

# Driving forces and patterns of water policy making in Egypt

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## Abstract

In studies on transboundary river management, it is often assumed that national water policies are made by ‘governments’ or ‘water ministries’ as unitary, rational decision-makers. This article analyzes actors, institutions, and decision-making processes in the Egyptian water sector and explores implications for the design and implementation of water policies. Rational choice is assumed to be only one possible pattern of water policy making, and is distinguished from other mechanisms driven by organizational routines or bargaining over stakeholders’ interests. It is found that in Egypt, despite considerable planning capacities, many water policy outcomes are influenced by developments beyond the control of the water ministry. Water governance is also influenced by top-level strategic decision-making, conflicts of interest between sectors, enforcement priority given to policies that prioritize political stability and/or certain privileged interest groups, and intra-organizational resistance to institutional reform. Policies in the traditional core tasks of the water ministry, i.e. water supply and drainage provision, and important strategic decisions regarding water allocation priorities are mainly made in a ‘rational choice’ fashion by the respective authorities. Issues that have emerged more recently, such as water quality or demand management, are subject to interest bargaining between different stakeholder groups in both the planning and the implementation phases.

*Keywords:* Egypt; Governmental politics; Nile Basin; Organizational processes; Rational choice; Water policy making; Water resources management

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## 1. Introduction

The task of transforming the flow of the Nile into socio-economic development and welfare has been passed on from one generation of Egyptian water professionals and politicians to the next for several millennia. Water managers in modern Egypt are faced with unprecedented population pressures and alarming levels of water pollution. Despite advances in irrigation technology, Egypt presently has to import cereals—or embedded ‘virtual water’—to cover around 50% of its demand. As the per capita size of irrigated land is shrinking and unemployment is high, national and local water management institutions are increasingly challenged to provide answers to the water crisis. Water resource

doi: 10.2166/wp.2009.052

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management in Egypt is closely linked with numerous aspects of the national economy and social stability, and at the same time has very direct effects on the health and livelihoods of many citizens. Two other management dimensions that deserve special mention are the regional hydropolitics in the Nile Basin, driven by ever stronger claims on the part of upstream countries for a higher share of the river runoff, and the increasing budgetary pressures on the water agencies.

The need for effective and innovative water policies is evident, and the proposed strategies increasingly exceed the task of irrigation water distribution as traditionally performed by the Ministry of Water Resources and Irrigation (MWRI) in Egypt. In accordance with global paradigm shifts, the engineering approach to water management is gradually replaced by more integrated policy-making processes taking into account issues of sustainability, efficiency, subsidiarity, inter-sectoral policy coordination, and stakeholder participation (e.g. Allan, 2003). The concept of Integrated Water Resources Management (IWRM) translates these principles into specific guidelines for effective water governance. These include the imperative to plan water resources development on the base of hydrological boundaries, to pay attention to the linkages between water quantity and quality, to consider the various functions of water in different sectors and in different ecosystems, and to fully integrate demand-side management approaches (for an extensive IWRM ‘toolbox’, see GWP, 2007).

This paper attempts to analyze the policy environment in the Egyptian water sector in order to understand current—and possibly future—water policy developments. The basic assumption is that the domestic institutional settings and patterns of water policy making critically influence water policy priorities, outcomes on the ground, and the country’s capabilities to react to exogenous and endogenous challenges. A theorybased perspective, distinguishing different decision-making ‘patterns’ in the Egyptian water sector, is presented. Rather than engaging in the scholarly discourse on the validity of different theoretical models of policy-making, however, the aim of this study is to develop an analytical approach to better assess water policy processes. A refined understanding of water governance systems can ultimately support water sector reforms at different levels.

While other scholars use frameworks of ‘actor analysis’ as the starting point for the analysis of processes in the water sector (see Hermans *et al.*, 2001), this paper elaborates on ‘patterns of policy-making’ to approach the processes of water policy design and implementation. Factors analyzed in this framework are the broader policy-making environment, the range of water sector actors that influence the policy-making process by the level of their participation and inter-linkages, the mechanisms of how the interests of different stakeholders are traded off, and the actual policies both as formulated in government documents and as implemented on the ground.

The Egyptian water sector has been subject to a number of recent studies and consultancy reports (e.g. MWRI & USAID, 2002; MWRI & USAID, 2003; MWRI & World Bank, 2003; JACOBS, 2005; MWRI, 2005). In addition, a number of studies on the Nile Basin also provide insights into the Egyptian water sector (Waterbury, 2002; Mason, 2004). Hermans *et al.* (2001) analyze stakeholders in the Egyptian water sector with a specific focus on potential coalitions but only include a limited range of—mainly governmental—actors. The account of Hvidt (1995) gives a rather sketchy inside view on the process of water policy making in the mid 1990s.

Deficiencies of the present water governance system in Egypt have well been identified by the Egyptian water authorities and are addressed by substantial reform programs. The purpose of discussing constraints to sound water policy formulation and implementation in this study is thus not to repeat well-known criticism but rather to add a conceptual dimension by linking the policy outcomes to typical patterns of decision-making.

### 1.1. Framework of analysis

‘Policy-making’ is understood as the sum of all processes that lead to the formulation of planning documents and strategies, and also determine the actual implementation of those strategies. ‘Patterns of policy-making’ are typical mechanisms that determine by whom and based on what criteria decisions are taken in a given policy (sub-) sector. The patterns distinguished in this paper are based on three models of decision-making developed by Allison (1971) and further specified by Allison & Zelikow (1999).

The *rational choice* model assumes that policies are made by a benefit-maximizing decision-maker, an individual or a group, according to a set of objectives and an understanding of the utility that results from different policy options. Processes of ‘rational’ decision-making are typically constrained by the limited availability of information, the uncertainties regarding the behavior of other involved actors, and the ‘boundedness’ of the decision-makers’ rationality (Bendor & Hammond, 1992).

The *organizational process* model explains policies as the outcome of embedded routines of organizations involved in planning and implementation. According to this model, new policies are often derived by marginally changing the existing policies, are biased towards the organizational interests of the agencies involved in the planning, and fragmented along the existing organizational lines within the governance system.

Finally, the *governmental politics* model assumes that policy decisions are the outcome of bargaining processes among different actors or actor coalitions pursuing their interests. Note that each actor may well derive his position from a ‘rational choice’ decision process, but the resulting policies significantly depend on the relative ability of all actors to defend their policy preferences.

Table 1 specifies the framework that was applied for the attribution of decision-making patterns to the observed governance processes for different water policy issues. It is assumed that different patterns may co-exist, and that patterns may diverge in the planning and implementation phases. Note that the decision-making environments may vary greatly for different policy issues, in different countries, and for different time-spans considered.

Table 1. Analytical framework guiding the attribution of water policy issues to policy-making patterns.

Policy phase	Pattern	Organizational process	Governmental politics
Planning phase	A single powerful decision-maker (or a like-minded group) selects the most beneficial policy options based on a set of their overall goals and the assumed utility of each strategy.	The organizational characteristics and priorities of the relevant actor organization determine how specific issues are viewed and how decisions are processed. Standard responses to a certain type of challenge are critical.	The policy agenda and the contents of policies are the outcome of ‘bargaining’ processes involving different actors advocating different positions. The relative influence in the planning processes and the pathways of participation are critical.
Implementation phase	Implementation of policy measures only deviates from the plans if the external conditions change, i.e., altering the utility functions regarding different policy options.	Policy outcomes deviate relative to the plans because the organizations involved in the implementation process the guidelines and projects in a different way than the planners intended.	Policy outcomes deviate relative to the plans because stakeholders act in unforeseen or unplanned ways to protect their interests, i.e., through non-action, delay, or active obstruction.

Data for this study were collected from policy documents and secondary literature as well as expert interviews and around 30 semi-structured stakeholder interviews with representatives of water sector actor organizations in Egypt, i.e., ministries, research institutes, NGOs, consulting firms, commercial enterprises, and donor agencies. On this basis, an overview of the involvement of the most important actors in different phases of the policy-making process was established for different water policy issues (Tables 2 and 3). Specific decision-making processes relevant for individual water policy issues were attributed to the dominant ‘patterns of decision-making’, i.e., rational choice, organizational behavior, or governmental politics (Table 4). Considering the fact that most decisions are influenced by overlapping patterns, the attribution to one or several dominant mechanisms is somewhat subjective and has to be interpreted as such. Special attention is devoted to cases where the dominant ‘pattern’ in the phases leading to the design of formal policies (agenda setting, drafting of a policy text, adoption of the policy) sharply contrasts with the patterns determining the implementation of these policies on the ground.

Only limited insights could be obtained with regard to the power relations at the highest political level of governance, i.e., within the Cabinet and the presidency.

## 2. The general policy-making environment in Egypt

Policy-making in Egypt is to a great extent the realm of central government actors. The political system of modern Egypt has its roots in the interventionist state of President Gamal Abdel Nasser, designed to curtail the influence of a feudal elite. The current system is dominated by a powerful President backed by a comfortable majority of his ruling party in the People’s Assembly. The Parliament rarely rejects key policies of the Government or the President downright, but nevertheless is a formal platform where criticism against unpopular reforms is expressed. The Cabinet is appointed by the President. In the current Government, business-oriented ministers are believed to set the tone (*Al-Ahram Weekly*, 2006).

The dominance of the central state in the last 50 years has limited the autonomy of the governorates and eroded the influence of traditional community leaders (*Radwan*, 1997). Increasingly, however, the excessive powers of the ruling elite have been challenged on various fronts by political parties, social movements, syndicates, the press, and large parts of the judiciary. These developments have stimulated a national dialogue on political reform and led President Hosni Mubarak to commit publicly to political amendments empowering the parliament, enabling real multi-party presidential elections, and replacing the decade-old emergency law with anti-terrorism legislation. Within the ruling National Democratic Party, a ‘new generation’ of reform-oriented individuals is in charge of the influential Policies Committee. While some observers speculate that this might add momentum for change, others question the reformability of the regime from within (*Al-Ahram Weekly*, 2005).

While overall visions for political reform are still vague, advancements towards a more pluralistic system of governance are slowly being undertaken in the fields of customer protection, human rights monitoring, and agricultural as well as private-sector liberalization. Historically, parts of the business elite are described as having had disproportionate influence on policy-making through ‘state-crony relationships’ (*Sadowski*, 1991) that reflect the privileged status certain business sectors enjoyed under President Anwar el-Sadat’s ‘open doors policy’ from 1974 (*Al-Sayyid*, 2003). For instance, *Sadowski* (1991) describes how business–government alliances shaped land reclamation developments—a critical issue for water policy—in the 1970s.

Table 2. Actors in the Egyptian water sector.

Actor	Mandates and functions related to water management	Interest quantity	Interest quality	Interest costs
President	Strategic decisions, issue national targets			
Parliament (People's Assembly, PA)	Adopt policies, amend of laws, approve or reject government budget			
Cabinet	Develop overall vision/policies, develop national plans, strategic decisions			
Political parties (mainly: National Democratic Party, NDP)	Define and promote political programs			
MWRI: Ministry of Water Resources and Irrigation	Overall responsibility for water allocation, coordination, regulation, international cooperation, flow control, irrigation/drainage infrastructure construction, O&M, R&D	✓	✓	✓
MoALR: Ministry of Agriculture and Land Reclamation	Minimize water use per unit of agricultural output, coordination with MWRI, R&D, on-farm water management programs	✓	✓	✓
MHUNC: Ministry of Housing, Utilities and New Communities (now named Ministry of Housing, Utilities and Urban Development)	Construction and management of municipal water supply and sanitation infrastructure (after decentralization: planning and coordination)		✓	✓
MoHP: Ministry of Health and Population	Set water quality standards, monitoring of industrial wastewater		✓	
EEAA: Egyptian Environmental Affairs Agency/Ministry of State for Environmental Affairs	Environmental regulation, programs to reduce water pollution, main responsibility for coastal water bodies and Nile cruise boats		✓	
MoTI: Ministry of Trade and Industry	Regulate, support, and monitor water pollution control measures in the industry sector		✓	✓
MoLD: Ministry of Local Development	Coordinate the 'Shorouq' program (local-level projects in rural areas and small cities, incl. water supply and sanitation (WSS)), coordination with local-level institutions (governorates, communities), define development priorities		✓	✓
MoE: Ministry of Electricity	Power production at the Aswan High Dam and other sites, cooling water withdrawal for thermal plants	✓		
MoT: Ministry of Transportation	Maintain navigable waterways, cope with low winter flows (mainly by dredging)	✓		

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MoP: Ministry of Planning (now integrated in the Ministry of Economic Development)	Integration of water policies with national policies (annual plans, five-year plans)			
MoFA: Ministry of Foreign Affairs	Transboundary negotiations, overall coordination of international projects including Nile Basin Initiative projects			
MoIA: Ministry of Interior Affairs	Enforcement of regulations (i.e., fines for water pollution)			
MoSA: Ministry of Social Affairs	Licensing/supervision of NGOs, participation in local development			
Potable Water and Sanitation Holding Company	Management of treatment plants established by NOPWASD, handing plants over to communities		✓	✓
North Sinai/South Valley Holding Companies	Manage and coordinate the utilization of reclaimed land in the mega projects	✓	✓	✓
Donor agencies (bi- and multilateral)	Fund and support various water-related development projects ranging from institutional reform and policy development to infrastructure development in WSS, irrigation, and drainage sub-sectors			
NGOs: non-governmental organizations	Implement local projects mostly in WSS, pollution control, some advocacy at national level			
Universities	Conduct water research (mainly at the faculties of civil and irrigation engineering)			
Consultants/advisors	Conduct investigations and contribute expertise in specific issues or general policy orientation			
Users: farmers	Water allocation and utilization at the “marwa” and (after the institutional reform) at the “mesqa” level	✓	✓	✓
Users: agro-investors	Invest in the reclamation and management of newly reclaimed lands, commercial provision of water services	✓	✓	✓
Users: municipalities	After decentralization: manage WSS programs, meet wastewater quality standards		✓	✓
Users: industries	Adhere to wastewater quality standards		✓	✓
Users: tourisms, fisheries, etc.	Minimize negative impacts on water resources		✓	✓
Businessmen’s Associations	Promote different business interests	(✓)	(✓)	(✓)

Table 3. Responsibilities and roles of the different actors in the policy process.

Policy issues	Agenda-setting	Policy formulation	Policy adoption	Implementation	Evaluation
<b>Quantity management–supply</b>					
Cooperation with Nile Basin (NB) countries to increase the availability of river water	MWRI, MoFA, President, other NB states	MoFA, MWRI, other NB states	President, Cabinet, PA, other NB states	MWRI, (other domestic actors), other NB states	President, MWRI, MoFA, other NB states
Exploitation of groundwater, rainwater harvesting	MWRI	MWRI	MWRI, Cabinet, PA	MWRI	MWRI
Technology development (desalinization, etc.)	MWRI	MWRI	MWRI, Cabinet, PA	MWRI	MWRI
Land reclamation (South Valley, North Sinai)	President, MWRI, MoALR, investors	MoALR, MWRI	President, Cabinet, PA	MoALR, MWRI, investors	Cabinet, PA, public
Land reclamation (West Delta)	Farmers, investors	MWRI, Users, Donors	MWRI, Cabinet, PA	MWRI, users	MWRI, donors
Food security/self-sufficiency policy	Cabinet, MoALR	MoALR	President, Cabinet, PA	MoALR, Cabinet	President, Cabinet, public
Water allocation between sectors	Sectors/users, MWRI	MWRI, sectors	MWRI, Cabinet	MWRI	MWRI, sectoral agencies
<b>Quantity management–demand</b>					
Increase water reuse (agricultural drainage)	MWRI, MoALR	MWRI, MoALR	MWRI, Cabinet, PA	MWRI, MoALR	MWRI, MoALR
Increase water reuse (municipal and industrial wastewater)	MWRI, MHUNC	MWRI, MoALR, EEAA, MoHP, MHUNC	MWRI, Cabinet, PA	MWRI, MoALR, MHUNC	MWRI, MoALR, EEAA, MoHP, MHUNC
Introduce cost recovery mechanism	MWRI, MHUNC	MWRI, MHUNC	MWRI, Cabinet, PA	MWRI, MHUNC, local water user groups	Cabinet, public
Limit cultivation of water-intensive crops	MWRI, MoALR	MWRI, MoALR	MWRI, MoALR, Cabinet, PA	MWRI, MoALR, farmers, traders	Cabinet, public
Irrigation improvement programs	MWRI, MoALR	MWRI, donors	MWRI, Cabinet, PA	MWRI, donors, users	MWRI, donors, users
Improve water supply and sanitation performance	MWRI, Cabinet, MoHP, MHUNC, public	MHUNC, MoLD	MHUNC, Cabinet, PA	MHUNC, MoLD, communities	MHUNC, MoLD, public
Protect ecologically valuable areas	Environmental groups, donors, EEAA	EEAA, MWRI	EEAA, MWRI, Cabinet, PA	MWRI, EEAA	Public, environment groups

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Awareness/water saving campaigns	MHUNC, MWRI	MHUNC, MWRI	MHUNC, MWRI, Cabinet	MHUNC, MWRI, NGOs	MHUNC, MWRI, NGOs
<b>Quality management</b>					
Define and enforce industrial quality standards	MoHP	MWRI, MoTI, EEAA, MoHP	Cabinet, PA	MWRI, MoTI, EEAA, MoIA	MoHP, public
Support polluters in installing water treatment facilities	MoTI, industries	MWRI, MoTI, EEAA	Cabinet, PA	MWRI, MoTI, EEAA	MWRI, MoTI, EEAA
Relocation of industries and design of new cities	President, Cabinet	Cabinet, var. ministries	President, Cabinet, PA	MoI, MHUNC, MWRI	Cabinet, public
Awareness/water-saving campaigns	EEAA, MWRI, NGOs	EEAA, MWRI, NGOs	EEAA, MWRI	EEAA, MWRI, NGOs	EEAA, MWRI, NGOs
<b>Institutional reform</b>					
Devolution of power, establish water user associations	MWRI, donors	MWRI, donors	Cabinet, PA	MWRI, users	MWRI, users
Promote stakeholder participation	MWRI, donors	MWRI, donors	Cabinet, PA	MWRI, stakeholders	MWRI, stakeholders

Key: Refer to [Table 2](#) for definitions of all acronyms. Note: Obviously, more actors than those listed are involved in the different phases of policy-making. The table highlights key actors according to their relevance for explaining policy-making patterns.



Table 4. Influence of patterns of policy making for selected policy issues.

Policy issue	Patterns of policy-making		
	Rational choice	Organizational processes	Governmental politics
<b>Quantity–supply</b>			
Cooperate with NB countries for increased supply	✓		
Exploit groundwater, rainwater harvesting	✓		
Technology development (desalination, etc.)	✓	✓	
Land reclamation (Toshka, Sinai)	✓	✓	✓
Land reclamation (West Delta)			✓
Food security/self-sufficiency policy	✓	✓	
Water allocation between sectors	✓		
<b>Quantity–demand</b>			
Increase water reuse (agricultural drainage)	✓		
Increase water reuse (municipal and industrial wastewater)			✓
Application of cost recovery mechanisms	P		I
Limit cultivation of water-intensive crops (rice, sugarcane)	P		I
Irrigation and drainage improvement	✓		
Protect ecologically valuable areas/ecosystem conservation	P	I	
<b>Quality management</b>			
Define and enforce industrial quality standards (Law 48)			✓
Support polluters to upgrade treatment facilities			✓
<b>Institutional reform</b>			
Devolution of power, establish water user associations	P	I	
Promote stakeholder participation	P	I	

P: planning; I: implementation; ✓: both planning and implementation.

National policies are formulated to varying degrees by the President, the Cabinet and the sectoral ministries, as well as the ruling party. Decision processes at the highest political levels are not very transparent and hard to assess analytically. The former Ministry of Planning (now integrated into the Ministry of State for Economic Development) is considered to be the ‘bookkeeper’ rather than the ‘think-tank’ of national policy making.

The government document “Egypt and the 21<sup>st</sup> Century” (GoE, 1997) is the main guideline for the planning period 1997–2017. It sets targets for, inter alia, economic growth, reclamation of living space, education reform, transition to an information-based society, and environmental protection. The planning priority assigned to water sector developments in this document is stressed in water sector documents (see below) or in donor country strategies, e.g., in the World Bank’s country assistance strategy (World Bank, 2005). From other recent government statements, the weight attributed to water policy relative to the other development priorities is not clearly apparent (e.g., GoE, 2006). The ruling party’s economic policy (NDP, 2006) contains few references to the development of water resources, with the exception of water supply and sanitation issues. Many of the key targets specified in the national planning documents, however, directly depend on a reliable water supply. Water sector experts consider the personal commitment to water development of both the President and Prime Minister Ahmed Nazif to be very high.

### 3. Changing narratives and water policies

The successive water policies in Egypt can be framed in the light of the narratives used to justify water development interventions.

The dominant narrative highlighting the necessity of state intervention regarding water management issues in Egypt until recently was the threat to food security and agricultural exports (mostly of cotton) because of the limited and variable river inflow. The British presence in Cairo in the first half of the 20th century stimulated the design of ambitious plans for basinwide river management that still inspire water planners in the country today (e.g. Collins, 1990). Of the two main objectives in that period—mitigating the negative effects of the high seasonal and interannual runoff variability, and increasing the total flow to Egypt—only the former was achieved with the construction of the Aswan High Dam in the 1970s.

The first ‘modern’ water policy of 1975 still largely dealt with measures to increase the supply of water for increased agricultural production on newly reclaimed land (Elarabawy *et al.*, 2000; MWRI & USAID, 2003; MWRI & World Bank, 2003). The pattern of massive state intervention persisted when the motivation for water policy reform shifted to new rationales. The justification for land reclamation projects gradually changed from ‘maintaining the per capita plot size for agricultural production’ to non-agricultural benefits such as ‘expansion of living space’ and ‘creation of employment opportunities’. Wichelns (2001) speculates that unemployment has become an even more pressing issue than agricultural production, particularly from a perspective of social welfare and stability.

Water policies throughout the 1980s and 1990s introduced new policy elements in response to the increasing demand and set-backs in the progress of upstream projects aiming to increase the net inflow, such as the Jonglei Canal in the Sudan. Demand management was strengthened through improved irrigation techniques, drainage water reuse, groundwater development, and restrictions on water release from Lake Nasser for non-consumptive uses (Elarabawy *et al.*, 2000; MWRI & USAID, 2002; MWRI & World Bank, 2003). Water management strategies in the 1990s still focused mainly on water quantity issues (MWRI & World Bank, 2003), even though water pollution problems had already reached alarming levels. Water quality issues have since been addressed more comprehensively both in the latest water policy documents and through institutional reforms, e.g., the issuance of the Law 4/1994 for the Protection of the Environment, and the establishment of the Ministry of State for Environmental Affairs in 1997 and of the Water Quality Unit within MWRI in 2002. It is important to note that water quality and quantity are interlinked, as polluted water cannot be utilized for all purposes. Pollution thus reduces the availability of usable water and the system-wide reuse potential.

In addition to the physical challenges of water scarcity and pollution, the governmental institutions in charge of water services delivery came under increasing budgetary pressure. In response to emerging calls for more efficient water utilization and strategies for cost-recovery, the MWRI gradually started to promote participatory and decentralized approaches to infrastructure operation and maintenance, and non-technical interventions such as awareness campaigns and initiatives targeting the behavior of water users.

The holistic approach of Integrated Water Resources Management (IWRM) is most clearly adopted in the latest water policy document, the National Water Resources Plan (NWRP). The proposed water sector strategies are based on four key pillars: (1) developing additional water resources (supply management); (2) making better use of the existing resources (demand management); (3) protecting public health and environment (quality management); and (4) ensuring institutional and financial

sustainability. Of these components, supply management is obviously most closely aligned with the existing organizational structures in the water sector traditionally geared towards distribution of irrigation water.

In line with the IWRM principle of inter-sectoral integration, the NWRP aspires to be a national rather than a sectoral policy. The NWRP analyses previous policies and devises strategies of water use in all related sectors. Representatives of the respective ministries were actively involved in the formulation of the NWRP. Formally, however, the NWRP is not binding for the other ministerial stakeholders, who are instead expected to formulate their own corresponding operational plans and make the necessary budgetary commitments.

Despite the fact that a holistic approach was pursued, the NWRP is still largely a compilation of sectoral policies and targets. An overarching framework on how to trade off the benefits of different water uses—an essentially political question exceeding the responsibility of the water authorities—is not clearly apparent. Furthermore, the NWRP only vaguely relates to national development targets, e.g., in terms of economic growth or poverty alleviation. The planning group obviously did not have the mandate and political backing to develop a fully integrated plan free from institutional biases, a constraint that will possibly be mitigated with the establishment of the high-level inter-ministerial National Water Council as suggested by the MWRI. Some gaps in the NWRP are addressed in a recent report, and include the lack of emphasis on local-level dimensions, the vague prioritization of the proposed interventions, a lack of clear visions for future institutional set-up, vague ideas for mechanisms of stakeholder participation, and limitations in assessing the capacities of stakeholders to implement the planned activities (MWRI & World Bank, 2005).

Only a few planning documents and working groups have attempted to develop strategies beyond the 2017 planning horizon. These strategies rely strongly on technological improvements and approaches to tap non-traditional water sources, such as sea water desalination, the use of saline water in cultivation, increased utilization of treated (municipal and industrial) wastewater in irrigation, and Upper Nile conservation projects (MWRI, 2000).

The narrative of food self-sufficiency is currently an ambiguous driver of water policy reforms in Egypt. Cereal imports—or virtual water transfers—already cover a large share of the food demand, and this is not projected to change according to the current water policy (MWRI, 2005). And yet, the idea of virtual water trade is met with suspicion and perceived as a threat to national security by many policy-makers. For many politicians and voters, self-sufficiency is more appealing than the prospect of food imports, and the self-sufficiency argument is sometimes used to justify large-scale land reclamation projects. This is partly misleading, because the agricultural modernization on the new lands—while doubtlessly increasing the overall efficiency of water use and generating benefits from cash crop production and exports—threatens to erode food self-sufficiency in the old lands by abstracting unprecedented amounts of scarce water.

The initiated shift of attention from supply-side management to demand and quality management offers an opportunity for publicly re-assessing the role of water resources for economic growth, poverty alleviation, and environmental protection. So far, however, such a broad discussion seems not to have been taken up sufficiently by national policy-makers or a greater number of concerned stakeholders.

Another narrative that periodically surfaces in Egyptian water policy debates is the spectre of a ‘water war’ and the alleged threat to national security from potential upstream water development (e.g., *Al-Ahram Weekly*, 1998). In recent years, the sabre-rattling in the Nile Basin has gradually been

replaced by transboundary dialogue in the framework of the Nile Basin Initiative. Transboundary issues are only addressed vaguely in Egyptian water policy documents, as the Nile Basin negotiations are still ongoing and only involve a rather narrow set of actors comprising high-level representatives of the MWRI and the Ministry of Foreign Affairs (MoFA).

#### 4. Actors in the water sector

Accounts of water sector actors and their responsibilities are provided in recent studies and in the water policy documents (MWRI & USAID, 2003; MWRI & World Bank, 2003; JACOBS, 2005; MWRI, 2005). Table 2 presents a list of selected water sector actors and actor categories, their main functions, and their stakes and interests in water quantity (i.e., the timely availability of water), quality and/or in the cost of water services.

Central government agencies play a dominant role in water policy processes, due both to the political history and organization of the state and the nature of the country's water supply as stemming from a single most important source. The MWRI enjoys a high degree of prestige due to the historic importance of irrigation water distribution in Egypt. Land reform in the 1950s rendered the Ministry of Agriculture an important partner in water allocation planning. The growing emphasis given to the industry and services sectors also increased the influence of the corresponding ministries in water policy processes. The MWRI has overall responsibility regarding water allocation. The Ministry of Housing, Utilities and New Communities (MHUNC, now renamed: see Table 2) is responsible for the supply of drinking water and sanitation services.

The MWRI and MHUNC, together with the ministries of agriculture, environment, health, industry, and local development, form the inner circle of water policy actors that constitute the NWRP steering committee. Ministerial stakeholders commonly engage in water policy planning through the departments dealing with water or environmental issues.

Water research is conducted at the National Water Research Center (affiliated with the MWRI), at the MoALR's Soil, Water and Environment Research Institute, and at different universities.

Among the non-governmental actors, donor agencies play a prominent role. The Dutch Embassy, the World Bank, and—formerly—USAID are arguably the most active donors in the field of water resources policy and institutional reform. However, as Allan (in JACOBS, 2005) notes, the influence of donors on strategic national decisions remains limited.

Business actors maintain mostly informal or indirect linkages to the water sector, either through personal contacts or through the responsible state agencies, e.g., the Ministry of Trade Industry, the Ministry of Tourism, etc. The Committees for Agriculture, Industry or Environment of the Egyptian Businessmen Association (EBA) are examples of formal private-sector advocacy channels. In recent years, the government has established a number of 'quasi-private' holding companies, e.g., for potable water and sanitation, or for the management of land reclamation projects in Sinai and the southern desert. However, these companies remain institutionally and personally linked to the related public sector agencies and their influence as autonomous actors is unclear.

There are only few advocacy NGOs in Egypt that deal with water and environmental issues at the national level. In a system of tight government control over civil society organizations (Abdelrahman, 2004), NGOs choose mostly to avoid confrontation with state agencies. Different water user groups and the ministries providing services to them have different interests in terms of

the quantity, quality, and cost of water (Table 2). As the current water policy gives allocation priority to the drinking water and industry sectors, increasing water scarcity will mainly affect the agriculture, hydropower production, and navigation sectors. The latter two sectors are excluded in principle from claiming water in excess of the release from Lake Nasser determined by the demand of the other sectors.

Table 3 specifies the roles played by the main water sector actors in the policy process. Agenda-setting, policy formulation, and formal decision-making are largely dominated by governmental actors. Top executive bodies, i.e., the President's office and the Cabinet, dominate the decisions regarding core strategic orientations—such as international cooperation, food security strategies, and large-scale land reclamation—while individual ministries have more leverage in defining sub-sectoral strategies. The predominance of governmental actors in the agenda-setting stage reflects the low profile of organized interest and advocacy groups in the water sector. Arguably, the only grass-root groups that have been able to 'set the agenda' with regards to water sector development are commercial farmers and investors through their involvement in land reclamation activities (e.g., in the West Delta region, see below). Donor agencies hold a certain agenda-setting capacity by supporting specific initiatives, e.g., for ecosystem protection, water pricing, or privatization.

Different actors contribute to the formulation of water policy. An ideal planning process as proposed in the IWRM framework considers the interests of all stakeholders and aims to integrate water uses in different sectors. The substantial efforts taken by the MWRI to make water policy processes more participatory and integrative are slowly bearing fruits in an environment where political reform and devolution of power have only recently become fashionable terms. Donors are usually involved in the planning of specific projects and indirectly influence policy formulation through their support of the NWRP and the institutional reform process.

The process of policy adoption is even more restricted to a narrow group of government actors involving the Cabinet, the President's office and the NDP-dominated People's Assembly. Whether a specific water policy decision is effectively taken at the level of MWRI, the Cabinet, or the President depends on its perceived strategic importance and its implications for other sectors. While water policies have never been rejected as a whole in Parliament, the role of the legislature in obstructing any raise of municipal water tariffs (Al-Ahram Weekly, 2004) is illustrative of the difficulty of adopting unpopular measures in spite of the excessive power of the regime.

Actors who are not significantly involved in the planning phase—particularly the water users themselves—may still influence the water policy outcomes by actively supporting, ignoring, or opposing policy measures during the implementation phase. Furthermore, insufficient coordination between the actors involved in the planning phase may result in implementation failure when conflicts of interests surface at a later stage. The limited influence of non-state or local-level actors in the planning phase is particularly significant for issues related to key interests of water users, such as cost recovery, food security, household incomes, forced shifts of cropping patterns, water quality standards, and institutional changes regarding the relationship between MWRI and water users. It is therefore not surprising that the implementation of far-reaching policy reforms commonly faces greater difficulties than the more technical policy elements do.

Non-state actors do also have an important role to play in the evaluation of policies. Donors, the media, and NGOs evaluate policies and express their opinions regarding the performance of the water sector. While the NGOs usually keep a low profile in criticizing government programs, the media increasingly hold the authorities accountable for the effects of their policies.



## 5. Cooperation and coordination in the water sector

Coordination and cooperation between stakeholders is vital for achieving Integrated Water Resources Management. Representatives of sectoral agencies as the main policy drafters meet at different levels: (1) in the Cabinet, (2) in committees to coordinate planning processes or oversee programs, or (3) when executing routine activities such as data exchange, joint project implementation, or research.

Inter-ministerial committees are abundant (listed in [MWRI & USAID, 2003](#); [MWRI & World Bank, 2003](#)), yet in many cases they are either not functional or leave little trace due to unclear mandates, lack of permanent supporting structures, and ineffective feedback mechanisms. Ministerial departments involved in the formulation of water policies may lack influence in their own sectors ('bureaucratic islands', see [World Resources Institute, 2003](#)), and thus can hardly commit their own ministry to binding strategies regarding water management. Strengthening these water focal points in every ministry is important for fostering effective stakeholder cooperation ([MWRI, 2005](#)). The coordinated efforts of two inter-ministerial committees formed for the formulation of the NWRP—a high-level 'political' and a lower-level 'technical' committee—and the establishment of a highest-level National Water Council are considered by many experts as a successful departure from former ineffective practices.

Regional and national workshops as well as consultative meetings with various local-level users, NGOs, research institutions, consultants, private companies, etc. were held in preparation of the NWRP. However, these stakeholder meetings are perceived more as being top-down information transfer events to communicate governmental policies rather than as truly participatory exercises allowing for bottom-up design of MWRI policies. Most of the involved non-governmental organizations or user groups lack the institutional capacity and/or the political weight to contribute substantially to the planning process. The establishment of stakeholder platforms—such as the Egyptian Water Partnership—is seen as a promising step, though arguably these platforms are still somewhat dominated by representatives of governmental agencies.

Cooperation between different (sub) sectoral agencies at the local level is also reported to be rather fragmentary and hampered by the fact that the spatial areas of responsibility of the different ministerial units often do not match ([Radwan, 1998](#)). Interactions between users and extension staff are reportedly from the limited decision power of the latter, inefficiency, and corruption ([Radwan, 1997](#)).

## 6. Selected policy issues

This section presents four case studies to illustrate specific characteristics of Egyptian water policy processes in some more detail.

### 6.1. Reclamation of new lands

Horizontal expansion is a key strategic target pursued by the government of Egypt in order to address population growth, high unemployment rates, and land loss due to urbanization and overexploitation. Escaping the narrow Nile Valley has been a dream of Egyptian rulers throughout the millennia. Moving agricultural production to unpolluted and non-fragmented lands and applying efficient and environmental-friendly irrigation and farming practices promises to yield higher returns per drop of water. However, the monetary and socio-economic costs of land reclamation in relation to the benefits for the average Egyptian citizen have given rise to criticism. The water sector policies of the 1980s and

1990s increasingly questioned the profitability of large-scale land reclamation projects. The 1993 Water Security Project judged desert land reclamation to be uneconomic, though necessary in order to catch up with increasing demand for food and living space.

Nevertheless, the launch in 1997 of an extensive land reclamation project in the southern desert, known as the ‘Southern Valley’ or ‘Toshka’ project, came as a surprise to many observers even from within the water sector. Together with the North Sinai land reclamation project, more than one million hectares of land is being reclaimed with water abstracted from the Nile. Some water experts point to the burden imposed on the old land farmers by these projects (Elarabawy & Tosswell, 1998; Wichelns, 2002), and others refer to them as being “based on a political decree from the beginning” rather than on comprehensive cost/benefit assessments (interviews conducted for this study). Critics of the projects claim that the government proceeded secretly, failed to reveal all relevant studies, did not inform the responsible parliamentary committee and the co-riparian states, and did not conduct any serious environmental impact assessment before the start of the project (Al-Ahram Weekly, 2000). It is feared that scarce resources—in terms of both water and funds—will be diverted away from productive uses in the Nile Valley, and that the benefits will mainly accumulate in the hands of foreign and domestic investors. Notably, no Western donors have signed up to support these ‘mega-projects’. Ten years after the launch of the Southern Valley project, observers still disagree on whether the project will be known as a “miracle in the desert” or the “biggest mistake in Egyptian history”.

A possible new trend of bottom-up land reclamation can be observed in the West Delta region. An area of 250,000 feddan (105,000 ha) at the fringe of the desert has seen a boom of commercial farming based on groundwater abstraction since the 1980s (World Bank, 2004). As groundwater abstraction already exceeds the safe yield in the Delta region, the MWRI was requested to connect the newly reclaimed lands to the surface irrigation grid. A project supported by the World Bank ensures that the principles of full cost recovery and stakeholder participation will be applied. While such policy elements and the bottom-up nature of the West Delta developments are generally desirable, the West Delta project will also add to the pressures on the Nile to the disadvantage of the farmers on the old lands who will have to cope with significantly reduced levels of irrigation water availability.

The modernization of the agricultural system on newly reclaimed land is controversial because the benefits in the form of potential employment opportunities must be traded off against decreased water availability on the old lands. From a decision-making point of view, the MWRI seems to react largely to external demands for more irrigation water, either arising from governmental land reclamation plans or from the initiative of local investors and water users. Such water demands exacerbate the task of the MWRI to provide sufficient water for all users. At the same time, the MWRI as an organization obviously benefits from the significant investments related to land reclamation programs. Therefore, both external developments and ‘organizational’ water sector interests seem to influence the water sector policies in relation to the national land reclamation policies strategies.

## 6.2. Rice production

Another interesting example that offers insights into processes of water policy making in Egypt are the recent attempts to shift cropping patterns towards less water-consuming crops. The NWRP stipulates a reduction of the area grown with rice and states that “illegal growing of rice will be strictly controlled in the future” (MWRI 2005). Implementation of these policies has only been partly successful so far, and rice production has even increased in recent years (FAO, 2006).



Protective import tariffs, high returns per feddan in the absence of water charges (Wichelns, 2001), and restrictions on cotton marketing (Wichelns *et al.*, 2003) have encouraged farmers to grow rice despite the threat of fines. Increasing these fines is proposed as one measure to achieve the targeted shift in cropping patterns (MWRI & USAID, 2002). Command-based measures like zoning of rice plantation areas and constraining seed supply (MWRI & USAID, 2003) have apparently also not resulted in the desired reduction of rice cultivation. The economic interests of rice producers and traders seem to receive priority over water conservation rationales, and governmental authorities shy away from the strict enforcement of rice bans in the light of the potential negative effects on the social stability and the level of discontent among the large community of rice farmers. The most notable success with regard to water conservation, therefore, was achieved through the introduction of less water-intensive short-duration rice varieties.

The attempt to decrease water demand by limiting rice production is an example of a policy element that has been designed through a rational planning process within the water sector, but largely failed due to the resistance of stakeholder groups and the lack of commitment on the side of the government to enforce the strategy. The decisive influence of different policy actors on the policy implementation in this case is an example of the ‘governmental politics’ model of policy-making.

### 6.3. *Waste water quality debate*

The issue of water quality management illustrates how unclear legal frameworks and enforcement priorities can obstruct rational water policy making. According to many experts, water quality is becoming the most urgent challenge to water policy-makers in Egypt. It is estimated that the economic losses due to water pollution in Egypt already add up to more than 1% of GDP (World Bank, 2002).

Within the government, the Ministry of Health and Population is responsible for issuing quality standards for industrial wastewater according to Law 48 (1982). The current standards are based on WHO guidelines but have done little to improve the water quality, as most industries find it difficult to comply with the law. The Ministry of Industry supports the industries’ interests in lax legislation by advocating an amendment of Law 48. The agencies responsible for licensing and penalizing polluters, the MWRI and the Ministry of Interior, respectively, have not rigorously enforced compliance with the wastewater standards either. According to an MoHP estimate, 95% of all discharging facilities do so without a permit (MWRI, 2005).

An inter-ministerial committee has been formed and has been discussing possible amendments of Law 48 for several years. In the long run, the government plans to transfer the industrial areas to low-vulnerability sites—i.e., to the desert—in order to avoid the negative impacts of waste disposal on water quality. In an initiative to contain water pollution without confronting the business interests of the industries, the Egyptian Environmental Affairs Agency supports efforts to improve the capacity of industrial plants for wastewater treatment. The current situation in which polluters’ interests are protected at the expense of the downstream water users can be explained partly by the weakness of consumer associations as compared to industrial interest groups, and by the priority given to industrial development in national planning.

Conflicting policies and practices also exist with regard to the reuse of municipal wastewater. The Environmental Affairs Agency has issued a policy banning the application of municipal wastewater to non-wood cultivated plants, a provision that is regarded as being too strict by MWRI policy-makers.

The institutional capacity of the water sector to address water quality issues has lagged behind the awareness of pollution challenges among the MWRI's top officials. The MWRI cannot solve the pollution problem alone, but needs to collaborate with different stakeholders including the polluting sectors, i.e., industries, agriculture, and municipal water users. However, water quality control is not generally a top priority in the respective ministries, and their departments dealing with issue of water quality may lack full internal support. The General Department of Construction and Environment, which is responsible for the coordination of activities to prevent water pollution in the Ministry of Industry, is an example of such a 'bureaucratic island' with little leverage to commit the industrial sector to far-reaching pollution control strategies. The Ministry of State for the Environment itself is also considered a still relatively weak actor in the water sector by many observers.

In summary, decisions regarding water quality control are very much subject to bargaining over stakeholder interests, both within the government and between the government and water users.

#### *6.4. Institutional reform*

An institutional reform process is currently underway in the Egyptian water sector with the goal of establishing a decentralized system that would allow the MWRI to deliver better services more cost-effectively, and would create incentives for users to utilize water more efficiently. Decentralization of water management tasks should eventually limit the direct responsibility of the MWRI to water allocation at the level of major canals, and to the design and enforcement of national policies and regulations (Kandil, 2003). Water User Associations (or Water Boards) at the local and branch canal levels will be in charge of local water distribution, operation and management of infrastructure, as well as cost recovery.

The integration of different government services at the local level is another concern addressed in the institutional reform. Merging core functions of the MWRI (irrigation and drainage infrastructure provision, groundwater development) at the district level is, in itself, a daunting task, considering the approximately 80,000 affected MWRI employees and the partly non-matching geographical command areas of the involved MWRI departments. Further-reaching integration of water services beyond the MWRI's responsibility—i.e., including on-farm water use, pollution control, and domestic water supply and sanitation—will be even more difficult to achieve, but is essential if 'integrated water resources management' and not just 'integrated irrigation and drainage management' is the target (MWRI & USAID, 2002).

A failure of the institutional reform would not only mean that financial resources currently spent on local-level irrigation and drainage services would not become available for other pressing water sector programs—e.g., water quality control—but also that the quality of water services for the end users could further deteriorate. Two aspects will be decisive for the success and impact of the institutional reform: (1) the ability and willingness of the MWRI staff to relax the current system of extensive central control, and (2) the question of whether the benefits under the reformed system will offset the transaction costs of self-organization among the water users. The willingness to undergo reform is well-established at the level of top management but is less certain among the lower-level MWRI staff. Changing routine behavior within the water sector institutions and dragging along the MWRI staff may be a greater challenge than convincing the farmers to organize themselves into water user associations. In this sense, the water policy outcomes related to the institutional reform process are governed to a significant extent by an 'organizational processes' type of policy pattern.

## 7. Patterns of policy-making

The above case studies show that water policy processes in Egypt are very complex, and that the MWRI's ability to design and implement water development strategies according to IWRM guidelines is limited. The interests of other stakeholders sometimes interfere, and water sector reform has to challenge existing organizational routines and biases. This section summarizes the dominant patterns of policy-making that determine the outcomes of policy processes concerning major water management issues (see Table 4).

### 7.1. Rational choice

Considering the vast size and experience of the MWRI, the capacity of the water sector to make 'rational' decisions regarding its core tasks is highly advanced. Water allocation is based on sophisticated hydrological models, and priorities given to the different sectoral uses are transparent and relate to basic human needs (drinking water), economic returns (industrial and services sectors), and the existence of viable alternatives to water-related activities (hydropower, navigation). Projects to develop better decision support systems taking into account opportunity costs and trade-offs between different water uses—including environmental protection—have been initiated and will further contribute to the 'rationality' of water allocation. Strategies regarding groundwater exploitation and rainwater harvesting, irrigation improvement, and water reuse are decided upon mainly through MWRI planning processes. These decisions can be assumed to follow a fairly 'rational' pattern based on criteria such as effectiveness, cost-efficiency, and social acceptance, and are not significantly challenged by external actors.

The rationality that influences strategic decisions at the highest political level—i.e., by the President or the Cabinet—is less transparent than the selection criteria regarding more 'technical' water sector interventions. Criteria for 'rational' strategic decision-making include the contribution to economic growth and welfare, food security, and employment. Deviations from such economic reasoning arise from the key priority given to security issues (e.g., in the negotiations with upper Nile countries), the aversion towards measures that threaten political stability (e.g., reduction of rice cultivation, enforcement of waste water quality standards), and the leaders' ambition to provide monumental 'gifts for the coming generations' (e.g. the New Valley land reclamation project). Allan (in JACOBS, 2005) stresses the fundamental impact of top-level political priorities on the design of water sector policies. At the same time, he points to the 'bounded rationality' that often determines the formulation of water policy decisions and draws strongly on beliefs and experience instead of science and economics. As described above, national food self-sufficiency is advocated by many representatives of the water sector, even though this target is neither hydrologically nor economically reasonable.

In Table 4, decisions on land reclamation are not unequivocally attributed to the rational choice pattern. Though certainly based on an assessment of costs and benefits, land reclamation policies can also be seen as a standard response to population growth biased by existing organizational interests and routines (i.e., an 'organizational processes' pattern). A degree of lobbying by potential beneficiaries of land reclamation projects (MoALR, agro-investors) can be expected as well, subjecting the respective decisions to a pattern of interest bargaining (i.e., a 'governmental politics' pattern).

### 7.2. *Organizational processes*

Organizational routines influencing water policy decisions can be found within individual organizations—e.g., the MWRI itself—or in the set-up and functioning of the entire sector. In an environment historically dominated by engineers, technical measures are often designed and implemented more smoothly than socio-economic interventions. Supply-side management remains the most obvious priority for many water sector representatives. The prominence of technological options to increase the total water supply (e.g., desalinization) and upstream water development projects—relative to non-technical demand side approaches—in the long-term planning visions indicates the inclination of the water sector to apply routine solutions to evolving challenges. Furthermore, the limited influence of environmental departments within different ministries and of the EEAA itself leads to a notorious marginalization of environmental policy targets—ranging from water quality control to protection of ecosystems—in the design and even more in the implementation of water policy.

Quite obviously, the institutional reform plans of the MWRI, though rationally designed to increase the efficiency of operations and foster financial sustainability, face internal resistance in an organization mainly geared towards the centralized provision of water services. Reforms potentially threaten the positions of MWRI employees at district level, reshuffle the power relations among the MWRI departments and among ministries, and to a certain extent challenge the political fabric of state–citizen relationships. The difficulties in coordinating different functions of ministerial actors or MWRI departments both at the local level and in the design of national policies indicate that the logic of organizational routine thinking often prevails over the rational design of ‘ideal’ institutions. Initiatives to foster participatory planning and decision-making have been only partly successful so far because they deviate too far from a political system that neither encourages independent self-organization at the local level nor favors the establishment of vocal civil society organizations that could effectively promote the interests of water users.

### 7.3. *Governmental politics*

Policy outcomes regarding different water management issues depend to a critical degree on the way the interests of a wider range of actors are traded off, and actions taken by interest groups during the implementation phase.

The horizontal expansion in the West Delta is an example of a user-initiated development that resulted in a major water development project and challenges the national water allocation system ‘rationally’ designed by the water authorities.

Another example of the ‘governmental politics’ pattern is the debate on industrial water pollution that involves inter-ministerial interest bargaining beyond the control of MWRI planners. Even though the MWRI is ultimately responsible for the provision of good quality water for users in all sectors, and is therefore enormously interested in maintaining acceptable quality levels, other actors’ antagonistic positions and actions in both the planning and implementation of quality control measures have so far impeded the adoption of effective pollution control regulations, as well as the enforcement thereof.

The divergence between the positions of MWRI and EEAA regarding the reuse of municipal wastewater also illustrates the ‘governmental politics’ type of policy-making. Whether and to what

extent municipal wastewater will be used to irrigate non-wood crops will be decided by the ‘pulling and hauling’ in the inter-ministerial planning committees unless the involved agencies can agree on a ‘rational choice’ type procedure to assess the benefits and disadvantages of different policy options.

Another example of a ‘governmental politics’ pattern is the attempt to reduce water demand by shifting the crop rotation away from water-intensive crops, such as rice or sugarcane. A ‘rationally’ designed MWRI policy was largely ignored by the farmers and traders, and the government was not ready to enforce the strategy against these stakeholders’ opposition.

Similarly, measures to increase the cost recovery by increasing the price for water services are regularly obstructed by members of parliament in the name of the water users they represent, and could only partially be implemented by the ministries in charge, i.e., the MWRI and the MHUNC.

## **8. Conclusions**

Important steps towards IWRM have been taken in the Egyptian water sector. Conveyance infrastructure and irrigation technology has been gradually improved to ensure efficient distribution and utilization of scarce water resources according to ever more sophisticated hydrological models. An institutional reform process has been set in motion to decentralize water management responsibilities to the water users. Quality issues are addressed by a number of new institutions, and the overall water policy making process has been made more integrative and transparent. Nevertheless, much progress is still needed to improve the effectiveness of the water sector in addressing issues such as pollution control, cost recovery, inter-sectoral coordination, and stakeholder participation.

Socio-economic aspects of water management have gained prominence as poverty, unemployment, public health concerns, and environmental degradation remain among the most pressing challenges of national planning. Inevitably, these challenges call for new approaches of water policy making. Reforming governmental institutions of water policy making is a formidable task. Water policy makers have to operate in an environment characterized by bureaucratic institutions, non-transparent power relationships, and competing stakeholder interests. As illustrated in this paper, the success of water management in Egypt is not merely a function of the planning capacity and willingness to reform on the part of the water authorities, but depends on many actors in the water sector and beyond. The relationships between the government, non-state actors, and user groups have to be shaped carefully in order to enhance both the efficiency and legitimacy of water sector interventions.

As this analysis illustrates, organizational processes and actor interest bargaining interfere with the ‘rational’ design of water management policies, or with the implementation of such strategies. Conflicts of interests and the pressure on the water authorities to produce comprehensive solutions to urgent problems are not likely to ease up in the near future. Bottom-up contributions by water users are essential for the success of water sector reforms. And yet, the salience of water scarcity and persistent biases in favor of polluters and inefficient water uses also call for farsighted top-down interventions and continued government commitment. Promoting both the imperatives of ‘sound water management’ and ‘sound policy-making’ is thus critical, and scientific efforts to reflect the relevant constraints and opportunities have to be strengthened further.



## Acknowledgements

The research for this article was financed by the NCCR North South program (nccr-north-south.unibe.ch). I am grateful to the numerous Egyptian water sector experts who contributed to this project, and in particular to Mohamed Hamouda and Simon Mason for their inputs to earlier versions of this paper.

## References

- Abdelrahman, M. M. (2004). *Civil Society Exposed—The Politics of NGOs in Egypt*. American University in Cairo Press, Cairo.
- Al-Ahram Weekly (1998). MPs warn against water wars. *Al-Ahram Weekly*, (377) 14–20 May.
- Al-Ahram Weekly (2000). Toshka in the crossfire. *Al-Ahram Weekly*, (466) 27 Jan.–2 Feb.
- Al-Ahram Weekly (2004). Toshka in the crossfire. *Al-Ahram Weekly*, (715) 4–10 Nov.
- Al-Ahram Weekly (2005). Reform without reformers. *Al-Ahram Weekly*, (767) 2–9 Nov.
- Al-Ahram Weekly (2006). Nazif pumps up the volume. *Al-Ahram Weekly*, (780) 2–8 Feb.
- Allan, T. (2003). *IWRM/IWRAM: a new sanctioned discourse?* SOAS Water Issues Study Group, King's College London, London, Occasional Paper 50.
- Allison, G. & Zelikow, P. (1999). *Essence of Decision: The Cuban Missile Crisis*. Longman, New York.
- Allison, G. T. (1971). *Essence of Decision: Explaining the Cuban Missile Crisis*. Little Brown, Boston.
- Al-Sayyid, M. K. (2003). *Politics and Economic Growth in Egypt (1950–2000)*. Unpublished manuscript, Cairo University, Cairo. See: <http://www.gdnet.org/middle.php?oid=77>
- Bendor, J. & Hammond, T. H. (1992). Rethinking Allison's models. *American Political Science Review*, 86(2), 301–322.
- Collins, R. O. (1990). *The Waters of the Nile*. Oxford Clarendon Press, Oxford.
- Elarabawy, M. & Tossell, P. (1998). An appraisal of the Southern Valley development project in Egypt. *Journal of Water Supply: Research and Technology-AQUA*, 47(4), 167–175.
- Elarabawy, M., Tossell, P. & Attia, B. (2000). Integrated water resources management for Egypt. *Journal of Water Services Research and Technology-AQUA*, 49(3), 111–125.
- FAO (2006). *FAOSTAT Database*. Food and Agriculture Organization, Rome. <http://faostat.fao.org>. Last accessed: November 2006.
- GoE (1997). Egypt and the 21st century. In *Government of Egypt*. Cabinet Office, Cairo.
- GoE (2006). Government of Egypt: Government Statement. [http://www.egyptiancabinet.gov.eg/StaticFiles/Government\\_Policy\\_Statement2006\\_E.pdf](http://www.egyptiancabinet.gov.eg/StaticFiles/Government_Policy_Statement2006_E.pdf) Last accessed: November 2006.
- GWP (2007). *IWRM toolbox*. Global Water Partnership, Stockholm. <http://www.gwpforum.org> Last accessed: July 2007.
- Hermans, L. M., El-Masry, N. & Sadek, T. M. (2001). Linking actors and models for water policy development in Egypt: analyzing actors and their options, knowledge, technology, and policy. *Knowledge, Technology, and Policy*, 14(4), 57–74.
- Hvidt, M. (1995). Water resources planning in Egypt. In *The Middle Eastern Environment*. St. Malo Press, Cambridge.
- JACOBS (2005). *Egypt: Water Sector Reform Programme, Identification Report*. JACOBS Consultancy, London.
- Kandil, H. M. (2003). Institutional reform vision for the irrigation sector in Egypt. *Water Resources Development*, 19(2), 221–231.
- Mason, S. (2004). *From conflict to cooperation in the Nile Basin*. Ph.D. thesis. ETH Zurich, Zurich.
- MWRI (2000). *A Study on water resources beyond the year 2017*. Ministry of Water Resources and Irrigation, Cairo.
- MWRI (2005). *National water resources plan for Egypt–2017*. Ministry of Water Resources and Irrigation, Cairo.
- MWRI & USAID (2002). *APRP water policy review and integration study*. Working Paper. Ministry of Water Resources and Irrigation, Cairo.
- MWRI & USAID (2003). *Inter-ministerial water policy integration*. Ministry of Water Resources and Irrigation, Cairo.
- MWRI & World Bank (2003). *Holistic approach to water resources management, stock-taking of IWRM in Egypt: policy and practice*. Ministry of Water Resources and Irrigation, Cairo.
- MWRI & World Bank (2005). *Integrated Water Resources Management Plan*. Ministry of Water Resources and Irrigation, Cairo.
- NDP (2006). *Economic policy*. National Democratic Party. [www.ndp.org.eg](http://www.ndp.org.eg). Last accessed: November 2006.

- Radwan, L. (1998). Water management in the Egyptian Delta: Problems of wastage and inefficiency. *Geographical Journal*, 164(2), 129–138.
- Radwan, L. S. (1997). Farmer responses to inefficiencies in the supply and distribution of irrigation requirements in Delta Egypt. *Geographical Journal*, 163(1), 78–92.
- Sadowski, Y. M. (1991). *Political vegetables? Businessman and bureaucrat in the development of Egyptian agriculture*. Brookings Institution Press, Washington, DC.
- Waterbury, J. (2002). *The Nile Basin: National determinants of collective action*. Yale University Press, New Haven.
- Wichelns, D. (2001). The role of ‘virtual water’ in efforts to achieve food security and other national goals, with an example from Egypt. *Agricultural Water Management*, 49(2), 131–151.
- Wichelns, D. (2002). Economic analysis of water allocation policies regarding Nile River water in Egypt. *Agricultural Water Management*, 52(2), 155–175.
- Wichelns, D., Barry, J., Müller, M., Nakao, M., Philo, L. D. & Zitello, A. (2003). Co-operation regarding water and other resources will enhance economic development in Egypt, Sudan, Ethiopia and Eritrea. *International Journal of Water Resources Development*, 19(4), 535–552.
- World Bank (2002). *Cost assessment of environmental degradation, Arab Republic of Egypt*. World Bank, Washington, DC.
- World Bank (2004). *West Delta Irrigation Infrastructure Development Project*. World Bank, Washington, DC, Report No.: AC625.
- World Bank (2005). *Egypt Country Assistance Strategy Document*. World Bank, Washington, DC.
- World Resources Institute (2003). *World Resources 2002–2004: Decisions for the Earth: Balance, voice, and power*. World Resources Institute, Washington D.C. See: [http://pubs.wri.org/pubs\\_description.cfm?PubID=3764](http://pubs.wri.org/pubs_description.cfm?PubID=3764)

Received 9 July 2007; accepted in revised form 8 April 2008. Available online November 2009