

DAM THE RIVER OR GO WITH THE FLOW? CHANGING VIEWS ON POLICY ANALYSIS IN DUTCH WATER MANAGEMENT

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Abstract

Does policy analysis (PA) exist outside the United States; or are the arts and crafts of policy analysis across the Atlantic a weakened and disoriented branch of *the real thing*? In this contribution a preliminary research project and research framework are proposed for Comparative Policy Analysis (CPA) interpreted as the comparative study of policy analysis styles in different policy (sub)systems. In order to illustrate and validate our proposal and the framework, the main characteristics (features) of policy analysis in the Netherlands are studied. The main question is what changes, if any, have occurred in policy analysis in the Netherlands since the Second World War and what events and learning processes triggered these changes? To answer this question, we use Dutch water management as a case. A traditional - engineering and economic - approach to policy analysis was successfully introduced in the Netherlands in the 1970s because the RAND corporation was involved in policy analysis studies on the flood protection of Eastern Scheldt estuary (the Polano-study) and the policy analysis for drought strategies (PAWN studies). Since then, the increasing ill-structured nature of Dutch water management problems, i.e. many actors, many problem perspectives, strong interdependencies, high uncertainty, controversies, has led to the incorporation of interactive, participatory and process-oriented styles of policy analysis into a traditional engineering based environment. The main findings are that: (1) Changes in policy analysis are not radical but new styles and methods are added to complement and fine-tune existing practices. (2) External events, such as floods and droughts, can have a marked effect not only on (changes in) dominant policy paradigms but also on policy analytic styles, methods and roles. (3) Policy analysis in Dutch water management is relatively conservative and reactive in its core, but experimentation and innovation in styles and methods has led to changes in the roles, language and methodological portfolio's of leading institutes.

Keywords: Comparative Policy Analysis / Water management / Policy Styles / Policy Change

1. The problem with comparative policy analysis

The real thing?

Consider two quotes taken from recent publications about the state of affairs in policy analysis.

No nation is even remotely in the same league as the U.S. in terms of supply of skilled policy analysts and large, highly qualified policy analysis and research organizations that have unbelievable capacity to manipulate and distribute an amount of information and interpretation not dreamed of at the start of federal policy analysis, when calculators, not computers were found on the desks of individual analysts. (Williams, 1999:158)

Indeed, in Europe, policy analysis methodology has not yet succeeded in finding its way, de facto, into policymaking processes. (...) This situation does not mean that policy analysis is not undertaken in Europe; rather, for most European policy analysts, knowledge and professional skills are unarticulated, tacit level of experience. (Iris Geva-May, 2002:251)

Does policy analysis (PA) exist outside the United States; or are the arts and crafts of policy analysis across the Atlantic a weakened and disoriented branch of *the real thing*? And if policy analysis does exist outside the United States - and from our point of interest in Europe and the Netherlands in particular - did or does it come about through a mere transplantation of theories, institutions and methods originally developed in the US; or has policy analysis outside the US an autonomous value, contribution and evolution? If various policy analysis styles exist in different countries that are not readily comparable, what than are these differences in style and what factors may explain them?

Until recently even the most reflective exponents of the PA-discipline did not typically raise such questions. However, since about the mid-nineties, the issue of comparative policy analysis (CPA) has attracted (renewed) attention (DeLeon & Resnick-Terry, 1999; Williams, 1999, Geva-May and Lynn, 1999; Amir, 2000; Geva-May 2002; Swedlow, 2002; Hoppe, 2002). Unfortunately, the picture of comparative policy analysis as portrayed in recent publications (ctf. the Journal of Comparative Policy Analysis) is somewhat diffuse and not unproblematic as far as the analysis of the different states of affairs and developments in policy analysis in various countries is concerned. Let us try to substantiate this proposition

by raising the following question: what exactly is compared in comparative policy analysis?

The meaning of CPA

In an early contribution to the Journal of CPA, Peter DeLeon (1999:10) argued that the comparative aspects of CPA involve 'similar policy issues among different nations'. DeLeon rightly argues that the first generation of CPA in the 70's and 80's was a dead-end. This, according to the author, was largely due to the fact that the demand for comparative lesson learning was lacking and that the theories and methods were flawed. (DeLeon, 1999:19). According to the same author, a now emerging second generation of CPA could be more successful because globalization has stimulated the need to learn cross-nationally and theories and ICT provide us with much better foundations for comparative research.

Duncan McRae's (1999:24 a.f.) further details the meaning of CPA by defining it as 'useful comparisons among nations or other political units, as well as borrowing lesson drawing.' (Mac Rae, 1999:23). For McRae, CPA can have two distinctive meanings: (1) comparative studies aimed directly at policy choice that will seek information derived from other nations to aid practical choices in the investigators own country. In other words, what practical aspects of policy can be transferred to a country that has used it to one that has not?; (2) Policies in various countries may be compared in the conventional style of basic social science as a means to generate knowledge and theories that will contribute to practical choices only indirectly. In other words, why do countries enact different policies and why do analysts assess policy options in different ways. (Ctf McRae, 1999:24).

McRae's obvious preference is for the first, although in his view some cross-national studies may be useful when explanatory independent variables can lead to policy suggestions for more effective policies. McRae's arguments on the nature of dependent and independent variables are illustrative in this sense: For the traditional and early approaches of comparative policy research - i.e. DeLeon's first generation - the dependent variables were typically valuative, e.g. the effectiveness of government or policy, while the independent variables were not manipulable. In his definition of a new generation of CPA, McRae however does not radically change the dependent and independent variables. He merely adds aspects as usefulness and manipulability as the main selection criteria for the dependent and independent variables. Not surprisingly, typical contributions to the field are cross-national studies where the effectiveness of

policy instruments for higher education (Dill, 2000), regulation (Majone, 1999), social security (Dixon, 1999) or agriculture (Coleman, 2001) are compared and transnational lessons are drawn. It is clear that this type of research is not concerned with the state of affairs of policy analysis styles in specific domains or countries. Policy analysis is the methodology for policy relevant lesson drawing and not the subject of study.

Now, let us contrast McRae's interpretation of CPA with recent contributions in the field of cultural theory applied to policy analysis (Geva-May, 2002; Hoppe, 2002; Swedlow, 2002). The following quote may introduce our point of argument.

Prevailing policy analysis theory maintains that although good policy-making may be based on good intuition and creativity, it should adhere to systematic approaches, namely, policy analysis methodology. While policy analysis implies intensive and professional filtering of data for systematic policy planning, policy analysis methodology and craft rely on the mainstream academic literature which is mainly American. However while the American market is replete with a range of established policy analysis models, very few of these are sufficiently sensitive to varying cultures and susceptible to delivery of culture sensitive skills. (Geva-May, 1999;244)

The assumption of cultural theory applied to policy analysis is that the PA-discipline is contextual and that this context is largely culture-bound: what would work in the US, would probably not work, or very differently, in France or China. The main research interest of this line of CPA is to examine the implications of cultural theory - e.g. hierarchical, egalitarian, individualistic or fatalistic cultures - for policy analysis (cf Swedlow, 2002). For obvious reasons we cannot go into depth about cultural theory here, but the implication is that policy analysis styles are viewed as dependent on cultural dimensions (Hoppe, 2002; Geva-May, 2002). Another important but more practical implication is that policy analysts should sharpen their crafts and adapt their tools taking into account different cultural contexts of policy subsystems or countries (Swedlow, 2002).

In other words, context in general and culture in particular, will and should determine policy analysis styles. These policy analysis styles may become manifest in values and beliefs, the role of the policy analysts, the use of tools and techniques, the analysts' strategies and probably other aspects. Cultural theory however does not exclude the possibility of

cross-national learning and transplantation of PA-styles and methods. DeLeon (1999) for instance describes some fairly good examples where approaches of participatory analysis and (local) planning have been transplanted from Europe to the States (See also Mayer, 1997; Fischer, 2000). This transplantation of policy analysis styles, e.g. methods, roles, models, approaches, however is not the same as the transplantation of effective policy measures as an outcome of comparative studies.

Changing the dependent and independent variables

The main argument we wish to make is that CPA may have two distinctive meanings which are quite different than those discussed by McRae. The difference is based in the reversal of the dependent and independent variable. Following the first interpretation of CPA, the dependent variables are manipulable operationalizations of policy effectiveness, and the independent variables are manipulable factors that may explain this effectiveness across policy arenas, subsystems or nations. Comparative policy analysis in this sense is comparative analysis *of* policies at a (sub)system level *for* lesson drawing and recommendation.

Following the second interpretation of CPA, the focus of attention is reversed and the dependent variable is turned into policy analysis (styles). This dependent variable, policy analysis styles, of course must be operationalized in observable or measurable dimensions such as values, roles, methods et cetera. The independent variables now are contextual factors, for instance found in cultural or institutional theories but other factors such as geographical conditions or events may play a role. The independent variables may help to explain differences in PA-styles across policy domains or countries. While in the first meaning CPA is comparison *of* and *for* policymaking *through* analysis, in the second meaning it is comparison *of* policy analysis styles *in* different policy contexts. In the remaining part of this contribution we will solely be concerned with the second meaning of CPA.

The dynamics of policy analysis

There is another dimension of CPA that needs to be considered; this is the evolution or change in policy analysis at a (sub)system level. In recent years, many studies have focused on policy analysis as an important factor for policy change (Hecl, 1974 & 1994; Hall, 1993; Rose, 1994) and policy oriented learning (Sabatier, 1987 & 1998; Bennett & Howlett, 1992; Sabatier & Jenkins-Smith, 1993; Minstrom and Vergari, 1996; Howlett & Ramesh, 1998). Few studies however have specifically fo-

cused on developments in policy analysis itself and the contributing factors. As has been argued convincingly in historic accounts on the evolution of policy analysis in the US, the arts and crafts of the discipline seem to be subjected to various carriers and barriers on the demand and supply side (DeLeon, 1988; DeLeon, 1999; Williams, 1999; and also House and Shull, 1991; Dunn 1994; Radin, 1997; Lynn 1999). Before we can even try to compare policy analysis styles cross-nationally, we would first need a general research model that allows us to study the evolution of policy analysis styles at a (sub)system level and the events and learning processes that contributed to these changes. To our best knowledge, no empirical and systematic accounts have been given on the development of policy analysis at various subsystem levels in countries *outside* the US. It may therefore very well be that the claim of US dominance in policy analysis originates from the fact that in other countries, different styles of policy analysis are prevalent but that these styles are not readily acknowledged as (part of mainstream) policy analysis. Other styles that are not very well established within the US, such as interactive or participatory styles of PA, may be more developed in other countries such as Denmark, Germany or the Netherlands (Mayer 1997; Fischer, 2000). If policy analysis exists outside the United States it may be necessary to widen our view of policy analysis styles and allow them to be considered worthy of the discipline. Otherwise we run the risk of falling into a tautological trap: (proper) policy analysis does not exist outside the United States because everything that is done outside the US is not (proper) policy analysis.

2. Narrowing down an ambitious research proposal

On the basis of the aforementioned arguments we would strongly support a cross-national research study comparing different policy analysis styles in different countries paying attention a/o. to the changes and evolution of policy analysis in various (sub)systems in different countries as well as the contributing factors that explain these changes and differences. The motivation for this research project of course is the fact that policy analysis is a varied and multi-faceted discipline and there is no single way of conducting policy analyses (Mayer, Daalen en Bots, 2001 and 2002). The PA-discipline consists of different schools, approaches, roles and methods (Bobrow and Dryzek, 1987; Hawkesworth, 1988; House and Shull, 1991; Dunn 1994; Lynn 1999; Radin, 1997). It can be

assumed that there are differences between contexts, countries, cultures, periods in time, regarding important characteristics of policy analysis such as styles, roles, preferred methods or the interaction between policy analysis and the political and policy system.

The proposed research project would imply a systematic analysis and comparison of the developments in policy analysis in terms of methods, approaches, underlying paradigms, use and usefulness over a longer period of time - probably several decades - in more than one policy domain in several different countries. In our view, besides the United States and other countries such as Canada or New Zealand, the smaller European countries with an open democratic and consensual culture such as the Netherlands or possibly Denmark (Ctf Mayer 1997; Fischer 2002) should be included. Boundaries such as time and sub national policy domains would have to be defined. In addition, a general framework is needed to better understand and compare the relevant dynamic aspects of policy analysis. Such a major undertaking cannot and will not be attempted here. A much less ambitious and preparatory research question however may back such a proposal.

What are the main characteristics (features) of policy analysis in the Netherlands? What changes, if any, have occurred in policy analysis in the Netherlands since the Second World War and what events and learning processes triggered these changes?

In the remaining part of this contribution we will narrow down our empirical domain to policy analysis for water management in the Netherlands between 1953 until the present date. The case of water management is interesting and exemplary for the following reasons: (1) Dating back to the middle ages, the Netherlands are among the leading countries in the field of water management; (2) Problems in water management are extremely messy and complex and have very distinctive technical, political and democratic features; (3) Water management in the Netherlands is one of the very early domains where policy analysis was imported or transplanted from the United States to Europe and the Netherlands. The early RAND-studies conducted on the Eastern Scheldt storm surge barrier in the seventies and the policy analysis of water management in the Netherlands (PAWN-studies) had a great impact on other policy domains and the dissemination of policy analysis in the Netherlands. (4) Since the last decade or so, policy analysis for water management has taken new inroads; participatory and interactive methodology has become an ac-

credited part of the toolbox both on the demand side and the supply side.

The structure of the remaining part of this contribution is as follows. First, we will develop a preliminary framework for analysis. We will base this framework on a model of policy analysis presented in other publications at an earlier date. Second, we will tell and structure the story of policy analysis for water management in the Netherlands between 1953 until the present date. Third, we will highlight and discuss a number of observations about policy analysis and policy styles. We conclude with a discussion of the findings and raise issues for further research.

3. A proposed framework for analysis

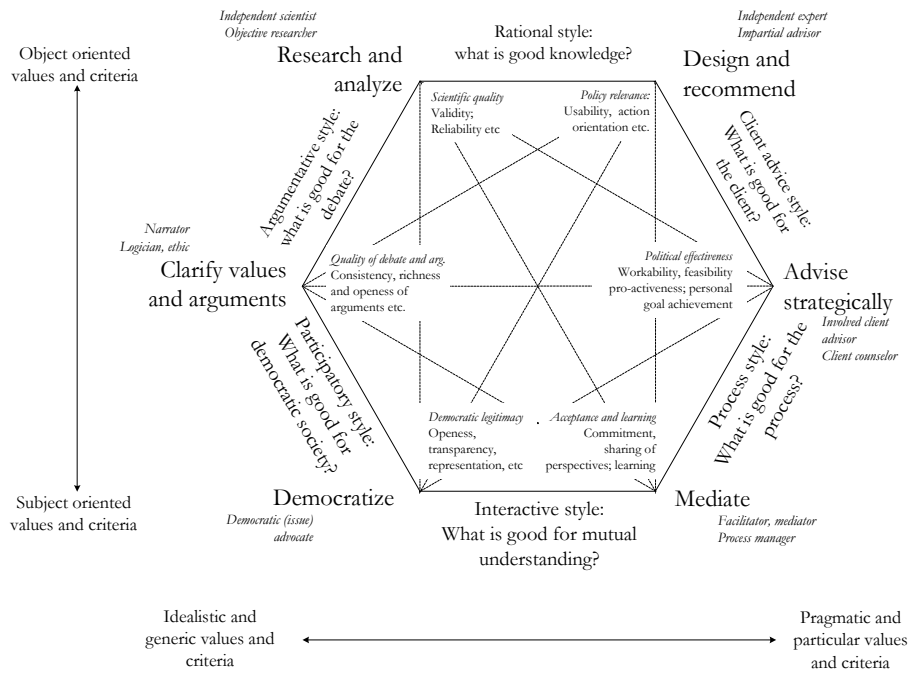
In order to set up a framework for CPA we would have to specify the dependent and independent variables of research.

Policy analysis as dependent variable

Various approaches of policy analysis criticize each other and it proves very difficult to define and describe what policy analysis is. In an earlier contribution we have therefore presented a conceptual model for understanding, designing and evaluating policy analysis. This model is presented in figure 1. For reasons of space, we must refer to earlier publications for a detailed clarification of the model (Mayer, Daalen en Bots 2001 and 2002). In short, the model is based on six general activities that policy analysts perform when it comes to supporting policy and policy processes: They are (1) research & analyze, (2) design & recommend, (3) provide strategic advice, (4) clarify arguments & values, (5) democratize, and (6) mediate. We have further argued that these activities root in different policy analysis styles: These are (1) a rational style, (2) a client advice style, (3) a process style, (4) an interactive style, (5) a participatory style, and (6) an argumentative style. We subsequently argued that these styles are based on different values and apply different criteria for judging the quality of policy analysis: activities on the left-hand side are judged by idealistic and generic criteria for good policy analysis, such as validity, reliability, consistency, fairness, equality or openness. The activities on the right-hand side of the hexagon are judged by pragmatic and particular criteria, such as workability, usability, political effectiveness, opportunity, feasibility or acceptance. The model relates these values to

different roles of policy analysts in the policy process (Durning & Osuna, 1994).

Figure 1: a conceptual model of policy analysis styles



The main argument we wish to make here about the hexagon shaped model as portrayed in figure 1 is that it provides a starting point for identifying and operationalizing four important aspects of policy analysis styles as the dependent variable of our model:

- (1) The underlying *beliefs*, e.g. the values and worldviews about what is and is not good or proper policy analysis;
- (2) The *roles* that policy analysis and analysts actually play in policy-making;
- (3) The preferred *methods* or *methodological approaches* of PA;
- (4) The *institutions* and *institutionalizations* of policy analysis, e.g. the number of organizations, the characteristics of the PA-market, the rules and regulations that guide the relations with clients.

Changes in policy analysis over a period of decades, or differences across contexts, can be described in terms of these aforementioned aspects. But what triggers or prevents these changes in policy analytic styles?

Events, social context, institutions and learning

It has been argued above that policy analysis is contextual and that this context can be considered as cultural. However, it seems unlikely that differences (in evolution of PA) between systems (e.g. countries) or sub-systems (e.g. policy domains or belief systems) can be explained by cultural factors alone (or other factors should explain cultural differences and cultural changes).

The development of water management in the Netherlands for instance is first (and maybe foremost) the result of geographical conditions and significant events such as floods and droughts that have occurred since the early middle ages until today. Like changes in policy, changes in policy analysis are the result of a variety of factors: some are external to the system such as events; some are contextual such as cultural or political trends that are part of society at large; some are institutional such as changes in legislation or a swing from state to market; and finally there are factors that result from learning processes, e.g. a growing awareness of the problems incongruences and incompatibilities of existing policy (analytic) practices (Hall, 1993; Sabatier, 1987 & 1998; Sabatier & Jenkins-Smith, 1993; Bennett & Howlett, 1992; Howlett & Ramesh, 1998).

In other words, starting points for identifying possible independent variables can be found in:

- (1) *System theory*, e.g. important events coming from outside the system.
- (2) *Cultural theory*, e.g. conditions and trends that describe the cultural state of the (sub)system;
- (3) *Institutional theory*, e.g. the rules and regulations, market and political systems that guide the (sub)system;
- (4) *Learning theory*, e.g. the dominant beliefs and paradigms about the nature of the problem and the best way to solve them, including the available knowledge base and its incompatibilities and incongruences within.

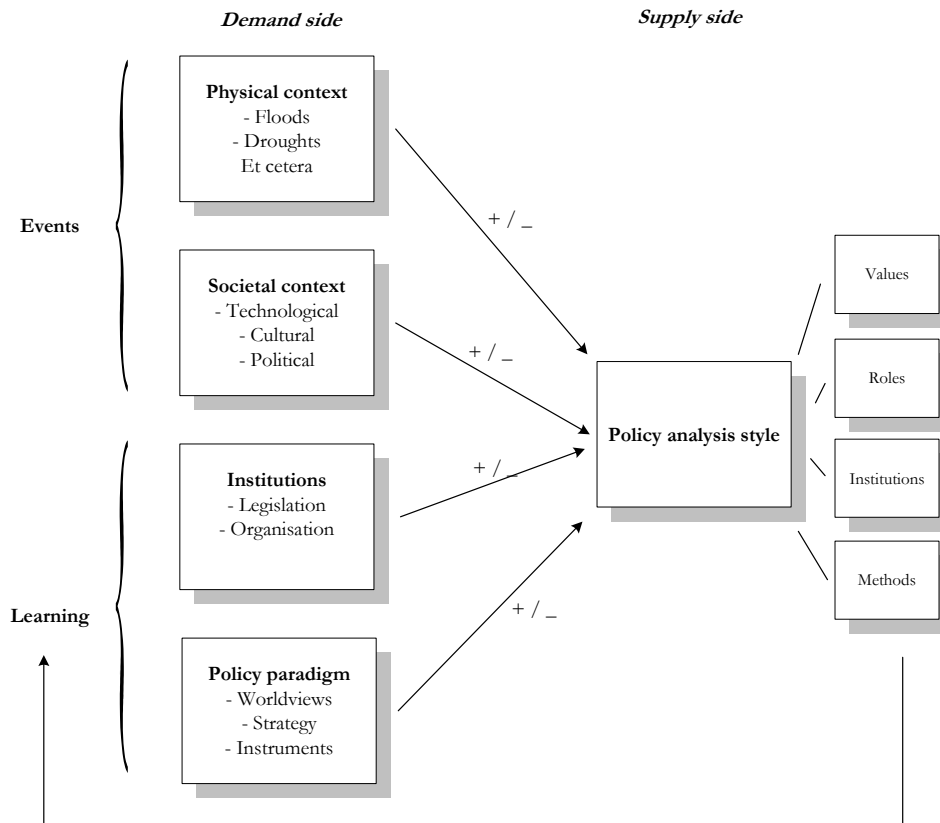
Supply, demand and feedback

Learning theories have focused on how policy analysis contributes to policy-oriented learning (Sabatier, 1987 & 1998; Sabatier & Jenkins-Smith, 1993): In the wordings of Peter DeLeon (1988 and 1999) the supply side educates the demand side. In many or most instances however, policy analysis is a commissioned activity. The demand side might therefore very well determine the supply side. Policy analysts hold beliefs about problems and best approaches, in the same way that policy makers hold beliefs about theirs. Although (some) policy analysts may have (taken) the liberty to speak truth to power, in many cases the client finances their studies, gives them the problems and sets the boundaries in their search for solutions. To put it bluntly, if for some reason certain modeling or cost benefit approaches are out of fashion and interactive approaches are in fashion within the policy system, PA-institutes competing for commissions will have many incentives to incorporate these interactive methods into their toolbox. If on the other hand, the results of certain approaches are disappointing, policy makers may have incentives to try out new approaches from other institutes. Figure 2 presents the research model for CPA. The framework can be used to generate a number of research hypotheses:

- *Events*, such as floods and droughts in the case of water management, are likely to create a sense of urgency, windows of opportunity and can lead to changes in policymaking. These events and changes in policymaking can have effect on policy analysis styles leading to changes in beliefs, methods, institutions and roles of policy analysis.
- *Wider social, political and cultural changes* such as a trend towards more democratization or decentralization will lead to corresponding changes in policy analysis styles.
- *Institutional conditions and rules* such as when and how often policies are to be evaluated or accounted for, co-determine policy analysis styles.
- Changes in policy analysis styles and methods can be the result of *learning process* on what constitutes 'good' policy analysis both by clients and users as well as policy analysts. These learning processes on the benefits and limitations of policy analysis styles will appear as incongruences and incompatibilities between what is demanded and what is delivered.

The line of argument presented above gives us the following research model for CPA.

Figure 2: Proposed research model for comparative policy analysis



In the next sections, we will give a condensed illustration of the application of such a model using policy analysis for water management in the Netherlands as a case study. We will concentrate on flood management along the river Rhine during the last decades (1953-present day). The story of policy analysis for water management in the Netherlands is a rich tale full of events, (almost heroic) engineering projects, methodological transplantations and innovations but also political conflicts and stalemates. The developments can be described as a sequence of external events, i.e. floods and droughts, policy analysis studies and subsequent decision-making followed by (often a lack of) implementation. Although the emphasis is on flood management, we will digress to other areas

when relevant for understanding the development of policy analysis in the Netherlands. We will first tell the story of policy analysis and water management in section 4, and then analyze the case of policy analysis in section 5 using the model.

4. The story of water management in the Netherlands

The stage

From the rivers Rhine and Meuse, the Netherlands receive a large inflow of water via Germany and Belgium. As most part of the 'low countries' are actually below sea level, water management is largely about *keeping our feet dry*. Historically, the containment of floods has been a main concern in Dutch water management. To organize flood protection, water boards, i.e. regional water management authorities, were established as early as the 12th and 13th century. Nowadays these water boards are functional decentralized governmental bodies, democratically elected and with great expertise and executive power in the field of water management. Figure 3 shows a map of the Netherlands that summarizes some important geographical characteristics of the rivers Rhine and Meuse.

The storm surge disaster of 1953

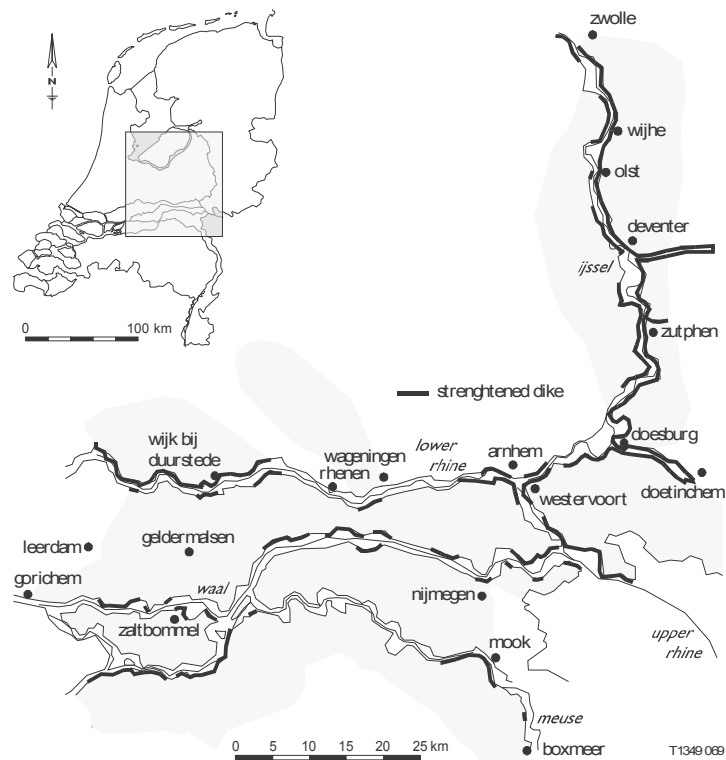
In 1953, a storm tide hit the Netherlands. Catastrophic flooding occurred in the South Western Delta area. Almost 2000 people died during these floods and the economic damage was enormous. The conceivable reaction was: 'This may never happen again'. The *Delta committee*, established soon after the event, published its important *Delta Plan* in 1960. It comprised a large set of engineering works to raise protection from the sea. The Dutch government incorporated the plans of the Delta committee plan in the famous *Delta law*. Except for entrances to the ports of Rotterdam and Antwerp, most sea-channels and estuaries were to be dammed off from the sea.

Policy analysis as engineering

The Delta committee also introduced a completely new approach to determine the required level of protection against flooding. After the last 'real' flood event in 1926, engineers had determined the required height of the embankments on the basis of the following principle: *the highest observed water level plus 1 meter*. On the basis of a *cost-benefit analysis*, the Delta committee determined a new optimum level of protection, formu-

lated as *return period* for the design water level. Taking into account the variances in risk and possible damage, different return periods for the Delta and rivers were established: for the central western part of the Netherlands where the main cities Amsterdam, Rotterdam and The Hague are located, a protection level of (on average) one flood in 10,000 years was adopted; for the dikes along the river Rhine, a protection level of one flood in 3,000 years was proposed.

Figure 3: Schematic map of the River Rhine and its branches within The Netherlands



Growing concerns

In the 1960's and early 1970's, most of the Delta works were constructed according to plan. The engineers and decision makers started with the smaller works and then proceeded with the larger works, thereby developing great expertise in the design and construction of the closure

works. In the early seventies, most works were completed except for the biggest and most ambitious challenge of the Delta plan: the closing of the Eastern Scheldt Estuary. Triggered by environmental concerns, i.e. the conservation of the tidal and salt-water ecology, and economic interests, largely fishery, the societal and political opposition against the closure of the Eastern Scheldt had risen significantly. The matter led to fierce political and societal debate and caused a deadlock situation. Meanwhile, many of the dikes along the river Rhine were heightened and reinforced rather rigorously. As with the Eastern Scheldt barrier, the opposition against river dike reinforcements grew. It was a logical response to the destruction of landscapes, cultural-historic sites and ecosystems along the rivers. Here also, societal protests and legal procedures led to an impasse in decision-making. The implementation of the plans for dike reinforcement came to a halt.

In reaction to the impasse and the implementation problems of flood protection along the river Rhine, the government installed the independent *Becht committee*. The committee was asked to give advice on how the deadlock situation could be 'opened'. Based on a number of engineering studies, the Becht committee recommended a better incorporation of the values of landscape, ecology, culture and history through *smart designs* for dike reinforcement. In addition, the committee recommended lowering the *return period* of a river flood to once in every 1,250 years. A lower return period of course reduced many of the strains regarding the local impacts of dike reinforcement but did not enhance safety.

The Polano study

The aforementioned plan to close off the Eastern Scheldt almost led to a fall of the then governing coalition cabinet. Two opposing views existed: (1) the closing of the estuary as proposed in the Delta plan; (2) the enforcement of the dikes along the estuary as proposed by environmental pressure groups. Once again, a government committee was installed to break the stalemate. The committee found an alternative that could reconcile the values of safety, ecology and fishery and could therefore be acceptable to all parties. The innovative solution was to build a *storm surge barrier*, a dam that could be closed under severe weather conditions but would otherwise remain open to allow the free flow of seawater in and out of the estuary. On behalf of the Dutch Ministry of Public Works and Water management, the American RAND Corporation carried out its famous Polano-study to support the subsequent decision-making (Goeller, 1977). By and large, the Polano-study was an impact assessment of

the three alternatives to flood protection: the original closure plan, the plan to raise the dikes around the estuary and the storm surge barrier. The results of the analysis conducted by the RAND-analysts were presented in colorful *scorecards* providing decision-makers with a comprehensive overview of possible options and their impacts. Because of its innovative approach, its high status and its great impact, the Polano-study and the RAND style of policy analysis of the time gained a high profile in Dutch water management and other areas.

Droughts as another concern in water management: the PAWN-study

The containment of floods is not the only challenge in the Netherlands. Periods of extreme drought can also cause serious problems and damage to the economy. In the summer of 1976, the Netherlands faced one of the most serious droughts of the 20th century. In response, the *PAWN-study*, an acronym for Policy Analysis of Water management in the Netherlands, was commissioned. Furthermore, the PAWN-study was a good opportunity to replace the first policy document of 1968 on water management and get input for a second governmental policy document. ‘Water supply under drought conditions’ became the major theme of the PAWN-study and the 2nd governmental policy document on water management. The PAWN-study was a major research project carried out between 1977-1980 and involved the Ministry of Public Works and Water management, the RAND Corporation and an independent technological research institute from the Netherlands, Delft Hydraulics. The budget of the project was some 5 million Euros in 1980 price-levels. The study included a thorough and comprehensive *systems analysis* of the Dutch national and regional water systems and its use[r]s. Various computer models, still main frame at the time, simulated the dynamics of water management. The outcomes of the PAWN-study were used to draft the 2nd policy document on water management issued in 1984. This was also the year that the PAWN-study was awarded the Management Science Achievements Award by the Institute of Management Sciences, USA.

In the early and late 1990’s, the *systems analysis* approach developed for the 2nd policy document was repeated for the 3rd and 4th policy documents. Although water supply remained an important issue, water quality, the ecological recovery of water systems and the interaction of water management with spatial planning were new important themes in these policy documents. In the policy analysis PA-study were updated and extended: The older models were updated to allow them to be used on

personal computers. New simulation models that covered new issues in water management such as water quality were developed.

It is noteworthy however, that although the scope of the policy analysis studies had become much wider and the quality of the studies and models had strongly improved, the actual impact of the systems analysis studies, i.e. its use and usability, for policymaking decreased significantly. The systems analysis approach perfectly matched the dominant engineering approach and safety paradigm of policy makers. While social institutions, stakeholder behavior and quality aspects such as ecology, landscapes became more important, policy makers and analysts gradually realized that the tools and tricks of the systems approach were much less effective. The styles and methodology of policy analysis for water management had to be broadened.

The protest against the dike reinforcement program remains

Meanwhile, the aforementioned recommendations regarding the smart engineering of dike improvements put forward by the Becht committee, were not properly adopted and implemented by the authorities. As a consequence, stakeholder protests often resulted in lengthy appeal procedures and delays in the completion of the dike reinforcement program. Because the most recent floods along the river Rhine had been in 1926, politicians and societal stakeholders did not feel a great urgency to strengthen the dikes. Moreover, the construction of the storm surge barrier in the Eastern Scheldt estuary had exceeded its budget markedly. To fill the financial gaps, the funds reserved for dike improvement were siphoned to the Delta works.

In 1987 the influential *Plan Stork* was published. The plan included a vision on nature development on marginal agricultural lands including the flood plains of the rivers. The publication of this proposal widened the scope of the policy agenda even further: nature development and the conservation of natural and cultural-historic sites became an integral part of the policy paradigm.

With the completion of the storm surge barrier in the Eastern Scheldt in 1985, the required funds for the river dike programs were released and the implementation of the program gained priority. The space of implementation remained slow however. In 1993, the *Boertien committee* was installed to evaluate the starting-points for dike reinforcement. An important policy analysis study was commissioned to a consortium consisting of Delft Hydraulics and the recently established RAND-Europe division located in Delft. Based on these policy analysis studies, the Boertien

committee came up with a number of recommendations. First, the committee reiterated and confirmed the recommendations of the Becht committee calling for smart designs taking into account local natural and cultural-historic values. The policy analysis study also scrutinized the statistics of the river flows, which resulted in a recommendation to lower the design water levels.

The floods of the 1990's

In 1993 and 1995, serious flooding occurred in the basin of the river Meuse. On both occasions, there were no casualties but the economic damage mounted up to 200 million Euro. After the 1993 flood, the *Boertien II committee* was installed to investigate the flooding and recommend solutions for the flooding problems. A major policy analysis study was commissioned to a consortium led by Delft Hydraulics. This Boertien II study was in fact one of the last comprehensive policy analysis studies tendered to a consortium of research institutes and private consultants. A thorough systems analysis of the river behavior under flood conditions was carried out and alternative strategies were developed to reduce flood damage. An interesting and innovative aspect of the study was that the committee took great effort to consult local stakeholders and the public at large for their suggestions on how to solve or alleviate the flooding problem. The Boertien II committee had taken a first step towards the introduction of a more *interactive* and *participatory* style of policy analysis into the seemingly technocratic world of engineers and water managers.

Early 1995, there was an even more serious risk that the dikes of the river Rhine would collapse. This would lead to the inundation of a large area along the river with depths up to 6 meter and a sincere risk of casualties. The authorities summoned the evacuation of 250.000 inhabitants in the areas at risk. In the end, the dikes did not collapse but the evacuation costs were substantial and it seriously disrupted daily and economic life.

There is a saying often quoted by Dutch water managers, which translated to English says: 'Lord, give us our daily bread and an occasional flood'. The 1995 flood placed the dike-reinforcement program high on the political agenda. A *Delta law* for the large rivers was rushed through parliament. It restricted hearing and appeal procedures and forced the execution of existing plans. The dike reinforcement program gained momentum and by the year 2000 nearly all parts of the reinforcement program of hundreds of kilometers of river dikes had been realized. The 1995 flood event also triggered a rather proactive policy response: the

policy directive 'Room for the river' was accorded in parliament. This policy directive restricted the use of land for construction and commercial activities in areas prone to floods. It has been under local economic pressure ever since. Memory seems to fade as fast as the river flows.

Climate change as a new concern

The floods of 1993/1995 in combination with the international debate on the effects of global warming, raised the awareness about the risks of floods and droughts. In reaction, the aforementioned institute Delft Hydraulics launched an in-house research project called 'river Rhine in longer-term perspective' (Obdam, 1998). The study included rather pessimistic assumptions about the impact of climate change on river flows and water levels forcing a long-term closure of the storm surge barrier in the Rotterdam waterway. The project intended to generate new and challenging ideas for the future of water management and make them part of the policy debate. From a point of exposure, the foresight study was very successful: at the time, it was the headline of many Dutch news bulletins.

'Room for the rivers' as a new policy paradigm

Considering the fact that flood management is vital, the Dutch Law on Water Defenses orders that hydraulic boundary conditions, i.e. design water levels and wave heights, should be updated every five years and that water defenses should be evaluated for these new conditions. The flood events of 1990, not only put flood management higher on the political agenda it also led to a significant adaptation of the river flow statistics. The new boundary conditions for 2001 implied a further reinforcement of the dikes by 0.5 to 1 meter, at a time when the reinforcement program based on the former statistics was nearly completed. Understandably, water managers proved very reluctant to further raise the river dikes. At the turn of the millennium, serious doubts were raised whether the Netherlands could go on enforcing the dikes. Now, alternatives were studied and debated in order to reach a more sustainable response to the impacts of climate change and improve the spatial quality of the flood plain areas. The alternatives relied on strengthening the resilience of rivers and nature and giving room to the rivers. In a relatively short period of time, the policy paradigm of policy makers, engineers and water managers changed significantly: dike reinforcement changed from most preferred to least preferred option, only to be used when other flood protection measures such as giving space to the rivers were unfeasible. Based on the new policy paradigm a whole sequence of *reconnaissance*

policy analysis studies was carried out: studies combining monitoring, forecasting and impact assessments. It is noteworthy that the scope, starting-points and boundary conditions of these studies evolved in reaction to the insights of, and critique on previous studies. The earlier studies were rather local, conservative in their starting points and still reflected the dominant perspectives and interests of the powerful water management authorities. In the later studies much larger areas that crossed the regional boundaries of the various water authorities were considered, longer-term perspectives were adopted and many political and cultural constraints to possible solutions were overcome. This evolution might be understood as a learning process of water authorities, policy makers, engineers and policy analysts. They adapted to the benefits and pitfalls of their traditional methods and approaches and developed better and new ones. In some cases, powerful insights were gained because the analysts ignored many of the pre-set constraints and therefore were able to present provocative but feasible solutions for local bottlenecks. Over time, local authorities adopted some of these solutions, sometimes after modification. Let us give one brief example. In the eastern part of the Netherlands, near Nijmegen, the river is too narrow and this stretch of river is considered to be a hydraulic bottleneck. Analysts had suggested creating a bypass around Nijmegen as a very cost-effective way of lowering design water levels. This proposal met a lot of opposition at first, but it also induced local authorities to come up with a plan to relocate the winter dike backwards and integrate it into the planning of water-bound urban development. The policy analysis studies conducted for the project acted as a crowbar for an open discussion on possible solutions.

Water management in the 21st century

Excessive rainfalls in 1998, causing a damage of 400-500 million Euros, triggered the project *Water management in the 21st century* of 1999/2000. When they visited the flooded areas, the Dutch queen and prime minister raised the question whether the Dutch regional water systems were still up to date. Again, the flooding event put water management high on the political agenda. In a personal interview, the Dutch crown prince expressed his great interest in water management. He soon took up an active and leading role in the field and among others was appointed honoree chair of the committee for Integrated Water Management. The routine way of working during the previous decades was to install an independent committee supported by a consortium of a few authorita-

tive policy analysis institutions in the field of water management. These consortia conducted comprehensive policy analysis studies for these committees. However, the organization and way of working in the project Water management in the 21st century was a clear break with this routine, and it set the standard for the organization of policy analysis in water management until this date. A temporary project bureau with a staff of five people was set up to support the committee. After a few months of orientation and round table discussions, the project bureau presented a research program that consisted of fifteen research themes. The committee subsequently commissioned studies from a wide spectrum of consultancy bureaus and experts. The underlying objective was to mobilize and interrelate a large number of experts with different forms of expertise. In practice however, the many consultants faced problems to coordinate with the other themes and develop proper integrated analysis. The project bureau did not have enough capacity to coordinate the studies properly. As a consequence, some reactions afterwards indicated that the quality of the policy analysis studies were far below expectations and budget efforts.

5. Policy analysis in water management

We started the case-study raising the question what are the main characteristics (features) of policy analysis in water management, what changes, if any, occurred and what events and learning processes triggered these changes. The preliminary analysis of the story of water management leads us to a number of observations. In Table 1, the main conclusions are presented in the framework of analysis. We can best structure the developments in policy context and policy analysis styles into five periods (see also Van Leussen, 2002):

- Policy analysis *avant la lettre* (1953–1975)
- Introduction of policy analysis ‘American style’ (1975–1980)
- The hey days of systems analysis (1980–1993)
- The experimental years; interaction and participation (1993–1998)
- The managerial approach to policy analysis (1998–today)

1953–1975: policy analysis avant la lettre

The contextual side of this period can best be characterized as a ‘safety first’ paradigm. In other words, water management implied protection

against flooding by the construction of large water works and reinforcement of dikes. It largely coincides with a period of consensual politics among elites in the Netherlands (Cf. Arend Lijphart's famous analysis of consensual politics in the Netherlands, 1968). There was still an unquestioned belief in science and engineering. The work of the Delta committee followed by the Delta law and execution of the Delta works greatly stimulated the demand for policy relevant knowledge and analysis in the field of water management. Policy analysis, *avant la lettre*, consisted of engineering studies to support dike-reinforcement and the closing off of estuaries, augmented with economic (cost benefit) analyses. A great body of policy relevant knowledge was available within the water boards and the engineering societies and firms. The tools and methods of knowledge for policy making were derived from the engineering and economic sciences. The values from these fields were dominant because the water policy advisors *were* engineers, economist and jurists. In the second half of the sixties, the 'consensual democracy' and the unquestioned belief in science and engineering, started to erode. The dominant policy paradigm was challenged by ecological values and increasing knowledge about the impact of the Delta works and river dikes on ecosystems and landscapes. But it took some time before the engineers and policy advisors realize that the context has changed from technologically complex to politically complex and ecologically sensitive.

Introduction of policy analysis 'American style' (1975-1980)

The introduction of policy analysis American style took place in a time of strong polarization in Dutch society and politics. Policy makers and policy advisors had become more aware of the political complexity of water management. The solution to the conflicts and impasses however were still largely technocratic and technological. Engineers would 'simply' have to come up with smart designs that could better balance or trade-off the conflicting values. On the supply side, policy analysis became more client-based and definitely more aware of the existence of multiple stakeholders, values and viewpoints. The Polano-study conducted by RAND, supported and legitimized a historic decision-making process in the Netherlands. It introduced to policy makers a new way of thinking: in terms of alternative solutions that can have different impacts on multiple criteria. The storm surge barrier resolved most of the conflicts between values of safety, economy and ecology, but the technological challenge and the financial costs would soon prove to be staggering. Through the Polano study, policy makers in the Netherlands got acquainted with the

concept of policy analysis, but it was the PAWN-study issued after the 1976 period of drought, that really institutionalized the systems analysis approach. In the wake of the PAWN-study, many courses and seminars were organized about systems analysis in order to disseminate the knowledge and methodology to regional water management authorities. A number of institutions developed as think tanks and system analysts in the field of water management. The water management sector had become a relatively early adopter of a rational and client advice style of policy analysis (ctf. figure 1).

The hey days of systems analysis (1980–1993)

No major physical events, such as floods or droughts, occurred during this period. In addition, the strong polarization in Dutch society and politics cooled off. The success of the first PAWN study was replicated in subsequent studies. These studies became more and more institutionalized because they were important inputs for various policy documents on water management. Most significant for the development of policy analysis however was the rapid development of information and communication technology - in particular the personal computer. It boosted simulation models and studies of the behavior of water systems. There seemed to be a perfect fit between the characteristics of the water system, the demands of water managers and what the systems analysis techniques could supply. The professional engineering community happily accepted the systems analysis approach because of the shortcomings felt with their traditional engineering approach. By varying parameters, the performance of water systems could be analyzed in different scenarios and the models could be expanded and refined to include more parameters and more accurate data. But meanwhile, the implementation of the Dike reinforcement programs came to a halt. The demand side evolved, widening the gap between policy analysis and decision making. The viewpoints and values of stakeholders towards water management expanded to other domains such as water quality, construction, urban and commercial development, agriculture, nature conservation, ecology, preserving cultural heritages and landscapes. These issues emerged on the political agenda but could not as easily be put in models and simulations.

The experimental years; interaction and participation (1993-1998)

The flood of 1995 definitely broke the opposition against dike reinforcement. At the same time, there was growing awareness among decision makers that an integral approach to water management was needed.

Water management would have to be combined with and coupled to, other domains such as spatial planning, economic development, agriculture, environment et cetera. Structural measures, i.e. dikes and barriers, were replaced by non-structural measures, e.g. adaptation of land use. In other words, water managers learned how to 'go with the flow' rather than try to contain it. In a physical sense, this became apparent through notions s.a. 'building with nature' and 'giving room to water'; in a metaphorical sense it also applied to the political and stakeholder context. The dike reinforcement controversy had taught that public acceptance and stakeholder cooperation were important determinants for effective policymaking. Given the scarcity of land, the new paradigm of integral water management, implied that more coordination and cooperation with other government authorities was needed. The water management arena expanded significantly. New and unfamiliar stakeholders entered the water management arena. In addition to the analysis of water systems – and the analysis of risks, floods, droughts, impacts of climate change et cetera - interactive and participatory styles of analysis were needed to consult the general public about their interests and opinions, increase public understanding and awareness, reach public acceptance, involve stakeholders, pool resources and arrange cooperation between authorities. Some of these interactive and participatory methods and approaches had already successfully been introduced in other areas – e.g. traffic and transport policy. Therefore, explanatory studies were conducted on what participatory and interactive methods were available, what had been the experiences in other domains and how they could be used for water management. New and smaller consultancy firms emerged on this market. They designed and facilitated a number of interactive experiments and projects, some at a smaller and local/regional level. The traditional institutes such as RAND and Delft Hydraulics also engaged in this market and invented ways to make their traditional tools more interactive or combine different approaches. This happened in a number of different ways: (1) Traditional methods were adapted to make them more interactive or suitable for a participatory setting, e.g. participatory modeling. (2) Larger projects were split into smaller projects where various approaches and styles could be used. (3) Participatory and interactive policy analytic projects, e.g. public debates, conferences et cetera, were initiated but simulation models or expert analyses provided necessary background information or analyses.

The managerial approach to policy analysis (1998–today)

The world of water management is relatively conservative. Serious doubts regarding the quality and usefulness of the information and knowledge acquired by the new participatory and interactive approaches, had to be overcome. But the steady trend in the Netherlands towards open and interactive planning procedures, has strongly enhanced the adoption by, and adaptation of the water management sector. On the demand side, the institutional complexity of water management has increased: more actors, more interdependency, more rules and regulations et cetera. The complex interdependencies are reflected in a National Agreement on Water management between the national, provincial and local authorities and the regional water management authorities. On the supply side, the market of policy research and policy advice has boosted. The number of institutions and firms that has entered the market of policy research and advice for water management has strongly increased. Policy analysts from other disciplines than engineering or economy have become involved in the participatory and interactive styles of analysis: for instance communication scientists, group psychologist, and organization and management scientists. Because of the increasing political and institutional complexity, thinking in terms of large projects and grand designs has virtually become impossible. We see a number of recent trends: (1) the focus of attention of a substantial part of policy analysis now lies on understanding and managing the institutional and stakeholder context rather than the content. In practice, this implies that stakeholder, network and resource analyses are conducted, that possible strategic behaviors are explored, policy options evaluated ex ante for instance by gaming-simulation and that meta decision making procedures and institutions are designed with insights and techniques of process management. In terms of the hexagon model in Figure 1, the interactive and process styles of policy analysis have been added to the rational and client advice style. (2) We further see a trend of institutionalization, professionalization and commercialization at the demand and supply side of policy analysis. Policy research and advice has become a big market and the market parties act accordingly. Whereas respective institutes in the field of water management used to be closely tied to government authorities and were publicly funded, they now have to acquire commissions in competition with other institutes. Policy makers act as clients and have learned to manage consultants professionally. Contract formats, procedures and institutions have been developed as for the project Water management in the 21st century of 1999/2000. In addition, clients have started to think in portfolio's of methods suited for different contexts

and purposes and answering to different strategic needs. Because the institutional context has become more complex, more actors - stakeholders as well as experts - need to be included. Sometimes, the experts *are* the stakeholders. Involving them in large projects through policy analysis studies can therefore have important strategic benefits. The downturn might be that strategic market behavior both on the part of commissioners and policy analysts will start to play an important role. Most recently we have noticed that clients tend to split up their comprehensive needs for research and advice into (too) many small projects leading to many coordination problems between the consultancy and research institutes involved.

6. Conclusion

The story of developments in policy analysis for water management in the Netherlands has briefly been analyzed in this contribution. We are aware that more historic, analytic and theoretic questions can be raised on these matters and that more detailed answers are needed. Other case studies in the Netherlands (or other countries) should be studied, such as the introduction and subsequent failure of policy analysis for financial and fiscal policy, the failure of the Dutch COBA (committee for Policy Analysis) experiment, or the development of think tanks and planning agencies such as the Central Planning Bureau in the Netherlands. Our case, however, does allow us to make a number of tentative observations for a comparative study of policy analysis.

The first and most obvious observation is that there exists a tradition of policy analysis for water management in the Netherlands. This tradition has been influenced by transplantation of methods and styles, but also shows its own adaptation and learning processes. In the Netherlands, the water management sector was one of the first and relatively successful adopters of policy analysis. This is much earlier than other similar policy domains such as traffic policy or industrial policy.

The second observation is that application of the research model we propose for comparative policy analysis (cf. Figure 2) indeed reveals variance in both the dependent variables and the independent variables. The framing of changes in terms of values, roles, institutions and methods comes quite natural; although the case study presented here lacks detail,

the research model provides us a level of resolution that is functional for locating areas that deserve more specific investigation. Moreover, the case study shows that the independent variables of our research model help us to understand the observed changes over time:

- *Policy paradigms:* Water management in general, and the typical water problems of the first decades of the period we investigated, have characteristics that very well fitted the then available methodological approach, i.e., system analysis and modeling. In other words, at the hey-days of systems analysis there was a physical, cognitive and political match between the supply and demand side. But when incongruences and incompatibilities occurred in the policy paradigms, policy analysis adapted. The traditional engineering type of research and advice for instance had become incompatible with the growing political tensions on important water management issues.
- *Institutions:* For engineers, the success of the Polano study gave much credit to the discipline of policy analysis. The construction of the Eastern Scheldt storm surge barrier and the policy analytic studies created many institutions, methods, and approaches in policy analysis that last until today. Many policy analysts and engineers that worked on the building of the barrier are now leading businessmen, scientists and politicians.
- *Physical events:* The case of water management further indicates that events such as floods and droughts can strongly influence policy analysis both in content and approach. Events create a sense of urgency for problem solving and decision-making, the narrow the focus to a limited set of factors related to the immediate well-being of people (e.g., safety, fresh water supply) and create a demand for a specific type of information and analysis.
- *Social context:* Cultural factors such as a trend of democratization or polarization can also have marked influence on policy analysis. Polarization induces the need for stakeholder management, strategic advice, the solution for compromise and mediation. Democratization trends or a consensual culture contribute to a demand for citizen consultation or other forms of public involvement.

We emphasize that our research model *helps us to understand* the observed changes. The dependent and independent variables can be 'measured', albeit at a high level of abstraction, but the case study has been too su-

perfidious to properly address the issue of causality in the model. To determine whether it is indeed appropriate to view the observed changes as the result of learning processes on the supply side and the demand side needs still more research.

The last observation we wish to make is that, regardless of cause and effect, the trend of steadily increasing complexity in policy analysis is real and poses a challenge that must be met by policy makers and policy analysts. If engineers are pressed to come up with ever more clever system solutions to resolve conflicts between stakeholders, then policy analysts are likewise challenged to be creative in developing new methods and finding suitable styles to support decision making processes. Comparative policy analysis is likely to be one of the keys to their success.

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