe(Grimble and Wellard, 1997; MacArthur, 1997)[31]. In all these instances, there are not much leads to uncover underlying mechanisms that might explain the utilization failure in the cases studied here.

Therefore, other bodies of literature were explored, based on which four possible mechanisms can be described. These explanations are not independent explanations, they are related and show some overlap. Nevertheless, there are also noticeable differences. The first two explanations are based on the notion that water experts *cannot* use actor analysis output, even if they wanted to. Similar explanations were also discussed in the introductory chapter, stating that water experts lack the tools or expertise to apply actor analysis. However, here it is argued that this inability to use actor analysis methods and their output actually goes beyond a mere lack of technical skills. The last two explanations are based on the notion that, even though there are practical constraints that make it difficult for water experts to utilize actor analysis output, they could overcome at least some of those constraints if they wanted to. However, they *do not really want* to use the output of actor analysis.

11.3.2. Path dependence in ongoing projects

Project path dependence and limited room to change existing project designs

In the cases where an actor analysis was done for ongoing policy analysis projects in the water sector. These projects were in various phases of implementation, but they all had in common that an initial problem formulation had already been developed and that the (core of the) analysis teams had been

[29] "...our model will become, we hope, an important source of information and insight...." (Borsuk et al., 2001, p369); "Through the use of mixed methodology, we have gone some length to uncovering some of these complexities, and collected information on the preferences of individuals and focus groups which we believe are of genuine use to policy makers." (Kontogianni et al., 2001, p.138)

[30] "allowing for a greater understanding of common values by negotiators and aiding in attaining a consensus position among respondents" (Stone, 2002, p.1025)

[31] "SA is potentially well able to throw light on these issues, but to date has been little applied, and its most appropriate and effective contribution is as yet uncertain." (Grimble and Wellard, 1997, p.189); "Very little of the project was redesigned after the stakeholder analysis was finalized relatively late in the planning process, and no new activities were added" (MacArthur, 1997, p.259)

composed. The actor analysis output suggested new perspectives or new issues for analysis but it was difficult to incorporate these new suggestions in the projects because they had already started on a certain track.

This phenomenon is known from the literature as path dependence, which is a sequence of events in which a particular process is unable to shake free from the influence of its past states or motions because decisions made in the past have long-term impacts, binding, limiting or postponing alternative options (Araujo and Harrison, 2002, p.6; Kaivo-oja et al., 2004, p.532). This notion of path dependence has been developed by economists and has lately been used to analyse technological innovation processes, where the complementarity and interdependence of components and subsystems are a major source of path dependence (Araujo and Harrison, 2002; Rycroft and Kash, 2002; Kaivo-oja et al., 2004).

Even though the water experts stated that they were willing to incorporate the relevant recommendations from the actor analysis into their projects, the case findings suggest that they were not able to do this. The actor analysis output proposed a widening of the analysis scope that was not at the core of the official project assignments. This meant that there was no budget to include new issues or additional perspectives in the project and that the existing teams did not have the appropriate expertise to implement the proposed new directions for analysis. Previous decisions and agreements introduced certain path dependencies that did not allow water experts to change the direction of the project.

Case observations explained by this mechanism

In the case of Turkey, the project's terms of reference were quite demanding and set some specific requirements related to the introduction of the EU Water Framework Directive (WFD) in Turkey. The EU WFD contains elaborate and detailed requirements for river basin management plans and in combination with a tight project budget this left no room to deviate from the existing project design and to make substantial changes to the issues that were to be included in the analysis.

In the case of North-Holland, the involved water experts in the regional project organization had already decided on a certain procedure that they would use as a basis for plan development. This procedure revolved around the existing official standards for polluting sources and did not take into account the policy environment. The actor analysis was intended to fill this deficiency, but once its outcomes were available, they could not persuade the project organization's members to deviate from the chosen path. The scarcity in time and resources that they could allocate to policy development on diffuse pollution issues did not make them very enthusiastic about changes that implied an additional workload.

In the Water REMIND case a project document had been drafted prior to the actor analysis. This document provided the officially approved basis for the project and was already quite elaborate and wide in scope. Therefore, additional aspects as suggested by the actor analysis were more difficult to include.

Finally in the Egyptian case, there seemed to be some room to incorporate new insights into the project, as an institutional expert was added to the project team shortly after the actor analysis. However, the majority of the activities still revolved around the mathematical decision support models in which the project's water experts already had invested quite some time and resources.

Implications for future use of actor analysis

Within ongoing projects there is limited room to incorporate new suggestions for changes due to project path dependence. This could be addressed by applying actor analysis earlier in projects, preferably when the terms of reference for a project are formulated, or by leaving more flexibility in project planning for changes along the way. However, the possibilities for flexibility are often also limited and even in early project stages, there is likely to be a certain path dependence. It is usually difficult to find a blank start moment, as policy analysis projects usually do not start from scratch but carry a history of previous activities and events, even when they are formally only being conceptualized.

The Water REMIND project for example was rooted in a water debate that had been going on for years. It carried the expectations of the various organizations that had been involved in the first local workshop that was held more than a year before a first attempt was made to formulate a project proposal. Likewise, the NWRP project was strongly influenced by the previous "Strengthening the Planning Sector" (SPS) project. This project built a Planning Sector within the Ministry of Water Resources and Irrigation and provided it with planning tools in line with the classic engineering paradigm. The NWRP project logically built upon the tools provided in the SPS project. This illustrates that there is always some path dependence, although in between two projects it is easier to reverse certain developments than when a project is being implemented.

11.3.3. The institutional setting of water resources management

The constraints posed by the institutional setting in the water sector

Path dependencies make it more difficult to incorporate new insights into ongoing projects. Literature on path dependence in technological evolution indicates that similar constraints of a more structural nature exist on an underlying level, related to institutions rather than individual projects (Araujo and Harrison, 2002; Rycroft and Kash, 2002; North, 1993). Institutions provide a relatively stable framework within which policy making takes place, i.e. the "infrastructure" for policy making (March and Olsen, 1989; Sjöstrand, 1993; Ostrom et al., 1993, p.6). Institutional structures have a dual nature, as they are both the medium and outcome of social actions, and in their basic rationalities, they reproduce the actual basis for their existence (Giddens, 1979; Sjöstrand, 1993). This institutional reproduction of practices is promoted by the need for mutual intelligibility of acts and discourse, which are understood by all parties

involved, and by the fact that most actions are rooted in relatively unconscious decisions or routines (Giddens, 1979, p.218).

The analysis projects in the water sector are part of an established institutional system that consists of organizations, rules, regulations and individuals and that can be expected to influence the formulation of new projects. The existing institutions organize the way in which water resources management problems are addressed. In doing so, they also introduce a certain focus and emphasize certain aspects while ignoring or suppressing some other potential participants, issues, viewpoints, or values (cf. March and Olsen, 1989).

The engineers that dominated the water sector in the past decades have shaped the institutions for water resources management into technocratic structures (see for instance Disco and Van der Vleuten, 2002; Ravesteijn, 2002; Loucks, 2003). This technocratic orientation, combined with the reproductive nature of institutions, is likely to result in the formulation of analysis projects that emphasize technical and quantitative analysis, and that leave the social science perspectives and the participatory approaches outside their main scope. The people who are involved in the formulation of new analysis projects on behalf of public agencies are often water experts with the same engineering background and orientation as the majority of the researchers and consultants that are hired to execute those projects.

Even though the actors in the existing water institutions recognize the limitations of this technocratic orientation and see the need for more 'soft analysis' and participatory approaches (Ravesteijn et al., 2002), the current institutional infrastructure and the existing mass of technological, cultural and organizational components make it difficult to break the reproductive nature of the existing institutions[32]. The path dependency observed in the projects thus already starts with the institutional setting prior to any project formulation.

Case observations

In the case of Cebu the observed water problems were the reason for the start of the Water REMIND project. Water problems are the domain of water experts, who are used to formulating water research projects to find solutions to those problems. Therefore, it is not surprising that they formulated a project that focuses on the conservation and use of Cebu's water resources. However, the underlying causes for the water problems in Cebu were primarily of social and economic nature. Effectively addressing the water problems would require a political discussion of the underlying socio-economic developments on the island rather than a thorough analysis of its water system. This illustrates the influence of existing behavioural patterns and procedures in institutions on the formulation of new analysis projects.

The European Union's Water Framework Directive stresses the importance of integrated water resources management and public participation. However, it

[32] A good example of the reproductive aspects of technocratic water institutions is provided in a recent paper by Raina and Sangar (2002) for agricultural water management in India.

also prescribes a detailed list of issues that have to be included in river basin management plans and emphasizes water quality, ecological and institutional concerns. There is a tension between the two, because true integration and public participation may reveal that water issues outside water quality improvements and institutional reforms are more urgent in some areas. This tension could be seen in the IWFD project in Turkey, where the WFD guidelines were probably not the most appropriate way to address the main water issues in the Büyük Menderes river basin. This illustrates the influence of existing regulations on the formulation and execution of water projects. Furthermore, one of the project managers for the Turkish case stated that most clients valued technical advice and "hard" outcomes over comprehensive problem analyses and institutional analyses. Therefore, the budgets of most projects have a bias towards technical analysis components, which indicates that the existing preferences of project sponsors are not likely to promote a shift to new types of projects.

The water experts involved in the regional project organization in North-Holland used the existing official water quality standards in their daily practice of enforcement of water quality regulations. They were responsible for upholding these standards and therefore it is quite understandable that they took these standards as their starting point for the development of a new water quality policy. Even if the other actors were not convinced of the importance of these standards.

In the case in Egypt, the NWRP project was the sequel to the Strengthening the Planning Sector project. Both projects were financed by the Netherlands' government and introduced a classic systems analysis approach in Egypt's Ministry of Water Resources and Irrigation. It is easy to see why this systems analysis approach was selected for this project, as the Netherlands itself had been using the same approach for its water resources management since the Policy Analysis for Water resources of the Netherlands (PAWN) project early in the 1980s[33]. With this systems analysis approach, a focus on mathematical modelling was also introduced, as well as a certain risk of a gap between analysis and policy making processes.

Implications for future use of actor analysis

Water policy development and analysis are part of an institutional system that has evolved in a technocratic engineering tradition. Although the start of an institutional transition can be observed, it still remains difficult to start activities and projects that are not in line with the established routine. The emergence of actor analysis can be seen as part of the transition towards a more participatory and 'soft' approach. Actor analysis may support this transition in making water

[33] In addition, but besides the main point here, the Netherlands was also exporting its system of water boards for regional water management to Egypt, through a Water Boards project. All this in line with Hofstede's observation that "Governments of smaller power distance countries often eagerly try to export their institutional arrangements in the context of development cooperation." (Hofstede, 1991, p.39)

experts and policy makers more aware of the limitations of the dominant engineering tradition, thus causing them to question their routine activities (cf. Giddens, 1979). However, the utilization success of actor analysis also depends on this transition, as the outcomes of actor analysis often point to analysis activities that are at the fringes of or outside the domain of traditional engineers.

Due to the size, scope and reproductive nature of the existing institutional system, such a transition is not easily made. Institutional change is usually "overwhelmingly incremental", except for the rare cases of revolutionary change (North, 1993, p.37). Furthermore, the direction of change is difficult to predict (March and Olsen, 1989). Actor analysis is linked to this process of institutional change and it is difficult to predict whether the changes will eventually make actor analysis output more or less likely to be used.

11.3.4. The professional tools and expertise of water experts

The preferences of water experts for their own tools and expertise

Project path dependencies and the existing institutional system limit the possibilities for water experts to use the outcomes of actor analysis, but the water experts themselves also play an important role in the low use of actor analysis output. Water experts are trained and educated in an engineering tradition, being part of the technocratic tradition that dominates the existing water sector. They rely on engineering tools and expertise and they are comfortable with a classical systems analysis approach for their work.

Water experts prefer engineering tools, not only because they know these tools best and they are asked to use them, but also because they believe that these are the best tools for the job. Water experts feel that a good water policy should be based on state-of-the-art mathematical models that evaluate the impacts of various possible policy options, mainly in terms of physical and financial consequences for planning investments (cf. Loucks et al., 1981; Mays, 1996). Similar to experts in other fields, they have a genuine fear of loss of analytical quality if they do not use their engineering tools and expertise (Enserink and Monnikhof, 2003, p.319).

Actor analysis output often suggests that more attention needs to be given to aspects that are difficult to capture with classic engineering tools, calling for more participatory approaches and more attention for institutional and socio-economic aspects. The apparent unwillingness of water experts to try new tools and analysis approaches that are needed to use the output of the actor analyses can be explained using the conflict model for information preferences of Janis and Mann (1977). This model states that people are likely to become close-minded and biased in their information preferences if they perceive serious losses from changing their current behaviour, and if they have no hope of finding a satisfactory solution (Janis and Mann, 1977, p.205). Another part of the model states that *informal* social constraint and personal constraints make people reluctant to admit to themselves and to others that changes to their initial

analysis designs might be required (Janis and Mann, 1977, p.280-284)[34]. These conditions are all present in the cases, as discussed below.

Case observations

The four case projects were designed to support water policy development in quite different environments and conditions. In all these projects, the classic systems engineering paradigm was used to design the analysis activities. The use of mathematical models and decision support systems was at the core of the policy analysis projects in Egypt (e.g. Nile-DSS and other models such as SIWARE and ASME), North-Holland (spreadsheet model for polluting sources) and Water REMIND (various planned water-related management information systems). The IWFD Turkey project did not specifically centre on the use or development of such models, but this project followed the EU Water Framework Directive, which contains specific requirements for a river basin management plan, in line with a classic systems analysis approach, the 'DPSIR' framework. The WFD requires, among other things, the identification of state, pressures, impacts and (environmental) objectives for river basin districts (EU WFD, 2000, Annex VII).

Sometimes the water experts in these projects acquire new experiences with participatory applications. However, these new applications usually do not replace the traditional tools but rather function as a limited, participatory "add-on" to the more traditional tools, such as for instance the use of a participatory multi-criteria assessment approach that was mentioned by one of the experts involved in the Water REMIND project. In all cases, the water experts mainly used the outcomes of the actor analysis that were in line with their existing analysis procedures. Suggestions for additional analysis activities were sometimes echoed, but could not move the water experts' attention from their preferred and planned analysis activities to new fields of analysis.

In all cases, the output of the actor analysis pointed to the need to incorporate new aspects into the problem analyses but did not give the water experts detailed guidelines on how to this. The majority of water experts were not very familiar with approaches that could help them to translate such findings into actions. This left them with a stimulus to change but without the experience or tools to do so. In line with the conflict model for information preferences, this is likely to have caused the water experts to ignore those outcomes of the actor analyses that suggested a need for new analysis activities that they were not familiar with.

Implications for future use of actor analysis

The conflict model for information preferences suggests that water experts are not only limited in their capacities to incorporate the outcomes of actor analysis in their work but that they are also limited in their willingness to do so. This

[34] One could also see this as a personal cognitive path dependence, in addition to the external, project and institutional, path dependence discussed above.

leaves room for two options for the future use of actor analysis by water experts. Firstly, actor analysis can be used to suggest changes to existing problem formulations, as has been done in this research. However, these suggestions are not likely to be welcomed and acted upon, at least not until the community of water experts has gained sufficient experience and trust in the additional analysis approaches required. Secondly, actor analysis can be used to support water experts in identifying problems *for their tools to solve,* even if these are perhaps not the most important problems from a broader policy making perspective.

11.3.5. Water experts as issue advocates

Neutral information providers or issue advocates?

In the cases described in this study, the water experts aspired to a role of information providers, providing information to policy makers (cf. Thissen and Twaalfhoven, 2001). Three dominant types have been identified for this role of information providers by Heintz and Jenkins-Smith (1988). Firstly, there is the role of the "objective technician", who provides neutral, objective and comprehensive analysis. Secondly, there is the "issue advocate", who uses analysis to pursue some conception of what is good for society. Thirdly, experts and analysts can have a role as the "client's advocate", using analysis to make the best case for their clients' preferred options (Heintz and Jenkins-Smith, 1988, p.273).

Water experts usually present themselves as objective technicians or independent researchers. They build decision support systems and use rational engineering tools to analyse water systems and provide neutral information that helps policy makers to make a well-funded decision (Loucks, 1992, 1995; Mays, 1996; Dinar, 1999; Acreman, 2001). However, empirical research suggests that water experts in practice often bear a close resemblance to issue advocates. A survey by Sabatier and Zafonte (1999) related to a water policy dispute in the San Francisco Bay/Delta showed that the involved experts, university scientists and civil servants, had belief systems that were very similar to those of interest group leaders of environmental and water development groups (Sabatier and Zafonte, 1999, p.31).

The impression of water experts as issue advocates is further strengthened by the statements and claims that are commonly made by water experts when talking about their concern over the gap between their work and the world of policy makers. When water experts say that they want to connect better with the policy makers, they often seem to mean that they want to get their message across on the importance of water and a prudent management of this precious resource: "The crucial role of water for socio-economic development, even in poor drought-stricken countries, remains poorly understood outside of the professional world." (Falkenmark, 2002, p.2), and "Water management problems include:…Limited political and public awareness of water issues." (Guerquin et al., 2003, p.26)

Water experts seem to have their own agenda, based on their technological expertise, and a conviction that they know what is good for the water system. They have an important message to tell the world, and have a moral obligation to communicate this message to the policy makers. Although they state that their role is to support policy makers in the choices they are making, rather than finding out what the questions are that these policy makers are interested in, most water experts believe they already know what policy makers *should* be interested in. These water experts welcome actor analysis with the expectation that it helps them to communicate their message, to help to educate the policy makers and other actors. They are less interested in outcomes of the actor analysis that are not instrumental to this educational purpose.

Case observations

In North-Holland, the actor analysis showed that the policy makers had priorities for water quality problems that were different from the priorities of the water experts. To their surprise, the water experts noticed that the policy makers' priorities were not in line with the actual impacts of polluting substances on water quality. Nevertheless, the initial approach that water experts had developed for the prioritization of polluting sources remained unchanged. In the same case, the use of herbicides in public space was identified as an interesting area for further analysis in a meeting with the regional water experts. This issue was selected because: "everybody agrees on the need to reduce the use of herbicides, and yet this is not happening". The actor analysis later showed that the need to reduce the use of herbicides was not felt by all the actors involved.

The water experts of the Water Resource Center in the Philippine case showed a strong commitment to the issues of tenure rights and dam construction. The water experts may have been right in their belief in the importance of these problems, but it also made it more difficult for them to open up to other actors' priorities. Part of their interpretation of the actor analysis outcomes therefore was that a lot of actors still did not see the really important problems and that education and information campaigns were required.

In the Turkish case, the project team was implementing the EU Water Framework Directive and in following the WFD it also 'inherited' its bias towards the use of new institutions such as river basin districts as the most appropriate way to organize water resources management. The actor analysis suggested that the institutional aspects might neither be the main problem in the current water system, nor the main answer to the problems, but nevertheless the institutional reforms were likely to remain an important component in the project. This might be due to the WFD requirements, but the team members seemed to at least share the belief in the benefits to be gained from institutional reforms (cf. Jaspers, 2003).

Implications for future use of actor analysis

In the official documents, the analysis projects by water experts are usually presented as objective technical exercises that provide neutral information to support policy makers. This suggests that actor analysis could be useful to help identifying the problems that the policy makers are interested in and that water experts should address in their projects. However, in practice, most of the water experts that work on policy related projects already know the problems and possible solutions that policy makers *should* be interested in. The main issue is to get the message on the main water problems and the most promising solutions across to the policy makers.

The role of water experts as "issue advocates" is not necessarily a bad thing, since they often express legitimate concerns; after all, they are the experts. However, it is another role than that of the independent and impartial researcher and therefore also suggests another role for actor analysis. An advocative role suggests that actor analysis can be helpful to water experts mainly to improve the communication of their message to policy makers. Water experts know best what is good for the water system, but they do not know the policy environment of which they are a part. Actor analysis educates water experts about the policy arena, helping them to deal more effectively with the actors in the policy environment. Actor analysis can show water experts how to catch the attention of policy makers, to what concerns of policy makers they could connect their message and what parts of their message need strengthening to convince in a policy debate.

11.3.6. Implications for future use of actor analysis by water experts

In the previous sections some mechanisms are suggested that help to explain why water experts did not use the output of actor analysis to formulate problems worth solving. These mechanisms are related to practical limitations in ongoing analysis projects, to more structural limitations caused by the institutional system and to a lack of support among water experts, who cling to their engineering tools and their pre-conceived ideas on the main water-related problems and solutions. What does this mean for the future use of actor analysis? Should one conclude that there is no point in doing actor analysis, as water experts are neither capable of nor willing to use its output?

The explanations presented in the previous sections do not necessarily suggest that actor analysis is not a useful tool for water experts, but rather that certain changes in its application might be required to improve the conditions for the use of its output. Actor analysis could be applied an earlier stage, when it is easier to make changes to problem formulations and project designs, or it could be applied mainly in projects that have a flexible design which leaves room for changes. Developing and disseminating additional tools that enable water experts to act upon the output of actor analyses, such as process facilitation and negotiation tools and skills, can also support the use of actor analysis output.

However, on the long term the usefulness and success of actor analysis depends on changes in the institutional context. Currently, changes in water institutions can be observed in response to the pressures of globalization, participation, decentralization and privatization (see e.g. Ravesteijn et al., 2002). These institutional changes are difficult to influence, but they are critically linked to the use of actor analysis output. In this process of institutional change, actor analysis can play a supporting role by providing water experts with a tool that enables them to question their traditional practices. This can help to persuade water experts to call more often upon the expertise from the non-engineering disciplines, where complementary knowledge exists that can effectively help to work in a more participatory way. At the same time, these changes will have a crucial impact on the future use of actor analysis, as an enabling institutional environment is required to embed actor analysis in participatory processes, rather than executing it as a "stand-alone" exercise.

If there is no supportive institutional change on the long term, actor analysis could still provide a useful tool to water experts, but in a somewhat different way than initially envisaged. In this case, it should be tailored much more to the needs of the "traditional breed" of water experts, providing them with support in the use of their engineering tools and in the advocacy of their concerns on the main water-related problems and solutions. Actor analysis then could be used to help them to identify relevant problems on which to use their engineering tools and models, even if these are not the most pressing problems on the political agenda. Or, stated differently, actor analysis could be used to help water experts to find problems for their solutions (cf. Kingdon, 1984; De Bruijn and Ten Heuvelhof, 2000). Actor analysis can also be used to help water experts to get their message and solutions across to policy makers, by being used to identify the critical actors that need to be convinced or critical arguments that need to be refuted to influence water policy processes in desired directions.

11.4. Reflection and future research

11.4.1. Focus on utilization of analytical output by water experts

The focus of this research was on the use of actor analysis as a means to identify problems worth solving and to help water experts to frame their analysis projects in a way that responds to the needs of policy makers. However, in the studied cases, the impact of actor analysis on this problem framing was not as large as initially expected. The water experts did not use actor analysis to change their substantive analysis; they did not include other analysis activities or add other aspects to their problem formulations.

Actor analysis did not lead to important changes in the substantive analysis and problem framing by water experts, but it did have some impacts on the studied cases. This was a more indirect impact through learning by water experts about their policy environment, and through supporting interaction processes. The actor analysis made water experts more aware of the policy context and

helped them to function as one of the actors within a policy arena. This suggests that the main use of actor analysis might be different than originally envisaged: not as an information provider to change problem framing by water experts, but as an activity that facilitates learning and that provides a channel for interaction between experts and actors.

The evaluation framework used for this study places the analytical output of the actor analysis central, focusing on impacts that can be related to this analytical output. However, there are also impacts that are generated simply by the act of executing an actor analysis. Interviewing actors and discussing findings with water experts is likely to influence the analysis process and the perspective of water experts.

The importance of these impacts of the process of executing the actor analysis points to the limitations of the "information-centred" evaluation framework used in this research. The evaluation framework was explicitly focused on the analytical output as a link between actor analysis and its practical usefulness for water experts, but the case outcomes suggest that the direct impact of this analytical output might not be as important as expected. Still, water experts were generally positive about the actor analysis, mainly due to the process of executing the actor analysis. For instance, in North Holland the interviews triggered the involved actors to reflect on their roles in the policy making process, while in Turkey the interviews for the actor analysis were useful to introduce the project to the actors and to involve them from the start.

Apparently, there is another important link directly from actor analysis application to impacts on the work of water experts in policy making processes, (see Figure 11.2). This direct link between actor analysis and utilization by water experts and actors also more adequately reflects the joint responsibility of water experts and policy makers in using scientific knowledge to support policy making. In line with some of the previous explanations for the observed utilization failure of actor analysis, this direct link also implies that actor analysis should not be considered only as a tool for water experts, but also as a tool for policy makers, which they can use before they approach water experts to support their policy making process. It would be worthwhile to explore this link further in future research on use and application of actor analyses.

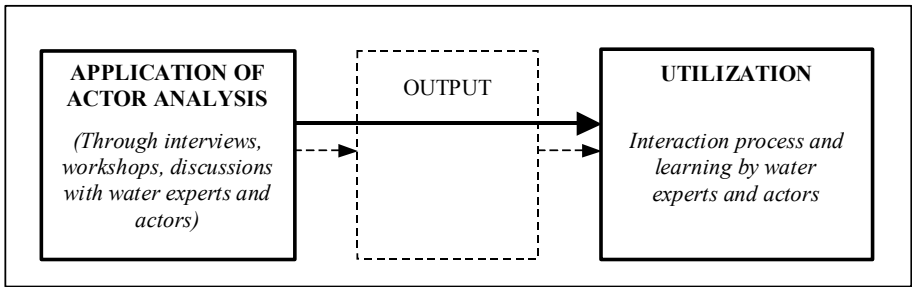


Figure 11.2 Changing accents in evaluation framework

11.4.2. Actor analysis as a participatory processes

In most of the models contained in the overview given in Chapter 3 an analyst perspective is assumed, where the analyst is a rational observer of a real world situation who translates his or her observations into a model, makes logical inferences from this model, and translates these inferences back to the real world situation. Only two models discussed in Chapter 3 have been developed for participatory applications, Strategic Options Development and Analysis (Eden, 1989) and the participatory application of transactional process models by Timmermans (2004).

Nevertheless, a participatory application of actor analysis does seem to have a high potential value. The direct involvement of actors increases the validity of the analysis, as the actors take part in the analytical interpretation of their positions, it enables a more effective communication of insights and it opens possibilities for shared learning and building mutual understanding. Finally, such direct involvement is likely to create a better sense of shared ownership for the analysis output. So far, practical experiences with participatory applications of actor analysis models are limited in the literature. However, the experiences that are available, including the participatory metagame application that was explored in the Egypt case for this research, indicate that actor analysis models hold a significant promise for participatory applications.

11.5. Actor analysis and its promise for water experts

Water experts often express their concern over the gap between themselves and policy makers. Closing this gap requires effort on behalf of both water experts and policy makers, but the focus here was on the role of the water experts. Not because they would have a greater responsibility than policy makers in this regard, but simply because they regularly express the desire to narrow the gap. At the beginning of this research, actor analysis was identified as a tool that was thought to hold the promise of helping water experts to identify what kind of useful knowledge they could contribute to ongoing policy processes. However, actor analysis was little used in practice and had the status of a promise yet to be fulfilled.

This limited use of actor analysis might be due to several practical reasons, such as the relatively recent introduction of actor analysis tools in the water sector, a lack of skills and expertise to use these tools or the limited usefulness of actor analysis output that might only stir up politically sensitive issues. Therefore, this research set out to identify an approach for actor analysis that would be relatively easy to apply within a limited amount of time and using limited resources, while still meeting requirements for analytical soundness. The resulting model-based approach to actor analysis was applied in four different cases, which resulted in output that the involved water experts indeed considered to be potentially useful to their work.

Although water experts considered the actor analysis output to be new, credible and relevant, they did not use it to modify their analysis activities significantly. Therefore, at the end of this research, one has to admit that actor analysis has not really lived up to the high expectations held at the start of the research. Practical barriers limit the extent to which water experts can use the output of an actor analysis, as path dependence and institutional complexities limit their room for manoeuvre. Furthermore, the mindset of water experts poses another barrier that seems to be at least as important.

Water experts have a genuine belief in their own tools and expertise and in their own problem formulations and solutions. Connecting with policy makers not only requires policy makers to be more receptive to the knowledge of water experts, but also requires water experts to depart from their water-oriented tools and solutions and to find a compromise between their own concerns and those of policy makers. The output of an actor analysis makes this very clear. The fact that water experts do not act upon this output does not necessarily mean that the actor analysis output is useless, but may well imply that water experts need to reflect critically on their grievances about the gap with policy makers and the role they want to play in the policy process. Do they really want to provide objective information on issues that policy makers are interested in, or would they rather advocate the importance of water problems and their possible solutions? Do they want to explore new participatory ways of addressing water problems, or would they rather stick with the traditional engineering approaches that have proven their usefulness in the past? Are they willing to share the drivers' seats of their projects with experts from other disciplines who have complementary knowledge? Water experts themselves are an important driver behind the creation and preservation of their gap with policy makers.

Actor analysis remains a promising tool to close this gap between water experts and policy makers, but it does not offer an easy solution. It is part of an emerging set of tools and approaches that fit in a relatively new stream of thinking about policy making as an interactive process between multiple actors. The application of actor analysis can not easily be isolated from this stream of thinking to be transplanted for use as a single tool. The effective use of actor analysis to close the gap between water experts and policy makers requires an effort on behalf of water experts that goes beyond a positive attitude towards this tool. Actor analysis needs to be combined with truly participatory approaches and new interactive ways to apply existing tools and expertise. Therefore, the promise of actor analysis can only truly be fulfilled if water experts commit themselves to the exploration of new ways of supporting policy development, venturing along roads they have not travelled before.

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Meetings, correspondence and informants for case chapters

NWRP Egypt case

Written answers to specific evaluation questions (email)
- Casper Veeningen, WL|Delft Hydraulics, Team Leader
- Nader El-Masry, MWRI, Project Engineer (involved in actor analysis activities)

Comments on prepration and on interpretation of case in (draft) publications (email)
- Tarek Sadek, MWRI, Project Director (incl. email 19/02/2002)
- Casper Veeningen, WL|Delft Hydraulics, Team Leader (incl. email 05/12/2001);
- Nader El-Masry, MWRI, Project Engineer (incl. email 02/12/2001)

Discussions on actor analysis during field visit in Cairo:
- Tarek Sadek, Project Director
- Casper Veeningen, Team Leader (long term consultant)
- Alexander Mueller, Arcadis/Euroconsult, Socio-Economist (long term consultant)
- NWRP Project Engineers
- Kees Bons, WL|Delft Hydraulics, Water Quality Expert (short term consultant)
- Erik Ruijgh, WL|Delft Hydraulics, Modelling Expert (short term consultant)

Plenary evaluation of participatory metagame workshop with members of the NWRP project team on 2 May 2001.

Presentation and discussion of preliminary results of actor analysis in meeting of NWRP Technical Committee on 10 May 2001.

Discussions on actor analysis in Delft (WL|Delft Hydraulics):
- Casper Veeningen, Team Leader (23/06/2003)
- Kees Bons, Water Quality Expert (as part of other meetings, a.o. 14/03/02)
- Eelco van Beek, Project Coordinator (as part of other meetings, a.o. 14/03/02)

Diffuse pollution Netherlands case

Meeting RWS 01/06/2001, with RWS representatives:
- Els van Bon – RWS-NH, FWVO, member Reg. Proj. Org.
- Leo Breedveld - RIZA-Emissies, project L3
- Sebastian Jansen - RWS-IJsselmeergebied, project L3

Meeting 10/07/2001, meeting RWS and Regional project organ., with:
- Hans Overbeek – Province of NH, coordinator regional project organization
- Els van Bon - RWS-NH, FWVO, member reg. Proj. org.
- Monique Zwiers - RWS-NH, member reg. Proj. org.

Meeting 07/11/2001, meeting RWS and Regional project organ., with:
- Hans Overbeek – Province of NH, representative regional project organization
- Monique Zwiers - RWS-NH, member reg. proj. org., L3

Meeting 15/11/2001, meeting project group of regional project organization NH, meeting of administrative representatives of member organizations (executive officials).

Meeting 03/12/2001, meeting steering group of regional project organization NH, meeting of decision makers of member organizations (elected officials).

Meeting 15/04/2002, meeting RWS and Regional project organ., with:

- Marja van Hezewijk - Province of NH, representative regional project organization
- Hans Overbeek - RWS-NH, member reg. proj. org., L3

Meeting 07/11/2002, meeting project group of regional project organization NH, meeting of administrative representatives of member organizations (executive officials).

Meeting 15/05/2003, evaluation interview with Hans Overbeek, formerly working for Province of North-Holland, currently working for Rijkswaterstaat North-Holland, member of regional project organization. Evaluation (interview transcript) checked and complemented by Els van Bon, Rijkswaterstaat North-Holland.

Meeting 19/05/2003, evaluation interview with Marja van Hezewijk, Province of North-Holland and member of regional project organization.

IWFD Turkey case

12 February 2002. Meeting with Teun Botterweg, Team Leader, Ecorys-NEI, Rotterdam

11 April 2002. Meeting with Enrico Moens, Project Director, Grontmij, and Teun Botterweg, Team Leader, at Ecorys-NEI in Rotterdam

4 June 2002. Preparation meeting with Kentkur Consultants Çağri Muluk and Hande Songür and with Frank Jaspers, project's institutional expert, IHE Delft, the Netherlands.

14 June 2002. Preparation meeting with project consultants (Çağri Muluk, Hande Songür, Mattijs Hehenkamp and Erwin de Bruin) at Grontmij office in Houten.

15 July 2002. Email Frank Jaspers, institutional expert (IHE), on planning actor analysis activities.

27 August 2002. Email to project team members in the Netherlands who were preparing the first regional workshop, containing attachment with DANA models of the interviewed actors.

3 September 2002. First regional workshop Implementation WFD project in Aydin (workshop report prepared by Mr. Halil Agah and Çağri Muluk, Kentkur)

5 September 2002. First meeting of Regional Working Group at PDoE office in Aydin.

10 December 2002. Evaluation meeting with five members of Regional Working Group at IHE in Delft. Among members present were representatives of the key actors in Aydin: Provincial Directorate of Environment (Mr. Özçan Yavas) and DSI, State Hydraulic Works (Dr. Doğan Akar).

12 December 2002. Evaluation meeting with members of WFD project team at IHE in Delft. Frank Jaspers (institutional expert, IHE), Enrico Moens (project director, Grontmij), Mattijs Hehenkamp (project administrator, Grontmij)

13 May 2003. Evaluation meeting with Teun Botterweg, team leader and economic expert, Ecorys-NEI, Rotterdam.

14 February 2002. Meeting with Eelco van Beek, professor integrated water management TU Delft and WL|Delft Hydraulics, co-organizer of future search workshop held in August 2000.

9 January 2003. Meeting with dr.ir. Han Rakels, member of Formulation Mission Team that drafted the project document for the Water REMIND project; co-organizer of future search workshop held in August 2000.

16 January 2003. Meeting with dr.ir. Rien Dam, Project Coordinator at CICAT, TU Delft, responsible for contacts Delft Cluster – Water REMIND project.

20 January 2003. Meeting with prof. Eelco van Beek, TU Delft / WL|Delft Hydraulics / Delft Cluster.

4 February 2003. Meeting with Father Herman van Engelen, SVD. Director USC-Water Resources Center.

5 March 2003. Short meeting with international consultants of the Technical Support Group (TSG) hired by Royal Netherlands Embassy (RNE) to support implementation of projects funded by RNE, including Water REMIND project.

7 March 2003. Stakeholder workshop for Water REMIND project in Cebu

22 March 2003. Comments TSG on preliminary report actor analysis (email, received through Alexander Mueller, economist, member TSG).

2 May 2003. Memo by Fr. Herman van Engelen and Fe Walag, resp. Director and Deputy Director of WRC, with comments on draft actor analysis report (email).

25 September 2003. Comments on (evaluation of) actor analysis by T. Nauta, Resident Expert for Water REMIND project (email)

29 September 2003. Memo on evaluation of actor analysis by Fe B. Walag, Deputy Director WRC (email)

Annex

Selection of factors for evaluation of case studies

Long list of potential factors for evaluation of case studies

Combining the frameworks of Goeller and Miser Quade provides different, partially overlapping, categories for the evaluation of case studies, as well a list of factors that can be used to evaluate the use of actor analysis to support water experts (Goeller, 1988, p. 587, p. 592; Miser and Quade, 1988, p. 639). An overview of these factors is tabulated in Table A.1. In addition to the factors identified by Goeller and Miser and Quade, two additional factors have been included, based on insights from the actor analysis literature described in the previous chapters: "quality of collected data" and "efficiency of analysis process". These are printed in *italic*. The listed factors are categorized following the evaluation framework of Goeller, distinguishing factors for analytical and utilization success, using the notions of input-process-output modes to further detail the factors that contribute to analytical success.

Table A.1 contains a long list of factors that all contribute to a successful application of actor analysis in the case studies. However, not all these factors are included in the case evaluation framework. Through the use of certain selection criteria for the cases (discussed in Section 5.3.1) and through the general procedure for the execution of the cases, certain factors are initially assumed to be sufficiently addressed in all cases and therefore they are excluded from the case evaluation framework. For example, the resources and time constraints and the support of the user group have been addressed through the case selection, as only cases were selected that allowed for a two to three month actor analysis and with conditions that were supportive to the use of the results.

Another part of the factors are excluded from the case evaluation framework because they show a considerable overlap with other factors that are easier to observe. For example, the persuasive validity of the results is difficult to assess, but has a strong link with the contribution of the results to policy analysis. The factor related to the common sense of results overlaps with the credibility-factor.

Finally, some factors are excluded because they are outside the scope of this research. The robustness of results, as established through sensitivity analysis, has not been assessed in any of the cases and is generally less applicable to the execution of actor analyses. Furthermore, if it would affect the use of the results, it would do so by affecting the technical validity of the analysis procedure and the credibility of its results. The collaboration with the intended users of the results has been limited to data collection and presentation of the results. Similarly, there was no direct involvement in the case studies for follow-up after the actor analysis was done. A more intensive collaboration, extended during the

follow-up phase after the actor analysis, is likely to affect the impacts of the actor analysis in a positive way. However, this was not feasible due to time and resource constraints for this research, and the applied working procedure is considered representative for the type of actor analysis tested in this research; actor analysis done within reasonable time constraints by an external expert.

The factors that are excluded are still shown in the lower part of Table A.1 and discussed in more detail below. These factors are excluded from the initial evaluation framework, but they might be revisited if the framework does not enable a sufficient explanation of the case study findings.

Table A.1 Overview of factors to evaluate the use of actor analysis to support water experts

	Analytical success		**Utilization success**
Input	**Process**	**Output**	**Utilization by water experts**
Included:	**Included:**	**Included:**	**Included:**
Problem formulation (purpose)	Quality collected data	Credibility	(Users of study)
Assumptions	Efficiency of analysis process	Relevance (pertinence)	Elements used
	Technical validity	Usefulness (e.g. new?)	Purpose/type of use
Excluded:	Match methodology (model) with case	**Excluded:**	**Excluded:**
Quality of available data		Availability	Imitation
Resource and time constraints	**Excluded:**	Timeliness	
Available theory	Documentation	Technical sophistication	
Support within user group	Communication	Professional recognition	
State of the art	Standards of professional practice	Supported by evidence	
Quality of analysts	Dissemination	Adequate coverage of issue?	
Adequacy of technical tools	Review of study	Intelligible?	
	Review of validation techniques	Consonant with ethical standards?	
	Ease of use	Conclusive?	
	Promotion	Persuasive validity	
	Style	Acceptance of conclusions	
	Collaboration with users	In line with purpose?	
	Analysts involvement in follow-up	In line with common sense?	
		Sensitivity analysis/robustness	

Motivation for exclusion of factors from the case evaluation framework

Factor	**Value of factor in cases**	**Sufficient?**
Resource and time constraints	Three months time and one main analyst, supported by team of water experts ('clients')	Yes
Available theory/methods	Actor analysis models described in Chapter 3	Yes
Support within user group	Supportive conditions as selection criterion for cases	Yes
State of the art	Worked according to state of the art as described in proposed procedure for actor analysis	Yes
Quality of analysts	Always same analyst, academic level experience in use of stakeholder analysis, policy analysis and water management	Yes
Adequacy of technical tools	Not applicable. MS Office software used and software that came with the method.	Yes
Application process		
Communication	Frequent communication prior, during and after analysis. Prior and after analysis in some cases limited to email communication	Probably
Promotion	Not applicable. Covered by other factors (communication, support, dissemination)	NA
Degree of formalization	Not applicable. Actor analysis was relatively new to most users, so formalization of analysis within user group could not be expected.	NA
Documentation	Extensive records, including reports and interview transcripts (see par. 3.2.2)	Yes
Style	Desk-oriented analysis based on interviews and validated by stakeholder workshops/meetings (except for Egypt case, partly participatory style)	Probably
Standards of professional practice	Followed best practices described in Chapter 2 and Section 3.2	Yes
Dissemination	Preliminary results discussed with water experts and wider group of actors. Reports made available to water experts	Yes
Collaboration with users	Limited collaboration, mainly for data collection and presentation of results	Room for improvemnt
Review of study	Actor analysis reports reviewed by water experts ('clients'), research supervisors and scientific peers	Yes
Review of validation techniques	Validation based on recognition by users and presentation to external actors. Not applicable as long as results are considered credible.	NA
Ease of use	Actor analysis reports concluded with specific conclusions and recommendations	Yes
Analysts involvement in follow-up	No, after finalization of report, analyst had not further formal role in activities by water experts	Room for improvemnt

Output/analytical outcomes		
Persuasive validity	Assessed only indirectly through utilization by water experts	NA
Availability (reports, briefings)	Reports available to PA team, meetings with wider group of actors	Yes
Timeliness	Timing taken into account in preparation and planning, reports available within one month after data collection	Probably
Sensitivity analysis/robustness	No sensitivity analysis done in any of the cases. Less applicable for performed actor analyses	Room for improvemnt
Technical sophistication	Assumed sufficient through other factors: state of the art, quality of analyst, standards professional practice	Yes
Acceptance of conclusions	Assessed indirectly through other output criteria (credibility, relevance, newness)	NA
Professional recognition	Papers based on results accepted for publication	Yes
Conclusions supported by evidence	As much as possible through use of model based approach for actor analysis (see Ch.2)	Yes
In line with common sense?	Covered by credibility criterion	NA
Adequate coverage of issue?	Assessed indirectly through other criteria (relevance, newness, technical validity, contribution to PA)	NA
Contribution to methodology and state of the art?	Not applicable. Actor analysis for cases intended to support PA, not to further methodology development	NA
Prestige	Not applicable. (and partly covered by professional recognition)	NA
Generalizability of results	Not applicable. Results in cases intended to support specific PA projects.	NA
Familiar and intelligible?	Reviews of reports suggest so, as well as evaluations provided by PA teams	Yes
Consonant with accepted ethical standards?	Assumed sufficient through review of reports	Yes
Recommendations conclusive?	Actor analysis reports concluded with specific conclusions and recommendations	Probably
Contribution to policy analysis		
Users of study	Focus was mainly on use by water experts	NA
Rate of use	Not applicable. Most results can be used or not, but not repeatedly.	NA
Imitation	Assessed indirectly as part of purpose/type of use	NA

Summary

Water experts who aim to use their knowledge and expertise to support water policy development have become aware of a gap between themselves and their clients, policy makers. Often, policy makers do not implement the solutions proposed by water experts and, despite the studies and reports made available to them, policy makers display a poor understanding of the crucial role of water in socio-economic development. Therefore, water experts are nowadays exploring ways to improve the connection between their analyses and the policy making process.

Actor analysis offers an analytical tool that produces knowledge about the actors, their interests, relations, influence, problem perceptions, preferred solutions to policy problems etc. It is this kind of knowledge that helps water experts to get to know more about their policy making environment and therefore, actor analysis is considered to have a high potential to help water experts to address the concerns of policy makers in their work.

So far, actor analysis has been little used by water experts in practice and has the status of a promise yet to be fulfilled. This limited use of actor analysis might be due to several reasons, such as the relatively recent introduction of actor analysis tools in the water sector, the lack of skills and expertise among water experts to use these tools or, possibly, the limited usefulness of actor analysis output that might stir up politically sensitive issues. The focus of this study was the unfulfilled promise of actor analysis as a tool for water experts, examining if actor analysis lives up to its promise for water experts if one takes away the practical barriers that might prevent a widespread use of this tool.

The first part of this study consisted of a literature review with a dual purpose. One was to develop a conceptual framework for the multi-actor context of policy making, describing the field of analysis to be covered by actor analysis. Another was to identify an approach for actor analysis that would be relatively easy to apply within a reasonable amount of time and using limited resources, while still meeting requirements for analytical soundness.

The methods known under the general label of stakeholder analysis provided a logical starting point for the identification of a practical approach for actor analysis. These stakeholder analysis methods have been used to support public policy making in the field of natural resources management since the early 1990s. Based on the literature about stakeholder analysis, it was possible to outline a general analysis procedure that would require relatively little effort and expertise on behalf of the analyst to make a quick scan of the actors in a policy making environment. However, the analytical core of the stakeholder analysis methods is quite weak. It consists of different tables or "laundry lists" of items that are neither clearly connected to each other, nor to underlying theory. This does not help the analyst to derive the input for the analysis and to translate the analysis outcomes into conclusions on stakeholder behaviour. Therefore, an

analysis procedure solely based on stakeholder analysis methods might not be sufficient to safeguard the analytical soundness of actor analysis.

For that reason, the use of models for actor analysis was proposed as a way to use the available theory on policy making processes to improve the analytical soundness of actor analysis. A model is a representation of a specific situation, based on an underlying theory, but usually much narrower in scope and more precise in its assumptions than its underlying theory. A model typically consists of clearly defined and logically consistent concepts and propositions, which help to guide empirical observations and the interpretation of data. The underlying theoretical framework is likely to trigger the analyst's thinking, forcing the analyst to resolve inconsistencies and ambiguities in the analysis, to reflect on the limitations of the used theory and to identify the particularly interesting peculiarities where reality cannot be captured by the selected model. Furthermore, the use of models enables a transparent presentation of findings and analysis procedures, making it easier to discuss results with peers and to identify flaws and possible improvements in the analysis.

There are different models that describe the role of actors in policy making and that can be used for actor analysis. These models were categorized according to their main focus: a focus on the influence of *network structure* on the interactions between actors, on the *perceptions* of actors that drive their actions and that fuel the policy debate, or on the actors' *resources and objectives* that drive their interactions. Because all the identified models have a rather limited scope, it is important to select a model for actor analysis that is appropriate for a specific situation. Therefore, the relevant characteristics of seventeen models were described in more detail.

The use of actor analysis models was considered to be a good way to balance the requirements for an actor analysis: appropriate focus, analytical soundness and practical feasibility. Actor analysis models provide analytical rigour, while they put relatively modest demands on time and resources for analysis and therefore their application was proposed as an addition to the general procedure of stakeholder analysis. Thus, a model-based approach for actor analysis, combining the general procedures for stakeholder analysis with the use of models for actor analysis, was elaborated as an answer to the question: How should an actor analysis be done?

This model-based approach for actor analysis was applied to four different cases to explore the practical usefulness of actor analysis to support water experts. The selected cases were located in Egypt, the Netherlands, Turkey and the Philippines and they covered different aspects of water resources management. Such a broad selection of cases was used to reflect the variety of situations in which water experts find themselves in practice and in which actor analysis could be useful. However, the cases had in common that they all consisted of policy analysis projects, executed by water experts who aimed to support policy development by providing sound and useful information to policy makers.

These cases provided a first practical test for the proposed procedure and guidelines for model-based actor analysis. The appropriateness of these guidelines was confirmed by and large, although the case experiences also offered some more detailed insights into their application. These additional insights were incorporated into the procedure for model-based actor analysis, resulting in a more elaborate set of guidelines.

The case evaluations indicated that in all four cases, the conducted actor analyses met the necessary standards for analytical soundness and that the output contained several insights that were considered to be new, credible and relevant by the involved water experts. Thus, the analytical success of the actor analysis was considered to be sufficient, providing a good basis for the actual use of the actor analysis output by water experts.

Although water experts considered parts of the actor analysis output to be new, credible and relevant, they did not use it to significantly modify their analysis activities. The utilization of the actor analysis output was mainly related to aspects that fitted in relatively well with the existing activities of the water experts or to general learning without many directly observable impacts.

Therefore, the actor analysis in all four cases could be characterized as an analytical success but a utilization failure. This contrast with the prior expectations raised the question if this was a peculiarity of the four studied cases or if possible explanations could be found in the literature. Therefore, the literature was explored again, to develop some hypotheses of underlying mechanisms that might help to explain the utilization failure in the cases.

Four underlying mechanisms were identified, related to: practical limitations in ongoing analysis projects (i), more structural limitations caused by the institutional system (ii), a lack of support among water experts who cling to their engineering tools (iii) and a lack of support among water experts who stick to their pre-conceived ideas on the main water-related problems and solutions (iv). These explanations do not necessarily suggest that actor analysis is not a useful tool, but rather that certain changes in its application might be required to improve the conditions for the use of its output by water experts.

Actor analysis could be applied an earlier stage, when it is easier to make changes to problem formulation and project design, or it could be applied mainly in projects that have a flexible design which leaves room for changes. Developing and disseminating additional tools and skills that enable water experts to act upon the output of actor analyses, such as process facilitation and negotiation tools and skills, can also support the use of actor analysis output.

However, on the long run the usefulness and success of actor analysis depends on changes in the institutional context. Currently, changes in water institutions can be observed in response to the pressures of globalization, participation, decentralization and privatization. These institutional changes are difficult to influence, but they are critically linked to the use of actor analysis output. In this process of institutional change, actor analysis can play a supporting role by providing water experts with a tool that enables them to question their traditional practices and to work in a more participatory way. At

the same time, these changes will have a crucial impact on the future use of actor analysis, as an enabling institutional environment is required to embed actor analysis in participatory processes, rather than executing it as a stand-alone exercise.

If there is no supportive institutional change on the long term, actor analysis could still provide a useful tool to water experts, but in a somewhat different way than initially envisaged. In this case, it should be tailored much more to the needs of the traditional breed of water experts, providing them with support in the use of their engineering tools and in the advocacy of their preconceived ideas on the main water-related problems and solutions. Actor analysis then could be used to help water experts to identify relevant problems for their engineering tools and models to solve, even if these are not the most pressing problems on the minds of policy makers. Actor analysis could also be used to help water experts to get their message and solutions across to policy makers, by being used to identify the critical actors that need to be convinced or critical arguments that need to be refuted to influence water policy processes in desired directions.

One has to admit that actor analysis has not really lived up to the high expectations held at the start of this study. Actor analysis remains a promising tool to close the gap between water experts and policy makers, but it does not offer an easy solution. It is part of an emerging set of tools and approaches that fit in a relatively new stream of thinking about policy making as an interactive process between multiple actors. The application of actor analysis can not easily be isolated from this stream of thinking to be transplanted as a single tool. The effective use of actor analysis to close the gap between water experts and policy makers requires an effort on behalf of water experts that goes beyond a positive attitude towards this tool. Actor analysis needs to be combined with truly participatory approaches and new interactive ways to apply existing tools and expertise. Therefore, the promise of actor analysis can only truly be fulfilled if water experts commit themselves to the exploration of new ways of supporting policy development, venturing along roads they have not travelled before.

Nederlandse samenvatting: Actorenanalyse voor waterbeheer

Waterdeskundigen die hun kennis en kunde willen gebruiken de voorbereiding van waterbeleid te ondersteunen, nemen een kloof waar tussen henzelf en hun opdrachtgevers, de beleidsmakers. Het komt regelmatig voor dat beleidsmakers niet de oplossingen kiezen die worden aanbevolen door waterdeskundigen en dat ze weinig begrip lijken te hebben voor het belang van goed waterbeheer voor sociaal-economische ontwikkeling, ondanks talloze beleidsstudies en rapporten. Om deze reden zijn waterdeskundigen op dit moment zeer geïnteresseerd in instrumenten die kunnen helpen om hun werk beter te verbinden met de wereld van de beleidsmakers.

Actorenanalyse is een analysemethode die gebruikers helpt om zicht te krijgen op de verschillende actoren en hun belangen, relaties, invloed, probleem percepties, voorkeursoplossingen voor beleidsproblemen, enz. Dit soort kennis helpt waterdeskundigen om hun beleidsomgeving beter te doorgronden en daarom wordt actorenanalyse beschouwd als een beloftevolle methode om waterdeskundigen te helpen hun werk beter af te stemmen op de vragen en behoeften van beleidsmakers.

Tot nog toe is actorenanalyse nog weinig gebruikt door waterdeskundigen in de praktijk en heeft het de status van een onvervulde belofte. Het beperkte gebruik van actorenanalyse kan verschillende praktische redenen hebben, zoals het feit dat de methode nog relatief nieuw is voor de watersector, dat waterdeskundigen vaak nog de kennis en vaardigheden missen om dergelijke methoden zelf toe te passen en de angst dat een actorenanalyse slechts politiek gevoelige zaken op zou rakelen die het beleidsproces meer kwaad dan goed doen. Het onderzoek dat in dit boek gepresenteerd wordt, richt zich op de onvervulde belofte van actorenanalyse als een instrument ter ondersteuning van waterdeskundigen, door te onderzoeken of de belofte wordt ingelost op het moment dat men tegemoet komt aan de verschillende praktische bezwaren.

Het eerste deel van het onderzoek bestond uit een literatuurstudie om een conceptueel kader te ontwikkelen voor de multi-actor context van beleidsontwikkeling, en zo het analyse-object van actorenanalyses in kaart te brengen. Daarnaast werd literatuurstudie gebruikt om een benadering voor actorenanalyse te vinden die relatief makkelijk is toe te passen, binnen een redelijke termijn en met bescheiden middelen, zonder de voorwaarden voor analytische kwaliteit uit het oog te verliezen.

De methoden die internationaal bekend zijn onder de noemer “stakeholder analyse” bieden een eerste aanknopingspunt voor het vinden van zo’n praktische benadering voor actorenanalyse. Dergelijke methoden voor stakeholder analyse worden gebruikt voor water en milieu-studies sinds begin jaren negentig van de vorige eeuw. Gebruik makend van de stakeholder analyse literatuur is het

mogelijk om een algemene procedure te beschrijven waarmee men met relatief weinig middelen en in korte tijd een eerste ruwe schets van de beleidsomgeving kan maken. Echter, de analytische basis van stakeholder analyse methoden is vrij zwak. Deze bestaat uit verschillende tabellen en een "waslijst" van elementen die noch duidelijk met elkaar verbonden zijn, noch met een onderliggende theoretische basis. Zodoende bieden ze de analist weinig steun om de benodigde informatie voor de analyse te vergaren en om de analyse-uitkomsten te vertalen in conclusies omtrent het gedrag van stakeholders. Daarom is een procedure die uitsluitend gebaseerd is op stakeholder analyse methoden waarschijnlijk onvoldoende in staat om de analytische kwaliteit van een actorenanalyse te waarborgen.

Om die reden wordt het gebruik van modellen voor actorenalyse voorgesteld als een wijze om de beschikbare theorie over de rol van actoren in beleidsprocessen te gebruiken om de analytische kwaliteit van actorenanalyses te verbeteren. Een model is een beschrijving van een bepaalde situatie in de werkelijkheid, gebaseerd op een onderliggende theorie, maar meestal met een veel beperktere reikwijdte en veel preciezer in de aannames dan deze onderliggende theorie. Een model bestaat doorgaans uit helder gedefinieerde en logischerwijs consistente concepten en veronderstellingen, die empirische observaties en de interpretatie van vergaarde gegevens ondersteunen. Het onderliggende theoretisch kader zal de analist er toe aanzetten om kritisch na te denken over eventuele inconsistenties en dubbelzinnigheden in de resulterende analyse en om zicht te krijgen op bijzonderheden in werkelijkheid die moeilijk binnen de kaders van het gebruikte model te vangen zijn. Daarnaast ondersteunt het gebruik van een model een inzichtelijke presentatie van analyse en uitkomsten, waardoor het beter mogelijk wordt om de resultaten van de actorenanalyse te bespreken met collega's en om gebreken en mogelijkheden voor verbetering te identificeren.

Er zijn verschillende modellen die de rol van actoren in beleidsprocessen beschrijven en die gebruikt kunnen worden voor het doen van actorenanalyse. Deze modellen kan men indelen op basis van hun focus: een focus op de invloed van de structuur van het *netwerk* van actoren op de interacties tussen actoren, een focus op de *percepties* van actoren die hun handelen beïnvloeden en de beleidsdiscussie voeden en een focus op de *middelen en doelstellingen* die de acties van actoren bepalen. Omdat alle gevonden modellen een beperkte reikwijdte hebben is het van belang om voor een actorenanalyse een model te selecteren dat geschikt is voor de gegeven omstandigheden. Ter ondersteuning van een dergelijke selectie, zijn de eigenschappen van zeventien modellen in detail beschreven.

Het gebruik van modellen voor actorenanalyse wordt geacht een goede manier te zijn om de vereisten van de juiste focus, analytische kwaliteit en praktische haalbaarheid met elkaar te verenigen. Modellen voor actorenanalyse bieden een ondersteunend analytisch kader zonder overdreven eisen te stellen aan benodigde tijd en middelen. Daarom wordt een model-benadering voor

actorenanalyse voorgesteld als antwoord op de onderzoeksvraag hoe een actorenanalyse te doen.

De model-benadering voor actorenanalyse is toegepast op vier verschillende casussen om het praktische nut van actorenanalyse voor waterdeskundigen te verkennen. Casussen zijn geselecteerd in Egypte, Nederland, Turkije en de Filippijnen en vertegenwoordigden verschillende aspecten van waterbeheer. Een dergelijke brede casusselectie is gebruikt om recht te doen aan de brede waaier aan situaties waarin waterdeskundigen werken en waarin actorenanalyse bruikbaar zou kunnen zijn. Ondanks hun verschillen hebben alle casussen met elkaar gemeen dat het in alle gevallen beleidsanalytische projecten betreft, waarin waterdeskundigen zich ten doel hebben gesteld om beleidsvoorbereiding te ondersteunen met bruikbare, wetenschappelijk verantwoorde informatie.

De vier casussen leverden een eerste praktische test voor de voorgesteld model-benadering voor actorenanalyse en de hiervoor geformuleerde richtlijnen. De toepasselijkheid van deze richtlijnen werd grotendeels bevestigd, hoewel toepassing in de casussen ook enige aanvullende inzichten verschafte in hun toepassing. Deze aanvullende inzichten zijn verwerkt in de voorgestelde procedure voor een model-benadering voor actorenanalyse, door een uitgebreidere set van richtlijnen.

De casusevaluaties laten zien dat in alle casussen, de uitgevoerde actorenanalyses voldoen aan de voorwaarden van analytische kwaliteit en dat ze verschillende inzichten opleverden die door de betrokken waterdeskundigen werden beschouwd als nieuw, geloofwaardig en relevant. Dit betekent dat in elke casus het analytische succes van de actorenanalyse voldoende is, hetgeen een goede basis biedt voor het gebruik van de uitkomsten van actorenanalyse door de waterdeskundigen. Echter, de waterdeskundigen maakten geen gebruik van de opgedane nieuwe inzichten om hun analyse activiteiten significant aan te passen. Het gebruik van de actorenanalyse-uitkomsten is voornamelijk beperkt tot die uitkomsten die relatief goed pasten binnen de bestaande activiteiten van de waterdeskundigen en tot leren over de beleidscontext in het algemeen, zonder dat dat tot direct zichtbare gevolgen leidde.

Zodoende kan in alle vier de casussen de actorenanalyse gekarakteriseerd worden als een analytisch succes maar een mislukking voor wat betreft praktisch gebruik. Dit is niet in overeenstemming met de aanvankelijke verwachting en het roept de vraag op of dit een bijzonderheid is van de vier bestudeerde casussen en of mogelijke verklaringen kunnen worden gevonden bij nadere bestudering van de literatuur. Bij nadere bestudering kunnen vier onderliggende mechanismen worden gevonden die een mogelijke verklaring bieden, gebaseerd op: praktische beperkingen binnen lopende analyse projecten (i), beperkingen van meer structurele aard veroorzaakt door de institutionele omgeving (ii), een gebrek aan steun onder waterdeskundigen, die vasthouden aan hun eigen ingenieursinstrumenten (iii), en aan hun ideeën over de eigenlijke waterproblemen en de beste oplossingen (iv). Deze verklaringen suggereren niet zonder meer dat actorenanalyse geen bruikbaar instrument is, maar wel dat bepaalde aanpassingen in het gebruik ervan nodig zijn om de voorwaarden te

scheppen die het gebruik van de uitkomsten van actorenanalyse door waterdeskundigen bevorderen.

Actorenanalyse kan worden toegepast in een eerder stadium, wanneer het makkelijker is om probleemdefinitie en projectontwerp aan te passen, of het kan worden toegepast in die projecten die een flexibele opzet hebben die voldoende ruimte laat voor aanpassingen in een later stadium. Het ontwikkelen en verspreiden van instrumenten en vaardigheden die waterdeskundigen in staat stellen om de uitkomsten van actorenanalyse om te zetten in nieuwe activiteiten, zoals vaardigheden voor het faciliteren van interactieve processen en onderhandelingen, kan een verdere bijdrage leveren.

Desondanks zullen op de lange termijn het succes en de bruikbaarheid van actorenanalyse afhankelijk zijn van veranderingen in de institutionele omgeving. Momenteel kan men veranderingen waarnemen in waterinstituties, als een reactie op de toenemende invloed van globalisering, participatieve benaderingen, decentralisatie en privatisering. Hoewel deze institutionele veranderingsprocessen moeilijk te beïnvloeden zijn, zijn ze wel onlosmakelijk verbonden met het toekomstig gebruik van actorenanalyse, omdat een ondersteunende institutionele omgeving nodig is om actorenanalyse in te kunnen bedden in participatieve processen, in plaats van het te gebruiken als een opzichzelfstaande analyse.

Als er geen ondersteunende institutionele veranderingen plaatsvinden op de lange termijn, kan actorenanalyse nog steeds wel een bruikbaar instrument bieden voor waterdeskundigen, maar in een iets andere manier dan aanvankelijk werd voorzien. In dat geval zou het veel meer moeten worden toegesneden op de behoeften van het meer traditionele slag waterdeskundigen, om hen te ondersteunen in het gebruik van hun traditionele ingenieursbenaderingen en in het uitdragen van hun ideeën omtrent de belangrijkste waterproblemen en de beste oplossingen. In dat geval kan actorenanalyse helpen om relevante problemen te identificeren die waterdeskundigen met hun traditionele ingenieursinstrumentarium kunnen oplossen, ook al zijn dit dan misschien niet de problemen die beleidsmakers het meeste bezig houden. Daarnaast kan actorenanalyse waterdeskundigen helpen om hun boodschap en de door hun voorgestelde oplossingen beter over te brengen op beleidsmakers, door de identificatie van belangrijke actoren in het beleidsproces die overtuigd moeten worden, of van belangrijke argumenten die weerlegd moeten worden om het beleidsproces in de gewenste richting te beïnvloeden.

Het valt niet de ontkennen dat actorenanalyse niet echt voldaan heeft aan de hoge verwachtingen die er waren aan het begin van dit onderzoek. Actorenanalyse blijft een veelbelovende methode om de kloof tussen waterdeskundigen en beleidsmakers te verkleinen, maar het biedt geen makkelijke oplossing. Het is deel van een breder scala aan benaderingen en methoden die passen binnen een relatief nieuwe stroming waarin beleidsvorming gezien wordt als een interactief proces tussen verschillende actoren. De toepassing van actorenanalyse kan niet zonder meer geïsoleerd worden van deze bredere stroming om getransplanteerd te worden als een

opzichzelfstaande methode. Effectief gebruik van actorenanalyse om waterdeskundigen en beleidsmakers dichter bij elkaar te brengen vereist een inspanning van waterdeskundigen die verder gaat dan een positieve grondhouding jegens actorenanalyse. Actorenanalyse moet worden gecombineerd met een werkelijk participatieve aanpak en met interactieve toepassingen van bestaande instrumenten en deskundigheid. Daarom kan de belofte van actorenanalyse pas echt worden ingelost als waterdeskundigen daadwerkelijke bereid zijn om nieuwe manieren van beleidsondersteuning te verkennen, de gebaande paden te verlaten en nieuwe wegen in te slaan.

Curriculum Vitae

Leon Hermans (Leidschendam, 6 June 1975) studied Systems Engineering, Policy Analysis and Management at Delft University of Technology (TU Delft) from 1993 to 1999. He specialized in water resources management and did practical field work in Yemen, where he conducted an actor analysis for the Ta'iz branch of the National Water Resources Authority, and New York, where he worked on his MSc thesis on the design of phosphorus management strategies for one of the New York City watersheds. After obtaining his MSc degree, he started a PhD research in November 1999 at the Faculty of Technology, Policy and Management of TU Delft, the results of which are reported in this book. In December 2003 he joined the Food and Agriculture Organization of the United Nations in Rome, working mainly on issues related to water valuation.