

Linking Actors and Models for Water Policy Development in Egypt: Analyzing Actors and their Options

Leon M. Hermans, Nader El-Masry and Tarek M. Sadek

Policy development in the field of water resources management is traditionally supported by various analysis tools and planning models. Recent years have shown increasing attention for the social dimension of policy development, as this involves different actors interacting in an attempt to satisfy their interests. This requires information on the technical and financial aspects of policy options and information on the roles and interests of different actors. The use of the analysis of options technique is explored in this article, with the aim of incorporating such information in the development of a new water policy for Egypt.

Leon Hermans is a research associate in policy analysis at the Faculty of Technology, Policy and Management of the Delft University of Technology in The Netherlands. His main research interest is in the use of actor analysis to support decision making in the field of water resources management, and he has worked on actor analyses for water projects in Yemen, Egypt, and The Netherlands. He received his M.Sc. in Systems Engineering, Policy Analysis and Management from Delft University of Technology in 1999. He may be reached at <l.m.hermans@tbm.tudelft.nl>.

Nader El-Masry works as a water resources engineer for the National Water Resources Pan Project at the Ministry of Water resources and Irrigation in Egypt. In this position, he is involved in the development of a national water resources plan that should match Egypt's water demands and supplies until the year 2017. He holds an M.Sc. in Water Resources and Environmental Management, from IHE, Delft, The Netherlands. He may be reached at <nelmasry@hotmail.com>.

Tarek Sadek has 12 years of experience in the field of hydrogeology, hydraulics, geomorphology, water resources management and environmental science. Currently, he is director of the National Water Resources Plan Project at the Ministry of Water Resources and Irrigation in Egypt. He holds a B.Sc. in Civil Engineering from the Faculty of Engineering of Cairo University (1988), an M.Sc. in Hydrology from the Department of Engineering Hydrology, University College Galway (UCG, 1992), Republic of Ireland, and a Ph.D. in Environmental Engineering from the Department of Civil & Environmental Engineering, The University of Melbourne, Australia (1997). He may be reached at <t_sadek@hotmail.com>.

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Introduction

Water is imperative for human existence and development, and this crucial linkage between water and human society is perhaps nowhere more clearly illustrated than in Egypt, characterized as "the gift of the Nile." The remains 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. It is no wonder that the development of a new water policy for Egypt is a complex task that is intertwined with the development of this nation's society as a whole.

The close link between the natural water system dominated by the Nile, and Egyptian society, results in a complex picture. Different economic, sanitary, ecological and other water requirements influence the quantity and quality of the available water, and this in turn affects the economic, social and environmental conditions in the country. This complexity of the water resources system is not unique to Egypt, but is present in most other countries throughout the world, and such complexity makes it necessary to support decision makers with relevant information on possible choices and their consequences. Traditionally, the focus of such policy analysis in water management has been on technical and economic aspects, trying to identify policy options that are technically efficient (see for example Loucks et al. 1981, Goeller et al. 1985, Mays 1996). The social, political and institutional aspects of water management have long been underestimated. In more recent years, however, analysts and decision makers have acknowledged the importance of the social dimension of policy development, as it is a process in which different parties interact in order to satisfy their interests. This process-oriented view on policy development shows that identifying options that are technically efficient is no guarantee for success, as it is often impossible to satisfy all parties involved. What is good for one party might be bad for another. Today there is a wide felt need to incorporate this process-oriented view, one way or another, into policy development for water management (see for example Dinar 1998, Cosgrove and Rijsberman 2000).

These developments in the water sector are not isolated; similar debates on the social dimension of policy development have been also started in other areas, and analysts and scientists alike are searching for ways to handle this dimension of policy problems (see for example Fischer and Forester 1994, Shulock 1999, De Jong 1999, Hall et al. 2000). An approach that may help in this search is to explore the social system in more detail as part of policy development, using "actor analysis" as the main tool. This type of analysis takes the different parties involved in a problem (the actors) as a starting point. Actor analysis should yield information on actors, their interactions, objectives, resources, and perceptions. Analysts can use this information to design and execute analysis activities that are of more relevance

to the actors who make the decisions, and to execute these analysis activities in a way that enhances acceptance and the use of results by all the involved actors.

Different methods are available for actor analysis (Hermans and Timmermans 2001), but so far few results have been reported for practical applications designed to support policy development in water management. In this article we explore the practical use of actor analysis for the development of a new water policy for Egypt. We start with a short introduction of the project, after which the results of two different applications of actor analysis are discussed and evaluated. The last section contains a summary of our work and some preliminary conclusions that can be extracted from this case on the use of actor analysis as a tool to support policy development for water management.

Water Policy Development in Egypt: the National Water Resources Plan Project

Water resources management in Egypt is dominated by the Nile river, which plays a central role in Egyptian society and which is by far the most important water resource. The majority of Egypt's population live in the Nile valley and the Nile delta, where more than 95 percent of the country's population lives on less than 5 percent of the available land (NWRP 1999, 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. Currently, the government of Egypt has to find ways to cope with the increased and increasing population pressure in the Nile valley and to further the social and economic development. To do this the Egyptian government has planned a number of large projects, called horizontal expansion projects, which involve the development of desert land for agriculture, together with the construction of new irrigation canals to divert water from the Nile river to these new areas. These horizontal expansion plans are expected to have an impact on Egypt's development similar to that of the construction of the High Aswan Dam in the previous century.

The horizontal expansion plans are necessary to enable the continued growth of the Egyptian economy and the population, and as a result the Egyptian government has already started to implement parts of the plans. 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 international agreement with upstream countries 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 (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.

Egypt is preparing a water policy that should help to safeguard its water resources in the 21st century to deal with the precarious water situation.

The Ministry of Water Resources and Irrigation (MWRI) is responsible for this water policy and, in collaboration with the Netherlands Directorate General for Development Co-operation, has established the National Water Resources Plan (NWRP) project to guide the policy preparation (NWRP 1999). The NWRP project started in October 1998 and should result in a new national water policy in 2003. An important part of NWRP's efforts has been devoted to analysis activities, in which the development of various hydraulic and hydrologic simulation models plays an important role.

The NWRP project has also recognized the importance of social and procedural aspects and it has initiated three inter-ministerial committees to involve the important actors early in the analysis process (MPWWR 1998). In these committees, representatives of different ministries are kept informed of the project's progress and have the opportunity to contribute to the analysis activities. Apart from these committees, a base-line survey of the institutional arrangements in different regional governorates has also been executed. Nevertheless, combining the knowledge of the actors and the institutional arrangements with the development of technical simulation models has proven to be a difficult challenge.

During the past two years the NWRP project has collected data and developed simulation models, and now the project is in the phase of identifying and evaluating possible policy options. In this phase of activity, the importance of actors is obvious; the actors will have to implement the policy options, and they will also be the ones to benefit or suffer from their consequences. Therefore, a structured actor analysis could offer useful support, as this can be used to add the actor perspective to the policy analysis activities in this phase of the project.

The Purpose of Actor Analysis for NWRP

Actor analysis in the NWRP case must explore the position of the actors that are likely to play a role in the development and implementation of a national water resources management plan. The actor analysis for NWRP should support the project by linking the different water policy options, and their consequences, to the objectives of the actors. Insight into the issues that actors are interested in and the objectives that influence their behaviour will help to identify the necessary trade-offs between objectives and the choices that have to be made when developing a water policy. Actor analysis should also help to assess the influence that different actors might have on water management, by taking stock of their means and resources.

Information such as outlined above can be used to derive criteria for the evaluation of policy options from the actors' perspectives and to assess recognition, support and opposition for options. The information should also indicate the interdependencies between actors, by reviewing the ways in which their objectives may conflict, the outcomes that are likely to result if actors do not co-operate and the compromises that are possible. In this

way, the actor analysis should provide a basis to include the actors' values and interest into the project's analysis efforts and to involve the actors in the process of policy development.

Actor Analysis through the Analysis of Options

The analysis of options technique was selected for application to the NWRP project, based on a review of different approaches for actor analysis (Hermans and Timmermans 2001). This conceptual modelling technique seems to be particularly appropriate for the purposes stated above, since it has been specifically developed to analyze the options that actors have to realize their objectives. Analysis of options is used in the field of conflict analysis, and its development is linked to that of metagame analysis (Howard 1971). Generally, conflict analysis techniques model the interaction between actors as games. They assume actors to be more or less rational agents whose behavior is guided by a combination of their objectives and the actions under their control, i.e. options. The interaction of actors revolves around certain issues, and each actor has different options to influence these issues. These options can be used to formulate possible strategies of an actor by indicating which combination of options an actor decides to implement. The individual strategies of the actors can be combined to form possible outcomes of the game (Howard 1989). Modeling the actors, issues, options and objectives thus enables one to gain insight into the range of possible outcomes of decision making.

The analysis of options format provides the conceptual basis for metagame analysis and for other conflict analysis techniques such as the Graph Model for Conflict Resolution (Fang, Hipel and Kilgour 1993, Obeidi, Hipel and Kilgour in this issue) and hypergame analysis (Bennett, Cropper and Huxham 1989). The literature on conflict analysis suggests that it could yield insight into the possible outcomes of decision making and into the possibilities for individual actors to influence these outcomes. Among the reported benefits are its use to identify interdependencies between actors, to suggest promising courses of action, to anticipate actions by other actors, to indicate possible outcomes of conflict situations and to identify opportunities for coalitions between actors (Howard 1989, Fraser and Hipel 1984, Kilgour et al. 1996).

Analysis of options could be used to support the NWRP project in two different ways, one as an analysis tool to yield some of the above mentioned insights for the project, based on interviews and other sources of information. Two, the conceptual analysis of options format could be used to facilitate a discussion between the actors. A "game-like" workshop in which the structure of actors and options provides the basis for discussion, could support communication among actors and between actors and NWRP analysts. Both applications of the analysis of options technique, its application as an analysis tool and as a discussion support tool, have been explored in Egypt and this is discussed below.

Analysis of Options as an Analysis Tool

The analysis of options technique was used for an actor analysis to provide the NWRP project with information on the way in which policy options were linked to the actors. The results were intended to help the project team to assess the issues and options that seem to be important as well as the important criteria required to evaluate options, the possible coalitions and conflicts between actors, and how those could be handled. Other expected benefits were that the analysis would provide a picture of how different actors perceived measures and objectives, help to complete and adjust the set of policy options for analysis that the NWRP project already developed and help understand which options could easily gain recognition and which options the actors tended to overlook.

The information for the analysis was primarily obtained using interviews with representatives of the most important actors. 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 identified as the most important actors for a new water policy in a previous stage of the NWRP project. The interviews were structured using a predefined list of questions that covered the different steps in options analysis: the issues that actors found to be of importance for water resources management, the objectives of the actors, and the options that were available to influence the important issues. Actors were also asked to give their opinion of other important actors involved in the project to check and supplement the results of the different interviews. The information gained from the interviews was supplemented with written sources of information such as policy documents, meeting minutes and related reports.

Results of the Analysis of Options

The actors were asked to identify their most important issues, which resulted in five categories of issues that were considered to be most relevant: water quality, re-use of wastewater, agricultural water management, public water supply, and water quantity. One can see that these issues do not form a very homogenous set, this is because they merely represent the categories of issues as they emerged from the interviews with the actors. These categories were used mainly to cut-up the decision making into smaller pieces that were considered to be relevant to the actors. In reality, the different issues are related and are subject to change; actors may reformulate issues, new issues may emerge and existing issues may be solved.

The interviewed actors were also asked to indicate their objectives, in a similar way to the identification of issues. This was done to allow us to estimate the actors' preferences, and to identify criteria that could be used to evaluate options in the NWRP project. The results showed that the actors could be grouped according to the objectives that they focused on, resulting in five main groups: public and environmental health, with an emphasis on water quality; availability of water, with an emphasis on water quantity; agricul-

ture; social development and economic development. These groups of actors with similar objectives provided a first indication of possible coalitions.

Besides issues and objectives, the actors were also asked to identify promising options that could influence issues in a direction that would better match their objectives. Based on this input information, preference tables were constructed for each of the five important issues. These tables provide the basis for more detailed analysis, and their use will be illustrated for one particular issue: "agricultural water management." This is an important issue because agriculture is by far the largest water using sector in Egypt.

Table 1 gives an indication of the actors' view of the issue of agricultural water management, as it is based on the input produced by actors during the interviews. Of course it is unlikely that this view represents the complete and comprehensive picture, but it provides a useful basis to explore the most important options involved in agricultural water management. The first column of Table 1 shows the options and the subsequent columns show the preferences of actors for certain options, inspired by and adapted from the format suggested by Howard (1989)¹. Grey cells are used to indicate that an actor (partially) controls the corresponding option.

The results of the interviews suggest that the discussion in the agricultural sector focuses on institutional issues such as the organization and privatization of the way in which the water infrastructure is managed. As can be seen from Table 1, the Ministry of Water Resources and Irrigation has an important position in this discussion and it controls some of the important options, as it is currently responsible for most management tasks. The Ministry of Agriculture and Land Reclamation also controls important options, related to the institutional and legal reform of the agricultural sector. It should be noted that the options of actors in the private sector and at the local level are missing in the table, but that they are in fact also important; if the management of the water infrastructure was decentralized or privatized, these actors would have to play a more prominent role.

Possible problems among actors can be derived from Table 1 based on the indicated preferences of actors. For example, the introduction of water charges for irrigation water is favored by the Ministry of Water Resources and Irrigation, indicated by "y" in the corresponding cell, but will probably be disliked by the farmers, indicated by "n" in the corresponding cell. Another problem may occur in the ongoing liberalization process in agriculture, as certain subsidies on agricultural products are being removed and this is increasing the costs for farmers. However, liberalization also means that certain taxes are removed and this may balance the costs for farmers. Liberalization, understood as the removal of all subsidies and taxes in agriculture, might also make it more difficult to promote environmental agricultural practices and this might be a reason for the Environmental Affairs Agency to be opposed to this option. Finally, the preferences of the controlling actors are not known for certain options. For example, the Ministry of Water Resources and Irrigation controls the option of rehabilitating the irrigation system, but it is not known what level of resources it is willing to invest in this measure. Similarly, the Ministry of Planning will have to allocate funds

Table 1

Preferences for Agricultural Water Management Options

OPTIONS	PREFERENCE OF ACTORS						
		Environm. Agency (EEAA)	Min. Agriculture (MALR)	Min. Health (MHP)	Min Local Developm. (MLD)	Min Planning (MoP)	Min Water Res. & Irr (MWRI)
Establish a social fund to make water available for the poor			y	y?	?		y?
Introduce economic water charges for irrigation water		y?			y	y	n
Revise irrigation law to enable decentralization and privatization		y			y?	y	?
Increase farmers' participation in operation & management irrigation system		y				y	?
Rehabilitate existing irrigation system to enable transfer O&M to local level		y?				y	y
Liberalize agricultural sector		n?	y		y?		n-y
Privatize operation of irrigation system		y			y	y	?
Provide funds to implement water policy					y?	y	

Explanation of cell contents: "y" means that an actor prefers the corresponding option to be executed by the controlling actor, while "n" means that an actor prefers that the option is not executed. Grey is used to indicate that an actor has (partial) control over an option. Empty cells indicate that the opinion of actors is not known and is assumed to be of minor importance for an option. Question marks are used either to indicate that preferences of an actor are not known but are important, or to indicate assumptions on actors' preferences for options, when preferences on these options could not be derived clearly from the interviews.

for a new water policy, but it is not known at this point how much funds it is willing to provide. And would this Ministry agree with the idea of a social fund for the poor, and what should then be covered by this fund?

Insights Gained from the Analysis of Options

Similar tables have been drawn and analyzed for the other issues. This exercise revealed that there were not many clearly opposing positions

among the actors in the direct circle around the NWRP project. This apparent agreement might be explained 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 is not self-evident that this agreement also holds for the options through which these objectives should be realized. Furthermore, it will probably not be possible to satisfy all objectives, and disagreement will emerge when certain objectives have to be sacrificed to enable the realization of others. Therefore, it is important to have more specific information on the costs and benefits of the options, as well as their distribution among actors: Who benefits from an option, and who pays a price? This would help us to link the options more clearly to the objectives and to gain more insight into the trade-offs between objectives.

The analysis further showed that in describing the impacts of options, the benefits were emphasized, while the costs were often neglected in the initial discussion. If funds and other resources were not a problem, perhaps all objectives could be satisfied at the same time. It is only when (financial) resources are limited, that problems occur. Costs and 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. 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.

So far, it is mainly national government actors that have been involved in NWRP's activities. The implementation and the consequences of certain measures identified by these actors point to other actors that are also of importance. Governmental actors on a national level may reach an agreement on a package of measures, but new difficulties may surface when these measures need to be implemented and other actors 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 will help to assess their willingness to co-operate with certain measures and to assess the possibilities to compensate them for less preferred measures.

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

Evaluation of Analysis of Options as an Analysis Tool

The analysis of options was used to provide information on important issues, options, criteria, possible conflicts and coalitions. The discussion of the results shows that the analysis provided a part of this information:

1. The objectives that the actors valued suggested five main categories for the definition of criteria for the evaluation of policy options. They also provided an indication of possible coalitions between actors.
2. The analysis of options showed that trade-offs between objectives were not identified, let alone resolved. The analysis also offered an explanation for this: specific costs and benefits were not yet part of the discussion on policy options and this discussion only included a limited circle of actors.
3. The information from the analysis on issues, objectives and options could be used to check the list of options that the members of the NWRP project had prepared previously.
4. The analysis pointed to the importance of institutional sector-reform issues such as decentralization, privatization and liberalization. These issues are expected to require more attention in the near future.

The above list shows that the analysis of options did not produce quantitative input information for further detailed conflict analysis, the reason for which the method is usually applied. Instead, the analysis served another purpose in Egypt: to explore perceptions and public debate between actors. There are other methods designed specifically for this purpose, such as cognitive mapping (Eden 1989) or argumentative policy analysis (Fischer and Forester 1994), but nevertheless, the analysis of options approach offers some advantages for the described application. First, it focuses specifically on the link between actors and options, which is precisely what the NWRP project was interested in. Furthermore, it offers a very structured approach which was especially helpful in the preparation and execution of 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, was very helpful when conducting the interviews. The approach also offered procedures for the analysis of the information and the presentation of the results, which facilitated analysis within a reasonable period of time.

The application of the analysis of options also revealed some drawbacks of the technique. If the results are presented in a straightforward manner, the approach tends to emphasize the conflicts rather than the agreement between actors. For projects on important but sensitive issues, such as water management in Egypt, a clear-cut presentation of conflicts may not be of help for policy development. Describing (possible) conflicts might increase the risk that actors firmly adhere to their positions and that conflict increases rather than disappears. Careful presentation of the results is required during communication to 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 possible coalitions between actors.

The use of the analysis of options was constrained by the fact that it proved difficult to obtain complete input information. The broad field of inquiry, water management in Egypt, did not allow for complete coverage of the subject during one interview. Furthermore, only a limited number of

actors could be interviewed, which made selection of respondents a critical step. Such a selection can always be expanded with additional actors or more representatives of certain actors to improve the accuracy of the results. The ideal analysis of options would require a complete list of actors, options and preferences, but obtaining such information in full is often unfeasible in practice given the limited time and resources available for an analysis. Besides, one can seriously question if the effort needed for a complete analysis would be justified by the quality of the results in terms of completeness and uncertainty.

The quality and reliability of the results will of course increase given a wider range of respondents and more elaborate interviews, but still the results will continue to show some gaps and uncertainty. Decision making is a strategic process and this means that respondents are not willing to share all their information with an analyst. Respondents withhold some information and do not reveal all their preferences. Supplementing the interview results with data drawn from additional sources of information such as relevant literature, including policy documents and meeting minutes, and previous experience, can help to increase the insight into the actors and their role in decision making. However, there will always remain some uncertainty about the completeness, accuracy and reliability of the results of an analysis.

The Analysis of Options Approach to Support Discussion

The conceptual structure of the analysis of options can also be used to support a discussion of promising options between actors. Such a discussion should be based on available knowledge of possible options and their estimated impacts. This technique could help to streamline communication between the NWRP analysts and the actors and between the actors. Such a discussion would make the participants more aware of the trade-offs and choices that have to be made when formulating a water policy. NWRP analysts could use this discussion to determine the areas of agreement, the possible conflicts between actors and some of the promising compromises. This could help them to combine different options to formulate water management strategies in which the preferences of actors are also incorporated.

Approach and Workshop Preparation

The use of an interactive application of analysis of options to facilitate dialogue is 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 session covered one of Egypt's water management issues and was executed with the members of the NWRP team, who played the role of one of the actors. 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.

Currently, two separate water systems exist in the Nile delta and in Lower Egypt. The irrigation system carries and distributes fresh water for irrigation, drinking water plants and industry, and the drainage system collects and transports wastewater to the sea. 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 to its use and can create health problems.

A model of the drainage water re-use issue was prepared prior to the workshop, based on the analysis of options format. This options-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 also option B is implemented," "option C excludes option D" etc. An options-model is made to provide the first basis for discussion, and should include all the actors and the options that participants find to be of relevance. Therefore, the options-model of drainage water re-use in Egypt was formulated in consultation with the participating NWRP team members. The complexity of this model was limited to allow the users to explore the use of the analysis of options approach in a relatively simple form and to provide the participants with good insights into the actors and their mutual relationships and interdependencies.

Results of the Workshop

The analysis of options approach was tested in a three-hour session with the NWRP team. Each of the actors was represented by one or two team members. The meeting consisted of three main activities: introduction and preparation, discussion, and evaluation. First the objective of the meeting was introduced and the options-model was explained. The participants were already familiar with most of the model's features since they had been consulted during its construction. The actors then started their preparation for discussion with the other actors. This process was guided step-by-step and was intended to help participants to formulate a strategy for discussion and to obtain information for the analysis of the session. The preparation made the participants more aware of their objectives, the ways in which these objectives were influenced by the different options, and the actors with whom they should discuss to promote their objectives.

Next, discussions took place in two rounds, each of which was 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 strategies. At the end of a round, the actors informed the facilitator of their strategies, i.e. the options they would like to implement. The facilitator then reviewed these individual strategies and announced the resulting outcome.

During the first round of discussions, the participants had to check if their estimations of the preferences of the other actors were correct and to

locate the important bottlenecks. At the end of the first round, not all the actors were aware of the others' intentions, which lead 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 the water quality standards would 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, participants were more aware of each other's positions and they started to identify new options outside the model, searching for compromise. MALR agreed to reduce pollution from agriculture and to invest in wetland purification methods for secondary treatment, in return for secondary treatment provided by NOPWASD. MWRI and the Environmental Affairs Agency (EEAA) agreed on optimizing instead of maximizing re-use. Re-use would be maximized where possible, and limited in cases where that was needed.

Evaluation of the Analysis of Options Workshop on Drainage Water Re-use

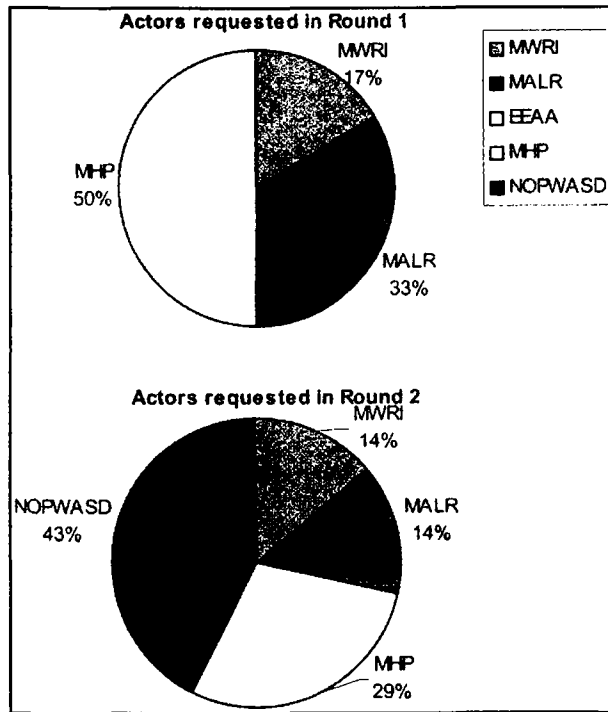
The main objective of the discussion was to gain and share insights into the interests of actors and the interdependencies between them. NWRP could use these insights to design policy alternatives that include the concerns and ideas of actors and consequently have a wider support. The discussion was 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 forms the participants filled in during the workshop were used to indicate if these objectives might be met with the tested approach.

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 were aware of the need to achieve a compromise with the Ministry of Health from the beginning, 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. Figure 1 shows that, for the second round, the number of requests for a discussion with NOPWASD increased, illustrating the fact that most actors seemed to have learned about NOPWASD's position during the workshop.

The impression that actors learned from the discussions during the first round, is 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

Figure 1

Actors Requested for Small Group Negotiations



that after the first round, actors had a better knowledge of each other's interests and positions. Another indication that new insights were gained is the fact that the actors were stimulated to identify compensation as they moved towards agreement during the discussion, resulting in new options for compromise.

Evaluation of the Analysis of Options Approach as a Tool to Support Discussion

The use of the analysis of options approach required considerable preparatory effort, including the involvement of experts and actors to construct a realistic model that provided a good basis for discussion. This was necessary because the use of the analysis of options technique as a discussion tool is limited if insufficient information is available on issues, actors, options and the impacts of options. If the estimated impacts of options are not known, it will be almost impossible to have a meaningful discussion and reach a sound agreement on how to deal with options. The preparation should help to avoid confusion and discussions centering on terminology and details instead of a search for compromise during a session. The use of a predefined model of actors and options also introduces certain limitations as it can only include a limited number of aspects, leaving

much more outside the scope of the model. The construction of a realistic model will not always be possible, even if the knowledge to make one would be available. For example, the Ministry of Health in Egypt had a little flexibility regarding the application of the official national water quality standards, meaning that re-use of water could be increased somewhat in areas where lower quality standards would still be sufficient to protect public health. This lowering of water quality standards in specific suitable instances was unofficially sanctioned at the time the model was designed, but could not be incorporated as an option in the model as it was not officially allowed.

The limitations of an options-model require careful attention to avoid the risk that the prepared model is mistaken for reality, leading to a distortion of the discussion and its outcomes. Participants may search for sub-optimal compromise within the model, possibly ignoring relevant aspects outside the model. One should be aware of the restrictions on the model that is used and should communicate these restrictions to participants. A model merely provides a starting point for discussion and should be used in a flexible way.

Discussion of the Use of Analysis of Options to Support Policy Development in Egypt

Two applications of the analysis of options approach have been described for the case of the NWRP project in Egypt, in an attempt to explore how this actor analysis technique could be used to include the social dimension of decision making in policy development. The single case described in this article is not sufficient to yield general conclusions on the use of the analysis of options technique, but it does help us to extract some interesting implications.

The research described in this paper suggests that the analysis of options tool enables a structured and clear presentation of the position of actors in relation to certain policy issues. The analysis helped us to obtain and structure information and to gain insight into the objectives of the actors, their criteria to assess the impacts of policy options, possible conflict, compromise and coalitions. A discussion based on options analysis in addition provided a tool to share the above insights among participants. During discussion, both participants and analysts learnt, speeding up the process of analyzing and compromising. The discussion increased the awareness among participants of the need for compromise as well as the "ownership" of compromises among participants, which would increase support for strategies formulated by NWRP.

Practical Value of Analysis of Options for the NWRP Project

An evaluation of the actor analysis by members of the NWRP project indicated that the outcomes of the analysis were of practical value for the project. In general they confirmed that the analysis produced adequate,

relevant and new insights to the project. More specifically, the analysis contributed to the project in at least four ways:

1. It helped to make the position of the various actors clear and helped to complete and review the list of policy options and criteria compiled by the NWRP project members.
2. The observation that more information on costs and benefits of policy options would be needed for a proper discussion between actors was echoed by the NWRP project members and provided them with "food for thought".
3. The issues of institutional reform such as decentralization, liberalization and privatization proved to play an important role in the current discussion on water management. After the actor analysis, NWRP launched a major new effort to address these issues as part of the project. The credit for this new activity cannot be attributed to the actor analysis alone, but it did focus attention on the importance of these issues at a time in which these issues had yet to be articulated within the NWRP project.
4. The NWRP project members elaborated on the approach, using the interview questions and methodology described in this article to conduct some further interviews with additional representatives of actors.

A less specific contribution of the application of the analysis of options, is that it seems to have influenced the perceptions of the NWRP team members. Most of their activities had been devoted to preparing mathematical simulation models. Participation in the test-workshop and involvement in the interviews and analysis activities probably helped to expand their focus to include attention for the importance of certain "actor-related" issues. Some of these issues prior to this were more in the background, for example the issues of privatization and institutional reform and the need to include financial aspects in the analysis. The perceptions of the NWRP analysts seem to have shifted during the actor analysis exercises, although the exact contribution of different activities is difficult to assess.

Observations on the Use of Analysis of Options in General

The structured approach of the analysis of options technique proved to be a very important feature and seems to be both a strength and a weakness. A structured approach helps to direct the data collection efforts and to structure the interviews. It also supports the analysis and presentation of results within a reasonable period of time. A structured approach makes it possible to pinpoint the necessary choices, the information gaps and possible conflicts. This might provide a good stimulus by creating a sense of urgency, generating a drive to search for compromise. However, in some situations pinpointing of conflicts and problems might have a paralyzing effect, creating a barrier instead of a stimulus to further discussion. In applying options analysis, it is necessary to find a good balance between the creation of a commonly shared feeling that compromise is needed, without emphasizing conflict.

The available knowledge and information that can be used as basis for the analysis proved to be another important feature of analysis of options.

Without a good or at least sufficient level of system knowledge, extensive analysis is not very useful for evaluating options. If no estimations of impacts and definitions of options are known, then an analysis and discussion of options and possible trade-offs is not very likely to result in new insights, but may only add to the confusion. However, one will always have to face imperfections in the available knowledge and information. The available information and its reliability, completeness and accuracy is likely to be an important limitation of analysis of options, and in fact any actor analysis exercise.

In almost all cases, it will be impossible to get the complete picture of considerations and decision mechanisms out in the open. Analysis of options will always have to deal with uncertain and fuzzy information, based on the pieces that actors are willing to release. Hidden agendas of actors may be very important for the outcome of decisions, but usually these hidden agendas will remain hidden, and even if information is available, it can not always be used in a public analysis of options, because identifying certain difficult issues might be counter-effective, paralyzing instead of stimulating progress in decision making. Therefore, analysts have to find ways to cope with the gaps in their knowledge caused by the information that they do not have, and at the same time they should also be careful in using the information that they do have.

Final Remarks

The research in Egypt suggests that it is very important to review the context in which the actor analysis is to be applied. Relevant characteristics to consider are the specific purpose of the analysis, and the level of available knowledge about the technical system, the opportunities to conduct interviews, the other data sources that are available besides interviews, the time available for analysis, the cultural characteristics of the environment, and the end use of the results.

The research also showed that actor analysis might be limited by the accuracy, availability and completeness of the information used in the analysis. Actor analysis has to cope with incomplete, fuzzy information, which is not always suitable for public discussion and which is not always accurate. This shows that the application of actor analysis is not without problems. Some of these problems may be solved, and some of them may prove to be inherent to the approach, but even with these limitations, analysis of options is considered to be a useful technique, as it offers a way to at least use the information that is available. Ignoring actors altogether is no longer an option.

Note

1. In reviewing this table, one should keep in mind that in reality preferences are often more "fuzzy" than is suggested by the (binary) yes/no variables. Therefore, "yes" can mean "yes, this options is preferred a little" or "yes, it is preferred a lot", while "no" can mean "rather not" or "absolutely not".

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