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Double-Edged Hydropolitics on the Nile

Linkages between Domestic Water Policy Making and Transboundary Conflict and Cooperation

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Linkages Between Domestic Water Policy Making and Transboundary Conflict and Cooperation

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Note on the structure of this document

The chapters of this thesis were written for publication as articles in scientific journals, not as parts of a monograph. Therefore all chapters start with an abstract, and most of them contain theoretical, methodological, and empirical sections. Some duplication in the introductory sections of the chapters is unavoidable. Since the peer review process was still ongoing for most articles at the time of printing of this document, the versions published in the journals may not correspond exactly to the chapters of this thesis.

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List of Abbreviations

AAU	Addis Ababa University
ADB	African Development Bank (see also AfDB)
ADLI	Agricultural Development Led Industrialization
AfDB	African Development Bank (see also ADB)
AHD	Aswan High Dam
AOYE	Arab Office for Youth and Environment (Egypt)
ASR&T	Academy of Scientific Research and Technology (Egypt)
CC	Chamber of Commerce
CEDARE	Center for Environment and Development for the Arab Region and Europe (Egypt)
CIDA	Canadian Development Cooperation Agency
CRDA	Christian Relief and Development Association (Ethiopia)
DfID	Department for International Development (UK)
DRC	Democratic Republic of Congo
DSS	Decision support system
EEA	Ethiopian Economics Association
EEAA	Egyptian Environmental Affairs Agency
EEPCo	Ethiopian Electric Power Corporation
EHPEA	Ethiopian Horticultural Producers and Exporters Association
EIA	Environmental Impact Assessment
EN	Eastern Nile
ENCID	Egyptian National Committee on Irrigation and Drainage
ENCOM	Eastern Nile Council of Ministers
ENSAP	Eastern Nile Subsidiary Action Program
ENSAPT	Eastern Nile Subsidiary Action Program Team
ENTRO	Eastern Nile Technical Regional Office
EPA	Environmental Protection Agency (Ethiopia)
ERHA	Ethiopian Rainwater Harvesting Association
EU	European Union
EWWCA	Ethiopian Water Works Construction Authority
FAO	Food and Agriculture Organization of the United Nations
FDRE	Federal Democratic Republic of Ethiopia
feddan	Unit of area used in Egypt; 1 feddan = 0,42 ha
GDP	Gross Domestic Product
GNI	Gross National Income
GoE	used for either Government of Egypt or Government of Ethiopia in the respective national documents

GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Development Cooperation Agency)
HEP	Hydro-electric power
IDEN	Integrated Development of the Eastern Nile
IR	International Relations
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
JICA	Japanese Development Cooperation Agency
MHUNC	Ministry of Housing, Utilities and New Communities (Egypt)
MoALR	Ministry of Agriculture and Land Reclamation (Egypt)
MoARD	Ministry of Agriculture and Rural Development (Ethiopia)
MoFA	Ministry of Foreign Affairs (Egypt/Ethiopia)
MoFED	Ministry of Finance and Economic Development (Ethiopia)
MoH	Ministry of Health (Ethiopia)
MoHP	Ministry of Health and Population (Egypt)
MoIC	Ministry of International Cooperation (Egypt)
MoLD	Ministry of Local Development (Egypt)
MoP	Ministry of Planning (Egypt)
MoSEA	Ministry of State for Environmental Affairs (Egypt)
MoTI	Ministry of Trade and Industry (Egypt)
MoWR	Ministry of Water Resources (Ethiopia)
MWRI	Ministry of Water Resources and Irrigation (Egypt)
NBD	Nile Basin Discourse
NBI	Nile Basin Initiative
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NFP	National Focal Point
NGO	Non Governmental Organization
Nile-COM	Council of Ministers of Water Affairs of the Nile Basin States
Nile-SEC	Nile Basin Initiative Secretariat
Nile-TAC	Nile Basin Initiative Technical Advisory Committee
North Sinai HC	North Sinai Holding Company (Egypt)
NWRC	National Water Research Center (Egypt)
NWRP	National Water Resources Plan (Egypt)
O&M	Operation and Maintenance
OCDC	Orthodox Church Development Cooperation (Ethiopia)
PA	People's Assembly
PMU	Project Management Unit
PRSP	Poverty Reduction Strategy Paper
PWSHC	Potable Water and Sanitation Holding Company (Egypt)

R&D	Research and Development
SAP	Subsidiary Action Program
SFD	Social Fund for Development (Egypt)
SVP	Shared Vision Program
TAC	Technical Advisory Commission
TECCONILE	Technical Co-operation Committee for the Promotion of the Development and Environmental Protection of the Nile Basin
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WB	World Bank
WSS	Water Supply and Sanitation
WUA	Water User Association
WWDSE	Water Works Design & Supervision Enterprise (Ethiopia)

Summary

This thesis focuses on domestic processes of water policy making in Egypt and Ethiopia in the context of transboundary conflict and cooperation in the Nile Basin.

In the light of increasing global water demands, transboundary rivers are often portrayed both as a source of inter-state conflict and as a catalyst for international cooperation. Analysts commonly explain the conflictive or cooperative behavior of riparian states in shared basins by referring to characteristics of the international system (e.g., the hydrological connected-ness, the overall level of water scarcity, the geo-political context, or the level of economic integration in a basin) and attributes of the riparian states (e.g., their geographical position along the course of the river, their economic and military power, existing and planned domestic water uses). Hence, most studies on transboundary river basins at least implicitly apply an analytical perspective rooted in 'International Relations' theories and tend to view riparian states as unitary rational actors pursuing specific 'national interests'.

Such a 'systemic' perspective contrasts with the observation that, in many shared river basins, the course of transboundary conflict and cooperation is significantly influenced by domestic constraints to the ratification or implementation of transboundary agreements. The inter-relations between domestic policy processes and transboundary cooperation have so far largely been approached in a qualitative and anecdotal manner. The present thesis addresses this gap in the transboundary river literature by applying a systematic perspective on domestic water sector actors, institutions, and processes in two Nile Basin countries (Egypt and Ethiopia).

The analytical focus on domestic actors and institutions in transboundary river basins relates to recent developments both at the theoretical and practical level. New theoretical approaches in political sciences integrate systemic (i.e., International Relations) and domestic (Public Policy Analysis) explanations of the foreign policy behavior of states. At the same time, prac-

titioners and modern water management paradigms increasingly highlight the important role of non-state actors and water sector institutions. In the context of these converging approaches, the notion of 'water conflict' has evolved from a narrow focus on inter-state warfare to emphasizing the impacts of non-violent transboundary disputes and local level conflicts on 'human security'. Linkages between domestic institutions and water policies on the one hand, and challenges to establish basin-wide institutions to foster transboundary cooperation on the other have become more and more obvious.

The present thesis adopts a *two-level game* perspective to conceptualize the mechanisms linking domestic policy processes to the progress of transboundary negotiations. The concept of national *win-sets* – i.e., the range of domestically ratifiable policy options – is used to identify and explain the specific negotiation challenges and to discuss implications for the potential negotiation outcomes. The study places the analytical focus on the interests and constellations of domestic actors and water sector institutions, as well as on specific 'patterns' of policy-making (i.e., rational choice decision-making, organizational routines, or interest bargaining between domestic actors). The empirical data were collected through expert and stakeholder interviews, document analysis, and the application of Social Network Analysis as a quantitative tool.

The thesis presents results at two different levels. First, the water sectors of Egypt and Ethiopia are analyzed with regard to their capacity to jointly design and implement effective and sustainable strategies for transboundary river development. Second, the study produces general insights regarding the nature of transboundary river conflicts and the challenges of conflict mitigation.

Domestic factors significantly constrain the ability of policy-makers in the Egyptian water sector to accept any *de jure* re-allocation of water quotas at the international level. Domestic constraints arise from 1) the widely held view that Egypt's current water share of 55.5 billion cubic meters per year is legitimate and non-negotiable, 2) the limited success of the water sector in influencing related sectoral policies that determine the total national water demand, particularly regarding irrigation expansion, and 3) the failure to design and implement effective policies regarding demand management or

pollution control. The Egyptian water governance system is highly centralized, and only a small number of non-state actors have direct access to the policy processes. Decisions regarding the traditional core tasks of the water ministry, e.g., inter-sectoral water allocation, are based to a large extent on 'rational choice' decision-making patterns. Water policy issues that have emerged more recently, such as water quality or demand management, are subject to intensive interest bargaining between different domestic policy actors at both the planning and the implementation stage. The lack of inter-sectoral policy integration and the low level of stakeholder participation constrain the ability of water authorities to design and evaluate alternative policy options both domestically and in the context of transboundary cooperation.

Most water sector actors in Ethiopia highlight the right of upstream countries to a higher share of the Nile and the need for a legal and institutional framework agreement re-allocating national water abstraction quotas. There is a broad consensus as to the need for enhanced hydropower development and the expansion of irrigated agriculture in Ethiopia. Actor preferences are divided to some extent, however, with regard to the priority assigned to large-scale infrastructure projects (large dams and water diversions) as opposed to more localized and household-centered strategies (rainwater harvesting, small-scale diversions and irrigation schemes). Different rationales and priorities are applied to issues of food security, economic growth, pro-poor development, and environmental conservation. Donor agencies, decentralized water authorities, and the planned River Basin Organizations somewhat constrain the decision autonomy of the central government. Capacity constraints arising from poor inter-ministerial coordination, overlapping levels of planning responsibilities, limited stakeholder participation, and limited research capacities reduce the government's ability to evaluate and exploit trade-offs between different domestic and transboundary river development strategies.

The analysis of domestic water sector networks illustrates the similarities and differences between the policy-making patterns in Egypt and Ethiopia. Governmental agencies occupy central network positions in both countries. The limited connectedness of sectoral agencies in both countries leads to fragmented policies, which in the case of the Nile Basin translates

into a focus on – unilaterally or jointly planned – infrastructure projects. International donor agencies play an important role by connecting different types of domestic actors in information exchange networks. The greater prominence of regional state water authorities and NGOs in the Ethiopian water sector indicates a somewhat higher potential for pluralistic water policy making. The weak institutional research capacity and the dependence on consultants in the policy formulation process affect the ability of the Ethiopian water authorities to design effective and broadly supported policies.

In conclusion, the thesis demonstrates that the negotiation positions and river management strategies of riparian states in transboundary river basins can be considerably constrained by divided actor preferences and deficient policy processes at the domestic level. Domestic constraints narrow down the win-sets for international cooperation either by limiting the government's decision autonomy and implementation capacity, or by reducing the range of policy choices available to the decision-makers. Inadequate planning capacities limit the riparian countries' ability to effectively coordinate their water policies within a cooperative framework. Non-participatory policy processes fail to tap a significant segment of the domestically available expertise in the effort to design and implement policies that are compatible with the interests of co-riparian states.

The Nile states could expand the range of domestically ratifiable options for a basin-wide river development framework by further including top-level national planners and decision-makers in the transboundary negotiations, by better integrating sectoral policies to address trade-offs between different water uses, and by seeking transboundary mechanisms to reward progress made in demand management and quality control.

Zusammenfassung

Die vorliegende Dissertation untersucht nationale Planungs- und Implementierungsprozesse im Wassersektor von Ägypten und Äthiopien vor dem Hintergrund der internationalen Verhandlungen um die Verteilung und gemeinsame Nutzung des Wassers des Nils.

Die zunehmende Konkurrenz um Wassernutzungsrechte an grenzüberschreitenden Flüssen wird oft als Ursache zukünftiger 'Wasserkriege' genannt. Schnelles Bevölkerungswachstum und das Fehlen grenzüberschreitender Institutionen zur Harmonisierung von nationalen Wassernutzungsstrategien lassen ein vermehrtes Auftreten von Konflikten zwischen Flussanrainern befürchten. Die Abflussregulierung wie auch die Verteilung von Nutzungsrechten zwischen den Nilstaaten ist seit langem umstritten. Die geplante Wasserentnahme zur Bewässerung im Oberlauf (etwa in Äthiopien) bedroht bestehende Nutzungen im Unterlauf (vor allem in Ägypten). Die von internationalen Geldgebern unterstützte und von allen Nilländern getragene Nile Basin Initiative (NBI) bildet den Rahmen für internationale Verhandlungen um ein neues rechtliches und institutionelles Abkommen zwischen den zehn Nilstaaten. Daneben strebt die NBI die Schaffung eines konkreten Mehrwerts durch Investitionsprojekte und eine Stärkung nationaler Planungskapazitäten an.

Wissenschaftliche Analysen zu den Ursachen internationaler Wasserkonflikte wenden meist implizit oder explizit theoretische Ansätze aus dem Fachgebiet der 'Internationalen Beziehungen' an. Solche 'systemische' Erklärungsmodelle stützen sich konzeptionell vorwiegend auf die Beschreibung des internationalen Systems (etwa die generelle Wasserknappheit, den geo-politischen Kontext, die ökonomische Integration zwischen den Anrainerstaaten) sowie auf Attribute der Anrainerstaaten selbst (z.B. ihre Lage am Fluss, ihr spezifischer Wasserbedarf, ihre ökonomische und militärische Stärke). Die Anrainerstaaten werden oft vereinfachend als einheitliche rationale Akteure betrachtet, welche bestimmte 'nationale Interessen' verfolgen. Innerstaatliche Entscheidungsprozesse und

politische Institutionen werden dabei als untergeordnete Erklärungsvariablen behandelt oder vernachlässigt.

Untersuchungen aus zahlreichen internationalen Flussbecken verdeutlichen jedoch die entscheidende Rolle nationaler Institutionen und Policy-Prozesse bezüglich der konfliktiven oder kooperativen Ausprägungen der zwischenstaatlichen Beziehungen. Die Aushandlung internationaler Abkommen, deren formelle oder informelle Ratifizierung sowie die tatsächliche Umsetzung hängen entscheidend von den Interessen nationaler Akteure und ihrem jeweiligen Einfluss auf die nationalen Entscheidungsprozesse ab. Die Interaktionen zwischen nationalen und internationalen Planungs- und Entscheidungsprozessen im Zusammenhang mit grenzüberschreitenden Flüssen wurden bisher meist unsystematisch und oft nur anekdotenhaft behandelt. Die vorliegende Studie präsentiert eine systematische Untersuchung der Zusammenhänge zwischen nationaler Wasserpolitik und grenzüberschreitender Zusammenarbeit anhand der Fallstudie des Nils und zwei seiner Anrainerstaaten.

Eine genaue Betrachtung der Berührungsfläche zwischen nationaler und internationaler Wasserpolitik bietet sich aus mehreren Gründen an. Auf konzeptioneller Ebene trägt sie der häufig genannten Forderung nach einer Integration der Forschungsansätze der 'Internationalen Beziehungen' und 'Vergleichenden Politikwissenschaft' (Public Policy Analysis) Rechnung. In der Praxis nehmen nicht-staatliche Akteure und partizipative Policy-Prozesse in der Evaluation und in der Entwicklung von Wasserbewirtschaftungsstrategien eine immer grössere Rolle ein. Innerstaatlichen Entscheidungs- und Umsetzungsprozessen kommt daher auch bezüglich einer internationalen Harmonisierung nationaler Strategien eine wachsende Bedeutung zu.

Die vorliegende Studie stützt sich auf den konzeptionellen Ansatz des 'Two-Level Game' zur Analyse der Schnittstelle zwischen nationaler und internationaler Wasserpolitik. Dabei spielt das nationale 'Win-Set' – also die Menge der für eine entscheidende Mehrheit der nationalen Akteure akzeptablen Policy-Optionen – eine wichtige Rolle. Das 'Win-Set' bestimmt den Verhandlungsspielraum der Verhandlungsführer in jedem Anrainerstaat, und damit auch die Aussicht auf ein internationales Abkommen. Die Studie untersucht die nationalen 'Win-Sets' anhand der Analyse von Akteursinteressen

und Akteurskonstellationen, der nationalen politischen Institutionen, sowie der spezifischen 'Muster' der Politikgestaltung ('Rational Choice', 'Organizational Processes', 'Governmental Politics'). Die Untersuchung beruht auf Daten aus bestehenden Policy-Dokumenten, Experten- und Akteursbefragungen, sowie aus einer systematischen Netzwerkanalyse.

Die Entscheidungsträger im ägyptischen Wassersektor haben aus verschiedenen Gründen einen eingeschränkten Verhandlungsspielraum bezüglich einer Reduktion der nationalen Wasserentnahmequote zugunsten der Oberanrainer. Zum einen hat sich die aktuelle Quote von 55.5 Milliarden Kubikmetern pro Jahr, festgelegt in einem bilateralen Vertrag mit dem Sudan, als nicht verhandelbarer 'historischer' Anspruch in den Narrativen der meisten ägyptischen Akteure verankert. Zum anderen hat das Wasserministerium nur bedingten Einfluss auf die Wassernutzung in anderen Sektoren und damit auf den totalen nationalen Wasserbedarf. Staatliche und privatwirtschaftliche Projekte zur Gewinnung von landwirtschaftlichem Land prägen die nationale Wasserpolitik entscheidend. Konkrete Bemühungen, den Wasserbedarf durch Effizienzsteigerungen und eine volkswirtschaftliche Umorientierung zu verringern, sind mit zahlreichen bürokratischen Hindernissen und dem Widerstand einzelner Akteursgruppen konfrontiert. Der ägyptische Wassersektor ist stark zentralisiert und bietet nur wenigen nicht-staatlichen Akteuren eine effektive Mitsprachemöglichkeit. Kernaufgaben des Wasserministeriums, wie etwa die Allokation von Wasser zwischen verschiedenen Sektoren, folgen vornehmlich einem 'rationalen' Entscheidungsprozess. Neuere Aufgaben des Wassersektors, etwa die Eindämmung der Verschmutzung oder die Verminderung des Wasserverbrauchs, sind in der Planung und Umsetzung stärker von der Kooperation verschiedener Akteure des Wassersektors abhängig, und folgen daher anderen Entscheidungsmustern.

Die meisten einflussreichen Akteure im äthiopischen Wassersektor fordern eine *de jure* Umverteilung der Wassernutzungsrechte am Nil zugunsten der bisher kaum berücksichtigten Oberanrainer. Diese Haltung trägt vor allem der Forderung nach 'Fairness' im internationalen Verteilungsmuster Rechnung, und ist weniger durch eine konkrete Bedrohung bestehender oder geplanter Wassernutzung erklärt. Die Notwendigkeit des Ausbaus der Wasserkraftgewinnung und der Bewässerungslandwirtschaft in Äthiopien

ist kaum umstritten. Allerdings bestehen Meinungsunterschiede bezüglich der geeigneten Grössenordnung und Nutzung entsprechender Projekte. Nationale Akteure beurteilen grossangelegte Infrastrukturprojekte unterschiedlich je nach ihren organisationellen Interessen und ihrer relativen Priorisierung verschiedener Ziele wie Ernährungssicherheit, Wirtschaftswachstum, Armutsbekämpfung oder Erhaltung naturnaher Ökosysteme. Stärker als in Ägypten nehmen in Äthiopien bi- und multilaterale Geldgeber, unabhängige Nicht-Regierungsorganisationen und dezentrale Verwaltungseinheiten an nationalen und sub-nationalen Planungs- und Umsetzungsprozessen teil. Diese Pluralität und die Abhängigkeit von externen Finanzmitteln und Expertise schränken den Handlungsspielraum der äthiopischen Regierung im Hinblick auf die internationalen Verhandlungen um eine kooperative Nutzung des Nils etwas ein.

Die Betrachtung der Akteursnetzwerke in den Wassersektoren in Ägypten und Äthiopien verdeutlicht die Gemeinsamkeiten und Unterschiede in den Politikprozessen der beiden Länder. Staatliche Akteure nehmen in beiden Netzwerken zentrale Positionen ein, sind gleichzeitig aber relativ schwach miteinander verknüpft. Internationale Geldgeber spielen eine wichtige Rolle, insbesondere als Vermittler von Informationen zwischen verschiedenen Akteurstypen. Die vergleichsweise hohe Pluralität im äthiopischen Wassersektor vermindert die staatliche Dominanz der Zentralregierung in der Planung grosser Infrastrukturprojekte nur unwesentlich. Die relativ geringe Forschungskapazität und die Abhängigkeit von Beratungsfirmen in Äthiopien beeinträchtigt dagegen die Effektivität sowie die gesellschaftliche Verankerung und Legitimität der nationalen Wasser-Policies.

Als Folge des schwachen Einbezugs der Wassernutzer und nicht-staatlicher Akteure sind nationale Strategien zur Eindämmung der Verschmutzung und Steigerung der Nutzungseffizienz in beiden Ländern nur beschränkt erfolgreich. Dadurch steigt der Anreiz für beide Länder, ihre Wasserversorgung durch Abkommen auf der zwischenstaatlichen Ebene zu erhöhen, entweder durch eine Umverteilung nationaler Entnahmerechte oder durch gemeinsame Infrastrukturprojekte.

Die vorliegende Studie zeigt auf, dass die Verhandlungspositionen in den Nilländern entscheidend durch Faktoren der nationalen Politikgestaltung

geprägt sind. Der Umfang der nationalen 'Win-Sets' ist eine Funktion der verschiedenen Akteursinteressen und der Institutionen, welche den Einfluss der Akteure in den relevanten Entscheidungsprozessen bestimmen. Einschränkungen der 'Win-Sets' resultieren sowohl aus der Beschränkung der Entscheidungsautonomie der Regierung, als auch aus Beeinträchtigungen der Planungs- und Umsetzungskapazität im Wassersektor. Eine weit reichende Harmonisierung der wirtschaftlichen Ziele und Wassernutzungsstrategien in den Nilländern ist zudem erschwert durch hohe Planungsunsicherheiten.

Der momentane institutionelle Verhandlungsrahmen mit den Wasser- und Aussenministerien als zentrale Verhandlungsführer, zusammen mit der lückenhaften Koordination unter den relevanten staatlichen Akteuren auf beiden Seiten, steht einer stärker integrierten internationalen Zusammenarbeit zwischen den Nilländern im Weg. Die Fokusierung auf Infrastrukturprojekte und auf die *de jure* Verteilung von Nutzungsrechten ist dadurch teilweise erklärbar. Ein stärkerer Einbezug von höchsten Entscheidungsträgern und Planungsinstitutionen in den internationalen Verhandlungen, und eine bessere Zusammenarbeit zwischen allen nationalen Interessensgruppen erhöht die Chance, dass der langfristige und gesamtwirtschafliche Nutzen einer verstärkten internationalen Kooperation erkannt und auch gegen die Interessen einzelner Akteure konsequent angestrebt wird.

1 Introduction

The growing global demand for freshwater has given rise both to speculations on future 'water wars' and to calls for intensified cooperation among the riparian states in shared river basins. In the last two decades, scholars and policy-makers have made considerable progress towards a better understanding of the conditions and mechanisms governing transboundary river conflicts and cooperation. Theory-guided accounts of river basin conflicts, however, tend to conceptualize riparian states as unitary rational actors aiming to maximize their utility in respect of a 'national interest'. Such 'systemic' conceptualizations fail to fully explain the observed variation of success and failure in transboundary regime-building and cooperation. This thesis challenges the perspective of riparian states as unitary actors by analyzing interactions between the domestic processes of water policy making and the transboundary negotiations in the Nile Basin. The study explores new ground by systematically addressing determinants of transboundary conflict and cooperation rooted in domestic interest divides and water governance institutions.

Demographic pressure as well as growing consumption and pollution levels pose tremendous challenges to policy-makers and institutions in the water sector. The availability of freshwater for human activities fluctuates in time and varies across geographical regions. A country's total water demand depends on the different inter-linked sectoral water uses, most of which relate directly to issues of economic growth, welfare, human and animal health, as well as environmental sustainability. This complexity implies a need for both better analytical tools to analyze the structure of water management challenges and enhanced efforts to formulate and implement integrated water management policies.

International boundaries dividing hydrological watersheds complicate the task of river management even further. Positive and negative externalities of water use often accrue asymmetrically on different sides of a border and may encourage 'free riding' behavior. The waters of the Nile have been a

source of transboundary disputes for millennia of recorded history. Egypt's total dependence on the river flow as a source of freshwater has created fears of deprivation since ancient times. However unsubstantiated concerns of upstream manipulations of the river flow have been in the past, modern hydro-engineering projects in the upstream of the river may dramatically alter the runoff regime of the river. Any unilaterally imposed reduction of the downstream water flow is certain to strain the transboundary relations among the Nile Basin states.

With ancient rivalries still echoing in the basin, the Nile states have decided to take a different path. For the first time in history, all ten basin countries (with Eritrea still as an observer) have engaged in the Nile Basin Initiative to jointly design the future utilization of their river. Under the stated overall goal of poverty alleviation, the World Bank and other donor agencies are committed to invest substantially into what is hoped will become a showcase of river basin cooperation.

This thesis starts from the assumption that both the potential for conflict and the recent shift towards cooperation in the Nile Basin are partly rooted in the domestic processes of water policy making. Specific mechanisms linking the domestic and international levels of water governance are addressed through the lens of a *two-level game* framework. Implications are drawn with regard to both the chances of reaching a transboundary agreement on the Nile and the likely focus of cooperative approaches.

This introductory chapter sets the stage for the presentation and discussion of empirical results. It first specifies the research question and the research objectives. Second, the focus of the study is positioned in the context of the scientific discourses regarding the analysis of foreign policy decisions and 'water conflicts'. Then, the overall conceptual framework is outlined, and an overview of the methodological approach is presented. The delimitations of the research focus are specified. The chapter ends with an outline of the thesis document.

Conceptual and methodological issues also are addressed in the introductory sections of Chapters 3 to 7. The purpose of the introductory chapter is to present an overarching perspective on the scope of this study, and to highlight a few conceptual and thematic aspects in a broader context.

1.1 Research questions and objectives of the study

The present thesis builds on earlier studies investigating the driving forces behind conflicts and cooperation regarding issues of water allocation and utilization in the Nile Basin. In most of these studies, the behavior of the Nile states and the potential for conflict and cooperation is explained with reference to the Nile states' 'national interests' and their relative military, economic, and diplomatic power in the broader geopolitical context. Such systemic approaches, however, can only partly explain and predict the shifts between conflictive and cooperative developments, or the specific areas of progress and deadlock in the transboundary negotiations.

This thesis takes an explicit look at domestic processes of water policy making and institutional factors that influence the national governments' priorities and thus constitute the 'national interests' brought forward in the transboundary negotiations. It is assumed that dynamic inter-linkages between the domestic policy processes and the international negotiations determine the course of transboundary cooperation and the specific outcomes in terms of policy reforms and infrastructure development on the ground. The analysis of domestic water policy processes can thus be expected to yield a refined understanding of the challenges and opportunities that characterize cooperation initiatives in international river basins. Accordingly, the main research questions addressed in this thesis are specified as follows.

- What characteristics of domestic water policy processes influence the negotiations aiming at a transboundary agreement in the Nile Basin?
- What particular bias in the design of cooperative agreements results from specific domestic patterns of water policy making?
- What are the specific mechanisms linking domestic processes of water policy making and the outcomes of transboundary negotiations over cooperative river management frameworks?

The goal of this thesis is to add a complementary perspective to the prevalent conceptualization of riparian states as unitary actors in transboundary negotiations. The thesis does not question the merits of systemic approaches to the description of transboundary river conflict and cooperation. Rather, it attempts to broaden the scope of explanatory variables and adds a complementary analytical dimension. The thesis thus aims to further explore the general assertion that 'domestic politics and institutions matter'. More specifically, the following objectives are pursued.

- First, the thesis aims to create a better understanding of the specific linkages between domestic and international water governance through the systematic – yet qualitative – application of a *two-level game* framework. The resulting insights are expected to explain in part – and qualitatively predict – the course of the negotiation process in the Nile Basin and the concrete cooperative projects on the ground.
- Second, the study aims to test a specific analytical framework to describe domestic processes of water policy making in relation to international conflict and cooperation. In contrast to earlier – and often anecdotal – descriptions of domestic factors affecting transboundary cooperation, the analytical focus of this study lies on present structures rather than past events. The approach adopted in this project invites discussion, modifications, and further refinement.
- Third, the findings from this thesis are expected to help researchers, but also water professionals and decision-makers in the Nile Basin and other regions, to design effective strategies that explicitly address the trade-offs between domestic and transboundary water development and management options.

The analytical perspective on the interface between domestic and international water governance can also serve as an entry point for a reassessment of certain 'dogmas' underpinning contemporary water management paradigms. In particular, the results of this thesis shed a new light on – though they do not necessarily reject – the assumptions that 'transboundary cooperation is desirable in any case' (see Bernauer 2002 for a critical view), 'Integrated Water Resources Management produces best outcomes' (see Allan 2003; Biswas 2004; Swatuk 2005 for differentiated analyses), and 'participation and decentralization leads to more efficient water utilization' (see Steelman and Ascher 1997; Milich and Varady 1999; Mostert 2003; Delli Priscoli 2004; Poolman and Van De Giesen 2006; Warner 2006).

1.2 The discursive and analytical context: What conflict? And how to analyze it?

This section embeds the topic of the study in the broader context of two relevant academic discourses, and reviews the literature on transboundary river conflicts. It prepares the ground for the conceptual framework presented in Section 1.4. First, the ongoing debate among scholars of political sciences on how to best explain foreign policy behavior of states is addressed. Approaches rooted in *International Relations* theories and *Public Policy Analysis* frameworks are discussed with a particular focus on the potential integration of the two conceptual streams (Figure 1.1, right side; see also Chapters 3 and 7). Second, the challenge of water allocation and development in transboundary river basins is reviewed through the lens of evolving conceptual approaches to the issues of 'water conflict' and 'water management' (Figure 1.1, left side; see also Chapter 3).

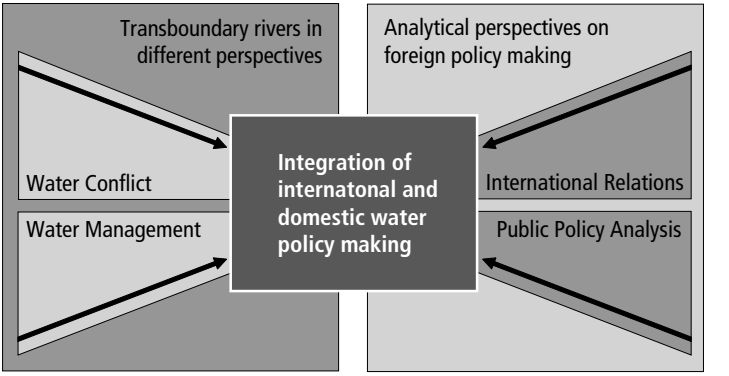

Figure 1.1: Converging analytical perspectives on transboundary river management

Systemic and domestic-level explanations of foreign policy behavior

According to Kenneth Waltz's (1979) seminal distinction, explanations of a state's behavior vis-à-vis other states are typically rooted in one of the following three levels, or 'images': 1) the decision-making frame of individual political leaders, 2) domestic political institutions and actor networks, or 3) the international system. 'Systemic' approaches (*third image*) are commonly applied in the scholarly field of *International Relations*. *Public Policy Analysis* is a separate field of study that focuses on domestic processes and institutions of policy-making (*second image*), including foreign policy making.

According to *International Relations* (IR) theories, the foreign policy behavior of a state is determined by two aspects: 1) its 'national interest', sometimes narrowly defined in terms of national security, and 2) the relative power and influence of the state in the geo-political system, defining the incentive structure for cooperative or antagonistic behavior in pursuit of the 'national interest'. IR approaches do not deny the fact that foreign policy decisions are produced through domestic political institutions, but they assume that the domestic policy process yields fairly predictable outputs in response to the incentive structure defined at the level of the international system (Moravcsik 1993). There is some disagreement between different IR

concepts with regard to the specific goals that states seek to maximize (i.e., military power and security, economic development), the role that international organizations play in shaping the behavior of states, and the degree to which the national governments can act independently from non-state actors. Specific characteristics of national policy processes, however, are generally considered only as interfering 'constraint-variables' (Dinar 2000).

In the opinion of many scholars, the neglect of domestic policy processes significantly constrains the ability of IR concepts to explain – and predict – the foreign policy behavior of states (Moravcsik 1993). This is particularly obvious when international cooperation is defined as the adaptation – or 'harmonization' – of domestic policies (see Keohane 1984). The 'domestic acceptability' and 'political feasibility' of different (foreign) policy scenarios is not systematically addressed in IR frameworks.

This weakness of state-centered IR approaches has led scholars to develop new conceptual frameworks to explain a state's foreign policy behavior as a function of domestic policy processes (*second image* conceptualizations according to Waltz's categorization) and vice versa (*second image reversed*, Gourevitch 1996). According to domestic-level explanations of foreign policy making, both the 'national interest' as well as the strategies selected to pursue it can only be understood in relation to the interests and the relative influence of domestic actors via the given political institutions and processes. Conceptual frameworks of *Public Policy Analysis* applied to foreign policy decisions are limited, however, by their inability to grasp the dynamic and reciprocal nature of international interactions.

Several scholars have called for the integration of *International Relations* and *Public Policy Analysis* theories. Robert Putnam (1988), for instance, proposed a conceptual framework, the *two-level game*, that takes into account the simultaneous and reciprocal interactions between policy-making processes at the domestic and inter-state levels (see Chapter 1.4 below). All approaches linking the domestic and systemic explanations of state behavior, however, struggle with the trade-off between conceptual clarity of IR approaches and the multitude of explanatory variables of *Public Policy Analysis* frameworks. Despite Putnam's call to 'marry' the *two-level game* approach with different theories of public policy making, no broadly accepted integrated conceptual framework or full-fledged theory has emerged so far.

Converging 'water management' and 'water conflict' perspectives

The development and management of transboundary rivers can be looked upon both as a management challenge or as a source of international conflict or cooperation. This section briefly summarizes the recent conceptual developments regarding 'water management' and 'water conflict' approaches in both research and practice.

The 'water management' perspective is concerned with the challenge – at different levels – to provide sufficient water of good quality to all users in a sustainable manner. Throughout the past two or three decades, the 'hydraulic mission', or 'command and control' type of river basin management focusing on large-scale infrastructure development has been gradually replaced by approaches taking into account economic, environmental, and equity aspects of water allocation and use (Allan 2003). The *Integrated Water Resources Management* (IWRM) approach, for instance, emphasizes the importance of demand and quality management in addition to supply enhancement, and considers hydrological river basins as the appropriate level for water resources planning. Former 'hydro-centric' approaches to water and food security in a given area have been expanded to consider trade-offs between water uses in different sectors and different regions globally (Brichieri-Colombi 2004; Allan 2005). The ethical dimension of water management has also gained increasing prominence in the scientific literature and in practice (see, e.g., Delli Priscoli 1998).

Corresponding to these conceptual shifts, the task of water managers has evolved from increasing reliable water supply through physical control towards maximizing allocative efficiency of water use in the context of different economic, social, and environmental demands (Biswas 1997; Allan 2003; Wallace et al. 2003; Biswas 2004; Smakhtin 2004). Evolving water management paradigms have influenced water policies in both Western (e.g., Bressers et al. 1995) and developing countries (e.g., Biswas 2001). Rather than being seen as a technical challenge, water management is increasingly recognized as a fundamentally political process involving a multitude of actors across different levels of governance and different economic and societal sectors (Allan 1999; Lundqvist 2000; Affentranger and Otte 2003; MacKay

and Ashton 2004). General trends towards privatization, decentralization, and civil society involvement have somewhat eroded the state's autonomy as the single most important driver of water policy developments.

The *Integrated Water Resources Management* (IWRM) framework relates to issues of water sharing in transboundary river basins both with direct reference to conflicts between water users at different levels and by giving attention to alternative, internationally more compatible water management strategies (Al Baz et al. 2002). For instance, a clear focus on demand management measures can release pressure from international water allocation disputes. Large-scale infrastructure projects (e.g., dams and diversions) are among the most disputed water management interventions for their potential to both spark international tensions and offer mutually beneficial solutions to water supply and regulation challenges (WCD 2000; World Bank 2004 a; Allan 2005). IWRM provisions on stakeholder involvement and environmental sustainability significantly alter the terms for the implementation of such infrastructure projects.

In contrast to the 'management' perspective on transboundary rivers, 'water conflict' narratives emphasize the potential threats to security stemming from competition over shared water resources and highlight the need for conflict transformation measures. Two conceptual developments are particularly important in the evolution of the 'water conflict' perspective. First, the notion of 'security' has been broadened from a narrow focus on inter-state war to include a greater spectrum of potential harms to human well-being ('human security'). Second, empirical findings have indicated that international 'water wars' are not a very likely consequence of competition over river water. Violence over water utilization may erupt at the local level, but the main damage from international water-related disputes likely accrues from the lack of cooperation and the resulting inefficient water use and lack of economic integration.

In view of these paradigm shifts, the search for approaches to mitigating water conflict increasingly focuses on the improvement and harmonization of national water policies and water management institutions. More effective strategies to provide sufficient water and protect the natural resource base have a positive impact on the 'human security' of water user groups, and may reduce pressure from the river in the transboundary context. The level

of 'water scarcity' not only depends on the physical availability of water, but also on the water use efficiency and the demand structure (Ohlsson 2000). National water policies and general economic strategies thus play an important role in determining whether 'water scarcity' is perceived as a viable justification for unilateral and conflictive behavior or as a challenge that can best be addressed in cooperation with the other basin states. The five different conceptualizations of 'water scarcity' presented by Molle and Mollinga (2003), namely, 'physical', 'economic', 'managerial', 'institutional', and 'political' water scarcity, illustrate the importance of domestic water management frameworks in the context of transboundary water allocation disputes.

In convergence, both the 'water management' and the 'water conflict' perspectives have shifted from focusing on the control over resources (commonly through state authorities) to emphasizing the impacts on water users and the environment under different scenarios. At the same time, both approaches have evolved to place a clear focus on the needs and roles of domestic stakeholders in the design of measures to address management challenges and mitigate water allocation conflicts

Transboundary river disputes in the literature

The converging 'water conflict' and 'water management' perspectives and the attempts to conceptually link *International Relations* and *Public Policy Analysis* approaches form a dynamic context for transboundary river research. This chapter summarizes the existing literature on transboundary river conflicts against this background. First, it provides an overview of major insights from previous studies regarding transboundary conflict and cooperation. The second part of the section focuses specifically on the analytical perspectives applied to investigate the transboundary river disputes. The literature on the Nile Basin is presented in Chapter 2.2.

Causes, characteristics, and solutions

The issue of transboundary river conflicts can be framed as part of the research field dealing with 'environmental conflicts'. The role of natural resources and their utilization in the outbreak and perpetuation of conflicts has been widely debated (see Hagmann 2005 for a review of the scientific discourse, and Chapter 3 for more details). Among the typical characteristics of conflicts linked to the utilization or degradation of natural resources are, inter alia, a high multiplicity of actors, a trans-sectoral character, a mismatch between ecological and politico-administrative boundaries, power asymmetries, high uncertainties, and long time spans (Baechler 1999). The complexity of such conflicts calls for adequately broad approaches to both the analysis of the conflicts and the design of mitigation measures.

More than 260 major rivers cross international borders (Wolf et al. 1999). The withdrawal or pollution of river water can create negative externalities in downstream states of a transboundary river basin. In a Malthusian logic, increasing demand leads to intensified competition, and potentially to conflict between local user groups, between different sectors of the economy, or between riparian states. Contrary to early alarmist projections (e.g., Starr 1991), however, empirical findings on the occurrence of river basins conflicts indicate that water sharing and management disputes are unlikely to escalate into full-fledged 'water wars' (Wolf 1998). On the contrary, shared rivers are increasingly described as potential catalysts of international cooperation, as they create inter-dependencies and offer benefits that can be tapped by jointly exploiting comparative advantages in different riparian states (Sadoff and Grey 2005). Nevertheless, incompatible claims for national water quotas as well as diverging strategies for water development and utilization in different basin states often strain the transboundary relations, and thus impede the development of effective river development frameworks (Wolf et al. 2003).

Despite the high profile of shared water bodies in the discourse on inter-state conflict and cooperation in different geographical contexts, a few critical voices warn against over-emphasizing the role of shared water bodies as a source of international conflict and cooperation. Without denying the importance of water in the political rhetoric and for the daily lives of users, it is argued that water remains relatively insignificant in the broader

political economy, for instance as compared to the economic importance of oil (Selby 2005).

The bulk of literature on conflict and cooperation in transboundary river basins consists of single basin case studies. An increasing number of scholars have deepened the knowledge base, either through comparative large-N studies (Toset et al. 2000; Giordano et al. 2002; Song and Whittington 2004; Yoffe et al. 2004; Furlong 2006; Gleditsch et al. 2006) or theory-guided analysis of multiple case studies (Durth 1996; Wolf 1997; Elhance 1999; Kliot et al. 2001; Marty 2001). Bernauer (2002) presents a review of the latter type of investigations and calls for further efforts towards the estblishment of rigid conceptualizations and empirical testing.

All transboundary river basins have been catalogued with regard to the past incidences of conflict and cooperation (Wolf 1999). Although the complexity of transboundary river challenges and the uniqueness of every basin is commonly recognized (Elhance 1999; Wolf et al. 1999; Van der Zaag et al. 2002), the following constraints to cooperative river management are identified in most shared watersheds (adapted from Elhance 1999):

- Asymmetric incentive structure for unilateral water development vs. transboundary cooperation due to upstream-downstream setting
- Priority attributed to sovereignty, territorial integrity, and national security concerns, rather than to overall social and economic development
- High uncertainties regarding hydrological variability, technological developments, and the water development in co-riparian states
- Inability of states to assess and integrate the full costs and benefits of cooperative river management options as an alternative to unilateral scenarios
- Specifically, the latter two points are exacerbated by the lack of transboundary data exchange, which is often attributed at least partly to a lack of trust

Measures to mitigate river basin conflicts aim to overcome these constraints in order to turn harmful unilateralism into mutually beneficial collaboration. Efforts to foster river basin cooperation have been made mainly on two

different tracks: 1) international law, and 2) bi- or multilaterally negotiated agreements.

Numerous scientific contributions deal with the issue of international water law (Benvenisti 1996; Bennett and Howe 1998; Boisson de Charzournes 2003; Mechlem 2003), and several studies have focused on the Nile Basin (Dellapenna 1997; Carroll 1999; Dagne et al. 1999; Al-Rashidi 2001; Brunnee and Toope 2002; Knobelsdorf 2006). The history of international water law illustrates the persistent difficulties in reconciling the antagonistic principles applied by basin states in support of their respective claims. For instance, Article 5 of the 1997 UN Convention on the Law of Non-navigational Uses of International Watercourses calls for an 'equitable utilization' of shared water resources. In many river basins, however, the application of this provision conflicts with Article 7, which seeks to protect existing water uses from harmful new water developments (Beaumont 2000). These inherent contradictions and the absence of a powerful supranational institution to enforce international water legislation limit the effectiveness of the legal track in resolving transboundary river conflicts.

Bilateral or basin-wide negotiations on the utilization of shared water bodies are mainly aimed at achieving two types of output: 1) legal provisions concerning water allocation, flow regulation, and pollution control, and 2) joint river management institutions for river development and management. Delli Priscoli (1994) illustrates the range of cooperative measures ranging from joint studies to the establishment of a comprehensive regional river management authority. Nakamaya (1997) identifies three fundamental requirements for success of transboundary organizations: 1) a willingness to cooperate, 2) involvement of highest-level decision-makers, and 3) support from a potent and neutral third party. The existence of a transboundary regime, however, should not be mistaken for proof of its effectiveness in addressing the specific water management challenges. In a note of caution, Bernauer (2002) questions the utility of using transboundary agreements as indicators for successful transboundary cooperation. He proposes to develop 'problem-solving' indicators instead (see also Al Baz et al. 2002; Lautze et al. 2005)

Different analytical perspectives on transboundary river basin challenges

Figure 1.2 illustrates the different levels of analysis that frame the studies on transboundary river basin conflict and cooperation. Supra-basin level explanations are concerned with processes that influence the building of transboundary regimes 'from the top down', and focus, for instance, on the impact of global norms on the regional water management discourse (Furlong 2004), or on the role of third-party interventions. The specific role of extra-regional hegemons in the geo-political context is discussed by Kukk (2004). The concept of a 'problemshed' (see Allan 2007) links the issue of water management in geographically constrained watersheds to the global political economy of water use. The concept of 'virtual water trade' (see, e.g., Allan 2003; Yang and Zehnder 2007) as a strategic policy option to decrease the pressure on (transboundary) rivers in arid regions is illustrative in this regard.

Most river basin studies, however, focus on the relations between the basin states themselves and – at least implicitly – adopt an *International Relations* perspective. Accordingly, the 'attributes' of states (i.e., their geographical position, their geo-political alliances, as well as their economic, military, and diplomatic power) and their specific 'national interest' regarding water development (e.g., food security through irrigation expansion, industrialization and hydropower production, flood control, environmental protection) determine the strategies that the countries are likely to adopt vis-à-vis the other basin states. Basin states are assumed to strive for maximum water inflow and unrestricted freedom to abstract and utilize the river water within their territory. National water policies are commonly understood as an independent variable and proxy for the 'national interest'.

The incentive structure for riparian states to adopt unilateral or cooperative approaches has been conceptualized in reference to 'common property resource' theories (e.g., Marty 2001; Yetim 2002) and game theoretical approaches (e.g., Waterbury and Whittington 1998; Bernauer 2002; Song and Whittington 2004; Dinar et al. 2007). A new field of study frames the challenges in transboundary river basins by explicitly focusing on the hegemonic behavior of powerful riparian states ('hydro-hegemony', see Zeitoun and Warner 2006). Explanations of the emergence of international river

management agreements often draw from (neo-) liberal regime theories (see Durth 1998; Brunnee and Toope 2002; Jägerskog 2003; Espey and Towfique 2004; Furlong 2004; Conca et al. 2006).

The dominance of state-centric approaches in the transboundary river literature has been criticized (Jägerskog 2003; Furlong 2006; Selby 2007). One particular point of criticism refers to the neglect of a systematic analysis of domestic-level factors governing the formulation of national water polices and negotiation strategies. The limited ability of 'systemic' theories to trace and predict the emergence or failure of transboundary cooperation in a specific basin can partly be attributed to the weak conceptual integration of domestic political processes influenced by different administrative units, sub-national entities, and non-governmental groups. Elhance (1999), for instance, concludes that "domestic political support for hydropolitical cooperation is often hard to generate and sustain, and is vulnerable to appeals both to nationalism and to group interests". Waterbury (2002) generally asserts that "cooperation begins at home".

Most transboundary river case studies that refer to the importance of domestic policy-making processes provide anecdotal rather than systematic evidence for the influence of domestic actors and institutions. Several authors elaborate on linkages between the domestic and international levels of water policy making in rather general terms (e.g., Wolf 1997; Elhance 1999; Dinar 2002; Mostert 2003; Tir and Ackermann 2004; Böge 2006).

Durth (1996) conceptualizes the negotiating states in shared basins as consisting of a government, an administration, and interest groups. He further distinguishes specific interactions between domestic and international decision-making processes in integrated and non-integrated systems. Jägerskog (2003) focuses on domestic discourses on water policy as a determinant of international conflict and cooperation. Other scholars conceptually or empirically explore the linkages between water-related conflict incidences at the domestic and international level (Giordano et al. 2002; Yoffe et al. 2004; Mason et al. 2007). The few applications of the *two-level game* framework to the issue of domestic and international water management use the concept in a rather metaphorical and anecdotal way (Williams 1996; Çarkoglu and Eder 2001; Richards and Singh 2001; Karaev 2004). Attempts to integrate the *two-level game* approaches with quantitative bargaining models for

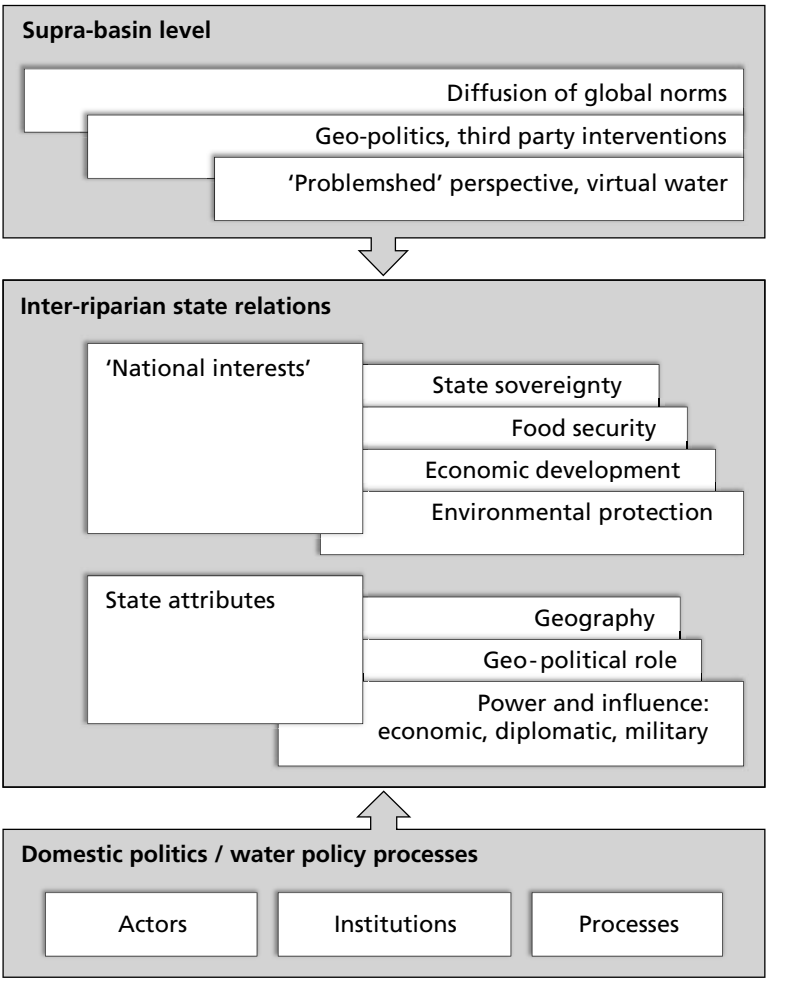

Figure 1.2: Explaining conflict and cooperation in shared river basins: Approaches on different levels

transboundary waters are even rarer (Richards and Singh 1997; Carraro et al. 2005). In his application of a 'three-level game' framework in the Nile Basin (extra-basin powers constitute a third level), Waterbury (2002) finds that the interactions between national governmental agencies, international donors, and transnational firms are of critical importance.

While most of these studies agree that political processes at the domestic level are of critical importance for the course of transboundary conflict and cooperation, the mechanisms for the domestic-international interactions are not systematically integrated into comprehensive theoretical frameworks. And yet, research on the interface between national and transboundary water governance promises to enhance significantly our understanding of shared river management challenges and potential mitigation strategies. Sections 1.4 and 1.5 below outline the specific conceptual and analytical approaches adopted in this thesis in order to narrow this knowledge gap.

1.3 Delimitations of the research focus

Given the integrative approach of this thesis, which draws on systemic and domestic perspectives on foreign policy-making as well as 'water conflict' and 'water management' concepts, it is particularly important to specify the analytical boundaries of the research field.

Importantly, this thesis focuses on the processes of water policy making, rather than on the water policies themselves and their effectiveness in addressing the river management challenges. Specific reforms of water policies, e.g., concerning irrigation water management institutions (e.g., Lubell et al. 2002), appropriate water property right regimes (e.g., Bjornlund 2003), or virtual water trade strategies (Rosegrant and Ringler 1998; Allan 2003; Wichelns 2005; Yang et al. 2006), are not evaluated in the light of their suitability and specific impacts in the case study countries, but rather in terms of the underlying policy-making processes.

Likewise, the thesis only peripherally addresses specific frameworks proposed to support transboundary negotiation processes, e.g., the development of algorithms for water appreciation and distribution (Hoekstra 1998; Huffaker et al. 2000; Seyam et al. 2000; Kilgour and Dinar 2001; Kelman and Kelman 2002; Seyam et al. 2002; Van der Zaag et al. 2002), systems of transboundary data exchange (Chenoweth and Feitelson 2001),

or the design of decision support systems for river basin management (Ito et al.; Salewicz and Nakayama 2004). The development and applications of methods to support multi-stakeholder decision-making (Simonovic and Fahmy 1999; Brown and Joubert 2003; Cai et al. 2004; Ghanbarpour et al. 2005) are not part of the analytical framework applied in this thesis, even though such approaches may obviously yield helpful tools for water professionals in the Nile countries to address the challenges of designing and implementing domestic and transboundary water development and management policies.

1.4 Conceptual framework

This section introduces the *two-level game* approach as the overall conceptual framework applied to analyze the interactions between water policy processes at the domestic and transboundary levels. It further specifies the concepts that were applied to frame the domestic policy-making processes.

The notion of 'transboundary cooperation' is used for any advance along one or several of the following tracks: 1) attribution of riparian water utilization rights and responsibilities, 2) establishment of joint river management institutions, 3) joint planning and implementation of river development strategies and projects, and 4) any further provisions, e.g., regarding data exchange, or research cooperation. 'Transboundary conflicts' are defined as situations where 1) at least two riparian states interact in an incompatible way, 2) at least one of the involved parties aims for or ignores the negative impacts of the interaction on the other party, and 3) at least one of the involved parties experiences damage from the interaction (see Mason 2004). Elements of transboundary conflict and cooperation are thus not mutually exclusive and may co-exist. 'Domestic water policies' are defined as including not only the written planning documents, but also unwritten strategies pursued by the authorities, and particularly also the attention and priority given to the planned reforms and projects during implementation. The 'national interest'

is defined as a state's key development targets according to the narratives adopted by key policy-makers.

This analysis starts from the assumption that the 'national interests' and domestic policies are neither fixed nor subject to any objective rationality. Rather, national policies and water sector targets are considered as a function of complex domestic policy processes. National governments respond to – and depend on – a range of domestic interest groups with different interests. Domestic actors can exercise influence through formal and informal channels, ranging from the formal rejection of a national policy or an international agreement in parliament to violent resistance against individual projects at local level. Such domestic 'constraints' on the government's decision autonomy can affect the chances that an international agreement is reached, and determine how long its implementation will take. Domestic constraints also determine which specific issues of cooperative river development are more likely to find basin-wide consent, and which targets cannot be traded off easily. The *two-level game* framework conceptually links the domestic and international dimensions of foreign policy making and international negotiations.

The 'two-level game'

The *two-level game* framework developed by Robert Putnam (1988) is based on the idea that *chief negotiators* in every involved country simultaneously bargain with their foreign counterparts (Level I) and with domestic stakeholders at home (Level II). A variable aggregate of stakeholder interests – rather than a unitary 'national interest' – thus influences the countries' bargaining positions and strategies. Negotiation advances at one level can have direct effects at the other. The *win-set* is defined as the range of domestically 'ratifiable' policy options, and depends on the preferences and the relative influence of all domestic stakeholders. Domestic actors whose preferences are more compatible with the mainstream interests of the foreign countries are referred to as 'dovish' in the *two-level game* terminology; actors whose interests are less compatible at the international level are referred to as 'hawkish'.

Figure 1.3 illustrates the main implications of different constellations of *win-sets* as specified by Putnam (1988). Broad *win-sets* are more likely

to overlap, which increases the chance that an international agreement can be reached. A narrow *win-set*, i.e., the existence of substantial domestic resistance against different policy options, decreases the range of mutually acceptable cooperation scenarios. At the same time, a narrow *win-set* may serve as a bargaining advantage and pull the content of a negotiated agreement toward the preferred outcome of the *chief negotiator* who faces the domestic constraints. This 'paradox of weakness' is also known as the 'Schelling conjecture' (Schelling 1960, see also Putnam 1988).

Putnam emphasizes the fact that the *chief negotiators* can actively manipulate the domestic constraints, and thus the width of the *win-set*. Negotiators may try to decrease the domestic opposition against international agreements by designing package deals and offering side-payments to satisfy specific domestic stakeholder groups. Another strategy for negotiators would be to 'tie their hands' by strengthening the influence of hawkish domestic actors in the – formal or informal – ratification process. *Chief negotiators* can create 'loss-of-face costs' by publicly ruling out any concessions to the foreign party. However, such tactics may not always be effective, both because leaders tend to prefer flexibility over 'tied hands', and because foreign parties are not easily misled by a purposely narrowed *win-sets* (Evans et al. 1993 cited in Caporaso 1997; see also Pahre 1997). Governments or *chief negotiators* that can deliberately generate or strengthen a domestic constraint usually also have the power to reverse such a move, and can thus hardly gain a substantial bargaining advantage.

The *two-level game* approach has been applied to different foreign policy issues, either qualitatively (see Evans et al. 1993 for a compilation of case studies) or through formal models (see Pahre 2006 for a review). The formalization of *two-level games* meets a number of significant challenges that include the operationalization and evaluation of actor preferences, and the trade-off between conceptual clarity and the analytical depth required to describe domestic policy processes (Moravcsik 1993; Callaghan 2001; Pahre 2006; Asgeirsdottir 2007). *Two-level game* models as usually applied to Western democracies are often highly stylized and conceptualize the state as consisting of an executive branch of government (the *chief negotiator*), one or more 'veto players' (often the legislature), and/or few other interest groups. The issue under negotiation is usually framed as a zero-sum allocation problem.

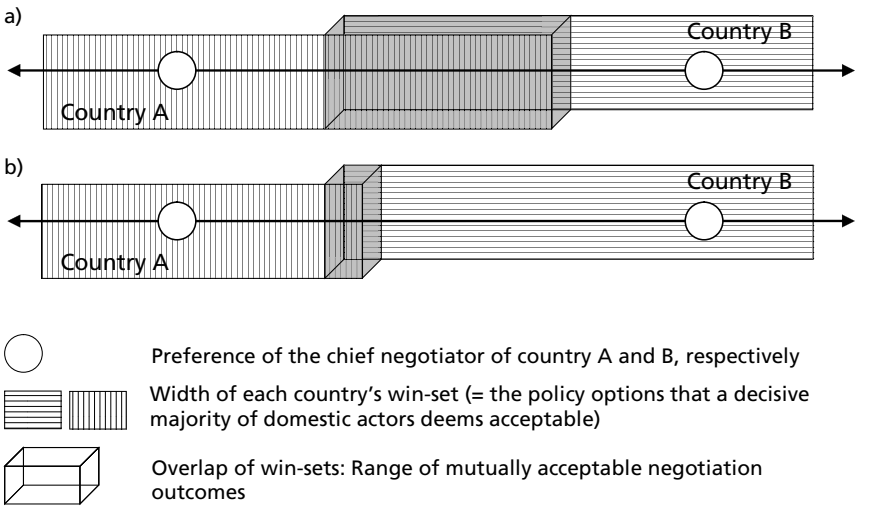

Figure 1.3: Basic effects of the two-level game. The likelihood that an agreement can be reached and the potential content of the agreement depend on the width of both countries' win-sets. In case b), the overall space for an agreement is reduced, and the outcome is biased towards the preferences of the chief negotiator of country A compared to case a).

The options of side-payments and issue linkages have also been integrated in some of the models (see Pahre 2006). Formal models vary in regard of their conceptualization of the negotiations process (e.g., simultaneous offer games vs. sequential bargaining models), and the assumption of perfect or imperfect information (Callaghan 2001). The insights generated by formal models are surprisingly ambiguous despite the significant simplifications. For example, the applicability of the Schelling conjecture – i.e., an increase of bargaining power due to a domestic constraint – is found to be highly dependent on the model parameters (Mo 1995; Tarar 2001; Pahre 2006).

Two-level games involving authoritarian regimes can be expected to differ from two-level games involving democracies. The greater autonomy of authoritarian governments diminishes the veto power of the legislature, if not of most other domestic actors beyond a small circle of key decision-makers (Caporaso 1997). Even in the absence of any formal challenge to the executive's decision autonomy, however, the involvement or exclusion of different stakeholder groups in the policy processes can still affect the

impact of policies domestically and – indirectly – the success of international negotiations (see Trumbore and Boyer 2000; Huth and Allee 2002). This is particularly evident when considering processes of policy planning and implementation – rather than just the formal policy adoption and ratification – as crucial components of the 'Level II' bargaining process.

The impact of domestic policy processes on the outcomes of the international negotiations varies according to the type of issue under consideration. Crisis bargaining, for instance, typically involves a much narrower set of domestic actors around the national *chief negotiators* (see references cited in Callaghan 2001 for two-level games in crisis situations). Other types of negotiations, e.g., on free trade agreements or on political and economic integration within the EU, span longer time periods and allow for a more diverse pattern of interactions between the international and domestic levels of policy-making.

In the case of river management cooperation in the Nile Basin, the role of domestic policy processes is deemed particularly important due to several considerations. On the one hand, the countries' claims for a high water share can be understood only in relation to current domestic water policies and plans for future water utilization. The capacity to realize some degree of 'policy harmonization' critically depends on the processes required to reform the national water utilization systems and policies. On the other hand, the Nile Basin Initiative has progressively expanded to include a greater range of governmental, sub-national, and non-governmental water sector actors in different functions. Any attempt to determine the effects of such an expansion of the planning process also requires a more detailed analysis of domestic actors' interests and specific roles in the domestic policy making. Differences in the patterns of stakeholder involvement at the domestic and international levels are obviously of particular interest.

According to the *two-level game* framework, the domestic constraints to international negotiations are neither entirely dependent nor entirely independent variables, but interact dynamically with the Level-I bargaining process. On the domestic side, a country's *win-set* mainly depends on two types of variable factors: 1) actor interests and preferences with regard to policy outcomes, and particularly the divides between different domestic actor preferences, and 2) institutions governing the actors' influence on policy-making and negotiation processes (Gourevitch 1996). Some authors

particularly stress the role of information availability and management (Milner 1997), or of competing narratives concerning the issue under negotiation (Bosold and Oppermann 2006).

Robert Putnam himself does not make concrete suggestions as to how exactly the domestic constraints should be conceptualized and measured, but challenges political scientists to 'marry' the *two-level game* framework with different theories of domestic policy-making. Reflecting the high diversity and complexity of theories developed to frame domestic policy processes (i.e., *Public Policy Analysis)*, no broadly accepted approach to operationalizing *two-level games* has yet been established. Moravcsik's (1993) observation that analysts investigating the interface between domestic policy-making and international relations are left with a 'haphazard checklist' of potentially influential domestic factors is still valid to date.

The multi-dimensional nature of the Nile Basin negotiations, comprising legal and institutional issues as well as joint river development projects, complicates the application of the *two-level game* framework. Cooperation in the Nile Basin is likely to proceed through flexible legal provisions and slow *de facto* water re-allocation towards the most productive uses, rather than through a one-time assignment of new national water quotas. Water policy decisions have multiple and often uncertain impacts on a broad range of water users and sectoral interest groups. Informal processes of consultation and information transfer at both the international and the domestic levels are considered particularly important in the context of cooperation in the Nile Basin, but are difficult to operationalize in a *two-level game* framework.

The *two-level game* approach as applied in this thesis thus takes a middle course between the anecdotal and formal applications found in the literature. The *win-set* is used as an explanatory concept, and a systematic analysis of domestic water policy processes is conducted. Key domestic factors are qualitatively linked to the questions concerning if, when, and regarding what specific issues a basin-wide agreement or any kind of transboundary cooperation is likely to be reached. Rather than attempting to quantify the exact width of the *win-sets*, the characteristic of domestic policy processes are analyzed with regard to their broadening or narrowing effects on different dimensions of the *win-set* (see Chapters 5 and 7).

Domestic policy processes

In order to explore a wide range of potential linkages between domestic policy-making processes and the course of international negotiations, a 'multiple lens strategy' is adopted to analyze the 'Level II' bargaining processes (Sabatier 1999; see also Keohane 2001). The analytical focus is laid on present political and institutional structures at the domestic level, rather than on policy developments and key events in a historic perspective. Based on the analysis of stakeholders and institutions in the water sectors of Egypt and Ethiopia, specific characteristics of policy-making processes are identified. The following conceptual dimensions are taken into consideration: 1) different phases of the 'policy cycle', 2) networks of cooperation and information exchange, and 3) different 'patterns' of policy-making (rational choice, organizational processes, and governmental politics).

The concept of a *policy cycle* was first developed by Harold Lasswell (1951). It divides the policy process into five distinct phases: initiation, formulation, selection, implementation, and evaluation. Lasswell's often criticized framework presents an overly simplified, linear, and non-dynamic picture of policy processes. Despite these weaknesses, the distinction of different phases of water policy making is deemed useful for identifying different specific mechanisms linking the domestic and international levels of water governance. For instance, implementation processes have been increasingly analyzed as a distinct source of policy success and failure, particularly in developing countries (Thomas and Grindle 1990) and in the context of multilateral environmental agreements (Gray 2003) or natural resources management in general (Tyler 1999). Gray (2003) highlights the following challenges concerning the implementation of multi-lateral environmental agreements in the African context: lack of political will, lack of coordination, lack of horizontal structures for inter-ministerial consultation and cooperation, low prioritization of the environment, limited professional skills and public participation, as well as poor integration of economic and environmental policies. Many of these constraints are also relevant in the agenda-setting, policy formulation, and evaluation stages.

The notion of *policy networks* has gained prominence in recent years, both due to the impression that policy processes increasingly depend on large numbers of different actors, and due to the explanatory benefits of highlighting the linkages between political stakeholders (see Bressers et al. 1995). Linkages between actors are used to exchange information and opinions, to form alliances in support of certain policy options, or to cooperate on the implementation of projects and strategies. While different qualitative and quantitative approaches to the analysis of *policy networks* have been applied, the insights as to what network types produce which policy outputs are rather fragmentary and qualitative. In this thesis, quantitative network data are combined with qualitative insights in order to illustrate the relevant structures governing water policy processes, and to identify key actors and their specific linkages to other domestic stakeholders (see Chapter 6).

The three 'patterns' of decision-making distinguished by Graham Allison (1971) – i.e., *rational choice*, *organizational processes*, and *governmental politics* – provide a useful framework for the analysis of 'Level II' policy processes in the context of a *two-level game* study (see also Chapter 4). *Rational choice* type decisions are made by a unitary actor (or like-minded group of actors) with the goal of maximizing utility in relation to clearly defined goals. *Organizational process* type decisions are conceptualized as the output of (sub-) units in the policy sector applying organizational rules and standard procedures. *Governmental politics* type decisions are defined as the outcome of a bargaining process between different domestic actors, and can be understood only by analyzing these actors' interests and relative influence on the decision-making process.

Other studies on the linkages between domestic policy processes and the formation of international environmental regimes tested similar sets of decision-making patterns (e.g., Underdal 2000). Intuitively, the task of transboundary policy harmonization can be expected to be easier if domestic policy processes follow a *rational choice* pattern rather than complex mechanisms involving multiple institutions and actors with diverging interests. An earlier analysis of the processes leading to the design and construction of the Aswan High Dam identified marked deviations from the *rational choice* decision-making pattern (Rycroft and Szyliowicz 1980).

1.5 Methodological framework

This section specifies the rationale applied in the case study selection, as well as the specific methodologies used to collect and analyze the information regarding water policy actors and their roles, interests, and networks, as well as regarding the institutions and policy processes.

Selection of case study countries

This thesis aligns with earlier studies on the Nile Basin conducted in the framework of the NCCR North South Program (Mason 2004; Yacob Arsano 2004). The Nile Basin was chosen as a case study because of its prominence as an often mentioned 'high-risk' basin that has nevertheless seen substantial levels of cooperation in recent years. The ongoing processes of legal and institutional framework negotiations and joint water development planning offer a good opportunity to analyze domestic challenges in relation to efforts of establishing a basin-wide cooperative framework.

Many studies on the Nile Basin conflict concentrate on the Eastern Nile, and in particular on the rivalry between Ethiopia as the major source and Egypt as the main consumer of the Nile's water. This thesis adopts the same focus for two reasons: First, the progress in the Nile negotiations largely depends on the reconciliation of fundamentally opposed positions advocated in the downstream (Egypt) and upstream countries (represented by Ethiopia). A better understanding of the domestic underpinnings of policy reforms in Egypt and Ethiopia is thus illustrative for the analysis of the basin-wide cooperation progress. Second, the analysis of an extreme upstream and an extreme downstream country allows for the detection of fundamental differences – if any – between the two cases with regard to domestic constraints on water policy making in the light of transboundary cooperation.

Specific similarities or differences in terms of water governance systems of Egypt and Ethiopia did not *ex ante* influence the choice of the case

studies. A short comparison of the two countries is presented in Table 1.1. More details are provided in Chapters 4 and 5.

The fact that the Sudan and the countries of the Equatorial Lakes region are not included as case studies in this thesis significantly limits the ability of the study to derive projections about the future of conflict and cooperation in the Nile Basin. Increasing water abstraction in the Sudan potentially has the most dramatic impacts in Egypt, and one of the greatest dangers for Egypt in the negotiations with Ethiopia, therefore, lies in creating a precedent that would encourage the Sudan to unilaterally augment its water use (Williams 2002). The looming division of the Sudan into two independent states obviously represents a particular challenge to any future arrangements regarding the cooperative management of the Nile.

Data type and data collection

There is an extensive body of literature regarding water management institutions (e.g., Thompson et al. 2001; Bhat and Blomquist 2004; Blomquist et al. 2005; Blomquist et al. 2005). Saleth and Dinar (2000) particularly focus on the driving forces for change in water sector institutions. In developing countries, water sector assessments are often produced by and available from international organizations and foreign consultants. While many of these studies provide a great wealth of facts and figures, they are rarely based on a comprehensive conceptual framework linking the institutional factors to policy outcomes.

General guidelines for the analysis of institutional water sector structures and characteristics have also been developed (Bandaragoda 2000; Saleth and Dinar 2000; Lamoree et al. 2005). Table 1.2 presents a 'checklist' as typically proposed for the analysis of institutions and processes in the water sector. The data collection for this thesis was based on these guiding questions, and focuses particularly on the aspects that are of relevance to the question of transboundary river management. Semi-quantitative expert and stakeholder interviews were conducted, and the key water sector documents were analyzed.

Table 1.1: Comparison of the Egyptian and Ethiopian water sectors

	Egypt	**Ethiopia**
Hydrological complexity	Single, fully regulated source of water (Aswan High Dam); no downstream neighbors	Various river basins; high rainfall variability in time and space; potential impacts on downstream states
Salience of water needs (see JACOBS 2005)	Cost: "I want water to be cheap" Quality: "I would like my water to be of good quality"	Reliability: "I NEED a regular water supply"
Agricultural water utilization	98% dependent on Nile, limited available water necessitates the import of cereals and other food stuff	Mainly rain-fed, limited water storage and abstraction capacity for (large-scale) irrigated production
Related challenges	Loss of agricultural lands due to salinization and urbanization; water pollution	Erosion; siltation of reservoirs
Alternatives to Nile water abstraction	Rainwater harvesting (limited); groundwater (limited renewable); desalinization (expensive)	Rainwater harvesting (variable); utilize rivers outside of the Nile Basin; strengthen natural water retention capacity
Demand management	Advanced: technology (mainly on new lands); overall re-use rate Constraints: institutions, pollution, change of cropping patterns	Very limited (but absolute abstraction of river water is also very low)
Comparative advantages	Irrigation and drainage expertise, trained labor, investment capacity, industries and services sectors	Hydropower potential, low evaporation at potential water storage sites, cheap labor
Size of governmental water agency	Approx. 150,000 staff (excluding water supply and sanitation sub-sector)	Approx. 350 staff at national level; understaffed regional and local water authorities
Main task of national water ministry	Provision of irrigation water for old lands and expanding agricultural area; enhancement of water use efficiency; pollution control	Provision of irrigation water for expanding agricultural area; improve water use in rain fed systems; provide domestic supply and sanitation
Planning experience	First water policy in 1975; vast experience (rolling planning); first IWRM plan in 2002 (NWRP); elaborated hydrological models	First Water Policy formulated in 1999; heavy reliance on consultants; high staff turnover

Closely related ministries	Housing (WSS); Agriculture (on-farm water management); Health; Environment	Agriculture (small-scale irrigation); Energy (HEP); Environment, Health
Decentralization status	Highly centralized system; decentralization of MWRI services is underway (mainly O&M); limited devolution of decision-making power	Central ministry is responsible for transboundary rivers, large-scale projects Regional states are responsible for WSS, small-scale irrigation projects Local WUAs are responsible for O&M of schemes
Domestically contested issues	• Need for additional supply vs. priority given to demand and quality management • Importance of food self-sufficiency vs. promotion of water-efficient cropping patterns, virtual water trade • Strategies to contain industrial pollution	• Large-scale vs. small-scale irrigation development • Importance of food self-sufficiency • Priority assigned to soil and ecosystem conservation • Responsibilities of different agencies and levels of governance

The stakeholder analysis performed for this study focuses on major attributes of actor organizations (mandates, legal status, capacities in terms of finance, expertise, and popular support), their role in different phases of policy-making, and the dominant narratives regarding different water policy options. In a notable difference from John Waterbury's (2002) analysis of the Nile Basin, the analytical design of this thesis assigns a greater weight to non-governmental domestic actors, but only very peripherally addresses the role of foreign contractors. The reason for the under-representation of contractors mainly relates to their low profile and visibility in the formal national policy processes.

The linkages between different water sector actors are analyzed by applying the analytical method of *Social Network Analysis* (see Chapter 6). Data on different types of relationships were collected through a questionnaire (see Appendix).

Information on the progress of international negotiations was gathered from project documents, media reports, and interviews with key informants.

The data collection took place in Ethiopia (2004, 2006) and Egypt (2005). The quantitative network data were collected by three M.Sc./M.A. students in Egypt (2005) and Ethiopia (2006).

Table 1.2 'Checklist' for water sector institutional analysis

Water Law

- Legal coverage of water and related resources
- Water rights
- Provisions for conflict resolution
- Provisions for accountability
- Scope for public/private sector participation
- Centralized regulatory mechanisms
- Integration of overall legal framework with water law

Water Policy

- Project selection criteria
- Pricing and cost recovery
- Water allocation and transfers
- Private sector participation
- User participation
- Linkages with other economic policies

Water Administration

- Formal organizations
- Organizational procedures
- Pricing, finance, and accountability mechanisms
- Information, research, and extension systems

Source: Bandaragoda (2000)

1.6 Outline of the thesis

Chapter 2 places the case study on the Nile Basin in the context of global water challenges and provides background information regarding the hydrology of the Nile and the history of transboundary relations between the basin states. The main empirical findings and conclusions are presented in five chapters written as articles for publication in peer-reviewed journals (Chapters 3 to 7). Chapter 3 reviews and compares conceptual developments and paradigm changes in the fields of 'water conflict' and 'water management'. Chapter 4 and 5 present the main empirical findings from the Egyptian and Ethiopian case studies, respectively. The chapter on the Egyptian case study (Chapter 4) specifically focuses on domestic patterns of decision-making, i.e., *rational choice*, *organizational process*, and *governmental politics*. The Ethiopian case study (Chapter 5) goes one step further by linking the insights on domestic water policy making processes to the behavior of Ethiopia in the transboundary cooperation process, i.e., to the government's *win-set* in *two-level game* terminology. Chapter 6 refines the analysis of each country's domestic water policy processes by providing a comparative perspective on the Egyptian and Ethiopian water sector networks. Chapter 7 integrates the findings presented in both country case studies, and discusses the prospects and expected priorities of cooperative arrangements in the Nile Basin from the perspective of a *two-level game* analysis. The concluding remarks presented in Chapter 8 critically discuss the added value of this thesis, and propose avenues for future research.

2 Water challenges in the Nile Basin

This chapter gives an overview of the hydrology and the recent hydro-political developments of the Nile Basin. First, it briefly presents the general context of water management challenges at the beginning of the 21st century.

2.1 Global and regional water challenges

Water is an irreplaceable element in all major environmental processes and is essential for human health, food production, and other economic activities. The anthropogenic demand for water is growing rapidly due to population growth and shifting consumption patterns. Rising demand and high pollution levels put increasing pressure on freshwater resources and the political, economic, and societal institutions governing their utilization (see e.g., Falkenmark 1990; Gleick 1993; Postel 1996; Postel 1997; Postel 1999; Rijsberman 2001; Postel et al. 2003; Zehnder et al. 2003; Biswas 2005).

Southern and Northern Africa (Sadoff et al. 2002; Turton and Henwood 2002; Turton et al. 2003) as well as the Middle East (Haddadin 2001; Haddadin 2002) are among the regions most affected by water scarcity. Many countries in these regions depend on irrigated or rain-fed agriculture for food security, export revenues, and rural employment, and at the same time struggle with 'difficult' hydrological conditions due to an arid climate or high rainfall variability (Al Baz et al. 2002). Degradation of natural ecosystems and a lack of infrastructure for water regulation and irrigation, combined with inadequate levels of drinking water supply and sanitation coverage, render the populations of these countries particularly vulnerable to drought, flood, and water-borne diseases. Industrial water pollution and the negative impact of non-indigenous plant and animal species on the

aquatic ecosystems are serious – yet still geographically confined – problems on the African continent.

In low-income countries, technical solutions to water management challenges are often unaffordable, and reforms in the agricultural sector (the main consumer of freshwater) need to be carefully tailored to the needs of the many small-scale farmers. Takahashi (2001) finds that water policy challenges in marginalized economies mainly relate to issues of agricultural productivity, poverty alleviation, and the prevention of inter-group conflicts. The need for a better understanding of the interactions between water uses in different sectors, economic growth, and poverty alleviation is recognized by researchers and policy-makers alike (e.g., Turton et al. 2003). The World Bank generally distinguishes growth-oriented and 'pro-poor' interventions that need to be traded off both in the design of water services delivery programs and in the overall planning of water resources development (World Bank 2004 a).

The debate on which interventions render maximum overall benefits, and how these benefits should be distributed, also shapes the search for domestic and basin-wide river management regimes in the Nile Basin.

2.2 The Nile Basin

The hydropolitical history of the Nile Basin in the last century is one of asymmetrical development and missed opportunities for cooperation. This section offers a brief overview of the hydrological and hydropolitical background of the Nile Basin from a macro perspective. Comprehensive literature reviews on the Nile Basin are provided by Collins (1991), Mohamoda (2003), and Tvedt (2003). A considerable number of articles and book chapters analyze the Nile Basin with a focus on the incompatible national interests and the strategies applied by the Nile states to meet their goals through unilateral and cooperative strategies (e.g., Mageed 1994; Wolf 1994; Hultin 1995; Swain 1997; Waterbury 1997; Scheumann and Schiffler 1998; Waterbury

and Whittington 1998; Allan 1999; Elhance 1999; Wiebe 2001; Swain 2002; Nicol 2003; Collins 2006).

Waterbury (1979; 2002), Collins (1990; 2002), Howell and Allan (1990; 2000), and Erlich (2000) provide detailed descriptions of the history, the hydrology, as well as the sociocultural characteristics of the Nile Basin. In a coordinated project, Mason (2004) and Yacob Arsano (2004) analyze downstream and upstream interests and positions in the Eastern Nile Basin (see also Amer and Hefny 2005; Amer et al. 2005; Hamad and El-Battahani 2005; Yacob Arsano and Imeru Tamrat 2005). Tesfaye Tafesse (2001) provides a detailed upstream perspective on the issue of conflict and cooperation in the Nile Basin. Varis (2000) illustrates the challenges in the Nile Basin using a wide set of development and governance indicators. Economic or explorative models on Nile development options and future scenarios have also been developed (e.g., Wichelns et al. 2003; Whittington 2004; Whittington et al. 2005; Wu and Whittington 2006). Preliminary assessments of the Nile Basin Initiative as the latest and most comprehensive cooperation program in the Nile Basin are contributed by academics (Foulds 2002; Swain 2002; Peichert 2003), NGOs (El-Khodari 2002; Pottinger 2004), or the local media (e.g., Addis Tribune 2004; Al-Ahram Weekly 2004).

Hydrology and water utilization in the Nile Basin

The Nile Basin (Figure 2.1) covers roughly 10% of the African continent, and is home to 18% of the African population. Table 2.1 provides an overview of the ten Nile Basin countries and their attributes in terms of population, water availability, water dependency and withdrawal rates, (potential) irrigation development, access to improved water supply and sanitation, and gross national income per capita. Several Nile Basin states are among the world's poorest countries and struggle with multiple development challenges such as famine, unemployment, and frequent violent conflicts at a local or regional level. Population densities are particularly high around Lake Victoria and the Ethiopian highlands, and the corresponding figures

skyrocket in the narrow green strip and the Nile delta that cut through the Egyptian desert.

The White Nile originates from the Equatorial Lakes Region and contributes roughly 14% of the river flow as measured in Aswan, Egypt. High evaporation losses in the vast wetland areas located mainly in the Sudan – i.e., the Sudd, the Bahr El-Ghazal system, and the Mashar marshes – prevent much of the water originating in the Southern parts of the basin from reaching Khartoum and joining the Blue Nile.

Rainfall in the Ethiopian highlands accounts for 86% of the Nile flow. The Baro and Akobo (called Sobat in the Sudan), the Abbay (Bahr Al-Azrak, Blue Nile), and the Tekeze (Atbara) river systems are the main Ethiopian tributaries to the Nile. The high rainfall variability both in time and space is a formidable challenge to the rain-fed agricultural production system in Ethiopia and results in catastrophic floods in downstream areas. Anthropogenic changes to the land and vegetation cover and the resulting high levels of soil erosion amplify the negative impacts of rainfall variability on food security and economic growth.

In the downstream regions of the basin, virtually the entire Nile flow is put to productive use. Irrigation schemes in Egypt and Sudan account for most of the water abstraction. Even so – and despite growing re-use capacities and technological advancements – Egypt has to cover roughly 50% of its cereal demand through imports. Issues of unilateral and cooperative river development and water sharing in the Nile Basin are most intimately linked to the strategies in the agricultural sectors of the riparian countries.

As the rainfall distribution varies considerably across the basin, so does the status of water development. The sophisticated system of irrigation and drainage canals in Egypt contrasts with the lack of infrastructure to regulate the water flow in the upper parts of the basin. The potential to increase the availability of timely water through dams and diversions is largely exhausted in the downstream part of the basin. Diversion canals to circumvent the swamps in the Sudan and conserve water otherwise lost to evaporation are a long-standing – but rather controversial – strategy of basin-wide river development. From a hydrological point of view, increasing the storage capacity in upstream countries would provide higher upstream

water security, reduce the impact of downstream floods and minimize the evaporation losses as compared to the current system relying on regulatory reservoirs in the hot and arid downstream parts of the basin.

Demand management measures (i.e. aiming at high water use efficiency, water re-use) and the capacity to tap alternative water sources (groundwater abstraction, seawater desalinization, rainwater harvesting) are also most advanced in Egypt. Demand management is also increasingly highlighted as a water management priority in the upstream countries, as the planned infrastrcture projects to enhance the supply provide direct benefits only to a fraction of highland farmers in the foreseeable future.

Water pollution is at least to date a minor transboundary problem in the Nile Basin, and mainly affects the most downstream stretches of the river in Egypt. The provision of domestic water supply and sanitation (WSS) services varies considerably across different Nile Basin states and is particularly low in poor upstream countries. In pursuit of the Millennium Development Goals, various programs have been launched to increase the coverage of drinking water and sanitation. Due to relatively small water quantities involved, however, the specific policies in the water supply and sanitation sub-sector are only peripherally linked to the issue of transboundary water management.

Redesigning the river management regime in the Nile Basin is not a zero-sum game, not even in a narrow hydrological sense. Upstream water abstraction only partly translates into downstream losses due to the buffering effect of variable wetlands and reservoirs. Moreover, the comparative advantages of water use in different areas can be exploited to maximize benefits from the scarce water resources. An integrated river basin management framework could generate shareable benefits by tapping the vast potential of hydropower development in Ethiopia and other upstream countries, by improving agricultural productivity throughout the basin, and by addressing issues of soil erosion and ecosystem protection. Far-reaching economic integration between the Nile states promises to further expand the range of mutual benefits. The establishment of close economic and political relations throughout the basin has never been feasible in the past, but is a key element in the visions of joint river development as propelled in the ongoing transboundary negotiation process.

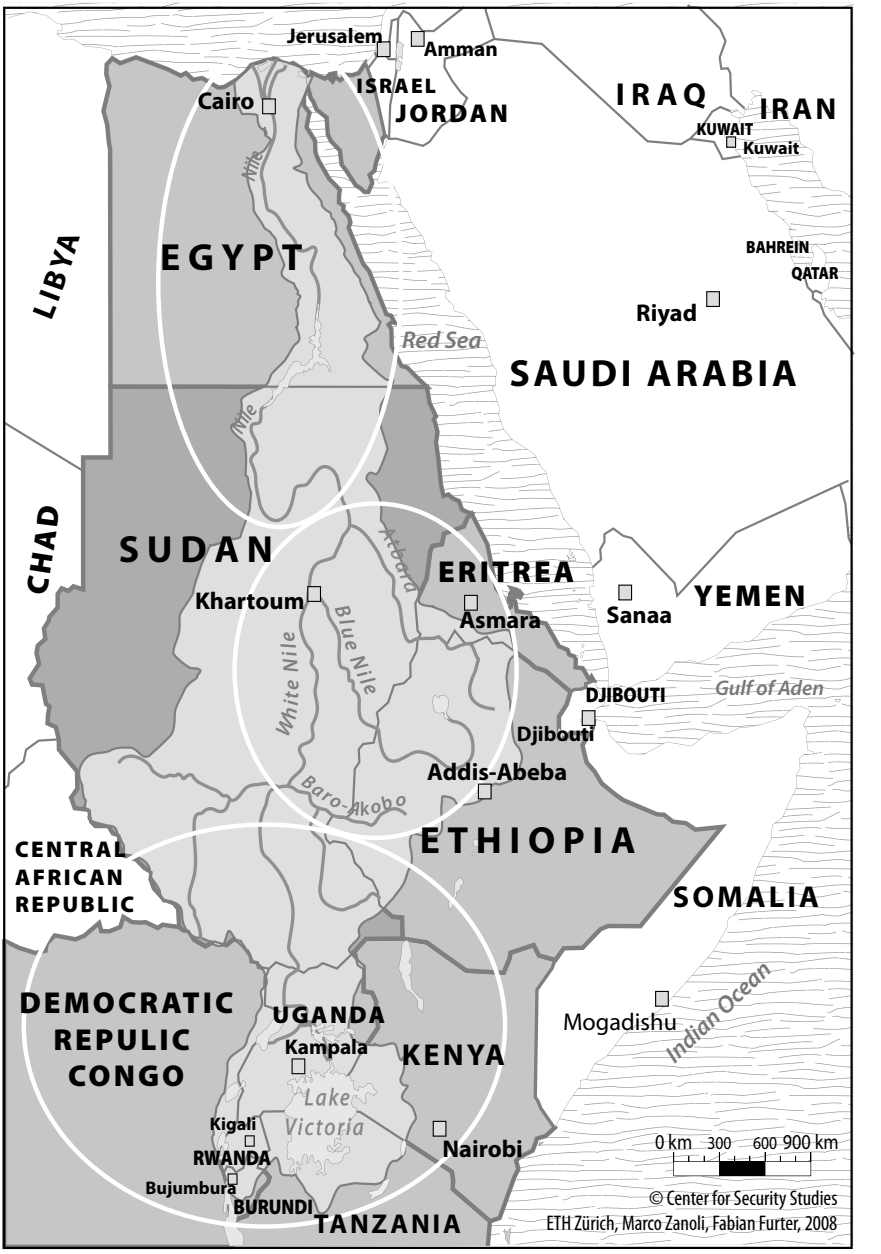

Figure 2.1: The Nile Basin

Major hydrological sub-basins: The Equatorial Lakes region (bottom), The Eastern Nile tributaries (middle right), and the Lower Nile (top).

Table 2.1: Population data, water withdrawal and utilization, and GNI for the Nile Basin countries

Riparian state	Total population (1000 inhab.)	Total internal renewable water resources (10^9 m3/yr)	Dependency ratio (%)	Total water withdrawal (10^9 m3/yr)
Burundi	7,319[2]	10.1[1]	0[1]	0.3[6]
DR Congo	56,079[2]	900.0[1]	29.9[1]	0.4[6]
Egypt	74,878[2]	1.8[1]	96.9[1]	68.3[6]
Eritrea	4,456[2]	2.8[1]	55.6[1]	0.6[3]
Ethiopia	74,189[2]	110.0[1]	0[1]	5.6[8]
Kenya	32,849[2]	20.2[1]	33.1[1]	1.6[6]
Rwanda	8,607[2]	5.2[1]	0[1]	0.2[6]
Sudan	35,040[2]	30.0[1]	76.9[1]	37.3[6]
Tanzania	38,365[2]	84.0[1]	9.9[1]	5.2[5]
Uganda	27,623[2]	39.0[1]	40.9[1]	0.3[8]

Riparian state	Irrigation potential (1000 ha)	Area equipped for irrigation (1000 ha)	Access to an improved water source[9] (% of popul.)	Access to improved sanitation facilities[9] (% of popul.)	GNI per capita (US$)[10]
Burundi	215[1]	21[6]	79	36	100
DR Congo	7,000[1]		46	30	120
Egypt	4,420[1]	3,422[5]	98	70	1,260
Eritrea	188[1]		60	9	170
Ethiopia	2,700[1]	290[8]	22	13	160
Kenya	539[1]	103[4]	61	43	540
Rwanda	165[1]	9[6]	74	42	230
Sudan	2,784[1]	1,863[6]	70	34	640
Tanzania	2,132[1]	184[5]	62	47	340
Uganda	90[1]	9[7]	60	43	280

Data source & year:

Aquastat database
[1] 2007
[2] 2005
[3] 2004
[4] 2003
[5] 2002
[6] 2000
[7] 1998
[8] no year specified

WDI database
[9] 2004
[10] 2005

Definitions

Internal Renewable Water Resources: Long-term average annual flow of rivers and recharge of aquifers generated from endogenous precipitation.

Dependency ratio: Indicator expressing the fraction of water resources originating outside the country out of the total renewable water resources.

Nile Basin History

An increase in cotton exports at the dawn of the 20th century triggered the transformation of the agricultural production system in Egypt from flood to perennial irrigation. This shift marked the first step towards a transboundary confrontation that still shapes the Nile Basin relations today. The so called 'Century Storage Scheme', conceived by British and Egyptian engineers in the first half of the 20th century, addressed the main challenges to downstream irrigation expansion, i.e., limited total water availability and high variability. The plan proposed to gradually establish a system of upstream dams in Ethiopia, Sudan, and Uganda, as well as several diversion canals to cut through the Sudanese wetlands. Of this ambitious project, only the Owen Falls Dam at the outlet of Lake Victoria could be realized. The Egyptian-Sudanese Jonglei Canal Project was criticized for its expected environmental impacts and for the alleged prioritization of downstream rather than local interests. The construction of the canal could not be completed because of the second outbreak of the North-South conflict in 1982.

Much to the frustration of hydraulic engineers, political questions regarding 'fair' national water abstraction quotas increasingly overshadowed the issue of hydraulic optimizations. The decolonization process increased the number of independent riparian states and rendered plans to construct upstream dams and diversion canals for downstream benefits increasingly futile. Egypt tried to consolidate its 'prior use rights' through agreements with the British colonial administration in the Equatorial Lakes region (1929 Agreement), and with the Sudan (1959 Agreement). The 1959 treaty divides the water flow of the Nile between Egypt (75%) and the Sudan (25%), and contains a provision that any demands for water abstraction by upstream countries would be met by a joint Egyptian-Sudanese response. Egypt's 75% share corresponds to an average amount of 55.5 billion cubic meters per year. This absolute figure has become deeply imprinted as the country's righteous entitlement in the views of Egyptian policy-makers, and was repeatedly used to fend off claims by upstream states for higher water shares.

Imperial Ethiopia was neither involved in the design of upstream infrastructure projects nor in the negotiations on the *de jure* distribution of the waters originating from its territory. As a consequence, Ethiopia has

always rejected any restrictions on its right to use the rivers flowing on its territory. The countries of the Equatorial Lakes Region have been similarly vocal in rejecting any downstream interference in their autonomy to develop their water resources.

In the light of the uncertain political developments the upper regions of the basin and shrinking chances to realize the Century Storage Plan, post-revolutionary Egypt opted to achieve over-year storage capacity within its own borders by constructing the High Aswan Dam. By regulating the previously very variable runoff, this dam allowed for a substantial increase of the agricultural productivity in Egypt after its completion in 1970. These gains, however, came at the price of high evaporation losses, serious erosion problems at the river mouth, the submersion of historic sites, and the resettlement of riparian communities mainly in the Sudan.

The end of colonial rule did not mean the end of foreign influence on Nile Basin politics. Shifting Cold War alliances affected the prospects of coordinated river development plans. The USA-Ethiopia Cooperative Program for the Study of the Abbay Basin in the early 1960s proposed the unilateral construction of several dams on Ethiopian Nile tributaries. If these plans were in part intended to put pressure on Gamal Abdel Nasser's Socialist Egypt, the tide turned with the overthrow of the pro-Western emperor in Ethiopia by the Socialist Derg regime and Egypt's re-alignment with the West under Anwar Sadat. Until today, the reluctance of Western donors to fund upstream infrastructure projects is mentioned by Ethiopian observers as a major cause of the low levels of upstream water development, and is partly blamed on Egypt's successful lobbying within the relevant institutions.

Despite the deep political rifts in the Cold War period, the 1960s (Hydromet Project) and 1970s (UNDUGU Group) saw the first attempts of basin-wide river development planning among the independent riparian states (see also Figure 2.2). Ethiopia did not take part in these early – and rather unfruitful – cooperation initiatives. Instead, tense international relations between Egypt and Ethiopia occasionally resulted in saber-rattling over river development plans. Practices aimed at de-stabilizing rival countries, for instance by supporting (armed) opposition groups within these states, were common during the Cold War and still haunt the Horn of Africa region today.

The end of both the Cold War and the Derg regime in Ethiopia in the early 1990s allowed for a reassessment of Nile Basin relations and gave rise to new efforts to foster transboundary cooperation, i.e., the Nile 2002 Conference series and the TECCONILE Project. In 1997, all Nile states agreed to engage in negotiations for a comprehensive legal and institutional framework agreement to regulate the allocation and management of the Nile waters ('D3 Project'), and in 1999 the Nile Basin Initiative (NBI) was established as a transitory mechanism to foster cooperative river development.

A century after British engineers were designing the first basin-wide Nile development plans, a real chance for integrated river basin management seems to be within reach. Obviously, the premises have changed dramatically in the past 100 years, and the interests of ten independent riparian states – rather than colonial ambitions or Cold War strategies – now shape the prospects of Nile Basin development. As Ethiopia and the Sudan recover from costly wars and disruptive regime changes, the Egyptian supremacy in terms of economic power and engineering capacity is likely to decrease. The growing prominence of Far-Eastern countries in Africa – particularly in the dam construction business – potentially enhances the leverage of upstream states to develop their rivers unconstrained by conditionalities of Western donors.

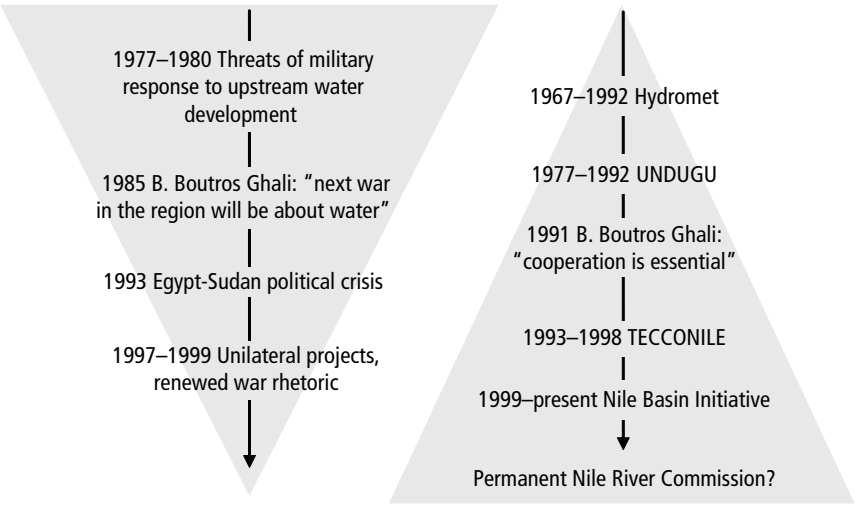

Figure 2.2: Conflictive (left) and cooperative (right) developments in the Nile Basin

The current status of Nile Basin cooperation

It is important to note that the status of transboundary relations in the Nile Basin at a given time cannot be pinned down easily on a continuum between conflict and cooperation. Conflictive and cooperative developments usually coexist (Figure 2.2, see also BAR Database 2007). While all basin states are currently participating in the design of a new river management regime in the Nile Basin, the diverging interests of water users along the river still call for huge efforts of policy harmonization and integration. The cooperative visions promoted in the NBI are not necessarily shared by all policy- and opinion-makers in the Nile countries, many of which seem to expect higher overall benefits from unilateral and – subtly or openly – antagonistic behavior.

Still, the achievements of the NBI are remarkable. The cooperative process has initiated a broad range of activities both to create a shared vision among all stakeholders in the basin and to implement fast-track projects aiming at tangible benefits on the ground. Seven Shared Vision Program projects are executed by project management units based in different Nile countries. Concrete investment projects are designed through two programs at the subbasin level: the Eastern Nile Subsidiary Action Program (ENSAP, involving Egypt, Ethiopia, and Sudan), and the Equatorial Lakes Subsidiary Action Program (NELSAP, involving Burundi, the Democratic Republic of Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania, and Uganda). The NBI is governed by the Council of Water Ministers (Nile-COM), assisted by a Technical Advisory Committee (Nile-TAC) and a Secretariat in Entebbe (Nile-SEC). The NBI is represented in each country by the National NBI Offices, which are closely affiliated with the respective national water ministries.

The NBI is designed to foster transboundary dialogue on several tracks. Besides generally strengthening their capacity for transboundary planning and collaboration, e.g., through data sharing or research partnerships, the Nile states negotiate over *de jure* water sharing provisions (through the 'D3 Project') as well as strategies for joint river development (through the SAP projects). The parallel advancement on all these tracks (see Figure 2.3) has been important for accommodating the concerns of all riparian states and for building trust regarding their commitment to the cooperative process.

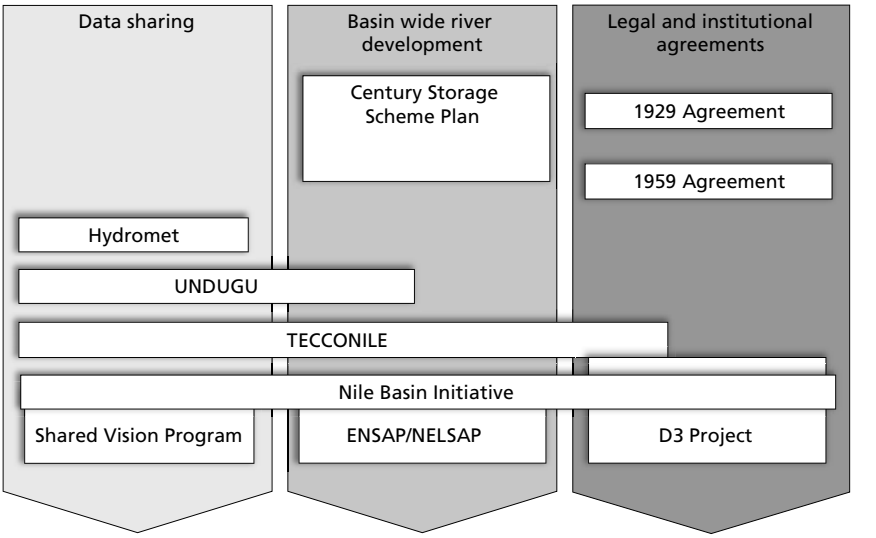

Figure 2.3: Advances on different tracks towards bilateral or multilateral cooperation in the Nile Basin

No definite breakthrough has so far been achieved in the legal and institutional framework negotiations with regard to the status of earlier agreements and the operationalization of 'water security' for the basin states. Progress with regard to the joint implementation of river development strategies hinges to some extent on the signing of the legal and institutional framework agreement, as the support of donor agencies is coupled to advances on the legal track. The infrastructure projects planned in the Eastern Nile Subsidiary Action Program (ENSAP), for instance, took longer than planned to move from planning to implementation. At present, the focus of the ENSAP lies on irrigation development projects in each country, the Ethiopia-Sudan electricity interconnection, and a watershed management component (ENSAP 2007).

In addition to the projects designed under the NBI, the Eastern Nile states also implement new infrastructure projects independently, e.g., the South Valley (Toshka) land reclamation project in Egypt, the Merowe Dam project in the Sudan, and the Tekeze Dam project in Ethiopia. Unilaterally or cooperatively, the Nile states are determined to put their river to greater

use. The following chapters take a closer look at the domestic water policy processes and their role in shaping the course of transboundary cooperation in the Nile Basin.

3 International River Basins: Management and Conflict Perspectives

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Abstract

Water management and water conflict are two distinct perspectives on water utilization challenges in transboundary river basins. The discourse on 'water management' has evolved from engineering approaches to increase supply towards a more holistic understanding that gives priority to environmental protection, efficiency concerns, and political as well as institutional aspects of cooperative and integrated water resources planning and management. As inter-state 'water wars' do not seem to be a very likely future scenario, studies on 'water conflict' increasingly emphasize local-level disputes over the allocation and utilization of water resources and the negative impacts of non-violent tensions on 'human security' in international river basins. 'Water management' and 'water conflict' narratives have converged in that they both 1) stress the importance of improving water services for the most vulnerable groups of society and of protecting the environment, 2) call for stakeholder participation in the design of management strategies and cooperative frameworks, and 3) increasingly recognize that political processes governing water utilization at different levels are inter-linked. The 'water conflict' perspective has contributed to ongoing efforts to integrate the management of shared rivers by promoting water issues to the agenda of high-level policy-makers as well as international organizations concerned with security issues, and by introducing specific analytical concepts and tools to address conflictive relations between stakeholders at different levels.

3.1 Introduction

Societal developments have been closely linked with the management of ecosystems, and particularly also of transboundary rivers, throughout human history. Evolving water management paradigms in the 20th century have reflected both the intensifying human-nature interactions and the increasing prominence of sustainability and stakeholder concerns. While the transboundary aspects of river management have long affected international relations, the scholarly debate on 'environmental conflicts' and 'water wars' has gained prominence mainly in the last two decades. As an essential resource for ecosystem health and human activities, water is increasingly associated with local and inter-state conflict under conditions of growing demand (e.g., Gleick 1993). Many of the world's 263 international river basins (Wolf et al. 2003) are located in regions that suffer from water scarcity and have a history of domestic or international conflicts, e.g., in the Middle East, the Horn of Africa, Western Africa, as well as South and Central Asia. Provision of 'water security' is therefore increasingly understood as comprising both the supply of sufficient water of appropriate quality to the water users *and* the prevention or transformation of water-related conflicts (e.g., Dinar 2002). Note that the term 'water security' is also used by some scholars in the context of attacks, e.g., by terrorists, on water supply systems.

The emerging emphasis on the 'security' dimension of water utilization is likely to influence the approaches of water management institutions at the local, national, watershed, and global levels. This chapter traces the discourses on 'water management' and 'water conflict' as distinct starting points for the analysis of international river basins. The conceptual developments of the two approaches over the last decades are analyzed, focusing particularly on the following three dimensions: 1) issues addressed and interventions proposed, 2) key actors and institutions, and 3) the spatial focus. A convergence between the 'water management' and 'water conflict' narratives can be discerned as they have both conceptually broadened with regard to the range of issues considered, and deepened to focus on the protection of the interests of individual water users. The challenges of water utilization are

increasingly seen as being political rather than technical in nature. Therefore, reflections on how water management relates – or should relate – to social and political processes at different levels are essential for the design of effective interventions. The statements that "water management is, by definition, conflict management" (Wolf et al. 2005) and "conflict prevention is in the first place an issue of good water governance" (Böge 2006) will be reflected in the concluding section.

The delineation between 'water management' and 'water conflict' approaches depends on the definition of the respective terms. For the sake of clarity, the term 'conflict management' is avoided in this thesis. The concepts addressed in this section are illustrated in Figure 3.1. 'Water management' denominates the evolving paradigms and strategies of water professionals that are currently represented by and developed mainly under the framework of *Integrated Water Resources Management* (IWRM, see GWP 2007). 'Water management' thus includes physical and socio-economic strategies designed to harmonize water supply and quality with the requirements of different users, sectors, and the environment.

'Water conflict' concepts have been developed mainly in the field of political sciences and relate to the broader field of 'environmental conflict' research. Studies investigating the causes, characteristics, and impacts of conflicts in shared river basins can be distinguished from scholarly contributions dealing specifically with the transformation of water conflicts.

The specific scholarly field concerned with 'international regimes' in transboundary river basins is considered as the watershed perspective on 'water management' in this study. Even though many scholars dealing with river management regimes'in shared watersheds stage their arguments without explicitly referring to 'conflict', the importance of international river management regimes for the mitigation of transboundary disputes is obvious.

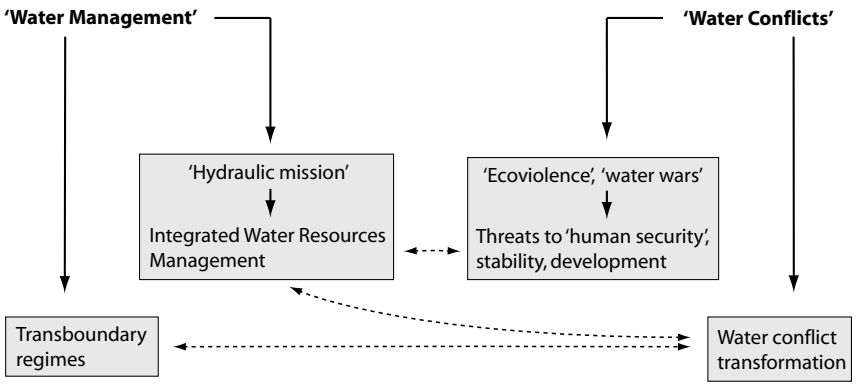

Figure 3.1: Components of 'water management' and 'water conflict' approaches. Dotted lines indicate convergence as discussed in the concluding section.

The overlap between the 'management' and 'conflict' perspectives is reflected in the fact that a number of leading scholars have contributed to both fields, e.g., Allan (2002; 2003), Gleick (1993; 2000), Ohlson (2000), or Turton (1999).

3.2 Responses to evolving river utilization challenges: Towards integrated water management

Drought and floods caused by erratic rainfall patterns are a major challenge for the riparian communities in many river basins. In early human history, man-made modifications to the flow of rivers – though geographically limited – were of critical importance for the rise of civilizations, particularly in arid regions. The increasing capability to regulate river flows with technological advancements offered new possibilities to mitigate the problems of erratic rainfall, but also gave rise to new claims for the right to control and abstract the water of shared rivers. Between 1950 and 2000, approximately 40,000 large dams were constructed worldwide (WCD 2000) with tremendous impacts on river runoff patterns and human water utilization. Unprecedented

pollution levels put additional pressures on many rivers, affecting both domestic water users in different sectors and the international relations between co-riparian states. Towards the end of the 20th century, observers and policy-makers increasingly warned of a global water crisis in the light of the persistent lack of access to water supply and sanitation in developing countries, populations growing beyond the water scarcity benchmark in numerous countries, and increasing concerns for the ecological and financial sustainability of water use (Gleick 1993). At international gatherings like the 1992 International Conference on Water and the Environment in Dublin and the 2002 Johannesburg World Summit on Sustainable Development, the fundamental importance of water in relation to human health, food production, and environmental conservation was highlighted and anchored on the agenda of policy-makers globally (e.g., Allan 2003).

'Water management' – broadly understood as the development, distribution, and regulated utilization of water resources – has evolved from a rather narrow technical notion into a complex framework in response to the manifold challenges.

Allan (2003) illustrates the development of 'water management' narratives in the light of several successive paradigms. While during the first part of the 20th century, water managers pursued a 'hydraulic mission' to increase and control river flows through large-scale engineering work, three emerging perspectives fundamentally transformed the predominant water management approaches. The growing awareness of the environmental value of aquatic ecosystems raised criticism towards large-scale infrastructure projects, particularly since the 1980s. In the 1990s, the debate on water as an economic good gave prominence to new water management approaches aiming to increase water use efficiency and cost recovery, and to strengthen the role of the private sector. In the 2000s, the political and institutional dimensions of 'water management' (now increasingly termed 'water governance') were highlighted in emerging 'holistic' approaches, most prominently in the *Integrated Water Resources Management* framework.

Gleick (2000) frames the emergence of the contemporary water management principles by pointing to the changing nature and flexibility of demand, the role of the environmental movement, and the economic advantages of non-infrastructural strategies in mitigating water scarcity and pollution.

Ohlsson (2000) approaches the interactions between water scarcity and the response of societies using the metaphor of the 'turning of a screw' for recurring tasks (i.e., identifying bottlenecks, designing mitigation measures, and dealing with the impacts of these measures) at different stages of water resources development. Accordingly, hydraulic engineering in the first 'turn' serves to increase the water availability through large-scale supply projects. When supply management becomes uneconomic or reaches physical or political limits, strategies for demand-side management to increase the water use efficiency at the end-user level are adopted. In a third 'turn', when end-user efficiency still cannot make up for the increasing demand, a re-allocation of water towards the most profitable economic sectors must be pursued.

Usually, this implies a shift away from agriculture and hence may necessitate the import of 'virtual water'. The concept of virtual water is based on the idea that certain productive sectors yield higher returns per drop of water as compared to agriculture. It makes thus sense economically to re-allocate water from agriculture to these sectors in water-scarce regions, and to import food instead of domestically producing it (Allan 2003).

According to Ohlsson's argument, therefore, 'water scarcity' is a relative concept and depends on the water management strategy in place. The notion of 'social resources scarcity' can be used to denominate the societal constraints (political, social, and economic) to the transformation of the water utilization systems in order to alleviate water scarcity.

The *Integrated Water Resources Management* (IWRM) framework provides guidelines relating to diverse aspects of water management such as water governance institutions, education, health effects, disaster prevention, and finances. Most centrally, IWRM emphasizes the importance of demand management, basin-wide planning, integration of water uses in different sectors and the environment, subsidiarity, and stakeholder participation in planning and implementation (GWP 2007). In addition to the IWRM framework, guidelines and recommendations for sound water management have been produced by a number of international organizations such as the United Nations, the World Commission on Dams, or the World Water Council. The UN Millennium Development Goals particularly emphasize the role of water management in efforts to alleviate poverty in developing countries.

According to a few critical scholars, the ambitious goals of IWRM is also one of the framework's major weaknesses (Biswas 2004; Jeffrey and Gearey 2006). The fact that water policies in 'advanced' Western countries have not fully adopted numerous IWRM principles raises questions about the universal applicability of the guidelines (Rahaman et al. 2004). Van der Zaag (2002) and Swatuk (2005) emphasize the fundamental challenges to existing power relations that arise with new institutions under the IWRM paradigm, e.g., for decision-making, cost recovery, or conflict resolution. Similarly, Allan (2003) stresses the importance to acknowledge 'integration', 'water allocation' and 'water management' more explicitly as political processes. Specific local conditions determine the success of the adoption – or 'localization' – of IWRM principles, and therefore must be conceptually integrated in water management reforms (Swatuk 2005; Jeffrey and Gearey 2006). Allan (2003) further notes that the focus on river basins as the planning units of water resources management tends to overlook the full potential of a global 'virtual water' trade system.

Even though many countries have formally adopted an IWRM plan, strategies for water development continue to diverge. Different water development paradigms dominate water policies in different regional contexts. Many water professionals still prioritize supply-side measures and large-scale infrastructure projects rather uncritically, despite their potentially harmful impacts. While IWRM is mainly proliferated through national water policies, the new water management paradigms also affect international river management initiatives, both by transforming national water utilization patterns and policy approaches, and by offering specific guidelines for negotiating states and mediating third parties to identify mutually beneficial options for basin-wide water management. The imperative of planning water resources development according to hydrological boundaries calls upon riparian states to cooperate. The emphasis on demand management and quality control potentially alleviates the impact of water scarcity at the domestic level, and therefore relieves pressure from the issue of allocating water between riparian states. Integration and coordination of water uses in different sectors opens up opportunities for 'win-win' solutions at the international level through the exploitation of comparative advantages of different areas within the basin. The

imperatives of stakeholder participation and institutional capacity-building are also applicable on the transboundary level.

Transboundary water management through international regimes

The research field of 'international river management regimes' deals with the factors that determine the success and failure of transboundary cooperation in shared river basins. Transboundary regime formation is primarily an issue of bilateral or multilateral negotiations between the riparian states, possibly supported by third-party mediators. In the absence of effective enforcement mechanisms, international water law remains too vague and its application too controversial to offer a blue-print for cooperative river basin regimes (e.g., Benvenisti 1996; Mechlem 2003). Transboundary regimes, understood as including all measures and institutions put in place to coordinate national water development and management in a river basin, relate in their substance to the predominant water management paradigms in the riparian states. Different transboundary regimes may thus focus on different issues, e.g., technical cooperation on infrastructure projects, joint water quality control, joint environmental conservation, or the allocation of national quotas for water abstraction.

While most qualitative insights regarding international regimes in transboundary river basins were gained from single case studies, Bernauer (2002) reviews four contributions that have particularly expanded the conceptual grounds for understanding the formation of transboundary freshwater regimes (i.e., LeMarquand 1977; Durth 1996; Wolf 1997; Marty 2001). The success of transboundary management depends both on the nature of the water management challenges and on the design features of negotiated agreements or river basin institutions. A "plethora of explanatory variables" (Bernauer 2002) has been proposed by 'regime' scholars to explain or predict the formation of regimes in international river basins. One basic insight is that regime formation is most difficult in clear upstream-downstream cases, i.e., when the negative externalities of water development in the upper part of the basin are felt mainly in the lower parts, but not vice versa (Bernauer

2002). Other scholars find a higher likelihood for successful cooperation in basins where countervailing economic and political powers offer a level playing field, or generally in basins shared by 'Western' countries (Song and Whittington 2004). Strong economic and political integration of riparian states is hypothesized to foster transboundary cooperation (Durth 1996). Analysts applying game theory (e.g., Barrett 1994) postulate a higher likelihood for the formation of a regime in basins connecting few riparian states and offering possibilities for issue linkages. Other variables that have been found to influence the likelihood of a transboundary agreement include divergence or convergence in the notions of equity and fairness in different basin states, the political commitment at the highest level of governance, the role of information exchange, and the existence of transboundary institutions to reduce transaction costs (Bernauer 2002).

With regard to critical 'design' features of a transboundary regime, most authors agree that compensation for any party that would have to bear disproportionate costs under a cooperative arrangement is an essential component of transboundary regimes. Ideally, such compensation can be derived from 'win-win' projects. Compensation and other incentives for cooperation may also be generated through issue linkages, though there is disagreement among analysts regarding the benefits of expanding the range of issues under negotiation (Brunnee and Toope 1997; Bernauer 2002). Other analysts also critically discuss the 'optimal' scope of cooperation and conclude that maximum cooperation on all possible issues is neither a necessary nor a realistic target in every basin (Waterbury 1997; Sadoff and Grey 2005). In order to broaden the spectrum of perceived potential gains, Sadoff and Grey (2005) propose to distinguish and explicatively target potential benefits 'to, from, because of, and beyond the river.' Other design features of international river regimes that are mentioned in the literature include 'feasibility', 'flexibility', or 'openness' (e.g., Milich and Varady 1999; Marty 2001).

As pointed out by Bernauer (2002), indicators for successful transboundary cooperation that only evaluate the existence of a signed treaty between the riparian states are of limited value. Indicators that assess the ability of a transboundary regime to furnish the targeted benefits – i.e., its 'problem-solving' capacity – are more useful for evaluating success, yet are more difficult to assess methodologically. Obviously, such 'problem-solving' approaches

reach far beyond the realm of diplomatic relations, and relate fundamentally to national water management policies and paradigms. The challenge for diplomats and water professionals is thus to trade off and harmonize benefits from water utilization for all domestic stakeholders through simultaneous domestic water management reform and international cooperation.

3.3 Water conflicts: water wars and threats to human security

The discourse on looming 'water conflicts' in international river basins surfaced through 'sensationalist' (Homer-Dixon 1995) statements by prominent policy-makers and scholarly contributions on the threat of 'water wars' (e.g., Starr 1991). While the storyline of inter-state warfare among hydrologically linked countries continues to attract most of the attention, the discourse among academics and policy-makers regarding the specific characteristics and impact of 'water conflicts' has evolved to paint a much more diversified picture. The spectrum of reported 'water conflicts' includes consumer protests against private or governmental water suppliers or against corporate users, violent clashes between pastoral communities in arid regions, resistance on the part of local communities against large-scale infrastructure projects, political disputes regarding the allocation of water resources between different sectors, and international disputes over water quality or quantity issues. Gleick (1993) accounts for the diverse roles of water resources in violent conflicts – other than being itself the issue of contention – and specifically refers to cases where water resources served as a tool or a target for political, military, or terrorist groups.

The issue of 'water conflicts' is embedded in a wider discourse on 'environmental conflicts', 'ecoviolence', or 'resource conflicts'. Efforts to develop a theory of 'environmentally induced conflict' have met with numerous challenges at the conceptual and methodological level (see Hagmann 2005 for a review). Variations regarding the types of resources considered, conceptions of 'resource scarcity', geographical scales, and escalation levels have

blurred the conceptual boundaries of 'environmental conflict' approaches. Early studies focusing on conflicts related to renewable resources concluded that scarcity and/or degradation of natural resources are the major causes of 'resource conflicts' (Baechler and Spillmann 1996; Homer-Dixon 1999). An expansion of the 'resource conflict' discourse to include non-renewable and/or lootable resources such as oil and diamonds led other scholars to postulate other causes and characteristics of resources conflict (De Soysa 2000; Gleditsch 2004). In parallel to the conceptual broadening of the notion of 'environmental conflict', the early findings were subjected to greater scientific scrutiny by several comparative large-N studies, by the analysis of 'null' cases where resource scarcity did not result in conflict or even resulted in cooperation, and by expanding the range of explanatory variables (Hagmann 2005). The insights from these conceptual and methodological refinements supported early doubts about the explanatory power of postulated causal relationships between resources scarcity and violent conflict.

The general findings that linkages between resources utilization and intergroup conflicts are complex and elude simple cause-effect relationships are also applicable in the case of 'water conflicts' (Salman 2006). While conflicts of interests between water users holding competing claims for finite water resources have to be expected under conditions of population growth, the likelihood that such conflicts will turn violent is obviously not only a function of the status of water resources and the urgency of the stakeholders' claims. 'Environmental conflict' researchers have defined additional 'intervening' factors that determine the chances for resolution or escalation in 'resource conflicts', namely, the socio-economic and political situation, the existence of religious, ethnical, or cultural fault lines, and the available capacity for conflict transformation (Baechler and Spillmann 1996; Homer-Dixon 1999; Gleditsch 2001).

Early 'environmental conflict' researchers were quick to raise doubts concerning the 'water war' hypothesis in its generality (Homer-Dixon 1995). Competition over the use of water resources is found to be only one of multiple inter-linked causes of a conflict, and (violent) conflict is but one possible consequence of diverging interests regarding water resources allocation and management. Rather than directly causing open or violent conflict, the persistence of non-violent transboundary disputes in water-stressed river

basins continues to negatively affect inter-riparian relations and impedes the design of improved arrangements for joint water resources management (Wolf et al. 2005; Mason et al. 2007). Slow and unsustainable development is likely to de-stabilize intra- and inter-group relations. Negative effects on people's livelihoods and their development opportunities – such as food shortage, poverty, disease, migration, or environmental degradation – may lead to secondary violent conflicts in the long run (Homer-Dixon 1999).

Studies analyzing a large number of shared river basins supported such criticism (Wolf 1998; Toset et al. 2000) and led analysts to conclude that the use of force to gain control over water resources at the local level – for instance between pastoralists and farmers in arid regions – are much more likely than inter-state warfare. Hardly ever has an international war been fought primarily for the control of water resources (Wolf 1998). Inter-state "war over water is neither strategically rational, hydrographically effective, nor economically viable" (Wolf 1998). Quite on the contrary, the riparian countries in many shared river basins have concluded agreements on the joint use of the resources, and many of these agreements have proved very resilient even during politically uneasy times (Wolf 1998). This has led analysts to emphasize the role of shared river basins as a source of cooperation rather than conflict (Allan 2002; Wolf et al. 2005).

Scholars analyzing the occurrence and causes of conflict and cooperation in international river basins point at the higher conflict potential in basins characterized by clear upstream-downstream constellations (this corresponds with findings of 'transboundary regime' scholars, see above), lack of cooperative international relations, and/or rapid physical or political change (Toset et al. 2000; Wolf et al. 2003). The absence of institutional capacity in a basin, i.e., the non-existence of cooperative transboundary regimes, is found to be a main factor increasing the risk of inter-state water conflict (Wolf et al. 2003).

Ohlsson's (2000) metaphor of the 'turning screw' provides a helpful illustration of different types of first and second order conflicts related to water utilization in the context of water scarcity in transboundary river basins. Accordingly, international water conflicts (first order conflicts) are more likely when riparian states are unable or unwilling to address water scarcity domestically by implementing water management reforms out of

fear of second order conflicts among domestic stakeholders. Under the predominance of the 'hydraulic mission' paradigm ('first turn of the screw'), first order conflicts over water allocation between basin states are likely, as all riparian countries strive to increase their water supply by abstracting more water from the river. Second order conflicts may arise at the local level when large-scale projects result in forced resettlement or threaten people's livelihoods. Demand management strategies that aim at increasing end-user efficiency ('second turn of the screw') are much more compatible internationally, but may incite conflicts between the government and previously subsidized water users. Efforts to re-allocate water from less profitable sectors to more profitable ones ('third turn of the screw') may necessitate dramatic social restructuring and potentially bring about substantial second order conflict and societal frictions. The reluctance of riparian state governments to address domestic water sector reforms can at least partly explain the priority attributed by co-riparian states to claims for higher shares of transboundary water resources.

Although little evidence has been found so far to support the 'water wars' hypothesis, the challenges of water allocation and management in shared river basins continue to be cited as a global security concern. This can partly be explained in the light of the evolving conceptualization of 'security' that shifted from inter-state warfare to other threats to welfare and stability. After the Cold War, the state-centered conceptualization of 'national security' was challenged by new emerging definitions of 'security' emphasizing sub-national violent conflicts on the one hand and socio-economic dimensions of human welfare on the other. As threats to people's well-being did not appear to diminish with the worldwide decrease of international warfare, new approaches defining 'security' from the perspective of individuals rather than the nation state were proposed.

The 'human security' concept illustrates the inter-dependent dimensions of national security and the individual freedom from both 'immediate' threats, i.e., violent attacks on physical integrity or other sudden and hurtful disruptions in the patterns of daily life, and chronic threats such as hunger, disease, and repression (UNDP 1994). The 'human security' approach thus conceptually links the policy fields of 'development' and 'security' (Brunnee and Toope 1997; Dinar 2002). While the 'human security' concept has been

criticized for being analytically un-focused and 'a loose synonym for bad things that can happen' (see Paris 2001; Krause 2004), many 'water conflict' researchers probably endorse the general expansion of the analytical focus from 'water wars' to the less spectacular interactions between aspects of water utilization, development, and security. The trend towards 'human security' in the security discourse is congruent with the 'water conflict' researchers' findings that conflicting interests in water resources more often lead to suffering in terms of food insecurity, water-borne diseases, environmental degradation, migration, and local inter-group violent conflicts than to casualties in 'water wars'.

Transforming water conflicts

Another branch of 'water conflict' studies looks specifically at conflict dynamics and the negotiation processes in transboundary river basins. These studies start from the assumption that the specific design of negotiation processes critically influences the course of cooperation or conflict. Conflict transformation approaches developed outside of the specific field of 'resource conflicts' are applied. Three broad approaches can be distinguished: First, the 'Harvard negotiation approach' focuses on interests (i.e., the reasons why actors want something) instead of positions (i.e., what actors want), and seeks to develop mutually acceptable criteria for the allocation of resources (Fisher et al. 1991). Second, the 'human needs' approach argues that all conflicts can be resolved if basic human needs are satisfied (Burton 1990). Third, the 'conflict transformation' approach gives priority to values, language, and the social construction of a conflict (Lederach 2005). Applications of these concepts to land and water conflicts are discussed by Baechler et al. (2002), Trondalen (2004), and Mason et al. (2007). Other studies have focused on the role of institutions, national policies, and third-party interventions (Nakayama 1997; Wolf 1997; Postel and Wolf 2001). Findings from these studies again highlight the tight linkages between the 'water management' and 'water conflict' narratives. The imperative to address the interests and needs of conflict parties in conflict transformation initiatives inevitably brings up issues of 'water management'. Effective water management (i.e.,

joint river planning, equitable allocation of water quotas as well as water-related services and benefits, demand management) can foster trust among the involved stakeholders and reduce the pressure from contested water resources. Hostile perceptions and seemingly incompatible values behind a conflict may be attached to a particular management paradigm, and can thus be addressed in the process of (cooperative) water policy reform.

3.4 Conclusions: converging perspectives

Water professionals striving for effective and efficient water utilization systems and security agencies committed to avoiding human casualties from conflicts have little in common at first sight. Nevertheless, the paradigmatic developments in the fields of 'water management' and 'water conflict' have increasingly driven them to collaborate more closely on the same topics, with the same stakeholder groups and third parties, and in the same geographical areas. Accordingly, the linkages between the two perspectives can be analyzed according to three different levels: 1) issues and proposed measures, 2) actors and institutions, and 3) spatial focus.

Figure 3.2 illustrates the expanding range of issues covered in the evolving 'water management' and 'water conflict' approaches, respectively. 'Water management' approaches have broadened from the hydraulic engineering realm to include provisions for environmental protection, economic efficiency as well as institutional and political reforms in the water sector and beyond. The 'water conflict' perspective, on the other hand, has evolved from mainly focusing on inter-state water wars to emphasizing local-level violent conflicts and the negative effects of non-violent disputes regarding the allocation and management of water resources in shared river basins. The lack of evidence for the occurrence of inter-state water wars and a paradigm shift in the security discourse led conflict researchers and security agencies to look beyond the diplomatic relations and military conflicts between riparian states and to examine more closely the water management challenges on the ground. By diversifying their objectives beyond 'maximizing water supply' and 'mini-

mizing inter-state violence', respectively, both water managers and security agencies increasingly recognized their capacity and their responsibility to contribute to issues of poverty alleviation, food security, and the protection of environmental services.

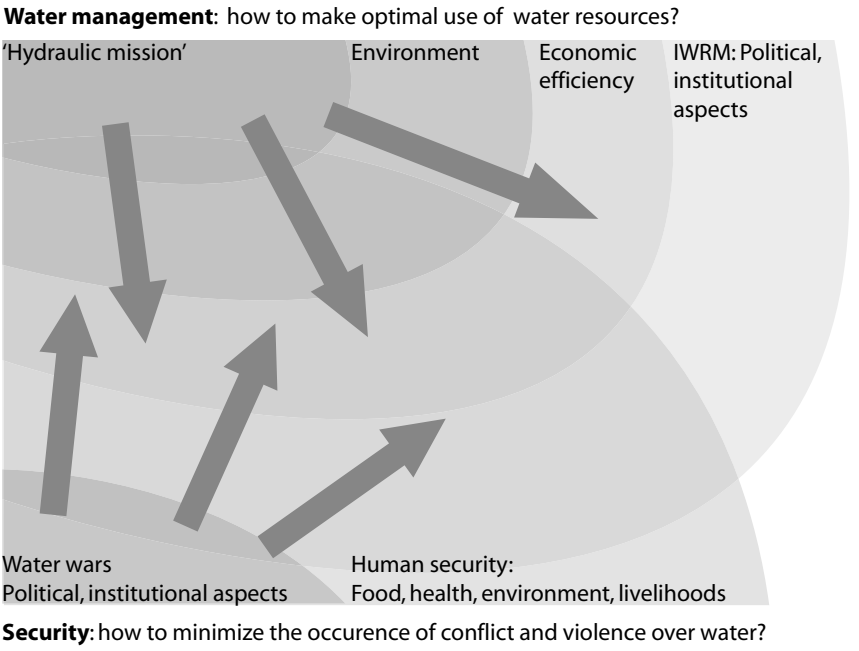

Figure 3.2: Convergence of 'water management' and 'water conflict' perspectives

This convergence in terms of issues is also mirrored in the attention given to local-level water users as the addressees of water management interventions as well as water conflict transformation efforts. The right of water users to a reliable supply of clean water and to protection against harm from water development projects receives increasing priority in contemporary water management policies, at least in principle. This coincides with an increasing concern for the security of the individual, rather than the nation state, in recent conceptualizations of 'human security'. The well-being of individual water users is thus increasingly guiding 'water management' and 'water conflict' transformation approaches alike.

Furthermore, the range of actors involved in water resources planning and management and in the initiatives aiming to resolve water conflicts has broadened substantially. National water authorities increasingly share the planning responsibilities they had monopolized in times of the 'hydraulic mission' both with other government agencies and with non-state actors. Decentralized water authorities and water user associations, NGOs, and the private sector have gained influence in the process of water policy-making. National governments are increasingly held responsible for their water development strategies. Water policies are expected to integrate water uses in different sectors (agriculture, health, environment, industry), and consider trade-offs at the national (comparative advantages in different sectors), basin-wide (comparative advantages in different sub-regions), and global levels ('virtual water' trade). It is evident that the task of fostering 'human security' in the context of contested water use also exceeds the competences and capabilities of traditional security agencies. As a consequence, negotiation processes to mitigate international water conflicts increasingly include actors from outside the national agencies in charge of water and foreign affairs.

The Malthusian narrative of states clashing over water resource use has lost ground to a more refined picture of the inter-dependencies between local, national, basin-wide, and global aspects of water utilization. Linkages between water management challenges and conflict at different geographical levels are increasingly recognized (Mason et al. 2007). In order to maximize societal benefits and minimize societal costs – e.g., in terms of inter-group conflicts – water managers need to trade off strategies relying on large-scale supply projects against alternative water management interventions (i.e., demand management) at the local, basin-wide, and global levels. Negotiated treaties to appease international tensions by implementing joint river development projects may come at the cost of local-level conflicts or environmental damage if the needs of local water users and the environment are ignored. Keeping the spatial dimension in mind is thus crucial, and institutions for 'water management' and 'water conflict' transformation increasingly pay reference to this imperative.

The question of whether "water management is, by definition, conflict management" (Wolf et al. 2005) or "conflict prevention is in the first place an issue of good water governance" (Böge 2006) is increasingly becoming

elusive with the broadening of the notions of 'water management', 'water conflict', and 'security'. Conflict management is becoming an integral part of water management frameworks, and water conflict resolution efforts cannot afford to downplay the difficult trade-offs in the design of sound water management strategies. The benefit of looking at water management challenges through the lenses of conflict and security approaches may thus not primarily lie in the prevention or resolution of (unlikely) water wars. Instead, the following impacts of the 'water conflict' discourse on the practice of water management can be highlighted.

First, the 'water conflict' narrative has brought the water management challenges onto the agenda of international organizations concerned with security, a wider range of top level national decision-makers, and political science scholars. This has resulted in an increased commitment and international support for establishing basin-wide river management regimes. Joint river management institutions can serve as vehicles for regional development efforts that also address impacts of water scarcity other than inter-state conflict, such as food insecurity, poverty, or migration.

Second, issues of conflict over water utilization at the local level have received increasing attention from water managers, and conflict resolution provisions have been included in water management guidelines and policies.

Third, tense relations between co-riparian states over the utilization of shared water resources have been addressed using specific conflict transformation tools, such as third party mediation, confidence building, and the in-depth analysis of positions, interest, needs, and perceptions. Such approaches are likely to foster the process of international regime formation, which in turn is the basis for more efficient utilization of transboundary rivers.

The nature of water utilization challenges prohibits an overly narrow focus on resolving inter-state 'water conflicts' in transboundary river basins. Giving equal weight to improving international relations on the one hand, and the water management institutions and policies at different levels on the other, is imperative. The establishment of river basin initiatives working on both tracks simultaneously, therefore, is an encouraging development.

4 Driving forces and patterns of water policy making in Egypt

Abstract

In studies on international river basins, it is often assumed that national water policies are made by 'governments' or 'water ministries' as unitary, rational decision-makers. This chapter 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 manner by the respective authorities. Issues that have emerged more recently, i.e., water quality or demand management, are subject to interest bargaining between different stakeholder groups in both the planning and the implementation phases.

4.1 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 management in Egypt is closely linked with 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 Egyptian Ministry of Water Resources and Irrigation (MWRI). 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 chapter 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 theory-based 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 chapter 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 and USAID 2002; MWRI and USAID 2003; MWRI and World Bank 2003; JACOBS 2005; MWRI 2005). In addition, a number of studies on the Nile Basin highlight several characteristics of 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 Egypt 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.

4.2 Framework of analysis

'Policy-making' is understood as the sum of all processes that lead to the formulation of planning documents and strategies, but also determine the actual implementation of these 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 chapter are based on three models of decision-making developed by Allison (1971) and further specified by Allison and Zelikow (1999).

The *rational choice* model assumes that policies are formulated 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 and 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, 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 4.1: Analytical framework guiding the attribution of water policy issues to policy-making patterns

Pattern ▶	Rational Choice	Organizational Process	Governmental Politics
▼ Policy phase			
Planning phase	A single powerful decision-maker (or a like-minded group) selects the most beneficial policy options based on a set of his/her 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.

Table 4.1 specifies the framework applied to attribute the different 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, across different countries, and for different time-spans considered.

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 4.2 and 4.3). Specific decision-making processes relevant for individual water policy issues were attributed to the dominant 'patterns of decision-making',

i.e., *rational choice*, *organizational processes*, or *governmental politics* (Table 4.4). 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.

4.3 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 downright rejects key policies proposed by the government or the president, 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). Lately, however, the excessive powers of the ruling elite have been increasingly challenged on various fronts by political parties, social movements, syndicates, the press, and large parts of the judiciary. These developments have stimulated a national dialog on political reform and have 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 regarding the political reforms 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' (Al-Sayyid 2003). For instance, Sadowski (1991) describes how business-governement alliances shaped land reclamation developments – a critical issue in the context of water policy making – in the 1970s.

National policies are drafted to varying degrees by the presidency, the cabinet and the sectoral ministries, as well as the ruling party. Decision processes at the highest political levels are little 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 21st Century' of 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, the 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 priority attributed to water policy relative to the other development priorities is not clearly apparent (e.g., GoE 2006). The NDP'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.

4.4 Evolving 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.

Until recently, the dominant narrative highlighting the necessity of state intervention regarding water management issues in Egypt was the threat to food security and agricultural exports (mostly of cotton) due to 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 basin wide 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 and USAID 2003; MWRI and 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 and USAID 2002; MWRI and World Bank 2003). Water management strategies in the 1990s still focused mainly on water quantity issues (MWRI and 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 issues are inter-linked, 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 provision came under increasing budgetary pressure. In response to emerging calls for more efficient water utilization and strategies for cost-recovery, the Ministry of Water Resources and Irrigation 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) (MWRI 2005). The current 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 the 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 alleviated 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 a lack of emphasis on local-level dimensions, the vague prioritization of the proposed interventions, a lack of clear visions for the 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 and World Bank 2005).

Only a few planning documents and working groups have attempted to develop strategies beyond the 2017 planning horizon. These strategies strongly rely 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 country's 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 most politicians and voters, self-sufficiency is more appealing as a policy goal 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, as the agricultural modernization on newly reclaimed 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 sufficiently taken up by national policy-makers or a greater number of concerned stakeholders.

Another narrative that periodically surfaces in Egyptian water policy debates is the specter 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 saber-rattling in the Nile Basin has gradually been replaced by transboundary dialog in the framework of the Nile Basin Initiative. Transboundary issues are only vaguely addressed in Egyptian water policy documents. The Nile Basin negotiations are still ongoing and only involve a rather narrow range of actors comprising high-level representatives of the MWRI and the Ministry of Foreign Affairs (MoFA).

4.5 Actors in the water sector

Accounts of water sector actors and their responsibilities are provided in recent studies and in water policy documents (MWRI and USAID 2003; MWRI and World Bank 2003; JACOBS 2005; MWRI and World Bank 2005; MWRI 2005). Table 4.2 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), 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 Ministry of Water Resources and Irrigation (MWRI) enjoys a high degree of prestige due to the historic importance of irrigation water distribution in Egypt. The land reform in the 1950s rendered the Ministry of Agriculture and Land Reclamation (MoALR) an important partner in water allocation planning. The growing emphasis given to the industral and services sectors also increased the influence of the corresponding ministries in recent years. The MWRI has the overall responsibility regarding water allocation. The Ministry of Housing, Utilities and New Communities (MHUNC, now renamed: see Table 4.2) is responsible for the provision 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.

Table 4.2: Actors in the Egyptian water sector

Actor	Mandates and functions related to water management	Interest quantity	Interest quality	Interest costs
Presidency	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 NDP)	Define and promote political programs			
Ministry of Water Resources and Irrigation MWRI	Overall responsibility for water allocation, coordination, regulation, international cooperation, flow control, irrigation/drainage infrastructure construction, O&M, R&D	✓	✓	✓
Ministry of Agriculture and Land Reclamation MoALR	Minimize water use per unit of agricultural output, coordination with MWRI, R&D, on-farm water management programs	✓	✓	✓
Ministry of Housing, Utilities and New Communities MHUNC[a]	Construction and management of municipal water supply and sanitation infrastructure (after decentralization: planning and coordination)		✓	✓
Ministry of Health and Population MoHP	Set water quality standards, monitoring of industrial wastewater		✓	
Ministry of State for Environmental Affairs / Egyptian Environmental Affairs Agency EEAA	Environmental regulation, programs to reduce water pollution, main responsibility for coastal water bodies and Nile cruise boats		✓	
Ministry of Industry MoI[b]	Regulate, support, and monitor water pollution control measures in the industry sector		✓	✓
Ministry of Local Development MoLD	Coordinate the 'Shorouq' program (local-level projects in rural areas and small cities, incl. water supply and sanitation), coordination with local-level institutions (governorates, communities), define development priorities		✓	✓
Ministry of Electricity MoE	Power production at the Aswan High Dam and other sites, cooling water withdrawal for thermal plants	✓		
Ministry of Transportation MoT	Maintain navigable waterways, cope with low winter flows (mainly by dredging)	✓		
Ministry of Planning[c]	Integration of water policies with national policies (annual plans, five-year plans)			
Ministry of Foreign Affairs	Transboundary negotiations, overall coordination of international projects including Nile Basin Initiative projects			
Ministry of Interior Affairs	Enforcement of regulations (i.e., fines for water pollution)			
Ministry of Social Affairs	Licensing/supervision of NGOs, participation in local development			
Potable Water and Sanitation Holding Company	Management of plants established by NOPWASD, handing systems 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	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	(✓)	(✓)	(✓)

[a] Now named Ministry of Housing, Utilities and Urban Development
[b] The industry portfolio is currently integrated in the Ministry of Trade and Industry
[c] Now transformed into the new Ministry of State for Economic Development

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 policy design. As Allan (in JACOBS 2005) notes, however, 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 ties or through the responsible state agencies, e.g., the Ministry of Trade and Industry. The Committees for Agriculture, Industry or Environment of the Egyptian Businessmen Association 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 the Sinai and the southern desert. However, these companies remain institutionally and personally linked to the respective governmental 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 mostly choose 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 4.2). As the current water policy gives allocation priority to the drinking water and industry sectors, water shortage will mainly affect the agriculture, hydropower production, and navigation sectors. The latter two sectors are excluded from claiming water in excess of the release from Lake Nasser determined by the demand of the other sectors.

Table 4.3 specifies the roles played by the main water sector actors in water policy making. 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 regard to water sector developments 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 tries 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 fruit 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 restrained to a narrow group of state 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 that 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 involved actors 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 in the context of issues related to key interests of water users, such as the cost of water services, food security, household incomes, shifts of cropping patterns, water quality standards, and institutional changes regarding the relationship between MWRI and water users. It is therefore not surprising

Table 4.3: Responsibilities and roles of the different actors in the policy process

Policy issues	Agenda-setting	Policy formulation	Policy Adoption	Implementation	Evaluation
Quantity management – supply					
Cooperation with NB countries for more supply	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
Quantity management – demand					
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 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
Awareness / water saving campaigns	MHUNC, MWRI	MHUNC, MWRI	MHUNC, MWRI, cabinet	MHUNC, MWRI, NGOs	MHUNC, MWRI, NGOs
Quality management					
Define and enforce industrial quality standards	MoHP	MWRI, MoI, EEAA, MoHP	Cabinet, PA	MWRI, MoI, EEAA, MoIA	MoHP, public
Support polluters in installing water treatment facilities	MoI, industries	MWRI, MoI, EEAA	Cabinet, PA	MWRI, MoI, EEAA	MWRI, MoI, 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
Institutional reform					
Devolution of power, establish WUAs	MWRI, donors	MWRI, donors	Cabinet, PA	MWRI, users	MWRI, users
Promote stakeholder participation	MWRI, donors	MWRI, donors	Cabinet, PA	MWRI, stakeholders	MWRI, stakeholders

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.

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 water 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.

4.6 Cooperation and coordination in the water sector

Coordination and cooperation between stakeholders is vital for achieving *Integrated Water Resources Management*. Representatives of government agencies as the main water 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 in the Egyptian water sector (listed in MWRI and USAID 2003; MWRI and 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 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 and World Bank 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 water 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 water 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 responsibilities of the different administrative bodies often do not match (Radwan 1998). Interactions between users and extension staff of national ministries suffer from the limited decision power of the latter, inefficiency, and corruption (Radwan 1997).

4.7 Selected policy issues

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

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 land

and applying efficient and environmental-friendly irrigation and farming practices promises to yield more benefit 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 modernization of the agricultural system on newly reclaimed land is controversial because the benefits in the form of potential revenues and employment opportunities must be traded off against decreased water availability on the old lands. The water sector policies of the 1980s and 1990s thus 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 and Tosswell 1998; Wichelns 2002), and others refer to them as being "based on a political decree from the beginning" rather than based 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 at the fringe of the desert

has seen a boom of commercial farming based on groundwater abstraction since the 1980s (World Bank 2004b). 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.

From a decision-making perspective, 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 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 plans.

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 the production of 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, however, 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 bring about a behavioral change on the part of the rice farmers (MWRI and USAID 2002). Command-

based measures like zoning of rice plantation areas and constraining seed supply (MWRI and 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 choice* 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 respective policy. The decisive influence of different stakeholders on the policy implementation in this case is an example of the *governmental politics* model of policy-making.

Waste water quality debate

The issue of water quality management illustrates how unclear legal frameworks and enforcement priorities can obstruct *rational choice* type 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 (MoHP) 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 by advocating for 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. 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 partly explained by the weakness of consumer associations as compared to industrial interest groups, and by the priority given to industrial development in the 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 evolution of institutional capacity 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 the departments dealing with issues 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 Environmental Affairs itself is also considered by many observers a relatively weak actor in the water sector.

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

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 to 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 and 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 projects – e.g., pollution 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 the 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.

4.8 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 4.4).

Rational choice

Considering the vast size and experience of the MWRI, the capacity of the water sector to make *rational choice* type 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 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'

Table 4.4: Influence of patterns of policy making for selected policy issues

Policy issue	Patterns of policy-making		
	Rational choice	Organizational processes	Governmental politics
Quantity – supply			
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	✓		
Quantity – demand			
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	
Quality management			
Define and enforce industrial quality standards (Law 48)			✓
Support polluters to upgrade treatment facilities			✓
Institutional reform			
Devolution of power, establish WUAs	P	I	
Promote stakeholder participation	P	I	

P planning phase
I implementation phase
✓ both planning and implementation

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 as compared to 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" (Toshka). 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 relates strongly to 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 4.4, decisions on land reclamation are not unequivocally attributed to the *rational choice* pattern. Though certainly based on the projection 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 also be expected, subjecting the respective decisions to a pattern of interest bargaining (i.e., *governmental politics*).

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 water 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 water supply (e.g., desalinization) and upstream water development project (e.g., diversion canals in the Sudan) in the long-term planning visions – relative to non-technical demand management approaches – 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 environmental ministry 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 overall 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 to date because they deviate too far from a political system that neither encourages self-organization of stakeholders at the local level nor favors the establishment of vocal civil society organizations that could effectively promote the interests of water users.

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 sector project.

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 the MWRI and the MoSEA 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.

4.9 Conclusions

Important steps towards Integrated Water Resources Management 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 chapter, 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 pressing 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.

5 Shaky ground: Ethiopian water policy making and Nile Basin cooperation

Abstract

This chapter explores domestic determinants of the Ethiopian position in the Nile Basin negotiations. It challenges the common conceptualization in the transboundary river conflict literature of riparian states as unitary rational actors. A qualitative two-level game approach is applied. The win-set of domestically acceptable policy scenarios is constrained mainly by two factors: 1) divides between domestic advocates of different strategies, e.g., supply and demand management, and 2) the limited capacity of water sector institutions to design and evaluate integrated water development strategies due to overlapping levels of planning, lack of inter-sectoral coordination, and insufficient stakeholder participation. The nature of the water policy processes can partly explain the high priority attributed in the ongoing negotiations to the issue of *de jure* water quota allocation and to joint large-scale infrastructure projects. A transfer of the negotiation mandate from the water sector to the national planning level could improve the ability of the basin states to evaluate and exploit trade-offs between different domestic and cooperative water management options.

5.1 Introduction

The Nile Basin countries have achieved remarkable progress towards transboundary cooperation in the last decade. A draft legal and institutional framework agreement lays down provisions for basin-wide water sharing and proposes the establishment of a commission for cooperative river development planning. Several investment projects have been jointly approved by the Nile riparian states under the Nile Basin Initiative (NBI).

There still is some disagreement between the Nile Basin countries regarding the validity of earlier treaties and the national water abstraction quotas assigned therein, as well as regarding the operationalization of 'water security' in the framework agreement under negotiation. The slow negotiation progress has been attributed to the high level of mistrust among the basin states and the fact that negotiators still largely apply national, rather than basin-wide planning rationales (e.g., Swain 1997; Waterbury and Whittington 1998; Allan 1999; Waterbury 2002; Mason 2004; Yacob Arsano 2004). Most studies on the Nile Basin conceptualize the riparian states as unitary actors striving for maximum *de jure* rights and *de facto* access to river water. The riparian states' respective water needs, as well as their economic, diplomatic, military, or geographic power (i.e., their location along the river, see Dinar 2002), are commonly mentioned as determinants of the countries' negotiation positions.

Most river basin conflict studies at least implicitly apply a conceptual framework that is based on *International Relations* theories (see Furlong 2006), and largely neglect the domestic processes of (water) policy-making. However, insights from many river basin case studies point at the importance of domestic factors for the course of transboundary conflict and cooperation (Elhance 1999; Bernauer 2002; Dinar 2002). Historical accounts on river basin conflicts (e.g., Collins 1990 for the Nile Basin) mostly do not apply a specific policy analysis approach and focus on past events rather than present structures.

This chapter presents an alternative approach to explaining the Ethiopian behavior in the Nile Basin negotiations. It focuses on the interface between

domestic water policy making and basin-wide negotiations. It is assumed that a country's domestic water policies and its positions in transboundary negotiations significantly depend on the constellation of domestic stakeholders, their interests, as well as the institutional setting in the water sector. The goal of this chapter is to identify the domestic factors that affect progress and stagnancy in the transboundary negotiations. 'Political feasibility' is highlighted as an important dimension in joint river development initiatives. The results of this study can help analysts and decision-makers in refining their approaches aiming at a better integration of domestic and transboundary policy-making processes, institutions, and policies.

As demonstrated in this chapter, the recent progress in cooperative river management on the Nile only partially corresponds with national-level water policy developments in Ethiopia. Lack of inter-ministerial coordination and limited stakeholder participation constrains the government's ability to evaluate trade-offs between different river development scenarios. The ongoing decentralization process could erode the government's autonomy to decide upon the implementation of (infrastructure) projects designed in transboundary planning processes. Increasingly prominent policy targets regarding environmental protection, hydropower production, support of commercial agriculture, and empowerment of water users also alter the terms for cooperative river management.

The findings presented in this chapter support the emphasis attributed in the Nile Basin Initiative to the issues of capacity-building, institutional reforms, and improved communication at the level of riparian states. Domestic water sector reforms are highlighted as an essential – yet often underestimated – prerequisite for tapping sustainable rewards at the international level.

This chapter proceeds as follows: First, the theoretical debate regarding the integration of systemic and domestic explanations of foreign policy behavior is outlined. In this context, the *two-level game* concept is introduced and applied to the Nile Basin context. The remainder of the chapter presents a systematic description of water sector stakeholders, institutions, and policies, and discusses the implications for the Ethiopian negotiation position in the Nile Basin.

5.2 Theoretical background

There is an ongoing debate among political scientists on how to best conceptualize the interactions between domestic policy-making processes and international relations (Moravcsik 1993; Pahre 2006). Two largely separate streams of theories deal with the foreign policy behavior of states: 1) *International Relations* (IR) theories, focusing on properties of the international system, and 2) *Public Policy Analysis*, focusing on domestic political processes. Policy analysts have developed a variety of approaches to integrate the two streams. Two general types of such integrative concepts can be distinguished: On the one hand, *second image* and *second image reversed* concepts (see e.g., Waltz 1979; Gourevitch 1996), respectively, analyze unidirectional causal relationships between domestic policy processes and the international behavior of states and vice versa. Putnam's (1988) *two-level game* metaphor, in contrast, considers simultaneous and reciprocal interactions between processes at the two levels.

According to the *two-level game* concept, a national *chief negotiator* simultaneously bargains with his foreign counterpart and with a range of domestic policy actors and interest groups. The *win-set* is the range of policy options that receive sufficient domestic support to be adopted or ratified either formally or informally. The size of the *win-set* determines the *chief negotiator*'s room for maneuver at the international level and is thus likely to influence the outcome of the transboundary negotiations. *Win-sets* are subject to evolving discourses, institutional changes, and manipulation by both domestic and foreign *chief negotiators* (Putnam 1988).

Key findings from both *second image* and *two-level game* studies can be summarized as follows (adapted from Milner 1997):

- An international agreement is more difficult to reach if the relevant domestic actors' interests are highly divided and result in narrow *win-sets*. This is particularly true if a majority of influential actors are 'hawkish', i.e., if their preferences are less compatible with the foreign party's interests.

- At the same time, a narrow *win-set* in one country under certain conditions tends to 'pull' the negotiation outcome towards the respective *chief negotiator*'s preferred policy option, because the domestic constraints restrict his ability to make concessions to the foreign party ('Schelling Conjecture', see Putnam 1988).
- Information asymmetry and high planning uncertainties at the national level tend to decrease the domestic actors' willingness to endorse specific proposals for international cooperation. Information brokers that provide information to potential veto groups can therefore increase the chances of reaching an agreement.

The following sections explore policy preferences of domestic stakeholders in the Ethiopian water sector and the political institutions that grant them access to the policy-making process. In order to cover a broad spectrum of potential mechanisms of domestic-international level interactions, this analysis considers different phases of the policy-making process, different levels of governance, and both formal and informal processes of decision-making.

5.3 The Nile Basin two-level game

Ethiopian tributaries to the Nile account for 86% of the water that reaches Egypt. The very low extent to which this water is abstracted and used in Ethiopia is particularly frustrating in view of narratives that partly explain Ethiopia's persistent poverty and food aid dependency with the absence of a reliable water supply (e.g., World Bank 2006). Inadequate infrastructure to capture, regulate, and utilize the abundant but erratic rainfall, combined with a degradation of the vegetation cover, results in soil erosion, floods, and crop failure. The level of water supply and sanitation coverage is very low even by African standards. Industrial and agricultural river pollution is still a relatively minor concern, except in the Awash Basin (more detailed

information on water sector challenges are provided by Tesfaye Tafesse 2001; Gulilat Birhane 2002; MoWR 2002; UNESCO 2004; WaterAid 2005; Yacob Arsano and Imeru Tamrat 2005).

The institutional history of the Ethiopian water sector is characterized by frequent changes (see Yacob Arsano 2004). A national Ministry of Water Resources (MoWR) was established in 1995. The first Water Resources Management Policy was formulated in 1999 (MoWR 1999), followed by a Water Resources Management Proclamation (Government of Ethiopia 2000), a Water Sector Strategy (MoWR 2001), and a 15-year Water Sector Development Program (MoWR 2002).

These policy documents were formulated based on a number of stakeholder meetings, and generally adopt the principles of *Integrated Water Resources Management*. Accordingly, they give attention to diverse issues such as drinking water supply and sanitation, irrigation, hydropower production, rainwater harvesting, watershed management, soil and soil moisture conservation, and groundwater management.

The comprehensiveness of the planning documents, however, is no guarantee for an equally comprehensive policy implementation. Inadequate institutional planning capacities, poor project design, and unintended side-effects have limited the success of recent water development efforts (ECWP 2005). Nonetheless, the country's capacity to regulate the runoff of its rivers is slowly increasing, and numerous small and large-scale infrastructure projects have been launched.

Projects to increase the abstraction and consumption of river water in the Ethiopian parts of the Nile Basin – i.e., large-scale dams and irrigation schemes – raise concerns due to their potential negative effects on downstream water availability, particularly in Egypt. From a downstream perspective, water development strategies that limit the Ethiopian demand for Nile water are preferable to large-scale dams and irrigation projects. Such strategies include watershed management, increasing the water use efficiency of both rain-fed and irrigated production, and the prioritized development of Ethiopian rivers outside the Nile Basin.

Most engineers and economists agree that substantial benefits could be generated by exploiting comparative advantages on a basin scale. For instance, upstream water storage could benefit all riparian states by increasing the capacity for hydropower generation and flood control, and by minimizing evaporation losses and sediment loads. Transboundary cooperation going beyond such hydraulic optimizations – i.e., advanced economic integration – promises to yield even greater overall benefits (Grey and Sadoff 2003).

Cold War rivalries and the political instability within many Nile riparian countries rendered joint river development a highly futile goal in the past. The treaties of 1929 between Egypt and the British Empire (administering the Equatorial lakes region), and of 1959 between Egypt and the Sudan consolidated Egypt's quasi-hegemony over upstream water developments. These treaties were repeatedly denounced by Ethiopia and other upstream states, but their existence still affects the transboundary relations and the search for new cooperative river management frameworks.

The establishment of the Nile Basin Initiative (NBI) by the water ministers of the Nile states in 1999 represents a major departure from earlier unilateral approaches and the occasional threats of violence during the Cold War period. The NBI hosts negotiations over a new legal and institutional framework agreement ('D3 Project'), implements several capacity building programs, and coordinates efforts to design joint water development projects on the ground.

The riparian state governments act as the *chief negotiators* in the *two-level game*. Ethiopia is represented in the NBI mainly by the Ministries of Water Resources and Foreign Affairs, the latter mainly engaging in the legal and institutional framework negotiations. The Ethiopian *win-set* – and thus the country's willingness and ability to engage in cooperative river development scenarios – depends on the domestic actors' ideological stand and their assessment of costs and benefits from different unilateral and cooperative river development scenarios. The following section discusses the interactions between domestic and international processes of water policy making in more detail.

5.4 Results

This section presents the key characteristics of water policy processes in Ethiopia in relation to the Nile Basin negotiations. It first outlines the spectrum of stakeholders and their interests, and then elaborates on the institutional factors that determine the actors' influence in policy processes. Table 5.1 summarizes the main domestic constraints on Ethiopia's negotiation behavior as described in more detail below.

Table 5.1: Domestic factors influencing the Ethiopian win-set in the Nile Basin negotiations

1. Factors that influence the chief negotiator's general decision autonomy
▶ **Enhancing:**
• Dominance of governmental actors in the water sector
• Strong dependence of water policies on national development policies; top-down control through the Ministry of Finance and Economic Development (MoFED); frequently changing national water development targets
• Weak civil society and private sector
▶ **Restricting:**
• Decentralization, devolution of planning responsibilities
• (Planned) establishment of River Basin Organizations
• Donor involvement in policy-making
2. Factors that influence the country's capacity to design innovative strategies
▶ **Restricting:**
• Inter-sectoral coordination deficiencies
• Gaps in the legal framework
• Limited planning and implementation capacity
• Weak civil society and private sector
• Limited research capacity
• Decentralization: unclear responsibilities of central and decentralized river management authorities
▶ **Enhancing:**
• Great hydrological potential, multiple river systems, diverse range of livelihoods
• Current policies prioritizing commercial agriculture, water supply and sanitation, hydropower
• Donor expertise and funding
• Additional resources provided by NGOs

3. Factors that narrow the range of transboundary water policy options with sufficient domestic backing

- **Towards a more 'hawkish' win-set (i.e., less compatible with downstream interests):**
  - Narratives focusing on the importance of food self-sufficiency
  - Dominance of beneficiaries and proponents of large-scale development in the national water sector
  - Weakness of the environmental sector
- **Towards a more 'dovish' win-set (i.e., more compatible with downstream interests):**
  - Criticism against large dams voiced by different actors
  - Decentralization; empowerment of local water users (strengthening of small-scale approaches)

In terms of different influence mechanisms, one can distinguish between factors that 1) determine the *chief negotiators*' general decision autonomy, 2) determine the water sector's capacity to design and implement effective and innovative water sector strategies, and 3) eliminate specific options from the 'menu of choice', thus shifting the *win-set* more towards the 'hawkish' or the 'dovish' side. The discussion at the end of the chapter takes up this categorization.

Water sector actors

Table 5.2 lists the major actors and actor categories and specifies their potential influence and areas of participation, their interests, degree of internal organization, susceptibility to policy outcomes, and potential conflicts with other actors.

The parliament has a formal veto power regarding fundamental policy shifts and the ratification of international agreements. In comparison to many Western states, however, the legislature's role remains limited, due to the overwhelming majority of seats held by the hierarchically structured ruling coalition led by the prime minister. The formal ratification of governmental policies or international treaties is thus hardly a main locus for stakeholder interferences.

A number of federal ministries play key roles in the water policy process and have substantial stakes in water policy decisions in terms of project

mandates, budget shares, and the allocation of water quotas to the users in their respective spheres of influence. The Ministry of Water Resources (MoWR) is mandated to coordinate the national water policy formulation process and implement large-scale water development projects. The MoWR interacts with different ministries, e.g., with the Ministry of Agriculture and Rural Development (MoARD) on the issue of irrigation development; with the Ministry of Health (MoH) on drinking water and sanitation issues; with the Ethiopian Electric Power Corporation (EEPCo) on hydropower development; and with the Environmental Protection Agency (EPA) on pollution control and environmental conservation.

The Ministry of Finance and Economic Development (MoFED) is in charge of the overall national planning and budgeting, including the administration of foreign loans and grants directed to different executive branches. The MoFED thus has far-reaching influence on sectoral policies. Accordingly, water management plans are more often amended in consultation with MoFED than later on by the parliament. The decision-making processes within the MoFED, however, are little transparent both to other ministerial actors and outside observers. MoFED decisions, e.g., regarding the construction of large-scale water development projects, are likely to be based on a combination of cost/benefit assessments with reference to the national development policies, direct influence by the political leaders, and the availability of (foreign) funds.

The Ministry of Foreign Affairs (MoFA) is not directly involved in regular water policy processes at national level. The MoFA plays a prominent role, however, in the transboundary negotiations on the legal and institutional framework in the Nile Basin. This rather narrow mandate partly accounts for the high prominence of ideologically motivated narratives highlighting the need for a *de jure* re-allocation of national water abstraction quotas in Ethiopia's negotiation position, as compared to technical or economic rationales.

Regional states in Ethiopia enjoy substantial decision autonomy under the system of 'ethnic federalism'. Donor agencies influence water policy making through their expertise and the support they extend both to planning processes at different levels and to projects on the ground. National

and international NGOs are relatively prominent in Ethiopia compared to other Nile countries both with regard to policy advocacy and in terms of their capacities to implement water development projects. Beyond their rather limited direct involvement in governmental planning processes, advocacy NGOs mainly rely on informal contacts to high-level officials and on linkages to donor agencies (Keeley and Scoones 2000). The Christian Relief and Development Association (CRDA) coordinates NGO activities at the national level.

Water research institutions have been strengthened in recent years, but their capacity to address the significant research needs (Kamara and McCornick 2002) remains limited. Efforts to establish a national water research center affiliated to the MoWR have met with delay. The recently established regional office of the International Water Management Institute (IWMI) is one of the most important academic water policy think-tanks in Ethiopia.

The private sector does not (yet) play a major role in the Ethiopian water policy sector (Dessalegn Rahmato 1999; UNESCO 2004). Insecurity regarding water rights and the low profitability of the drinking water sector are among the main constraints to private investments. Much of the irrigable land is located in remote areas that are characterized by a hot climate, highprecalence of infectious diseases, and security concerns. Recent claims for a reliable water supply and flood protection lodged by successful flower exporters, however, are a sign of the growing influence of agro-investors. Foreign contractors have also been mentioned as important players in the context of infrastructure projects (Waterbury 2002).

Table 5.2 indicates that some of the most vulnerable stakeholder groups have little influence on water policy processes and decisions. End-users are inadequately organized, lack access to relevant information, and face (formal and informal) political institutions that tend to value the agendas of central political elites higher than the local communities' right to self-determination. Remote ethnic minority groups and communities relying on non-agricultural livelihoods (e.g., pastoralists or fishermen) are particularly at risk of marginalization in both policy formulation and implementation processes.

Table 5.2: Water sector actors in Ethiopia

Actor	Issues of participation	Interests
Prime Minister PM (representing the political leadership and the ruling coalition)	Overall strategic decisions; transboundary issues	National development; political stability; consolidation of power
Parliament	International agreements; national budget	National development; political stability (different interests of different political parties)
Ministry of Water Resources MoWR	Policy design and coordination; definition of standards; issuing of permits; planning and impl. of large-scale projects	Integration of sectoral policies; maximize budgetary allocation to water sector; balance control and efficiency
Ministry of Finance and Economic Development MoFED	Approval of strategies and projects; allocation of funds	National development; financial sustainability
Ministry of Foreign Affairs MoFA	Nile Basin cooperation	Improve int'l. relations; enhance Ethiopia's regional influence
Ministry of Agriculture and Rural Development MoARD	Food security; small-scale irrigation; rainwater harvesting	Increase agricultural output (in a sustainable manner)
Ministry of Health MoH	Water supply and sanitation; hygiene; water quality control	Prevent the spread of diseases; improve public health
Environmental Protection Agency EPA	Water quality control; ecosystem conservation	Sustain ecological functions of aquatic systems
Ethiopian Electric Power Corporation EEPCo	Dam construction	Maximize hydropower production
Regional State Water Bureaus (and/or Bureaus of Agriculture)	Small-/medium-scale water development projects	Increase water services coverage
Donor agencies	Funding; policy discourse	Development (national indicators, pro-poor)
Advocacy NGOs	Water policy discourse	Advocate specific strategies (pro-poor); empower water users
NGOs involved in water development projects	Local water projects	Improve local level water use and services provision
Research institutions	Water research	Increase knowledge base
Contractors	Well drilling; manufacturing and sale of pipes; construction, etc.	Assignments; profit
Consulting firms	Policy and project design	Assignments
Users: industries	Water allocation; quality management	Cheap water; few legal restrictions
Users: agro-investors	Irrigation development	Cheap water; subsidized irrigation infrastructure
Users: small-scale farmers	Small-scale water development	Irrigation infrastructure; cheap, reliable water supply
Users: downstream pastoralists, fishermen	(planning of local projects)	Improved water supply, natural flow regime; flood protection
Users: urban	Water supply and sanitation	Cheap, reliable supply of good quality water

Potential influence [main sources thereof]	Main sphere of influence	Internal organization	Susceptibility [mechanism]	Potential conflicts [contentious issues]
High [mandate; control over administration and legislature]	National; (transboundary)	High	Medium [political accountability]	Political opposition; peripheral water users; donors [influence on decisions]
High [mandate]	National; (transboundary)	Medium	Medium [pol. acc.]	Government, ministries [policy decisions; budget]
High [mandate; expertise]	National; (transboundary)	High	High [pol. acc.; budget]	Various actors [policy priorities] Water users [water pricing; negative impacts of projects] Regions [competences; budget]
High [mandate; control over funds]	National	High	Medium–high [pol. acc.]	Line ministries; donors [strategic priorities; budget allocation]
High [mandate]	National; (transboundary)	High	Medium–high [pol. acc.]	Water authorities [approaches to Nile Basin cooperation]
Medium–high [mandate; expertise; extension capacity]	National	High	Medium–high [pol. acc.; budget, mandate]	MoWR [competences; responsibilities]
Medium–high [mandate; expertise]	National	High	Medium–high [pol. acc.]	MoWR [competences; responsibilities]
Medium–high [mandate; expertise]	National	High	Medium–high [pol. acc.]	MoWR; EEPCo [influence on decisions; enforcement of EIAs]
Medium–high [mandate; expertise]	National	High	Medium–high [pol. acc.; budget]	MoWR [competences]
High [implementation mandate and capacity]	Regional	High	Medium–high [influence]	MoWR [competences] Users [strategy]
High [expertise; funds]	National; (regional)	High	Medium [legitimacy]	PM; MoFED, line ministries [policy priorities]
Medium [expertise; funds]	National	High	Medium [legitimacy]	Government [participation] PM, MoWR [strategic priorities]
Low–medium [expertise; funds]	Local	High	Medium [legitimacy]	Government [operational liberty] MoWR [strategy, coordination]
Low–medium [expertise]	All levels	Medium	Low–medium [funding]	-
Medium [expertise; impl. capacity]	Local level	Medium	Medium [profit]	(Users, NGOs [influence on decisions regarding dams, etc.])
Medium [expertise]	All levels	High	High [profit]	-
Medium [funds]	Local	Medium	Medium [restrictions]	Other users [water use rights] EPA, users [pollution]
Medium [funds]	Local	Medium	High [profit]	Other users [water use rights, influence on policy decisions]
Low–medium [political representation]	Local	Low–medium	High [livelihoods]	Other farmers [water use rights] MoWR [decisions on large projects]
Low	Local	Low	High [livelihoods]	Other users [water use rights] MoWR [decisions on large projects]
Low–medium [political representation]	Local	Medium	High [health; cost]	MoWR, town administration [water services coverage; pricing]

Diverging actor preferences

In order to assess the different actors' influence on water policies, both their interests and the political institutions that regulate their participation in planning and implementation processes must be analyzed. Water policy preferences in Ethiopia are divided along several lines, two of which are particularly important in view of the transboundary water policy challenges:

- the priority attributed to legal issues of transboundary water-sharing and joint river development;
- the relative priority (including budget allocation) attributed to water development in different sub-sectors, i.e., irrigation (small-scale or large-scale), hydroelectric power production (HEP), drinking water supply and sanitation (WSS), flood control, navigation, recreational uses (tourism, etc.) and conservation of aquatic ecosystems.

The two corresponding discourses are analyzed in some detail in this section. It is important to note that the opinions of individual water sector representatives vary considerably even within a given actor category. For instance, NGOs generally tend to advocate household-centered and environmentally sustainable strategies, but individual NGO representatives may be strong advocates of large dams.

Transboundary allocation of water quotas vs. joint river development

There is no direct trade-off between *de jure* water-sharing provisions among Nile countries and transboundary cooperation regarding the joint development of the river through coordinated projects. Actors claiming a higher share of Nile water for Ethiopia may or may not advocate joint river development. Still, indirect linkages do exist between the existence of a water-sharing agreement and the pace as well as the specific focus of joint water development. A basin-wide legal and institutional framework decreases planning uncertainties and provides a solid base for further-reach-

ing cooperation. Inflexible legal claims perpetuate the confrontational tone in the transboundary dialog, which in turn decreases the willingness of the co-riparian states to consider proposals for a far-reaching harmonization of national water policies.

Most representatives of the Ethiopian water sector stress the country's entitlement to a higher share of Nile water, and regard a *de jure* water re-allocation in favor of the upstream countries as one of the main goals of the Nile Basin negotiations (Negede Abate 2005). Others de-emphasize the international dimension of Ethiopia's water challenges, arguing that the low level of water development in Ethiopia cannot be attributed to earlier Nile Basin treaties – however unbalanced they may be – that Ethiopia has never considered as binding. Their expectations towards the Nile Basin Initiative therefore focus on the potential benefits related to joint projects strengthening the country's water utilization capacity, rather than on the quota allocation per se.

Three general strategies for the development of the Ethiopian water resources in the context of the Nile Basin be distinguished:

- unilateral: develop the Nile tributaries without downstream consent or support, including projects that substantially affect the downstream water availability
- coordinated/inoffensive: focus on interventions that minimize negative downstream impacts, e.g., prioritize water development on rivers outside the Nile Basin, focus on non-consumptive water uses such as the improvement of rain-fed production or hydropower generation; or on issues on soil conservation and watershed management
- cooperative: engage in a transboundary planning process to identify mutually beneficial options to exploit comparative advantages

For advocates of a unilateral approach, a *de jure* quota re-allocation is desirable to eliminate constraints on the willingness of donors to fund large-scale infrastructure projects. More 'dovish' actors are willing to compromise the claims for maximum quotas if coordinated or cooperative approaches promise higher benefits in the short and long term.

Given the current asymmetrical situation of *de facto* water abstraction, only a minority of Ethiopian water sector actors is willing to consider the high downstream water demands as a constraint to upstream water abstraction. Far-reaching transboundary cooperation scenarios, though recognized as potentially most beneficial, are not prioritized by a majority of Ethiopian water sector actors, partly due to the high uncertainties attached. The emphasis on *de jure* water re-allocation, therefore, remains omnipresent in the Ethiopian discourse on Nile Basin cooperation.

The rift between proponents of a 'legal issues first' position and advocates of extensive transboundary cooperation runs right across the agencies involved in the Nile Basin negotiations. Generally, however, MoWR representatives tend to value joint (infrastructure) projects higher than gains on the legal and institutional front, while representatives of the MoFA typically are among the fiercest defenders of Ethiopia's claim for a higher *de jure* water abstraction quota.

Conservation, irrigation, hydropower, and large dams

This study cannot comprehensively evaluate different domestic water development options with regard to their potential overall costs and benefits (but see ECWP 2005; ERHA 2005; and NBI WRPM 2006 for an assessment of current policies). The way in which the different policy options are evaluated and prioritized by the domestic actor groups themselves, however, is of critical importance for this analysis. The domestic discourses regarding the following issues are of particular relevance to transboundary cooperation:

- The relative utility of enhancing the country's water storage capacity through large-scale infrastructure projects vs. conservation and rehabilitation of watersheds, rainwater harvesting, and small-scale irrigation development;
- The importance of achieving food self-sufficiency (at household or national level) vs. ensuring food security by other means, e.g., through economic diversification and food imports ('virtual water' trade, see Allan 2003);

- The justification of large-scale infrastructure projects for the sake of increased agricultural and hydropower production vs. the right of local communities to self-determination and protection of their livelihoods.

The dilemmas of agricultural water use in Ethiopia are mirrored in earlier policy shifts (Dessalegn Rahmato 1999). Agricultural policies under the Emperor Haile Selassie focused on large-scale irrigation schemes managed by state enterprises. The Socialist Derg regime in the 1970s and 1980s continued to design large dams, but attached greater importance to generating benefits for small-scale users by implementing soil conservation programs and by reclaiming 'underutilized' areas for resettled highland farmers. The current EPRDF regime started off with a clear focus on small-scale approaches targeting household-level food self-sufficiency, but has increasingly re-considered large-scale projects in recent years (MoFED 2006).

The viability of the different strategies can be assessed in various ways depending on the relative priority given to national economic growth or to pro-poor benefits, both in the short and in the long term (see World Bank 2004 a). The policy target of small-scale irrigation expansion is widely supported. However, the implementation of small-scale water development strategies has met with uneven success in the past due to poor design of small-scale dams, the spread of diseases around storage sites, and issues of use rights and user conflicts (Awulachew et al. 2005).

Large-scale infrastructure projects are domestically disputed on account of their potential environmental harm, the need for resettlement of affected communities, the livelihood changes imposed on downstream water users, and the overall cost-efficiency relative to other interventions. Large dams and irrigation schemes are costly, and many suitable sites are located in remote areas. In view of the high costs, modern irrigation schemes are better suited for the (export-oriented) production of cash crops, and can only offer an alternative livelihood option to a minority of the country's large population of small-scale farmers. The policy goal of national and household-level food self-sufficiency (MoWR 1999) thus represents a somewhat misleading justification for large-scale irrigation expansion. For the bulk of rural households, improving rain-fed production and livelihood diversification are more promising strategies. The focus on commercial agriculture in the

most recent national planning document (MoFED 2006) somewhat softens the imperative of household food self-sufficiency.

Strategies to improve watershed management, to foster rainwater harvesting, to institute measures for demand management, and to adopt a strategy for 'virtual water' trade all decrease the urgency to implement large-scale infrastructure projects that would abstract water from Nile tributaries. Though stipulated in the water policy documents, demand management strategies are only secondary priorities in the view of many Ethiopian policy-makers, and tend to be marginalized both in regard to budget allocation and during the implementation of water sector plans.

A rather broad consensus exists with regard to the benefits of exploiting the country's hydro-electric power potential (HEP). There is some disagreement, however, regarding the question of whether large- or small-scale approaches are preferable. The current construction of several large-scale dams indicates that the opposition to HEP development is marginal both at the domestic and basin level. Increasing attention is given to 'multi-purpose' dams that combine HEP production with irrigation water supply and create positive externalities by reducing the risk of floods and the siltation of downstream reservoirs.

Firm proponents of extensive infrastructure development and irrigation expansion are often found among hydraulic engineers (representing the MoWR, consulting firms, universities, NGOs, etc.), agro-investors, and contractors, but also among high-level national planners and donor agencies. Concerns with regard to the impacts on the environment and local livelihoods are expressed domestically by a few environmental groups, NGOs, academics, and advocates of the interests of local communities and minority groups.

From a *two-level game* perspective, the widely supported claim for a re-allocation of water quotas and the broad support for irrigation expansion translate into a rather narrow *win-set*. Accordingly, a new Nile Basin agreement should attribute a higher *de jure* water share to Ethiopia, and also provide support for dam and irrigation projects.

The landscape of actor preferences, however, only yields a fragmentary picture of the domestic constraints to transboundary cooperation. The following section investigates the water sector institutions that determine

how the different actors with their diverging interests interact to formulate and implement water policies.

Institutional aspects

The *win-set* depends on the influence of different actors on the design and implementation of (water) policies, and on the institutional capacity of the water sector to produce comprehensive and integrated policies. This section highlights the institutional setting of the Ethiopian water sector and focuses on the overlapping planning hierarchies, the influence of decentralized stakeholders, inter-sectoral coordination challenges, the specific role of donor agencies, and the participation of civil-society actors.

Overlapping planning processes at different institutions

Water development in Ethiopia is influenced by planning processes at the national, sectoral, sub-national, and – potentially – sub-basin levels. The first two realms are discussed in this section, the latter two below in the 'decentralization' section.

Water sector strategies are rooted in – and feed into – overarching national development strategies. These are most prominently represented by the Poverty Reduction Strategy Papers (PRSP, see MoFED 2002; MoFED 2006; see also DAG 2007) formulated by the MoFED in coordination with domestic stakeholders and international donors. Further strategic guidance is provided by other governmental policy white papers, e.g., the Food Security Strategy (MoFED 2002), internationally promoted development targets, e.g., the UN Millennium Development Goals (see MoFED 2005), or various strategy documents prepared by donor agencies.

The PRSP process is an opportunity to better coordinate sectoral policies and to adopt a holistic perspective on issues such as poverty alleviation or integrated management of water resources. However, the fact that the range of stakeholders effectively participating in the PRSP process is still

rather narrow at present renders the resulting national policies vulnerable to criticism from different sides.

The co-existence of different institutions for planning and target-setting at the national and sectoral levels tends to produce uncertainties and implementation failure. The Universal Access strategy for the provision of water services (MoWR 2006) initiated at the highest political level, for instance, dramatically differs from the targets set earlier in the 15-year Water Resources Development Program (MoWR 2002). Plans for irrigation development projects are subject to frequent shifts emerging from non-transparent top-level decision-making processes. The government's considerable autonomy and flexibility to amend water development targets broadens the *win-set* in the transboundary context, i.e., it enhances the government's ability to sign a far-reaching Nile Basin agreement even against potential domestic opposition. At the same time, however, the high uncertainties related to the non-transparent decision processes may constrain the willingness of important domestic and foreign actors to commit to the development of far-reaching strategies of cooperative river development.

The formulation of the first national water policy documents has been important for stimulating and structuring the national debate on water development. The policy documents themselves, however, provide little guidance on how to evaluate trade-offs between different sectoral water uses. The stipulated priority order for different sub-sectoral water uses (i.e., domestic > livestock > irrigation > HEP > environment, see MoWR 2001) is not specific enough to guide the prioritization of concrete projects.

Given the limited planning capacities at the MoWR, consulting firms played a significant role in the formulation of the national water policy documents. Even though these 'external' policy drafters did consult a broad range of stakeholders, questions must be raised in regard to the ownership and potential biases of the policy process. Several water policy provisions seem to disproportionately reflect the engineering background of the consultants. For instance, the target of reclaiming wetlands for productive uses (MoWR 2001) is bound to face strong resistance from environmental agencies, donors, and local communities that depend on these ecosystems. Likewise, the low profile of rainwater harvesting as a water development option in the policy documents somewhat contrasts with the potential benefits of this

strategy, and notably also with the considerable efforts undertaken by the Ethiopian authorities in this field in recent years (ERHA 2005; Yohannes Aberra 2005).

The selection of large-scale water development projects – both unilaterally and within the Subsidiary Action Program of the NBI – is usually made on the basis of River Basin Master Plan studies. These Master Plans constitute technical rather than politically ratified development plans and have been formulated either prior to or rather independently from the formulation of the national Water Policy and Strategy documents. The availability of funds critically determines the prioritization of projects in the implementation of existing water development plans, and may cause deviations from the Water Sector Development Program. Legal gaps and legal pluralism at different levels (Imeru Tamrat 2005) further undermine the effective and reliable translation of written water policies into water resources development and institutional reforms on the ground.

The uncertainties resulting from the overlapping planning processes and competing strategies diminish the ability of the existing policy documents to serve as an anchor point in the search for basin-wide cooperation arrangements.

Decentralization

The introduction of a federal system in 1995 has set in motion a power devolution process that is still ongoing. Accordingly, mandates and competences of federal, regional, and lower-level (water) authorities are still evolving (Keeley and Scoones 2000; UNESCO 2004; Imeru Tamrat 2005). Formally, the federal government is responsible for coordinating the development of all rivers that cross international or regional state boundaries (GoE 2000), which includes all major rivers in the country. Regional State bureaus for water and agriculture are responsible for the provision of water services to the users, including small-scale infrastructure projects.

The ongoing decentralization process potentially enhances the ability of decentralized authorities to veto or amend centrally designed (infrastructure) projects on their territory, and may thus have an impact on the course of the

transboundary negotiations in the Nile Basin. Recent efforts to formulate water policies at the level of regional states (Imeru Tamrat 2005) create frictions between regional and central planning processes. 'Win-win' infrastructure projects designed through the NBI must, at least informally, be approved by the respective regional and local authorities, or else risk meeting resistance during implementation. In fact, the risk of violent resistance from local water users is one reason for the slow progress of the jointly approved Baro-Akobo dam project in Gambella Regional State.

The planned establishment of River Basin Authorities within Ethiopia to coordinate river development interventions in river (sub-) basins in coordination with federal and regional authorities adds yet another level of water governance. This may further erode the decision-making autonomy of the central water authorities. It is still unclear, however, how soon and how dramatically these entities will take effect (Imeru Tamrat 2005). The limited impact of the already established Awash River Authority (McCormick and Seleshi Bekele 2005) and the slow progress of the pilot project to establish the Abbay Basin Authority illustrate the reluctance of central decision-makers to compromise their decision autonomy (Melaku Abiyou 2005). At least in the foreseeable future, River Basin Authorities are likely to play a mediating and advisory rather than an executive role (Imeru Tamrat 2005).

The potential discrepancies between water policy decisions at national, sectoral, regional state, and (domestic) river basin levels constrain the central water ministry's autonomy to design river development interventions, both unilaterally and as internationally designed 'win-win' projects. The expected benefits of decentralization – i.e., a higher efficiency of water utilization and water services provision due to enhanced stakeholder involvement – need to be traded off against a somewhat diminished bargaining leverage for the *chief negotiator* in the transboundary negotiations.

Inter-ministerial coordination

The coordination between governmental agencies in the extended water sector in Ethiopia is reportedly weak (UNESCO 2004; ECWP 2005), resulting in poor information exchange and inter-sectoral struggles over policy

decisions. For instance, there is some disagreement between the MoWR and the Ministry of Health (MoH) regarding the lead responsibility on issues of sanitation. The fact that the mandate for small-scale irrigation development and rainwater harvesting has been assigned to the MoARD is criticized by several MoWR representatives. Both the EEPCo and the MoWR compete for influence on decisions regarding dam construction sites. The Environmental Protection Agency is considered a rather weak executive organ, and influences water development mainly by issuing environmental legislation and by regulating the environmental impact assessment procedures (Keeley and Scoones 2000, p. 105). Top-down decisions by the highest political organs to assign clear lead responsibilities have partly silenced the inter-ministerial disputes, but substantial inter-ministerial cooperation on the ground is only slowly emerging.

The lack of horizontal coordination potentially hampers the development of effective policies, as trade-offs between different sectoral water uses are neither fully recognized, nor can they effectively be exploited. The mixed success of irrigation and rainwater harvesting projects can be partly attributed to the failure of planning and implementing agencies across different sectors to coordinate their efforts (Dereje Agonafir 2005; Nigussie Haregeweyn et al. 2005). No specific inter-ministerial committee has been established to integrate the water-related policies of different sectoral agencies so far (Imeru Tamrat 2005). The Memorandum of Understanding on water supply, sanitation, and hygiene issues signed between the MoH, the MoWR, and the Ministry of Education is perceived as a useful step, yet not as a fundamental departure from past fragmented approaches. Neither can the coordinating role of the MoFED in national planning processes make up for the lack of direct collaboration among line ministries. This is particularly deplorable as none of the main sectoral ministries (MoARD, MoH, EEPCo, EPA) would see its interests fundamentally threatened by a more integrated approach to water resources planning (see Table 5.2).

The mentioned institutional constraints on the ability of water planners to comprehensively evaluate trade-offs between different sectoral water uses limits the range of transboundary water development options that have a chance of gaining domestic recognition and support. For example, hydropower projects can only be effectively integrated in transboundary river

development frameworks if the MoWR and EEPCo effectively coordinate their policies. The less influence the MoWR has on the strategies regarding various aspects of water management, the more its suitability as *chief negotiator* in the transboundary negotiations must be questioned.

Donor dependency

Ethiopia's dependence on external sources of funding has implications for the prioritization of water sector strategies and projects, and thus potentially also for the country's room for maneuver in the transboundary negotiations. The World Bank's Operational Directive 7.50 rules out support to water development projects entailing substantial negative impacts on downstream states. The criterion of downstream harm is also applied – more or less explicitly – by other donors. These funding constraints narrow Ethiopia's *win-set* by eliminating the option of rapid unilateral infrastructure development.

The World Bank recently reinforced its commitment to financing large dams (World Bank 2004 a), arguing that a highly variable water availability due to a limited storage capacity can critically constrain economic growth, and thus also undermine poverty alleviation efforts. The converging inclination towards large infrastructure projects among Ethiopian planners and donor agencies partly explains the apparent focus on dams and irrigation schemes within the Eastern Nile Subsidiary Action Program of the NBI.

At the same time, conditionalities applied by donors with regard to stakeholder participation, environmental impact assessments, and resettlement, may also delay or impede the progress towards certain infrastructure projects favored by Ethiopian policy-makers. Some Ethiopian observers expect increasing financial support for dam projects from Far-Eastern donors to enhance the country's capacity to abstract river water in the future, and thus to strengthen Ethiopia's bargaining position on the Nile (Waterbury 2002; Mason 2004). However, Far-Eastern money lenders and investors also usually have ties with other Nile Basin states and are likely to take the hydrological connectedness of their different partners into consideration.

As donors are linked to the government both through the domestic policy processes and through the NBI framework, they are in a good position to

highlight trade-offs between different domestic and international water development strategies. Current efforts to enhance the coordination between donor agencies in Ethiopia, i.e., through the Development Assistance Group (DAG), are expected to have a positive effect on the integration and coherence of different sectoral policies. Donor networks act as one of the few water policy think-tanks to complement the governmental water policy process. In their role as 'information brokers', donor agencies contribute to reducing uncertainties and support the search for sustainable, domestically agreeable, and internationally compatible strategies.

In sum, donor agencies exercise influence on the Ethiopian *win-set* by 1) selectively supporting certain projects, 2) strengthening the national planning and project implementation capacity, 3) pressing for more stakeholder participation and environmental protection, and 4) leveling information asymmetries. Donors are likely to shift the national *win-set* towards internationally compatible strategies, i.e., 'win-win' projects and less consumptive water uses, both by not supporting 'hawkish' strategies and by supporting initiatives for transboundary policy coordination and joint planning.

Participation of non-governmental actors

The extent of stakeholder participation has somewhat expanded with the adoption of *Integrated Water Resources Management* (IWRM) principles. However, the overall patterns of stakeholders involvement remain rather fragmentary and vary across different phases of the planning process. While different stakeholders were consulted in the formulation of the water policy documents, important decisions regarding national development targets and the prioritization of projects are usually made in a top-down manner.

The lack of stakeholder participation is exacerbated by weak information flows between and within different actor categories. The government exploits information asymmetries in order to bypass the potential opposition of domestic actors in the design of both domestic and transboundary projects. Research institutions, NGOs, and donor agencies as domestic information brokers have a somewhat balancing effect in this regard.

The limited exploitation of non-governmental expertise potentially constrains the government's ability to design and implement effective and broadly accepted water development strategies. Incomplete knowledge regarding the overall costs and benefits of different policy options, e.g., small-scale irrigation and rainwater harvesting vs. large-scale infrastructure projects (see Awulachew et al. 2005), yields an unclear picture of the relative utility of different basin-wide cooperation scenarios. An increased involvement of NGOs, research organizations and local water user groups would not only strengthen the effectiveness of water management approaches at the domestic level, but also enhance the government's ability to evaluate trade-offs between different water policy options at the basin level more comprehensively.

5.5 Synthesis and conclusions

The inter-relatedness of *de jure* quota allocation issues and joint water development projects makes the *two-level game* in the Nile Basin particularly complex. Policy preferences diverge along several dimensions, rendering the delineation of a specific *win-set* very difficult. This is all the more true as the range of joint river development scenarios is not *a priori* known, but is currently explored by the basin states themselves.

The Ethiopian *win-set* in the context of the Nile Basin negotiations is constrained both by challenges to the government's planning autonomy, and by the limited capacity of water policy makers at different levels to design and evaluate innovative domestic and cooperative water management strategies. Obviously, these are two fundamentally different mechanisms influencing the *win-set* with different implications on the potential outcome of the transboundary negotiations.

A high degree of decision autonomy on the part of the government generally has a broadening effect on the *win-set*. A powerful government, or *chief negotiator*, can more easily amend national policies for the sake of basin-wide cooperation, and can more easily ignore critical voices among

the domestic stakeholders. Policy decisions by authoritarian governments suffer from a lack of legitimacy, a potential bias towards the interests of well-connected actors, and high levels of uncertainty regarding implementation success. The risk of sudden policy shifts and implementation failure tends to decrease the willingness among both domestic actors and foreign negotiators to commit to any far-reaching river development plans in a cooperative framework. Furthermore, a transboundary agreement reached between domestically unchallenged governments may not necessarily result in developments on the ground that are desirable for the majority of water users. This scenario is likely if the negotiating governments mainly advocate the interests of a few privileged and politically influential domestic actors, e.g., agro-investors, and underemphasize the costs in terms of ecological damage, negative effects on people's livelihoods in project areas, and a waste of public funds.

In contrast, an enhanced planning capacity as a result of effective inter-sectoral policy integration and stakeholder participation can broaden the *win-set* towards river development options – both domestic and basin-wide – that are more sustainable, mutually beneficial, and supported by a maximum of domestic stakeholders. An integrated water management approach considering irrigation development, improvements of rain-fed agriculture, and livelihood diversification, obviously lends itself more directly to the challenge of harmonizing national water policies than domestic approaches solely focusing on irrigation expansion.

Ethiopian proponents of cooperative approaches in the Nile Basin are fighting an uphill battle in an environment of overlapping planning levels, lack of inter-sectoral coordination, unclear responsibilities at different administrative levels, and limited research capacities. The NBI's Share Vision Program attempts to strengthen the planning capacity and stakeholder coordination at the level of basin states, but struggles to expand the integrated perspective regarding the development of the Nile Basin beyond a small core of water sector actors. The persistent inability of the water sector as a whole to comprehensively evaluate the various water development options is likely to shift the Ethiopian *win-set* towards the MoWR's core responsibilities, i.e., the control of the water flow through large-scale infrastructure projects.

The discourses on the *de jure* water quota re-allocation, domestic water policy priorities, and the potential benefits from different transboundary cooperation scenarios involve different sets of actors. Only few actors are substantially involved in all these discourses, i.e., mainly representatives of the water ministry and – potentially – international donors involved in both national policy processes and the NBI. It is important to narrow the institutional and discursive gaps between domestic and international water policy processes in order to proceed towards a basin-wide harmonization of water policy. This challenge is recognized by the NBI and addressed in the Shared Vision Program.

Given the mentioned constraints to developing integrated and internationally compatible water policies, highlighting the legal issues of a *de jure* quota re-allocation may simply be the least costly strategy for the political leaders in terms of convincing and aligning domestic actors. Vague statements in favor of transboundary cooperation may be generally supported by many domestic stakeholders, but are not a reliable indicator for the actual willingness and ability of the Ethiopian *chief negotiator* to commit to substantial policy reforms in order to accommodate downstream interests.

Currently, Ethiopia benefits from the implementation of several infrastructure projects jointly approved by all Eastern Nile states as well as the capacity-building and research components of the NBI without compromising its claim for a higher *de jure* share of the river. The country's reluctance to engage in further-reaching transboundary cooperation might not, however, render maximum benefits for the Ethiopian people in the long run. While the need to increase Ethiopia's water storage capacity is hardly questioned, the potential benefits of improving non-consumptive water uses, such as water supply and sanitation, watershed management, rainwater harvesting, or hydropower development are substantial. The transboundary cooperation process offers a – presently under-used – potential to mobilize funds and expertise from other Nile countries and beyond in order to tap these benefits more efficiently.

As this study demonstrates, both the emphasis on legal claims and the constraints on designing strategies of far-reaching cooperative river development can be explained, to some extent, by the constellation of domestic actors and their policy preferences, as well as the institutional setting in

the water sector. Giving greater emphasis to the domestic side of the transboundary river conflict and cooperation both in research and practice may yield valuable insights to better understand and manage the complex task of transboundary river management.

6 Water policy networks in Egypt and Ethiopia

Abstract

This chapter presents data illustrating the networked structure of the water sector in Egypt and Ethiopia. The method of Social Network Analysis is applied to quantify network characteristics. Linkages between the network structures and the water policy design and implementation processes are discussed. Governmental agencies occupy the most central network positions in both countries. Inter-sectoral cooperation is weak, impeding effective policy integration. The limited connectedness to non-state actors prevents the central policy-makers from tapping all available expertise and implementation capacities, and decreases accountability within the policy process. International donor agencies play an important role by connecting different types of actors. The higher prominence of NGOs and decentralized water authorities in the Ethiopian water sector indicates a comparably higher potential for pluralistic policy-making. In the context of Nile Basin cooperation, the fragmented national water policy networks and the limited ability to design integrated water development strategies favors cooperative projects aligned with the water ministries' core responsibilities, i.e., large-scale infrastructure development. Social Network Analysis is found to be a useful tool to highlight cooperation patterns in the water sector, but its utility for explaining policy processes without supplementary qualitative information is limited.

6.1 Introduction

Water management is an increasingly complex challenge in view of increasing population pressure, pollution problems, and projected climate change. Technical solutions often lag behind the evolving socioeconomic demands for sufficient water of good quality and at an affordable cost. Innovative societal arrangements to strengthen efficiency of water use must be developed, and the importance of the corresponding political processes is increasingly recognized. The need for 'policy harmonization' in the context of transboundary cooperation in shared river basins further complicates that task of water managers.

The framework of *Integrated Water Resources Management* highlights the need for demand and quality management, the importance of river basins as the appropriate planning unit, and the benefits of stakeholder participation for higher legitimacy, efficiency, and sustainability performance (GWP 2007). Institutions and planning processes in the water sector reflect the extent to which a country has adopted these paradigms, and potentially determine its success in formulating and implementing effective water policies.

This chapter applies *Social Network Analysis* (SNA) as a tool for investigating water policy processes in Egypt and Ethiopia. The main goal is to present empirical network data as a means to illustrate and discuss the institutional capacity of the two countries to address water management challenges. The study addresses the question of how the structure of both water sectors relates to the current priorities and water policy developments in Egypt and Ethiopia, with a special focus on the policies that are relevant for the issue of transboundary cooperation in the Nile Basin. A subordinate objective is to explore the utility of *Social Network Analysis* as a tool to analyze water policy processes in the particular context of developing countries.

The countries of the Eastern Nile Basin are challenged by limited and variable availability of freshwater in relation to their current and projected future demands. Ethiopia urgently needs to make better use of its water resources to foster economic development and poverty alleviation. Egypt's almost total dependence on the Nile, however, renders upstream river water abstraction a disputed issue. In 1999, the Nile Basin states engaged in a joint

effort to "achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin resources" (NBI 2007). The Nile Basin Initiative (NBI) hosts negotiations on a new legal and insitutional framework agreement, and supports cooperative water development projects (e.g., Amer et al. 2005).

Cooperative strategies in the Nile Basin can draw on the following approaches: 1) supply projects to increase the total water availability, 2) demand management to decrease the pressure on the river, and 3) exploitation of comparative advantages, and enhanced regional (economic) integration. These strategies relate in different ways to the domestic policies and water sector institutions, and have varying underpinnings in terms of costs and benefits for domestic stakeholders. The analysis of domestic policy networks is expected to yield insights concerning domestic policy processes that also determine the outcome of the transboundary negotiations. Differences in the policy processes of the two countries (e.g., the matured and highly centralized water sector in Egypt vs. the federal and somewhat unsettled structure of the Ethiopian water sector), could be expected to result in different ways of dealing with water policy challenges.

To the author's knowledge, this is the first instance of a quantitative network analysis methodology being applied to water sector networks in non-Western countries, and in a comparative setting. Previous water policy network studies mainly focus on European countries (Bressers et al. 1995; but see also Menahem 1998). These studies generally find a declining prominence of traditional professional groups (i.e., engineers) and a rise of environmental actors and businesslike governance structures. Substantial differences are observed across countries in terms of private sector participation and decentralization. Budgetary pressures on governments and political advocacy by environmental pressure groups are identified as important drivers of network change.

This chapter first outlines the conceptual and methodological framework applied. Then, network data for the two case studies are presented. The discussion section compares the results across the case studies and discusses implications with regard to national and transboundary policy processes. The chapter concludes with a critical assessment of *Social Network Analysis* as an analytical tool to illustrate water policy processes.

6.2 Conceptual framework

Network approaches to policy analysis assume that the way policy actors are linked with each other has an effect on the design and the outcome of policies. Governments are not considered as unitary decision-makers, but as internally divided and as interacting with a range of actors through relatively stable, nonhierarchical linkages.

Definitions of policy networks vary greatly (e.g., Dowding 1995; Kenis and Raab 2003). Some scholars refer to networks as a specific form of government, while others assert that networked interactions are an important feature of any type of governance system (see Börzel 1998, for a distinction). This study is inclined to the latter perspective.

Policy networks can be conceptualized as a dependent or as an independent variable. Studies of the latter type address the important question of whether and how network structures affect policies and policy outcomes. The contributions of Laumann and Knoke (1987), Marin and Mayntz (1991), Rhodes and Marsh (1992), Knoke et al. (1996), and Marsh (1998) offer particularly illustrative insights into the appearance and performance of networks in different countries and policy fields.

The effects of policy networks are often described in qualitative terms. For instance, Klijn (2003) asserts that "networks facilitate interaction, decision-making, cooperation and learning, since they provide the resources to support these activities, such as recognizable interaction patterns, common rules and organizational forms and sometimes even a common language". Marsh and Rhodes (1992) assert that small and exclusive networks (*policy communities*, in contrast to broad *issue networks*) favor continuity of both policies and the network structures themselves. The same authors assert that networks pursue the interests of their most dominant members. In small networks of strongly linked actors, effective social control often fosters cooperation among the members rather than competition (Coleman 1988). On the other hand, broad networks and 'weak ties' (indirect linkages between otherwise unconnected actor groups) allow central actors to tap a greater range of dispersed expertise and strengthen stakeholder participation, which may enhance the comprehensiveness of policy outputs (Burt 2000).

Some authors have established conceptual linkages between structural network types and specific governance systems – e.g., *neo-corporatism, pluralism,* and *clientelism* (Schneider 1992), or *elitism, pluralism*, and *marxism* (Daugbjerg and Marsh 1998). These theory-based network categorizations increase the explanatory value of the otherwise rather inconclusive typologies of networks along different dimensions, e.g., the number and types of actors, network functions, structures, institutionalization, rules of conduct, power relations, and actors' strategies (see Van Waarden 1992).

Still, the insights regarding the relationships between networks characteristics and policy outcomes remain rather unspecific (e.g., Agranoff 2003; Daugbjerg and Marsh 1998). The reasons for the persistent lack of a comprehensive network theory (Kenis and Raab 2003) are partly to be found in the lack of comparative multi-case studies (Marsh 1998), and in the conceptual difficulty to single out network effects given the complexity of policy processes influenced by macro- (i.e., political system), meso- (patterns of interests group intermediation), and micro-level (actions and decisions) variables (Daugbjerg and Marsh 1998). The paucity of comprehensive network theories contrasts with the wealth of algorithms proposed to quantify and depict network characteristics such as density, actor centrality, or subgroup connectivity (e.g., Hanneman and Riddle 2005; Scott 1991; Wasserman and Faust 1999).

This study applies network analysis as an analytical tool, rather than aiming to engage in the theoretical debate on the role of networks in policy processes. The theoretical insights regarding the relationship between network characteristics and policy outcomes were found to be of limited utility. The network results are interpreted mainly in relation to qualitative, case-specific insights regarding the respective water policy processes. A simple model linking network characteristics and water policy outputs is applied. According to this model, policy outputs depend on the relative influence of different actors and their specific policy preferences. The influence of an actor depends on both non-network factors (e.g., mandate, expertise, and control over resources) and his connectedness through the network. The study assesses the influence of network actors by means of 'reputational' and 'positional' approaches (see Laumann and Knoke 1987). Actors are deemed influential, in a 'positional' sense, if they effectively control the flow of relevant

information, link other actors in planning processes, and coordinate their activities during implementation. Two network characteristics presumably increase the effectiveness of policy-making processes: 1) tight cooperation between representatives of different sectors and 2) the inclusion of a wide range of expertise and interest groups.

6.3 Methodology

This section outlines the procedures of network delimitation, data collection, transformation, and analysis, and critically assesses the quality and robustness of the collected relational data.

Organizational actors – rather than individuals – are considered as the relevant nodes in the network. The identification of network actors followed an iterative process relying on the judgment of several independent water sector experts in each country. First, an open-ended list of organizations involved in water policy making was compiled. The actors were prioritized according to the criteria 'importance in the water policy-making process' and 'representation of major actor categories' (i.e., central government agencies, regional states, research organizations, private sector representatives, consulting firms, civil society representatives, and donor agencies). The number of nodes in each network was limited to around 40 for practical reasons. Major departments of both water ministries were included as separate nodes. Regional states were only included in the case of federal Ethiopia, and were arbitrarily selected from the five regional states with a share of the Nile Basin. The following actor categories were not included, mainly due to the difficulty of accessing them for interviews: political leaders at the highest level, large-scale agro-investors (with the exception of a flower farmers' association in Ethiopia), foreign contractors, and financial backers from the Far East.

For most actor organizations, the relational data were collected in an interview with the head of the department mostly dealing with water issues.

Importantly, however, the respondents were asked to specify the relevant network ties of their *entire* organization. The water ministry department were asked to specify linkages of their department only.

Six types of linkages were assessed through a questionnaire (see Table 6.1). Interviewees were asked to specify the existence or absence of a specific type of relationship to each other actor in the network (see questionnaires in the Appendix). The interviewees were asked to mention only linkages with relevance to issues of water policy planning and implementation.

The *influence reputation* parameter is a 'choice' relationship, while all other relation types indicate an actual interaction within a dyad (pair of actors). The frequency of *meetings* was assessed, yielding 'valued' relationship

Table 6.1 Linkage types, data types, and transformation of data (Eg: Egypt, Eth: Ethiopia).

Linkage	Country	Description	Data type	Data transformation
Influence reputation - overall - in planning - in implementation	 Eg Eth Eth	Which are the ten (approx.) most influential actors with regard to water policy making?	Binary, directed	-
Official affiliations	Eg	Institutionalized linkages, e.g. through bilateral treaties (y/n)	Binary	Symmetrization (select minimum value)
Joint activities - in planning - in implementation	 Eth Eth	Joint projects, jointly organized events (y/n)	Binary	Symmetrization (select minimum value)
Joint meetings	Both	Joint meetings on water policy issues (frequency)	Valued	Categorization, elimination of ambiguous responses, symmetrization (average)
Information flow - sending - receiving	 Both Both	Transfer of factual information relevant to policy formulation or implementation (y/n)	Binary, directed	Filter out non-matching answers
Effective cooperation - in planning - in implementation	 Both Both	Cooperation that in the opinion of the respondent has an effect on policies or policy outcomes (y/n)	Binary	Symmetrization (select minimum value)

data. The data on *information flows* are 'directed', and assess the existence of an information transfer from and to another actor. The *effective cooperation in planning* linkages are considered particularly significant in that they – by definition – relate to actual impacts of a connection on policy outcomes, and are used for graphical depictions and subgroup analyses presented below.

The relational data were collected in the framework of two individual MSc/MA studies between March and July 2005 (Egypt) and March and June 2006 (Ethiopia). The questionnaires were slightly modified in the Ethiopian case study in order to refine the explanatory value of the results. Accordingly, the *influence reputation* was assessed separately for planning and implementation processes, and *joint activities* were assessed instead of *official affiliations*.

The following transformations of the raw data matrices were performed (see also Table 6.1):

- Aggregation of all water ministry departments into one single actor in each case study by adding and dichotomizing (for every network actor) the relations to and from each department. This transformation allows for a direct comparison of the network behavior of the water ministries with other ministerial actors, but is valid only under the assumption of strong intra-ministerial connectedness. Ties of Actor A with Department X and Actor B with Department Y are reproduced as an indirect linkage between Actors A and B through the unitary water ministry in the resulting network.
- Symmetrization of binary n×n data matrices (and retaining the minimum value) to filter out non-matching answers regarding the existence of a relationship. The absence of a tie in the resulting networks thus either indicates the absence of a relationship in reality or disagreement in the respondents' judgment. The remaining relations are confirmed by both actors and can therefore be considered as particularly significant.
- Subtraction of the two matrices with directed *information flow* relations (*sending* matrix and transposed *receiving* matrix) to filter out non-matching answers. The resulting matrix is not symmetric, but specifies directed *information flow* relations confirmed by both the sending and receiving actor.
- Categorization of *meetings* data; assigning values of 0, 1, 2, and 3 for no, half-yearly, monthly, and bi-weekly or more frequent meetings; filtering out dyads in which only one actor reported joint meetings;

and averaging the values in the remaining dyads. The resulting matrixes thus still contain valued data.

The following sections presents three types of results: 1) *density* and *centralization* indices for the entire networks, 2) *centrality* indices for individual actors and 3) *density* values for actor categories and cohesive subgroups (see, e.g., Hanneman and Riddle 2005; Scott 1991; Wasserman and Faust 1999).

Density values indicate the ratio between the number of existing ties and the number of maximum possible linkages in any (sub-) network. *Centralization* quantifies the difference between the *centrality* of the most central actor and all other actors, and is thus a measure of the structural heterogeneity of the network.

Centrality indicators quantify an actor's connectedness in the network, but vary in terms of the weight attributed to direct and indirect linkages. The *degree centrality* indicates the number of an actor's direct linkages. The *betweenness centrality* of a node X indicates the fraction of all dyads that are indirectly connected with the shortest connection running through actor X.

Cohesive subgroups are network sections with particularly frequent internal linkages. This study applies the following algorithms – under varying parameters – to identify subgroups: *k-plex* (identifies groups in which every member is connected to all but k other members), *lambda-set* (identifies stable subgroups that are particularly resistant to the 'removal' of a number of ties), and *faction* (identifies subgroups with high average tie *densities*).

Densities of linkages within individual actor categories or cohesive subgroups are calculated separately. Internal *densities* of actor categories with three or fewer actors are not shown with one exception (multilateral donors in Egypt) due to their high sensitivity to selection bias and effects of the performed data transformations. The water ministries were not assigned to any cohesive subgroup or category in order to allow for a direct comparison between of sub-network *density* values. The *densities* of the entire networks (Table 6.2) were calculated including the water ministries, however, thus setting a somewhat higher reference point for the sub-network *densities* (Table 6.6).

The relational data were analyzed with UCINET software (Borgatti et al. 2002). The network graphs were produced with Visone software (Brandes and Wagner 2004). Note that graphical network descriptions can be misleading (Brandes et al. 1999; McGrath et al. 1996). It is important to note that the presented graphs do not show the overall connectedness of the water sectors, but only the *effective cooperation in planning* ties confirmed by both respondents in each dyad.

Quality control and robustness of data

The actor selection can be considered appropriate, as very few actors mentioned important ties to additional actors when explicitly asked during the interview (only the selection of bilateral donors in Ethiopia was sometimes questioned). Since the highest-level political leaders are not included, however, the presented networks better represent the linkages characterizing the design and implementation phases of water policy making, rather than the formal policy adoption step.

Network data were collected from all selected network actors, yielding a complete data set. The reliability of the actors' responses was evaluated by calculating the ratio of non-matching answers. The corresponding figures seem high at 15–25%, but resemble values from other network studies (see Mardsen 1990). The discrepancies can be explained, inter alia, by 1) the considerable margin for subjective judgment in the specification of the relationships (e.g., 'effective' cooperation, or 'relevant' information), 2) the tendency of peripheral actors to overemphasize their connectedness, and of highly linked actors to omit their less important ties, and 3) strategic responses of actors trying to create a particular impression of their role in the network. The data shown in the following section, therefore, represent a somewhat subjectively painted picture of the network connectedness. This does not *per se* mean that the resulting network descriptions are not relevant for the analysis of policy processes, but must be kept in mind when interpreting the network data. Note that the *influence reputation* question does not differentiate between different channels of influence (e.g., involvement in the policy formulation processes, formal veto power, regulative function, or

(non-) compliance with policies), and that the respondents might thus have interpreted the *influence reputation* question differently.

6.4 Results

This chapter first compares the network indices for *density* and *centralization* across the case studies. Then, the Egyptian and Ethiopian networks are presented separately in some detail. Actor categories are grouped in Figure 6.2. Abbreviations of actors' names are explained in Table 6.3.

Network comparison

Table 6.2 shows the overall *density* and *centralization* values (based on *degree centrality*) of the Egyptian and Ethiopian water policy networks.

The *meetings* network is slightly more dense in Ethiopia, but much more centralized around the water ministry in Egypt. The *information flow* networks are similarly dense in both cases, but slightly more centralized in Egypt. The *effective cooperation* networks are somewhat denser and

Table 6.2 Network density and centralization

	Density		Centralization	
	Egypt	**Ethiopia**	**Egypt**	**Ethiopia**
Official affiliation	0.18	-	0.77	-
Joint activities:				
Planning		0.14		0.58
Implementation		0.11		0.52
Meetings	0.44	0.56	2.13	0.69
Information exchange	0.15	0.16	In: 0.57 Out: 0.71	In: 0.45 Out: 0.52
Effective cooperation:				
Planning	0.12	0.08	0.77	0.55
Implementation	0.11	0.08	0.66	0.51

more centralized around the water ministry in Egypt. The higher network *density* regarding *effective cooperation* in Egypt can be explained at least partly by the fact that the network relations have settled over decades, while the Ethiopian water sector has experienced frequent institutional changes. The higher *meetings* and *information exchange density* in Ethiopia points at the activities generated by the recently initiated water sector programs, particularly in the water supply and sanitation sub-sector (e.g., through the EU Water Initiative). The federal system in Ethiopia and the relatively higher influence of non-state actors may account for the comparably lower *centralization* values.

The Egyptian water sector

Egypt's water demand for irrigation, industries, and domestic consumption already exceeds the supply of the Nile. The current water policy (MWRI 2005) aims to develop new supplies (e.g., through deep groundwater abstraction, joint 'water conservation' projects in upstream countries, or seawater desalination) and to strengthen measures for demand management (e.g., through re-use, improved irrigation efficiency, cultivation of less water-intensive crops, or import of food as 'virtual water') as well as water quality control. Non-technological demand management policies (e.g., the shift in cropping patterns towards less water-intensive crops, legal and economic regulatory instruments) seem particularly difficult to implement. Environmental provisions are not commonly enforced with priority. The diversion of water to new large-scale irrigation schemes is criticized for jeopardizing 'pro-poor' development targets. The weakness of democratic institutions somewhat restricts the government's accountability concerning water policy decisions.

The political system is highly centralized around a powerful central government. The Egyptian water policy network has evolved under conditions of relative political stability (see JACOBS 2005; MWRI and USAID 2002; and MWRI and World Bank 2003, for more detailed accounts on the Egyptian water sector). National economic policies – and particularly land reclamation targets – have a dominant effect on the design of national

water management strategies. However, the shifts from supply to demand management and the current institutional reform are important endogenous drivers of policy change pursued by the water ministry.

The Ministry of Water Resources and Irrigation (MWRI) is responsible for water resources development and allocation between different sectors, as well as for the overall water quality control. The Ministry of Housing, Utilities and New Communities (MHUNC, now renamed to Ministry of Housing and Urban Development) is in charge of drinking water supply and sanitation (WSS). In an attempt to foster 'businesslike' water management strategies, both the MWRI and the MHUNC have transferred part of their responsibilities to newly established holding companies.

The Egyptian water policy attributes allocation priority to domestic and industrial water uses. This renders the agricultural sector particularly susceptible to changes in the overall water availability. The Ministry of Agriculture and Land Reclamation (MoALR) regulates agricultural production in both the 'old' lands and in modern irrigation schemes on newly reclaimed areas. The Ministry of Health and Population (MoHP) and the industrial sector represented by the Ministry of Trade and Industry (MoTI) have diverging interests regarding the enforcement of stringent legislation for pollution control. Environmental interests are represented by the Ministry of State for Environmental Affairs (MoSEA, incorporating the Egyptian Environmental Affairs Agency EEAA).

Different water consumers and polluters, e.g., private and state-owned industries, agricultural investors, and small-scale water users, have unequal access to the policy process, and often rely on informal linkages. Civil society groups are rather weak in terms of popular support and access to key political resources. Dissatisfaction with water policies or water sector performance is sometimes raised in parliament or expressed in public protests. Stakeholder platforms such as the Egyptian Water Partnership are a relatively new network element.

Network results

This section discusses the *influence reputation* (Tables 6.3 and 6.4) and *centrality* values (Figure 6.2) as indicators of the relative influence of actors in the water sector. Figure 6.1 illustrates the *effective cooperation in planning* network, under specification of the MWRI departments.

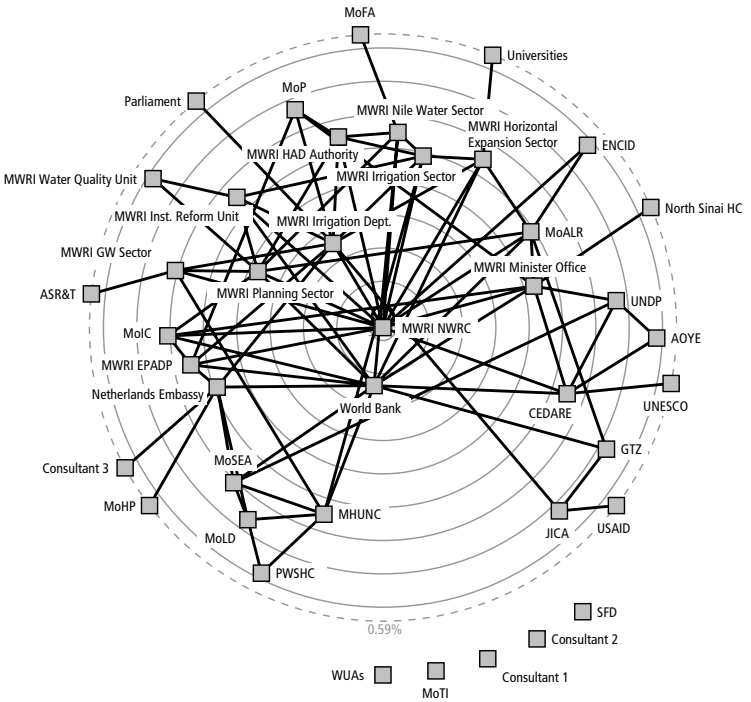

Figure 6.1: Effective cooperation in planning network (Egypt)

The distance to the center of the graph increases with decreasing centrality of an actor. The exact length of linkages between actor pairs has no significance. Isolates (bottom right) have no confirmed ties.

Not surprisingly, the water ministry emerges as the most influential actor in the Egyptian water sector. The National Water Research Center (affiliated to the MWRI), the Minister's Office, the Planning Sector, and the large Irrigation Department occupy central positions in the *effective cooperation in planning* network and receive high *influence reputation* scores. The limited external connectedness and the low *influence reputation* of the MWRI's

Water Quality Unit is illustrative of the difficulties of establishing effective institutional capacity in a relatively new policy domain.

Besides the MWRI, the ministries in charge of agriculture (MoALR) and domestic water supply (MHUNC) receive the highest *influence reputation* scores. Their *centrality* values are also high, but range in the same level of magnitude as the most prominent non-state actors.

The fact that the MoALR has *effective cooperation* ties to different MWRI departments, but not to other ministries, indicates that the issue of irrigation development – and inter-sectoral water allocation in general – is hardly subject to a fully integrated inter-ministerial planning process. Rather, sectoral demands are compiled and balanced by the MWRI in the light of national development targets.

The Potable Water and Sanitation Holding Company (PWSHC) receives relatively numerous *influence reputation* votes and also occupies a central position in the implementation network. In contrast, the holding companies in charge of administering the newly reclaimed agricultural lands (represented by the North Sinai HC) do not appear to have developed a strong independent profile.

The high *centrality* of the environmental ministry is interesting, as no *effective cooperation* relations to any MWRI departments are reported (only *meeting* relations). The MoSEA also ranges below the MoALR and the MHUNC in the *influence reputation* score. This could mean two things. Either the environmental sector cannot (yet) sufficiently exploit its frequent linkages to effectively influence water policies, or the majority of respondents fail to see the considerable influence (i.e., in terms of issuing environmental legislation) of this relatively new actor. Both explanations probably apply to some extent.

The *centrality* of the ministry in charge of industrial development (MoTI) is low, even compared to its moderate *influence reputation* score. Industries seem to gain their influence not from participating in water policy making, but rather from their ability to resist the enforcement of stringent water quality standards. The isolated position of the MoTI and the peripheral position of the Ministry of Health and Population are indicative of the laborious inter-ministerial process to reform the legislation regarding waste water quality.

The Ministry of Planning (MoP, now integrated in the Ministry of Economic Development) receives relatively few *influence reputation* votes. This corresponds with qualitative statements to the effect that the MoP compiles sectoral policies rather than integrating them and trading them off against each other, much in contrast to the MoFED in Ethiopia (see below).

Table 6.3: *Influence reputation*. In-degree values (d_{in}) indicate the number of respondents considering a given actor as influential.

Egypt		Rank	d_{in}
MWRI	Ministry of Water Resources and Irrigation	**1**	*30*
MoALR	Ministry of Agriculture and Land Reclamation	**2**	*27*
MHUNC	Ministry of Housing, Utilities and New Communities	**3**	*24*
NWRC	National Water Research Center (affiliated to MWRI)	**3**	*24*
Parliament		**5**	*17*
PWSHC	Potable Water & Sanitation Holding Company	**6**	*16*
World Bank		**6**	*16*
MoSEA / EEAA	Ministry of State for Environmental Affairs / Egyptian Environmental Affairs Agency	**8**	*15*
USAID	US Development Cooperation Agency	**9**	*13*
Netherlands Embassy	Netherlands Development Cooperation Division	**10**	*12*
MoHP	Ministry of Health and Population	**11**	*10*
WUAs	Water User Associations	**12**	*9*
MoP	Ministry of Planning	**13**	*7*
MoLD	Ministry of Local Development	**13**	*7*
MoTI	Ministry of Trade & Industry	**15**	*6*
ENCID	Egyptian National Committee on Irrigation and Drainage	**15**	*6*
CEDARE	Center for Environment and Development for the Arab Region and Europe	**17**	*5*
MoIC	Ministry of International Cooperation	**18**	*4*

Ethiopia		Planning		Impl.	
		Rank	d_{in}	Rank	d_{in}
MoWR	Ministry of Water Resources	**1**	*32*	**1**	*28*
MoARD	Ministry of Agriculture and Rural Development	**2**	*22*	**4**	*21*
MoFED	Ministry of Finance and Economic Development	**3**	*20*	**14**	*11*
EPA	Environmental Protection Authority	**4**	*19*	**10**	*15*
WB	World Bank	**5**	*18*	**4**	*21*
MoH	Ministry of Health	**6**	*17*	**10**	*15*
Oromia	Regional State	**7**	*16*	**2**	*26*
EEPCO	Ethiopian Electric Power Corporation	**8**	*15*	**6**	*18*
UNICEF	United Nations Children's Fund	**8**	*15*	**8**	*17*
Amhara	Regional State	**10**	*14*	**3**	*23*
AfDB	African Development Bank	**11**	*13*	**10**	*15*
Gambella	Regional State	**12**	*10*	**6**	*18*
Parl.	Parliament	**12**	10	**23**	*4*
UNDP	United Nations Development Programme	**12**	10	**16**	*8*
CRDA	Christian Relief & Development Association	**15**	*8*	**18**	*6*
EU	European Union	**15**	*8*	**18**	*6*
WaterAid	International NGO	**15**	*8*	**13**	*12*
IWMI	International Water Management Institute	**18**	*7*	**32**	*0*

Egypt, cont.

		Rank	d_{in}
ASR&T	Academy of Scientific Research and Technology	**18**	*4*
UNDP	United Nations Development Programme	**18**	*4*
SFD	Social Fund for Development	**21**	*3*
Universities	Faculties of Engineering	**21**	*3*
JICA	Japanese Development Cooperation Agency	**21**	*3*
MoFA	Ministry of Foreign Affairs	**24**	*2*
GTZ	German Development Cooperation Agency	**24**	*2*
North Sinai HC	North Sinai Holding Company	**26**	*1*
Consultant 2	Anonymous	**26**	*1*
Consultant 3	Anonymous	**26**	*1*
Consultant 1	Anonymous	**29**	*0*
AOYE	Arab Office for Youth and Environment (national NGO)	**29**	*0*
UNESCO	United Nations Educational, Scientific, and Cultural Organization	**29**	*0*

Ethiopia, cont.

		Planning		Impl.	
		Rank	d_{in}	Rank	d_{in}
MoFA	Ministry of Foreign Affairs	**19**	*6*	**26**	*1*
WWDSE	Water Works Design & Supervision Enterprise	**19**	*6*	**8**	*17*
ERHA	Ethiopian Rainwater Harvesting Association	**21**	*4*	**26**	*1*
Metafaria	Consulting firm	**21**	*4*	**18**	*6*
AAU Eng.	Addis Ababa University, Faculty of Civil Engineering	**23**	*3*	**24**	*2*
AAU Soc.	Addis Ababa University, College of Social Sciences	**24**	*2*	**26**	*1*
CIDA	Canadian Development Cooperation Agency	**24**	*2*	**26**	*1*
EHPEA	Ethiopian Horticultural Producers and Exporters Association	**24**	*2*	**22**	*5*
JICA	Japanese Development Cooperation Agency	**24**	*2*	**15**	*10*
Water Action	Domestic NGO (founded by WaterAid)	**24**	*2*	**16**	*8*
OCDC	Orthodox Church Development Cooperation	**29**	*1*	**18**	*6*
USAID	US Development Cooperation Agency	**29**	*1*	**24**	*2*
CC	Chamber of Commerce	**31**	*0*	**32**	*0*
EEA	Ethiopian Economics Association	**31**	*0*	**26**	*1*
GTZ	German Development Cooperation Agency	**31**	*0*	**26**	*1*

The most important donor agencies according to the *influence reputation* measures are the World Bank, USAID, and the Netherlands Development Cooperation Division (Dutch Embassy). USAID, however, has recently phased out its water policy support project, which explains its somewhat lower *centrality* values. Donors are connected to the MWRI – in an *effective cooperation* sense – both through the departments in charge of water policy formulation (Minister's Office, Planning Department), as well as through operational departments and water projects. The highly central role of several donor agencies in the *information exchange* network is noteworthy, and is likely to contribute to the donors' considerable influence in addition to their expertise and financial resources.

Table 6.4: *Influence reputation* (in-degrees) of departments of each water ministry

Egypt

MWRI Departments		Rank	d_{in}
Planning	Planning Sector	**1**	*28*
Irrigation Department		**2**	*22*
Minister's Office		**3**	*20*
GW Sector	Groundwater Sector	**4**	*16*
EPADP	Egyptian Public Authority for Drainage Projects	**5**	*14*
Irrigation Sector	Branch of the Irrigation Department	**5**	*14*
Nile Water Sector	(in charge of cooperation with Nile Basin countries)	**5**	*14*
HAD Authority	High Aswan Dam Authority	**8**	*10*
Horiz. Exp. Sector	Horizontal Expansion Sector (= land reclamation)	**8**	*10*
Inst. Ref. Unit	Institutional Reform Unit	**10**	*7*
W. Qual. Unit	Water Quality Unit	**11**	*5*

Ethiopia

		Planning		Implem.	
MoWR Departments		Rank	d_{in}	Rank	d_{in}
Planning	Planning Department	**1**	*29*	**8**	*9*
TopM	Top management (Minister, chief advisors, heads of key departments)	**2**	*27*	**6**	*16*
Rural	Rural Water Supply and Sanitation Dept.	**3**	*24*	**1**	*32*
Basin	River Basin Development Studies Dept.	**4**	*22*	**5**	*18*
Policy	Policy and International Cooperation Dept.	**5**	*21*	**10**	*4*
Irrigation	Irrigation Department	**6**	*18*	**3**	*23*
Urban	Urban Water Supply and Sanitation Dept.	**7**	*17*	**2**	*27*
Transb.	Transboundary River Department	**8**	*12*	**4**	*19*
Dam	Dams Design and Construction Department	**8**	*12*	**7**	*10*
Women	Women's Affairs Department	**10**	*7*	**9**	*6*
Research	Research Department	**11**	*5*	**11**	*1*

The Egyptian National Committee on Irrigation and Drainage (ENCID) and the Center for Environment and Development for the Arab Region and Europe (CEDARE) are the most influential NGOs in terms of *influence reputation*. ENCID, however, has tight institutional and personnel linkages to the MWRI. CEDARE's high *influence reputation* score can be partly attributed to the Egyptian Water Partnership, which it hosts. The Arab Office for Youth and Environment (AOYE) as the most independent NGO represented in the presented network has a low *influence reputation* score and maintains no direct *effective cooperation* linkages to the MWRI.

Non-ministerial research institutions are only peripherally linked in the Egyptian water sector. *Effective cooperation* linkages with individual operational departments of MWRI are reported, but surprisingly, none to

the National Water Research Center. In contrast to the Ethiopian case study, consulting firms play a marginal role, which points at the high expertise and ownership of the policy process on the part of the MWRI.

The parliament receives a high number of *influence reputation* votes, but is poorly connected in the network. The parliament hosts controversial debates on specific water-related issues (e.g., land reclamation projects, water quality and pricing policies), but the ruling party's solid majority makes the legislature an unlikely veto player in the design of water sector strategies, at least with regard to general policy directions. The high *influence reputation* score may thus partly reflect the formal rather than the actually exerted influence of the parliament.

The high *influence reputation* score of Water User Associations (including Water Boards) is interesting given their local character, their relatively brief history, and their low connectedness in the network. Water users commonly exercise influence by complying – or not – with government policies (e.g., the restriction on rice cultivation or groundwater use), rather than through direct involvement in the policy processes. Water User Associations and Water Boards are expected to play a more important role in the future according to the ongoing institutional reform process, which may account for their prominence in the *influence reputation* ranking.

It is important to note that both the parliament and the WUAs are special network actors in this study. The fact that they do not commonly interact with other policy makers as a collective entity, but rather through individual MPs and specialized committees, or individual WUAs, respectively, somewhat defies the inclusion of the 'parliament' and 'WUAs' as unitary nodes in the network. This can partly explain the discrepancy between *influence reputation* and *centrality* scores of these actors.

Table 6.5 lists actor categories and the cohesive subgroups identified in the subgroup analysis (based on the *effective cooperation in planning* networks). Two distinct cohesive subgroups were found in the Egyptian case study. One seems to deal mainly with water supply and sanitation issues, while the other mainly comprises actors concerned with irrigation policy. The MWRI and the World Bank are represented in both subgroups.

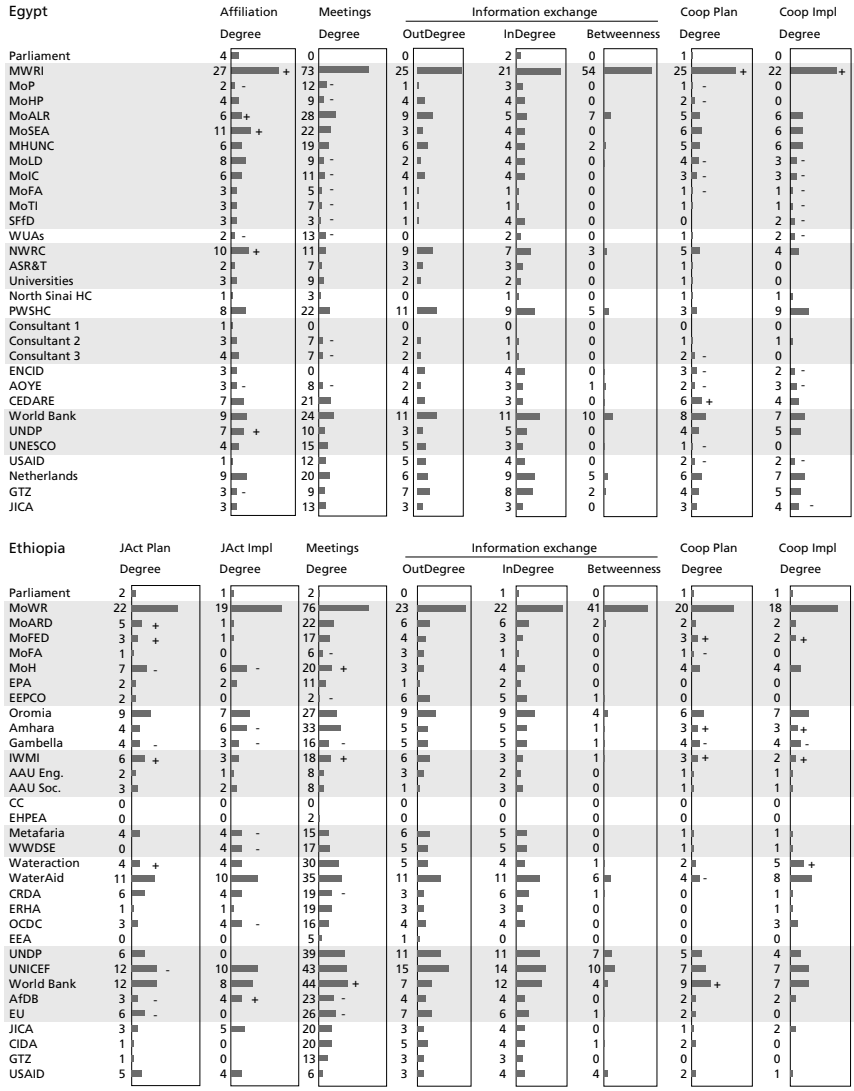

Figure 6.2: Actor centralities
Bars indicate the *degree centrality* values. *Betweenness centrality* values are displayed only for the directed *information flow* networks. For the other relationship types, [+] signs indicate that an actor has a particularly high *betweenness centrality* rank compared to the *degree centrality* rank; [–] signs indicate particularly low *betweenness centrality* ranks.

Table 6.5: Actor categories and subgroups. Note that the densities of cohesive subgroups in Table 6.6 are calculated *without* the water ministries.

Egypt	
Categories	
Ministerial actors	MoP, MoHP, MoALR, MSoEA, MHUNC, MoLD, MoIC, MoTI, MoFA, SFfD
Multilateral donors	WB, UNDP, UNESCO
Bilateral donors	USAID, Netherlands, GTZ, JICA
Cohesive subgroups (based on effective cooperation in planning networks)	
Subgroup 1 (WSS)	MWRI, WB, MoSEA, MHUNC, Netherlands, MoHP, PWSHC, MoLD
Subgroup 2 (irrigation)	MWRI, WB, MoALR, GTZ, CEDARE, ENCID, NWRC

Ethiopia	
Categories	
Ministerial actors	MoARD, MoFED, MoFA, MoH, EPA, EEPCo
NGOs	Water Action, WaterAid, CRDA, ERHA, OCDC, EEA
Multilateral donors	UNDP, UNICEF, WB, AfDB, EU
Bilateral donors	JICA, CIDA, GTZ, USAID
Cohesive subgroups (based on effective cooperation in planning networks)	
Subgroup (WSS)	MoWR, MoH, Oromia, Gambella, Wateraid, UNICEF, UNDP, WB

Table 6.6 shows average *densities* in each actor category and subgroup, and compares these values to the overall network *densities* for each linkage type. Note that differences between the categories of governmental actors are not directly comparable across the two case studies, as the numbers of ministerial actors differ significantly (ten in Egypt and six in Ethiopia).
Direct (i.e., not mediated through the water ministries) linkages related to water policy issues are infrequent within the category of ministerial actors, especially in terms of *effective cooperation*. This indicates that the task of water policy integration is still primarily performed by the MWRI, rather than by the ministerial actors as a group.

Donors have frequent ties with each other in terms of *meetings* and *information exchange*. These linkages, however, only partly translate into *effective cooperation* ties regarding policy formulation and implementation. This seems to confirm qualitative findings that donors in Egypt – unlike in Ethiopia – mainly influence water policies through individual projects, rather than jointly through the national and sectoral planning processes.

Table 6.6: Sub-network densities within actor categories and subgroups (all excluding water ministries). Percentages indicate relative values compared to the densities of the entire network for each relationship type (including water ministries).

Egypt	Affiliations		Meetings		Information flow		Eff. coop. plan.		Eff. coop. impl.	
Ministries	**0.27**	150%	**0.6**	136%	**0.13**	91%	**0.07**	58%	**0.04**	39%
Multilateral donors	**0.00**	0%	**1.00**	227%	**0.67**	457%	**0.00**	0%	**0.00**	0%
Bilateral donors	**0.17**	94%	**0.83**	189%	**0.67**	457%	**0.33**	287%	**0.17**	146%
Cohesive subgroup 1	**0.57**	320%	**0.71**	215%	**0.48**	326%	**0.52**	452%	**0.43**	376%
Cohesive subgroup 2	**0.30**	168%	**0.48**	108%	**0.55**	377%	**0.60**	517%	**0.50**	439%

Ethiopia	J. act. plan.		J. act. impl.		Meetings		Information flow		Eff. coop. plan.		Eff. coop. impl.	
Ministries	**0.13**	94%	**0.00**	0%	**0.40**	64%	**0.20**	129%	**0.07**	83%	**0.07**	81%
NGOs	**0.40**	282%	**0.40**	370%	**1.87**	300%	**0.33**	215%	**0.00**	0%	**0.27**	322%
Multilateral donors	**0.80**	563%	**0.30**	278%	**2.80**	449%	**0.80**	516%	**0.50**	617%	**0.30**	361%
Bilateral donors	**0.00**	0%	**0.00**	0%	**0.83**	134%	**0.33**	215%	**0.17**	206%	**0.00**	0%
Cohesive subgroup	**0.76**	537%	**0.48**	441%	**2.14**	344%	**0.60**	384%	**0.67**	823%	**0.62**	746%

The internal tie *densities* in the two cohesive subgroups are similar, and tend to be higher than internal tie *densities* of the actor categories, particularly for *effective cooperation* linkages. Subgroup 1 (water supply and sanitation) seems to be somewhat more closely connected through *meetings* and *affiliations*, while *information exchange* and *effective cooperation* are more pronounced within subgroup 2 (irrigation). These differences may partly reflect the long institutional history of the irrigation sub-sector, and the recently strengthened programs to improve drinking water and sanitation coverage in the context of the Millennium Development Goals.

The Ethiopian water sector

High rainfall variability and limited access to water services are the main challenges to water policy making in Ethiopia. Poverty alleviation and food security – sometimes understood in a narrow sense of food self-sufficiency – are overarching national planning priorities. The goal of increased agricultural production is pursued by means of large-scale and small-scale irrigation expansion, as well as by strengthening rain-fed agriculture (MoWR

1999; MoWR 2002). Substantial donor-supported initiatives in the field of water supply, sanitation and hygiene have been launched in recent years. Hydropower development has also received increasing attention.

The Poverty Reduction Strategy Paper (PRSP) documents formulated by the Ministry of Finance and Economic Development (MoFED) in partnership with donor agencies are key planning instruments that guide all sectoral policies. The comprehensive design of the Ethiopian water policy contrasts with a more fragmented implementation process. Strategies giving priority to household-centered rural development are increasingly rivaled by large-scale approaches targeting commercial agriculture, hydropower export, and national economic growth. The accountability of water sector planning is rather low, especially at national level, where decisions regarding large-scale infrastructure projects are made. More information on the Ethiopian water sector is provided by, e.g., Dessalegn Rahmato (1999), Yacob Arsano (2004), or UNESCO (2004).

The national Ministry of Water Resources (MoWR) is in charge of formulating water policies, issuing regulations and standards, and implementing large-scale water development projects. Forced regime changes in 1974 and 1991 and a high staff turnover have disrupted planning processes and dispersed water sector expertise. The limited planning capacity forces the MoWR to rely on consulting firms for many important steps of the policy design process. The Water Works Design & Supervision Enterprise (WWDSE), a MoWR spin-off, is particularly important in this context.

The mandates of different federal ministries regarding water management are still partly unsettled or unclear. This has caused friction between the MoWR and other government agencies, e.g., regarding the lead responsibility for small-scale irrigation (with the Ministry of Agriculture and Rural Development MoARD), dam construction (with the Ethiopian Electric Power Corporation EEPCo), or sanitation issues (with the Ministry of Health MoH).

Regional state governments enjoy substantial decision-making power in Ethiopia. Regional water and/or agricultural bureaus are charged with the provision of water services and the design of small-scale water development projects. Efforts to further empower zones, 'woredas' (districts), and local water user groups face substantial constraints in terms of trained manpower, financial resources, and regulatory frameworks.

International donor agencies and NGOs have established a strong presence in Ethiopia, particularly since 1991. Donors coordinate their activities through the Development Assistance Group (DAG) and through their involvement in the national planning process.

NGOs engaged in the water sector include international, domestic (national and regional state level) and faith-based groups. International NGOs generally enjoy greater privileges, both in terms of their financial capacity and of their independence from government control. Numerous NGOs coordinate their activities through the Christian Relief and Development Association (CRDA).

Water research is mainly conducted at universities and at the regional office of the International Water Management Institute (IWMI). Representatives of the private sector still have a relatively low profile in the water sector. Agro-investors, e.g., in the successful flower farming industry, are likely to play a more important role in the future.

Network results

The top position in the *influence reputation* ranking is taken by the MoWR (Table 6.3). Interestingly, the influential MoWR departments (Table 6.4) charged with strategic planning tasks – i.e., the Planning, Policy, and Basin Studies Departments – have no confirmed *effective cooperation in planning* linkages to the state agencies responsible for agriculture (MoARD), health (MoH), or hydropower development (EEPCo). This is indicative of the water sector's limited capacity to effectively coordinate and integrate trans-sectoral policy issues.

Among the operational MoWR departments, the Urban and Rural Water Supply and Sanitation Departments have the highest number of linkages to external actors, particularly the Ministry of Health (MoH), regional states, and donor agencies. This corresponds to the high levels of interactions due to the recently launched and donor-supported initiatives to boost the water supply and sanitation coverage. The relatively low *influence reputation* rank of the Dams Design and Construction Department indicates that the decisions regarding the implementation of dam projects are influenced by

other key actors, e.g., the Basin Studies Department in charge of the River Basin Master Plans, the EEPCo, and the MoFED.

The Ministry of Agriculture and Rural Development (MoARD), in charge of coordinating small-scale irrigation developments at national level, is considered to be very influential. The absence of confirmed linkages between the MoARD and the MoWR's Irrigation Department, in terms of *effective cooperation* and other types of relations, is indicative of the above-mentioned lack of inter-ministerial coordination. The high *influence reputation* rank of the Ministry of Finance and Economic Development (MoFED) corresponds with its key role in the overall national planning processes. Both the MoARD and the MoFED have relatively low *centrality* values, indicating that these agencies derive their influence from their formal power and access to political resources, rather than by means of their network performance.

The relatively high *influence reputation* scores of the Environmental Protection Agency (EPA) contrast with its low *centrality* values, particularly regarding *effective cooperation*, and the observation that environmental issues are often marginalized during the implementation of water development projects. The high *influence reputation* score may thus mainly relate to the EPA's regulative function and veto power concerning water development projects, which is expected to gain relevance in the future.

The *influence reputation* score of the parliament is lower in Ethiopia as compared to Egypt, but still significant considering the low respective *centrality* indices. As in Egypt, interference by the legislature is considered a minor constraint in national water policy processes.

Regional state authorities are considered influential in the design, but even more so in the implementation of water policies. Regional state water bureaus have *effective cooperation* linkages to MoWR departments and national ministries, but lack direct linkages with each other (except *meetings*). Differences between the network positions of regional states must be interpreted carefully, however, as the actual mandates of different water bureaus differ somewhat.

Multilateral donors are considered influential, particularly the World Bank, UNICEF, and the African Development Bank (AfDB). Bilateral

donors seem to play a comparatively marginal role in the planning and – JICA being an exception – the implementation of water sector strategies. The World Bank, UNICEF and UNDP are also among the most central donors in the network. The World Bank is particularly central from a *betweenness* point of view, that is, it links different sets of actors which otherwise have few linkages.

Among the NGOs, only WaterAid (an international NGO) and the umbrella organization CRDA reach intermediate *influence reputation* scores with regard to water sector planning. WaterAid in particular seems to derive its influence partly from its relatively high connectedness in the network. Other NGOs are considered influential regarding implementation to some degree, and maintain *effective cooperation in implementation* linkages to regional state authorities, MoWR and donor agencies.

Consulting firms have *effective cooperation* linkages to the MoWR's top management, and numerous *meetings* and *joint activities* linkages to many MoWR departments as well as regional state authorities and NGOs. Their relatively central network position is reflected in fairly high *influence reputation* scores.

The Chamber of Commerce and the Ethiopian Horticultural Producers and Exporters Association (EHPEA) have very low *influence reputation* and *centrality* values. This might to some degree reflect the fact that private sector representatives have only recently emerged to articulate claims for water services, and corresponds to the informal nature of the private sector's interactions with other water sector actors. A more detailed study involving a larger sample of private sector actors would be required to adequately describe the dynamics and the network connectedness of the private sector.

Research institutions are linked to the water sector mainly through the Research Department of the MoWR, which is well connected but not considered to be very influential. IWMI is the most frequently mentioned research institution with regard to *influence reputation* and also achieves the highest *centrality* values.

Linkage *densities* in the category of ministerial actors (excluding the MoWR) are below average, except for the information flow network (Table 6.6). The category of multilateral donors shows the highest degree of internal

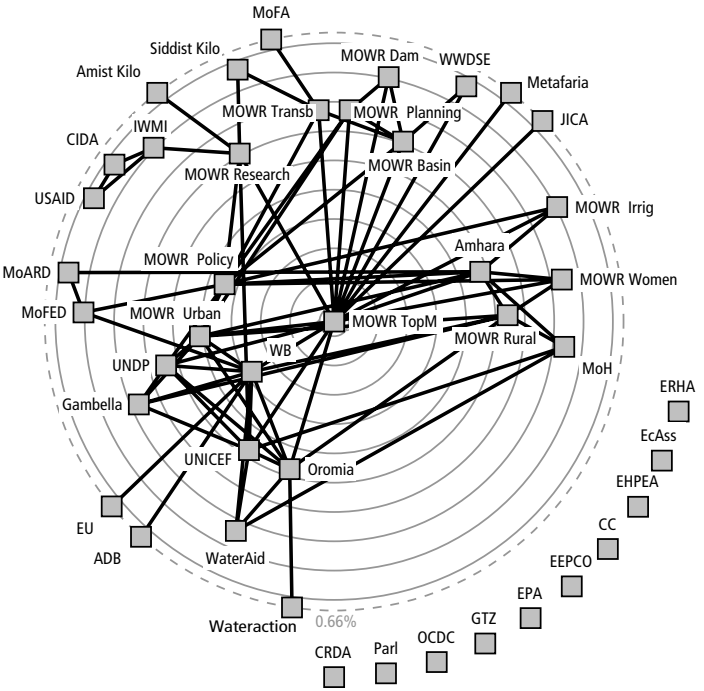

Figure 6.3: Effective cooperation in planning network (Ethiopia)

connectivity regarding *meetings*, *information exchange*, and also *effective cooperation* ties. Cooperation among NGOs is strong in terms of *meetings*, *information exchange*, and *joint activities*. These ties seem to translate at least partly into *effective cooperation in implementation*, but less so in *planning*.

The search for stable cohesive subgroups in the Ethiopian water policy network yielded only one reproducible subgroup, which mainly consists of actors engaged in water supply and sanitation programs (Table 6.5). The absence of tightly linked subgroups in the irrigation and hydropower subsectors may partly relate to the frequent institutional reforms and the interministerial competition regarding different water policy issues.

6.5 Summary and Discussion

This section relates the key results of the network analysis to the characteristics and outcomes of water policy processes both at the domestic and transboundary levels. Table 6.7 summarizes the main network characteristics in the two case studies.

The network structures identified in this study can be linked to specific patterns of water policy planning and implementation that influence both the domestic water policy outcomes and the countries' ability to harmonize their water policies in a basin-wide cooperative framework. It is important to note, however, that network structures can only partly explain policy

Table 6.7: Main characteristics of the water policy networks in Egypt and Ethiopia

	Egypt	**Ethiopia**
Most central actor	MWRI	MoWR
Core group	Ministries, donors	Ministries, donors, regional states, WaterAid
Key national planning bodies (excl. the president, cabinet)	-	MoFED
Decentralization	Centralized system, reforms to empower local water user groups	Federal system, reforms to empower local water user groups
Inter-ministerial cooperation	Weak	Weak
Subgroups	WSS, irrigation	WSS
Agricultural ministry	Influential, numerous linkages to MWRI	Influential, few linkages to MoWR
Environmental ministry	Influential (?), numerous linkages	Influential (?), few linkages
Donors	Central and influential (information brokers, project support)	Central and influential (information brokers, national planning, project support)
NGOs	Independent NGOs are weak and peripheral	Some are well connected (particularly for implementation)
Private sector actors	Few direct linkages (?): *not enough data on private investors*	Few direct linkages: *not enough data on private investors*
Research organizations	Ministerial research centers highly central, others peripheral	Limited connectedness
Consultants	Peripheral	Centrally linked to water ministry, other actors

outcomes, and that the particular political context, socio-economic factors, and the personal perceptions of political leaders also significantly influence water policy decisions.

The water policy networks in Egypt and Ethiopia partly reflect the general paradigm shifts regarding water management in these countries, as indicated by the presence of environmental actors and – to a lesser extent – representatives of civil society, the private sector, and decentralized stakeholder groups. In contrast to the water policy networks studied by Bressers et al. (1995), societal movements are not (yet) important as drivers of network change in Egypt and Ethiopia. Endogenous institutional reforms, donor conditionalities, and budgetary pressures are more important. The dynamics of water policy processes in both countries largely depend on the cooperation and competition between the centrally placed government agencies. Despite the stated goal of both governments to involve water users and the civil society, the hurdles for non-state actors to effectively participate in water policy making are still high.

The dominance of governmental actors is typical for the *statism* (Van Waarden 1992) or *elitism* (Daugbjerg and Marsh 1998) types of policy networks. As such, the networks and resulting policies can be expected to be rather reluctant to change (Marsh and Rhodes 1992). Inter-sectoral competition, however, also prevents the formation of a tightly linked and effectively collaborating *policy community* regarding water policy in each country.

The weak and conflictive inter-ministerial linkages correspond to rather fragmented planning processes and a limited ability of water policy-makers to evaluate and exploit trade-offs between different water uses and related policy options. Attempts to improve inter-governmental coordination, e.g., through the establishment of joint committees, have proven difficult in both countries. The coordinative role of the MoFED in Ethiopia only partly compensates for the weakness of direct inter-sectoral linkages. Lack of coordination particularly affects the design of policies to address trans-sectoral issues such as demand and quality management. The fruitless attempts to amend cropping patterns and enforce waste water standards in Egypt can partly be explained by a lack of inter-sectoral collaboration. Failure of demand management strategies strengthens those stakeholders in the water

sector who are most interested in conventional approaches, i.e., infrastructure projects to enhance the total water supply.

Structural under-representation of water users and advocacy groups decreases the governments' accountability with regard to pro-poor development targets and environmental conservation, and thus also favors the adoption of large-scale infrastructure projects in both countries (land reclamation, river diversion, large-scale dams).

Due to the higher budgetary dependence of the Ethiopian government, the influence of donor agencies is comparably higher in this country as compared to Egypt. The central role of foreign donors constitutes a special type of policy network. Donors are part of the restricted network cores, and at the same time explicitly claim to foster pluralistic policy making. This creates new entry points for non-state actors to engage in policy processes. Newly emerging policy issues are more likely to be handled through less stable, but more inclusive sub-networks, e.g., quality and demand management (both countries), or watershed management and rainwater harvesting (mainly in Ethiopia). It is hoped that more effective coordination among donor agencies will further strengthen their integrative effect on water policy making.

Decentralization of the water policy network poses a major structural challenge to the central government's decision autonomy in Ethiopia. The progressive empowerment of decentralized water authorities significantly changes the terms for the adoption and implementation of large-scale infrastructure projects. The trade-off between the rights of decentralized groups to self-determination and the government's room for maneuver in the planning of infrastructure projects thus affects both domestic water development and the Nile Basin negotiations.

Interestingly, the seemingly more pluralistic water policy network in Ethiopia - with independent NGOs, decentralized water authorities, and donors in central positions - does not seem to translate into significantly more integrated water policy processes and more effective water policies as compared to the Egyptian case study. NGOs and foreign donors in Ethiopia claim that they have sharpened the government's attention to environmental protection and to issues of sanitation or rainwater harvesting. These issues,

however, are pursued no less prominently in the less pluralistic Egyptian water sector. The higher research and planning capacity on the part of the Egyptian water ministry apparently compensates for the water sector's lack of linkages to non-governmental sources of expertise.

Many water sector representatives expect the Nile Basin Initiative to catalyze the joint implementation of large-scale infrastructure projects to regulate the flow and increase the total availability of river water in the basin. While the dominant network positions of central governmental actors decrease the risk of 'interference' from domestic actors in the design of transboundary agreements and projects, the lack of legitimacy and the weak integration of peripheral stakeholders' interests puts any top-down water development at risk of implementation failure. The Nile States will hardly be able to exploit maximum benefits from transboundary cooperation without broadening their water policy networks in order to design and 'societally ratify' ntegrated domestic water management strategies. The growing number and prominence of stakeholder platforms in both countries is expected to have a positive effect on the comprehensiveness of water policies. Donors can play a supportive role in this context and exploit their prominent positions in both countries to foster the adoption of more internationally compatible water development and management strategies.

6.6 Conclusions

The analysis of network structures can be helpful for explaining policy processes and outcomes in a given water sector, particularly in complement and in support of qualitative studies. Quantitative network results can help to identify and illustrate structural constraints in water policy processes, and can contribute to the design of institutional reforms in the water sector.

The application of SNA as a method developed mainly in the 'Northern' academic context produced viable data when applied to policy networks

in two developing countries. Special attention has to be paid, however, to the particularities of policy processes in specific political contexts when interpreting and comparing network data. While some particularities of policy processes in developing countries are reflected in the networks (e.g., the role of donors), others (e.g., the independence and influence of NGOs) must be interpreted in a context-sensitive manner.

The identification of clear correlations between network structures and policy outcomes in this study is somewhat constrained by the relative similarity of the two government-dominated water policy networks. Another constraint to the explanatory power of the presented network parameters results from the overlap of different water policy sub-fields (e.g., water supply and sanitation, irrigation, hydropower), which somewhat blurs the picture of which linkages are relevant for which specific water policy decisions.

A more refined approach could analyze the sub-networks in different water policy sub-fields separately, but should not neglect the structural linkages and trade-offs between these sub-sectors. Including more nodes in the network (both by including more actors and considering the internal structure of regional authorities and national ministries) would yield a more comprehensive picture and better represent peripheral players, particularly also from the private sector.

Alternative methods to quantify network linkages could be used in addition to the respondents' own assessment of their network relations, e.g., the analysis of co-participation in key policy events (2-mode network analysis, e.g., Wasserman & Faust, 1999). This would also be useful to better distinguish sub-networks related to specific channels of influence (i.e., regulation, direct involvement in policy design, or (non-) compliance).

The different relationship types distinguished in this study (i.e., *affiliations*, *joint activities*, *meetings*, *information exchange*, and *effective cooperation*) yielded fairly similar *centrality* patterns, and their number could be reduced without a significant loss of explanatory power. The distinction between an 'objective' (e.g., *meetings*) and a subjectively evaluated type of linkage (e.g., *effective cooperation*), however, can yield valuable insights.

Methodological refinements require significantly greater time investments and/or complicate the questionnaires. The utility of applying *Social Network Analysis* for the analysis of water sector processes ultimately depends on the required inputs in terms of time and human resources, particularly in view of the fact that quantitative network data can only complement and refine, but not replace a qualitative analysis of policies and water sector institutions.

7 Double-edged Hydropolitics: Domestic Constraints and International Cooperation in the Eastern Nile Basin

Abstract

Accounts on transboundary water conflicts often conceptualize riparian states as unitary rational actors. This study challenges this view by investigating linkages between domestic processes of water policy making in two case study countries, Egypt and Ethiopia, and the progress of international negotiations in the Nile Basin. A qualitative two-level game framework is applied. Each country's win-set is analyzed in the light of the diverging policy preferences of domestic stakeholders, the institutions granting them access to the policy process, and the active agency of chief negotiators. Domestic challenges to demand management in Egypt and to large-scale infrastructure projects in Ethiopia constrain the respective win-sets to some extent. The lack of inter-sectoral cooperation and stakeholder participation limits the capacity of both water sectors to evaluate trade-offs between different policy options in the domestic as well as the transboundary context, and favor the adoption of technical and legalistic perspectives instead. This chapter also discusses trade-offs between authoritarian and participatory planning approaches in terms of the chances for rapid negotiation success, as well as the sustainability and legitimacy of cooperative water development projects.

7.1 Introduction

In 1983, Southern rebels attacked and damaged the machine digging a 280-km canal through the Sudd swamps in the Sudan. The 'Jonglei Canal' project, jointly implemented by the Egyptian and Sudanese governments, aimed to 'conserve' 4 billion cubic meters of water per year for downstream uses. In this case, transboundary cooperation in a shared river basin failed not because governments were unwilling to coordinate their policies, but because a sub-national stakeholder group on one side found a powerful means to 'de-ratify' the deal.

This study addresses the domestic dimension of transboundary river conflicts and cooperation, thereby shedding light on an issue that is presently under-emphasized in research and practice. Determinants of success and failure of cooperation in shared river basins are often sought at the 'systemic' level of inter-relations between riparian states. Basin countries are commonly conceptualized as unitary rational actors, each seeking maximum benefits from river water utilization by exploiting its geographic position on the river as well as its economic, diplomatic, and military power. Conceptualizations based on game theory illustrate that the asymmetric incentives for upstream and downstream states render transboundary cooperation particularly difficult (Waterbury and Whittington 1998; Bernauer 2002; Dinar et al. 2007). Such 'systemic' accounts usually attribute the recent improvements of transboundary relations in the Nile Basin to geo-political changes – e.g., the end of the Cold War – and to the role of third parties supporting transboundary initiatives to build mutual trust (e.g., Tesfaye Tafesse 2001; Waterbury 2002; Mason 2004; Metawie 2004; Yacob Arsano 2004; Amer et al. 2005).

Several scholars have highlighted the linkages between domestic and international levels of water policy making (Durth 1996; Elhance 1999; Ohlsson 1999; Dinar 2002; Giordano et al. 2002; Böge 2006). They assert that domestic patterns of water governance critically influence the terms for transboundary conflict and cooperation. The political 'ratification' of transboundary cooperation at the domestic level depends on the interests of a variable range of domestic actors that are – to varying degrees – involved in water policy making or affected by water policy decisions.

Few authors have explicitly challenged the state-centric approaches and the related theoretical underpinnings that prevail in the literature on transboundary river conflict and cooperation (but see Dinar 2002; Furlong 2006). River basin case studies that specifically focus on the interface between domestic and transboundary water governance are rare (but see Richards and Singh 1997; Çarkoglu and Eder 2001; Richards and Singh 2001; Karaev 2004; and Waterbury 2002 for the Nile Basin). Linkages between international and sub-national water *conflicts* in the Nile Basin have been addressed by Westermann (2004) and Mason et al. (2007).

This study aims to broaden the spectrum of explanatory variables that are commonly mentioned to explain the success and failure and the specific focus of cooperative initiatives. Taking a step beyond the observation that 'domestic policy-making matters', this analysis addresses the question of how the linkages between national and transboundary water governance affect the outcomes of negotiations in the Nile Basin. A *two-level game* framework is applied to analyze the linkages between bargaining processes at the domestic and international levels. The divergence of domestic actors' interests and the institutions governing their involvement in water policy processes at different levels are key variables in this framework.

Both Ethiopia, located at the source, and Egypt at the downstream end of the (Eastern) Nile suffer from a mismatch between water demands and timely supply. The Nile branches and irrigation canals in Egypt are increasingly running dry ('physical water scarcity', see IWMI 2007). Ethiopia, by contrast, lacks the capacity to capture and store the abundant, but highly variable, rainfall ('economic water scarcity', ibid.). As in many other transboundary river basins (see Wolf et al. 1999 for an overview), questions of flow regulation and allocation of water abstraction quotas are the most contested issues in the Nile Basin.

In the last two decades, the Nile Basin countries have gone from saber-rattling to intensified cooperation (e.g., Swain 2002; Waterbury 2002; Collins 2006). The legal and institutional framework agreement under negotiation ('D3 Project') is hoped to end the controversies regarding water sharing provisions stipulated in earlier agreements that are considered unfair and non-binding by upstream states. The Nile Basin Initiative (NBI), established and governed by the ten riparian states, implements capacity building and

investment projects in order "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources" (NBI 2007).

The progress of transboundary cooperation critically depends on the ability of riparian water users to overcome widespread perceptions viewing the allocation of shared rivers as a zero-sum game. This can be achieved, for instance, by exploiting comparative advantages in different regions of the basin, and by sharing benefits from water uses instead of the sharing water itself (e.g., Sadoff and Grey 2002). Hydropower trade, the basin-wide coordination of agricultural policies (see Sileet et al. 2007), and far-reaching economic integration beyond the broader water sector promise substantial benefits for all Nile Basin states. Reforms of national policies are required to tap these transboundary potentials. Such reforms face considerable constraints at the domestic level, particularly as far as demand management as an alternative to increased river water abstraction is concerned. In view of these domestic constraints, the bargaining positions put forth by national negotiators tend to focus on the objectives of maximizing the *de jure* national water abstraction quotas, and the (joint) implementation of infrastructure projects to enhance the total supply.

This chapter first outlines the underlying conceptual framework and introduces the *two-level game* concept. It then elaborates on the main characteristics of water policy processes in Egypt and Ethiopia in terms of interest divides and water sector institutions, with a particular focus on the NBI. On this basis, the main mechanisms of interactions between domestic and international water governance, as well as the major implications for the course of transboundary cooperation in the Nile Basin are discussed. Important trends and opportunities to strengthen the ongoing cooperation process are addressed at the end of the chapter.

7.2 Conceptual framework

International cooperation can be defined as a process in the course of which countries adjust their behavior to accommodate the actual or anticipated interests of other states through a process of policy coordination, or harmonization (Keohane 1984).

Figure 7.1 illustrates how domestic interests are translated into national water policies and negotiation positions for the case of the Nile states. Domestic needs and interests (see Mason 2004 for a distinction between the two) are assessed by the government in consultation with national stakeholders, and are fed into the formulation of national development targets. In line with this process, and partly based on its own needs assessment, the water sector formulates national water policies. The countries' positions in the Nile Basin negotiations relate to both national and sectoral targets.

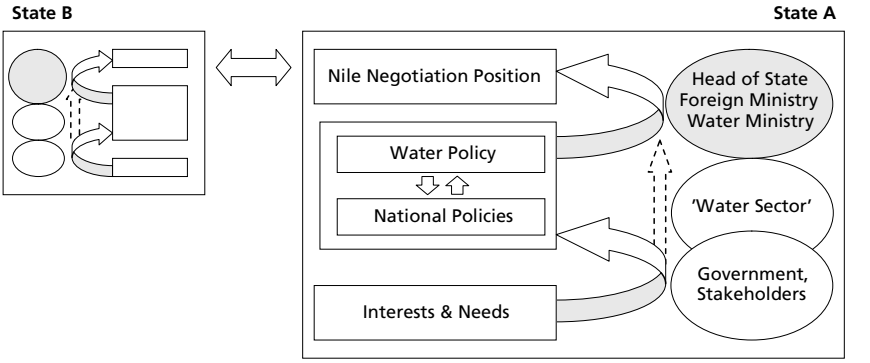

Figure 7.1: Conceptual framework linking domestic interest and international negotiation positions. Note that, for reasons of simplicity, the arrows do not adequately illustrate the feedback mechanisms from the transboundary negotiations to the domestic policy process.

The analysis of the domestic determinants of transboundary cooperation in shared river basins relates to a debate among scholars of political sciences on how to best explain the foreign policy behavior of states (e.g., Caporaso 1997). *International Relations* (IR) theories conceptualize foreign policy decisions as a function of the specific incentive structure determined at the level of

the international system. Accordingly, states are assumed to pursue certain 'national interests' and adopt unilateral or cooperative strategies depending on their relative power and their ability to influence the behavior of other states. Such 'systemic' explanations do not deny the fact that foreign policy decisions emerge from domestic political structures, but they assume that domestic institutions translate 'national interests' into foreign policy positions in a fairly predictable manner (Moravcsik 1993). In contrast, approaches of *Public Policy Analysis* focus on the interactions between domestic actors and institutions to explain policy decisions. IR theories are criticized for under-predicting outcomes due to their neglect of domestic factors (Moravcsik 1993), while *Public Policy Analysis* frameworks struggle to conceptualize the reciprocal nature of strategic foreign policy making in the international system.

The benefits of combining the two streams of theory are obvious. Robert Putnam's (1988) *two-level game* framework stresses the simultaneous and reciprocal interactions between processes of domestic policy making and international negotiations. According to the *two-level game* metaphor, a national *chief negotiator* simultaneously negotiates with his foreign counterpart(s), and with a range of domestic actors. The *win-set* is the range of policy options acceptable to a 'decisive' majority of domestic stakeholders. Both formal and informal processes of policy 'ratification' at the domestic level must be taken into account (e.g., Milner 1997). The following insights from the *two-level game* literature serve as a reference point for the interpretation of the results in this study.

A broad *win-set* tends to increase the chances that an international agreement can be reached. A *win-set* can be broadened by 1) the exclusion of potential resistance against specific strategies from the policy process, and 2) an expansion of the range of available options through the development and combination of innovative strategies at the domestic or international level. Note that these two mechanisms may broaden the *win-set* into fundamentally different 'directions', and thus have different implications regarding the legitimacy and long-term sustainability of resulting transboundary arrangements.

A narrow *win-set* can, under certain conditions, increase the *chief negotiator*'s leverage to extract concessions from the foreign party (Schelling

conjecture, see Schelling 1960). This is particularly true if most relevant actors are more 'hawkish' than the *chief negotiator*, i.e., if their policy preferences are less compatible with the foreign party's interests (Milner 1997).

Two distinct sources of domestic constraints on domestic policy-making can be distinguished (Gourevitch 1996): 1) divides between stakeholder interests, and 2) institutions determining the influence of the stakeholders in the policy processes. Specifically, domestic stakeholders can influence the progress and specific focus of transboundary negotiations through the following channels at the national level:

- decisions by formal 'veto players' to support or reject domestic water policy reforms or proposed international agreements
- direct influence by prominently placed stakeholders on the judgment of key decision-makers in regard to issues of domestic and transboundary water development and management
- inclusion or exclusion of different stakeholders and their expertise in the planning processes
- failure to implement policies and projects (or the anticipation thereof), e.g., due to capacity constraints or stakeholder resistance.

The *chief negotiators* themselves may try to manipulate the size of *win-sets*, both domestically or in the foreign state(s). The following strategies can be distinguished (Putnam 1988; Moravcsik 1995):

- *Chief negotiators* can try to actively narrow the *win-set* in their own country and thereby extract concessions from the other party ('tie hands' strategy). This can be done by formally or informally attributing a veto right to 'hawkish' domestic actors, or by creating 'loss-of-face costs' by publicly ruling out concessions to the foreign party.
- *Chief negotiators* can employ 'side payments', 'package deals', or 'take-it-or-leave-it' offers to win the support of domestic actors for certain policy options, therefore expanding the domestic *win-set* and increasing the chances that an international agreement can be reached ('cut slack' strategy).

- *Chief negotiators* can try to increase the support of a transboundary agreement among the foreign country's domestic stakeholders by credibly demonstrating commitment to cooperation and thus reducing the level of uncertainties and mistrust.

Governments may deliberately withhold information regarding their water development targets and strategies – both domestic and as part of a cooperative process – to exclude unwanted domestic opposition from the planning process. High uncertainties regarding the government's rationales and the impacts of different water development scenarios, however, can have a negative effect on the domestic actors' willingness to support the government's proposals for domestic or basin-wide water policy reforms (Milner 1997), and thus narrow the *win-set*.

Both qualitative and quantitative approaches have been developed to study *two-level games* in the context of different foreign policy issues (Callaghan 2001). Formal models often make significant simplifications, i.e., by only looking at a narrow range of domestic actors or by focusing on the ratification of an international agreement while excluding the complex processes of policy formulation and implementation (see Pahre 2006 for a review of existing models).

This study adopts a more explorative strategy by considering a broad variety of domestic influence factors at different levels and in different phases of the policy process. The term 'water policy' is understood in a broad sense, including policy documents as well as the formal and informal decisions that determine which policy elements are prioritized during implementation.

7.3 Results

This section describes the major domestic factors determining the size of the Egyptian and Ethiopian *win-sets*. The role of the NBI is addressed at the end of the section.

Domestic divides: actors and their interests

Descriptions of the Nile Basin challenges often assume that the riparian states pursue specific 'national interests' related to food and energy production, economic growth, poverty alleviation, employment, and living space (see e.g., Amer and Hefny 2005; Hamad and El-Battahani 2005; Yacob Arsano and Imeru Tamrat 2005, for national perspectives of the challenges of related to Nile Basin cooperation). This section differentiates the notion of the 'national interest', and focuses on the diversity and domestic divides of stakeholder interests in Egypt and Ethiopia.

The claims in both Egypt and Ethiopia for a maximum *de jure* water abstraction quota mainly relate to the priority assigned to irrigation expansion as compared to other water management strategies, such as demand management and ecosystem conservation. The drinking water supply and sanitation sub-sector is of little concern at the international level due to the limited water quantities involved.

In the past, irrigation expansion programs in both countries were mainly based on narratives focusing on food self-sufficiency and the equitable provision of agricultural land to small-scale farmers. Recent trends towards economic liberalization, however, have somewhat changed the national policy-makers' views on the role of the agricultural sector in relation to issues of economic growth and poverty alleviation. In Egypt, employment and living space concerns are increasingly prominent factors in the rationales underpinning the ongoing horizontal expansion projects. Commercial, export-oriented production on modern irrigation schemes promises higher economic returns than smallholder production on fragmented lands, and both countries are committed to modernizing their agricultural systems

at least in part. The priority given to meeting the water demands of the industrial sector follows the same rationale of maximizing the economic benefits from water use.

The trend to prioritize water-efficient sectors is generally desirable in a water-scarce region. Obviously, however, growing water demands by expanding irrigation and industrial uses compete against the demands of other existing water uses and users. The extent to which large-scale irrigation projects and industries can provide income and employment for the bulk of small-scale farmers in both countries, i.e., their 'pro-poor' benefits, critically affects the overall pressure to abstract more water from the river. Furthermore, water development strategies relying on large-scale infrastructure development have to be traded off against increasingly prominent sustainability and environmental conservation targets.

The spectrum of stakeholder preferences varies considerably in both countries as illustrated in Figure 7.2. Positions of stakeholders demanding increased water abstraction quotas for domestic uses (to the far left and right in Figure 7.2) are least compatible at the international level (i.e., more 'hawkish'). Positions focusing on non-consumptive water management strategies (in the center of Figure 7.2) translate into less pressure on the shared river, and are therefore more 'dovish'. Note that the spectrum of stakeholder interests is not synonymous with the *win-set*, as only a limited range of these actors can effectively influence the relevant water policy decisions and the countries' position in the transboundary negotiations.

Three domestically contested water policy issues are of particular relevance for the course of the transboundary cooperation in the Nile Basin: 1) the prioritization of large-scale infrastructure projects (supply management), 2) the prioritization of demand and quality management, and 3) the perceived benefits in different scenarios of cooperation with other Nile Basin states. The implications of the respective interest divides for the national *win-sets* are discussed at the end of this section.

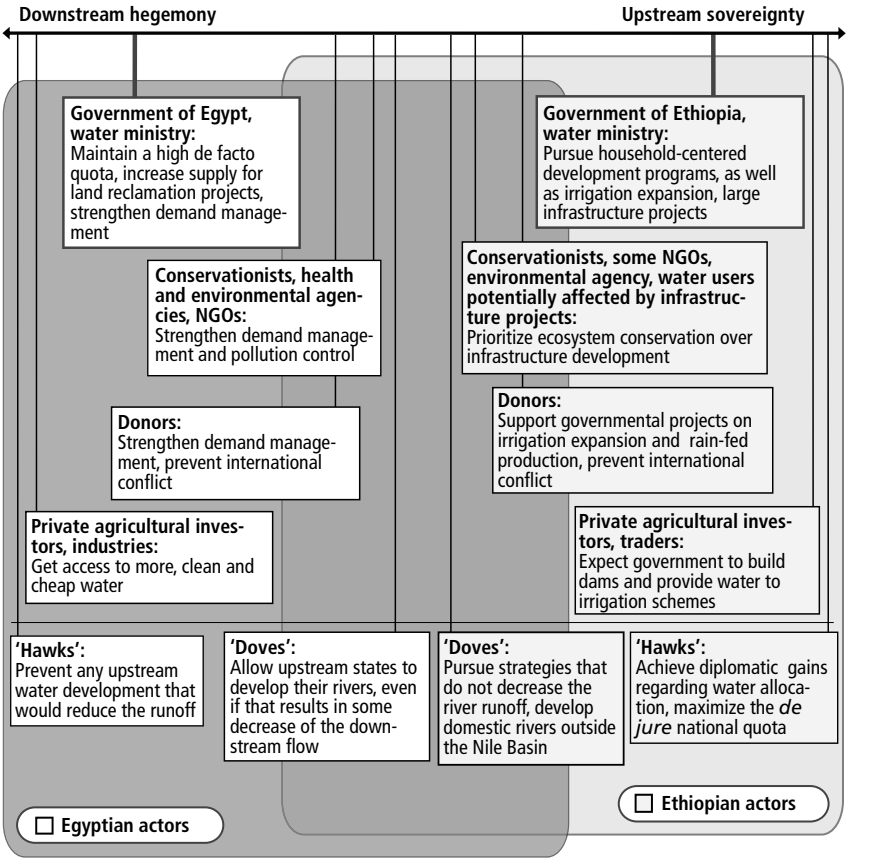

Figure 7.2: Spectrum of interests of different actors categories in Egypt (left) and Ethiopia (right). The axis ranges from mutually exclusive positions (to the left and right) to more compatible interests (center). The figure displays predominantly economic (above) and ideology-based rationales (below).

Supply management

The unilateral development of large-scale regulatory infrastructure projects (dams and river diversions) in the upstream countries is of major concern to downstream Egypt. Egypt itself, however, has long pursued large-scale infrastructure projects (i.e., the Aswan High Dam and the ongoing mega land reclamation projects) to consolidate its grasp on the lion's share of the river water.

Domestic opposition to large-scale irrigation developments is raised along two main lines of argument.

First, the cost-efficiency of irrigation development and the benefits for the national economy at large and for the poor people in particular are controversially assessed. These questions are particularly salient in Egypt, where the expansion of the irrigated areas tends to diminish the water availability for the small-scale farmers on the 'old' lands. In Ethiopia, where only a small fraction of the river flow is presently utilized, the trade-off between infrastructure development and household centered approaches targeting rain-fed production and small-scale irrigation mainly concerns the allocation of scarce funds. 'Multi-purpose' projects combining hydropower production and irrigation water supply can increase the utility of large-scale infrastructure development.

Second, infrastructure projects are questioned for their negative impacts on the environment and the livelihoods of local communities in the project areas that either have to be resettled or are affected by modified river flow regimes (e.g., downstream pastoralists or fishermen).

The water ministries in both countries are geared towards the development of hydraulic infrastructure due to their mandates (i.e., regulation of water flows, water provision to different sectors), the engineering background of many staff members, and their organizational structures (influential irrigation and drainage departments, particularly in Egypt). The position of the Egyptian water ministry with regard to irrigation expansion is somewhat ambivalent, however. The development of new irrigation schemes inevitably results in a reduced water availability for other purposes, which makes it more difficult for the Egyptian water authorities to fulfill their task of providing water to all users. Plans for increasing the water storage capacity through extensive infrastructure development have also been designed in Ethiopia over the last century. The fact that only a fraction of these projects could be realized is sometimes blamed on Egypt's lobbying activities and dissuasive influence on foreign donors.

Other state agencies also have an interest in irrigation expansion (e.g., the ministries of agriculture and trade) or advocate a more critical position (environmental affairs). The environmental ministries in both countries are considered to be relatively weak, and only have a marginal influence on the

target-setting processes in the productive sectors, including the irrigation and hydropower sub-sectors.

Extra-governmental opposition to large-scale irrigation projects in Egypt is mainly raised by critical individuals, and through the media (e.g., Al-Ahram Weekly 2000). Recent protests in Egypt among small-scale farmers on the old lands in reaction to failing (irrigation) water provision are also noteworthy in this context (Al-Ahram Weekly 2007). In Ethiopia, the risk of (violent) resistance by local stakeholders against large-scale projects in remote areas is a critical factor in the assessment of the overall costs and benefits related to any new dam projects. NGOs in Ethiopia tend to focus on household-centered approaches and advocate ecologically sustainable strategies, yet not all NGO representatives are personally opposed to extensive infrastructure development. The views of donor agencies with regard to the utility of large-scale infrastructure also vary. The World Bank, for instance, highlights the importance of reaching a 'minimum platform' of water storage capacity in order to reduce the negative effects of erratic rainfalls on the economy (World Bank 2004 a; World Bank 2006).

Apart from their hydraulic benefits, large-scale infrastructure projects also appeal to decision-makers because they satisfy public expectations of visible progress. Inaugurating a new dam is politically more rewarding than launching a water-saving campaign, even though the latter may benefit a larger number of people more directly.

Demand and quality management

Infrastructure projects need to be assessed in terms to their overall utility compared to alternative water development and management strategies, such as efficiency gains and pollution control.

The increasing commitment to demand management and the enforcement of water quality standards in the Egyptian water sector represents a significant departure from previous approaches that almost exclusively focused on supply management. This trend potentially expands the *win-set* with regard to the transboundary negotiations. However, while technological dimensions of irrigation efficiency have been addressed with considerable

success, other measures to reduce the pressure on the river such as pollution control, economic instruments to prevent water wastage, or the partial ban on growing water-intensive crops such as rice and sugarcane, have met with significant resistance from affected user groups, particularly farmers, traders, and polluting industries.

Considering the low level of water abstraction in the upstream parts of the basin, strategies for demand management in Ethiopia are not primarily concerned with minimizing water use for the sake of reducing pressure on the river. Demand management is pursued to enhance the productivity of rain-fed and irrigated agriculture, and to better cope with the high rainfall variability. Demand management strategies pursued by the Ethiopian authorities aim at technological improvements and institutional reforms in the irrigation sub-sector, rainwater harvesting, and watershed management to increase the environmental water retention capacity. Budgetary, legal, and institutional constraints, poor design, and the spread of diseases around small-scale water storage sites, however, have limited the success of these strategies so far.

Demand management strategies are broadly supported in Ethiopia, but are often considered secondary goals next to increasing the storage capacity through large-scale infrastructure development. Effective demand management in the upstream part of the Basin, as well as the decision to prioritize infrastructure development on Ethiopian rivers that are not part of the Nile Basin, potentially slow down the growth in the overall demand for upstream water abstraction from the Nile. Downstream states, therefore, have a strong interest in effective upstream demand management policies, be they implemented unilaterally by Ethiopia or through a coordinated approach.

Different options of transboundary cooperation

As Whittington (2004) observes, the symbolic value of the Nile sometimes overshadows the river's economic significance. In both Egypt and Ethiopia, the discourse regarding the 'fair' allocation of water abstraction quotas is

highly politicized, and remains somewhat detached from the regular national water policy processes. Expectations regarding the outcomes of the Nile Basin negotiations diverge significantly between individual water sector actors.

Perceptions of the issue of Nile water sharing as a zero-sum game are widespread, and many domestic actors expect their governments to fend off any external restrictions on the national *de jure* right or *de facto* capacity to abstract and utilize river water. Most Egyptian actors consider the quota of 55.5 billion cubic meters per year (as stipulated in the 1959 bilateral agreement with the Sudan) as a non-negotiable 'prior use right'. Many Ethiopians, on the other hand, see the Nile Basin negotiations as a chance to correct a historic wrong by attributing a 'fair' share to the upstream Nile countries. These 'hawkish' positions on both sides, focusing solely on increased national water quotas, are in many cases proliferated by individuals with little knowledge, or interest, in how a higher share of the Nile will be translated into concrete benefits for the water users on the ground.

'Dovish' actors, in contrast, are willing to take the water needs of all riparian countries into consideration. The re-allocation of national quotas is seen as a possible negotiation outcome, but not as the most important one. Joint efforts to increase the efficiency of water use, to tap additional water sources, and to exploit comparative advantages across different regions in the basin are expected to yield higher overall rewards. 'Dovish' positions are mainly advocated by water sector representatives that are centrally involved in the NBI, but also partly correspond with the strategies pursued by actors concerned with environmental conservation or promoting demand management strategies.

In sum, the landscape of policy preferences of Egyptian and Ethiopian water sector actors reveals a convergence of interests across the two countries in two particular fields. First, domestic strategies to strengthen demand management and environmental protection are internationally compatible, as they minimize the pressure on the river on both sides. Second, engineers in both countries have similar views regarding the potential benefits from (joint) hydraulic infrastructure development. Upstream instead of downstream storage, and diversion canals to reduce the evaporation in wetlands

are long-standing water development visions in the Nile Basin that both upstream and downstream water professionals can subscribe to.

The incompatible claims for high *de jure* water abstraction quotas have different domestic underpinnings in Egypt and Ethiopia. The pressure on the Egyptian authorities to defend the 55.5 bcm/y quota is based on unifying fears of a decreasing water availability among all water users. In Ethiopia, the potential benefits and the range of direct beneficiaries from a higher water abstraction quota are not as clear. As a consequence, the claim for a higher national quota for Ethiopia is most prominently defended not by water user groups, but by policy-makers and opinion leaders in reference to ideology-based rationales of 'territorial sovereignty' or 'fairness'.

Proponents of these different positions engage in water policy making through different channels. Their relative influence on the *win-sets* is determined by the institutions that grant them access to political resources and decision-making processes. These institutions are addressed in the next section.

Institutional factors

This section discusses institutional aspects of water policy making in Egypt and Ethiopia, and highlights the potential effects of institutional factors on each country's *win-set*.

The extensive control of a single political party (Egypt) or a hierarchically structured coalition (Ethiopia) over both the executive branch of government and the parliament constrains the role of the legislature as a formal veto player in both countries. The weakness of democratic control mechanisms tends to favor the policy preferences of actors with personal ties to political leaders, among them agricultural investors or industrial polluters, over the interests of the average citizen. Governments in both countries view organized non-state actors with suspicion, and only reluctantly invite them to participate in planning processes. The influence of NGOs and other civil society groups thus largely depends on the extent to which donors insist on their involvement in projects and policy processes.

In view of the authoritarian governance systems in both countries, the ongoing decentralization programs in the water sector are unlikely to empower local water users to a level where they could effectively interfere in the design or adoption of national or international water policy developments. In the absence of effective channels of participation, marginalized groups may perceive passive or violent resistance to the implementation of projects and policy reforms as the most effective means to defend their interests. This affects both supply projects (e.g., resistance of local communities against dams and diversions) and demand management measures (e.g., resistance against water pricing or restrictions to the cultivation of water-intensive crops).

Nevertheless, the federal system in Ethiopia somewhat constrains the central government's room for maneuver in the transboundary negotiations. While the national water ministry is formally mandated to design large-scale water development projects, the consent of the regional state authorities is essential for the implementation of any measure that entails significant negative impacts on local livelihoods, or resettlement. The planned establishment of River Basin Authorities adds another set of actors to the Ethiopian water sector whose role in the process of designing cooperative river development strategies in the Nile Basin needs to be defined.

The cross-sectoral nature of water policy challenges calls for an effective coordination of planning processes at the national and at the water sector levels. The most recent water sector plans of both countries (MoWR 2002; MWRI 2005) relate to overarching national development policies (GoE 1997; MoFED 2002). And yet, the water ministries in both countries have been faced with sudden top-down decisions significantly changing water development targets. For instance, the mega land reclamation projects in Egypt were criticized for being designed at the highest political levels without the involvement of parliament and major national stakeholders. The recent adoption of a Universal Access Plan in Ethiopia also substantially alters the targets that were set in the regular policy formulation process under the lead of the water ministry. The ease with which the highest-level political leaders can impose new policy targets also gives them considerable room for maneuver in the international negotiations, and thus broadens the *win-set* in both countries.

The forced regime changes in Ethiopia's recent history caused institutional disruptions and dispersed water policy expertise abroad or into different water sector organizations. The institutional stability and research capacity is considerably higher in Egypt. In both countries, the extent of inter-sectoral cooperation regarding water policy issues is considered to be insufficient. For instance, progress towards amending the wastewater quality legislation in Egypt has been stalled in inter-ministerial committees for years. Struggles over mandates have negatively affected the cooperation between the Ethiopian water ministry and the state agencies in charge of health (regarding sanitation issues), agricultural (regarding small-scale irrigation development), and energy policies (regarding dam construction). The key role played by the Ministry of Finance and Economic Development in the national planning process in Ethiopia does not replace direct inter-ministerial coordination, and is generally perceived as authoritative rather than facilitative.

Donors are among the most centrally involved non-state actors in the water sectors of both countries. They provide expertise and institutional support, and also influence water resources development on the ground by selectively funding specific projects. While the effects of donor support in terms of capacity-building are conducive to integrated planning, the fact that the governments constantly need to adapt their water development plans to the funding priorities of different donor agencies can lead to a rather unpredictable and piecemeal implementation process.

NGOs in the Ethiopian water sector enjoy a somewhat higher prominence as compared to the Egyptian case, due to their relatively higher project implementation capacities and their greater engagement in advocacy activities. The role of donors and NGOs as 'information brokers' helps to alleviate the high uncertainties with regard to the impacts of different water policy scenarios (both domestic and cooperative). The research centers affiliated with the ministries of water and agriculture in Egypt also act as policy think-tanks linking different water policy actors. The regional office of the International Water Management Institute in Addis Ababa plays a similar role, while plans to establish a national water research center in Ethiopia move ahead rather slowly.

Capacity constraints, the weakness of inter-sectoral coordination, and the lack of stakeholder participation limit the ability of the water authorities in both countries to evaluate and exploit inter-sectoral trade-offs, and to design innovative domestic and basin-wide water development and management strategies. Scenarios of transboundary cooperation are only vaguely addressed in the national water policies in both countries. Hardly any mention is made of specific strategies of policy harmonization (NBI WRPM 2006). Trade-offs between different domestic policy options – e.g., between irrigation expansion and improved rain-fed production, or between unrestricted industrial development and high water quality standards, are not transparently assessed. As a result, the central water authorities tend to focus on their core mandate and key competences, and particularly seek to increase the total water supply through large-scale infrastructure projects. The "obsession" with dams in Ethiopia (Keeley and Scoones 2000) and the "water security obsession" in Egypt (Tesfaye Tafesse 2001) should be understood in this context.

The Nile Basin Initiative addresses several of the above-mentioned institutional deficits. While this study cannot comprehensively evaluate the impact of the NBI so far, some observations with regard to its effects on domestic policy-making processes are discussed in the next section.

The impact of the NBI

The water ministers of the Nile Basin countries form the main decision-making organ of the NBI, the Council of Ministers (NILE-COM). In addition, the NBI is anchored in the national water sectors through the following institutions.

- The Technical Advisory Committee Nile-TAC and the negotiation delegation in the legal and institutional framework negotiations (D_3 Project), both composed largely of representatives of the national ministries of water and foreign affairs
- The national NBI Offices, usually hosted by the national water ministries

- National focal point organizations of the eight projects constituting the Shared Vision Program

The Eastern Nile Subsidiary Action Program (ENSAP) – one of two sub-basin investment programs mandated to design joint water development projects – is coordinated by the Eastern Nile Technical Regional Office (ENTRO). The Nile Basin Discourse (NBD) is composed of NGOs from all Nile Basin states and is designed as a civil society counter-part to the government-led NBI. The limited impact of the NBD so far reflects the general weakness of civil society organizations in the Nile Basin countries.

National conferences and stakeholder workshops organized by the NBI cannot hide the fact that the impact of the transboundary program on national policy institutions and policy processes has remained rather marginal so far. The range of actors directly involved in and informed about the transboundary negotiations is restricted, and many of the more peripherally involved actors have not given up their reserved or indifferent positions towards the NBI. The rift between the domestic and transboundary water policy processes is still only bridged by a few key actors, mainly at the water ministries, and the entire cooperation progress is highly dependent on these individual water sector representatives.

The main impacts of the NBI from a *two-level game* perspective can be summarized as follows.

- The political leaders in both countries have increasingly refrained from threats of unilateral action and military responses, and have instead highlighted their common interests and their general commitment to transboundary cooperation. This has somewhat decreased the 'loss-of-face costs' related to a potential Nile sharing agreement, and has thus broadened the *win-sets* on both sides. The political leaders' commitment to address the difficult domestic trade-offs related to far-reaching transboundary cooperation has remained rather limited, however.
- Several NBI projects have contributed to strengthening the capacity for integrated planning within domestic water sector institutions. The extent to which these capacities are applied to design transboundary water development strategies is somewhat less evident.

- Several infrastructure projects have been launched in recent years, either jointly approved through the ENSAP (e.g., the new irrigation projects in the Ethiopian Abbay basin or in Egypt's West Delta region), or at least tacitly accepted (e.g., the Tekeze and Merowe dams in Ethiopia and the Sudan, respectively). However, these projects are often advertised domestically as 'national' rather than 'cooperative' achievements. In fact, most of these projects were designed in purely domestic planning processes and later re-labeled 'NBI projects'.
- Transboundary trade agreements, as examplified by the recent deal on meat export from Ethiopia to Egypt, are encouraging 'spin-offs' from improved transboundary relations that are partly based on the success of the NBI. Nevertheless, the potential to engage the people of the Nile countries in their capacity as producers, traders, and members of the civil society is far from being fully exploited.

Nine years after its establishment, the NBI is still viewed with considerable skepticism. Critics see the NBI as a secretive, top-down technocratic venture, merely concerned with the joint exploitation of the river to increase national supply rather than with protection of the shared resources (Al-Ahram Weekly 2004; Pottinger 2004). As illustrated in this study, however, the limited success of the NBI in fostering the adoption of an integrated and sustainable river basin development framework can be at least partly attributed to political and institutional constraints at the domestic level, rather than to an inadequate design of the NBI itself or a lack of commitment among the involved water managers.

7.4 Discussion

Given the complexity of the Nile Basin negotiations, the interactions between the domestic and international levels of water governance are likely to follow equally complex patterns. The transboundary negotiations in the Nile Basin aim to establish a new legal and institutional framework, to initiate joint 'win-win' projects, and – in the longer term – to foster the harmonization of domestic water policies in order to exploit comparative advantages. Domestic constraints on all these issues collectively affect the national *win-sets*, and thus the outcomes of the overall negotiation process.

Several paradigmatic trends in the field of water governance influence the course of cooperation in the Nile Basin. Domestic political reforms that empower the legislature and decentralized water user groups relative to the central government may reduce the *chief negotiators'* room for maneuver in the Nile Basin negotiations and favor cooperative approaches that accommodate the interests of a broader range of domestic stakeholders. The adoption of national policies giving greater attention to issues of economic growth encourages the formulation of water sector strategies that aim at a higher water use efficiency at different levels, particularly also through the exploitation of comparative advantages at a basin scale. The growing influence of agro-investors and polluting industries in the water policy processes (potentially increasing the pressure on the river), is balanced by the increasing prominence of environmental concerns and environmental actors in the water sector.

The legal and institutional framework negotiations alone are unlikely to settle the issue of basin-wide water sharing due to the high uncertainties regarding the national short- and long-term water needs and the dominance in both countries of domestic actors perpetuating the claim for maximum national water shares. In part, this is the legacy of earlier threats of unilateral river development and the dogmatic approaches to the question of *de jure* national water quotas that have raised the 'loss-of-face' costs related to any concession to accommodate the interests of co-riparian states. Given the enormous domestic pressure, the Egyptian water authorities can hardly commit to a cooperative agreement that stipulates a reduction of Egypt's water abstraction quota. Likewise, many influential Ethiopian actors and

observers would be dissatisfied by any quota re-allocation provision that falls short of whatever they perceive as Ethiopia's rightful entitlement.

Incremental *de facto* shifts of water abstraction patterns in line with evolving demands are a more realistic scenario of water sharing in a cooperative framework in the Nile Basin. In order to enhance the current level of policy coordination and to strengthen transboundary cooperation, the national *win-sets* must be broadened by highlighting the benefits from integrated river development scenarios. Various options relying either more on supply or on demand management can be considered. The multiple water uses in different parts of the basin act as 'inherent issue linkages' and can be traded off favorably in a coordinated river development framework. The multiple impacts of domestic and basin-wide water policy decisions, however, also complicate the task of involving all concerned stakeholders in the design of transboundary agreements and water development strategies.

In both Egypt and Ethiopia, domestic-level constraints impede the full exploitation of demand management strategies. This narrows the *win-sets* towards cooperative strategies relying on 'win-win' infrastructure projects (upstream storage, diversion canals). Despite the environmental concerns and opposition of local communities, large-scale infrastructure projects seem less difficult to ratify domestically than non-technical policy reforms, and also align well with the interests and competences of the agencies that are centrally involved in the NBI, i.e., the ministries of water resources. Conservationist strategies are under-emphasized domestically, and the institutional capacity to design and evaluate far-reaching policy adaptations to exploit comparative advantages at the basin scale is limited in both countries.

The promise of favorable water re-allocation agreements or 'win-win' projects rises expectations among water policy makers that domestically unpopular policy reforms focusing on demand management can be avoided. Such hopes might be deceptive, however, given the fact that almost the entire flow of the Nile is already utilized at present. And yet, the current focus on the legalistic and technical dimensions of transboundary cooperation continues to impede the exploration of other basin-wide river development options that could yield higher overall benefits in the long run.

At first sight, it seems easier to strengthen strategies that minimize the pressure on the Nile in Ethiopia due to the hydrological diversity in the

country, the presently low dependence on river water, and the relatively high influence of domestic actors that advocate household-centered approaches. Egypt's ability to reduce the national water demand is limited if only the agricultural sector is considered, but increases in view of scenarios of further-reaching economic cooperation and integration. The lower dependence on agriculture both in terms of GDP and employment predestines Egypt – more than Ethiopia – to give priority to economic sectors that generate higher benefits per drop of water than agriculture (Waterbury 2002). More than any other Nile state, Egypt can generate income and employment outside of the water-intensive agricultural sector, and can thereby reduce its dependency on river water.

The present emphasis given to the (re-) allocation of national water quotas creates incentives for domestic water policy decisions that are fundamentally wrong. Any success to enhance irrigation efficiency in one country can be interpreted by the co-riparian states as an argument to object to this country's claim for a higher water share (see Richards and Singh 2001). A basin-wide agreement that would make any increase in the amount of water abstracted from the river contingent upon the success of demand management measures could correct this distorted incentive structure, and prepare the field for a more integrated river management system.

The findings presented in this study also point at a trade-off between a high decision-making autonomy on the part of the government (conducive to a faster negotiation progress) and stakeholder involvement (yielding more legitimate and domestically supported policy outputs). The exclusion of marginal stakeholders, e.g., communities affected by large dam projects, from the policy process broadens the *win-set* towards certain cooperative strategies, e.g., extensive infrastructure development. At the same time, however, this may shift the locus of interference of domestic stakeholders from the planning to the implementation phase of policy making, and thus compromise the chances of successfully implementing transboundary river development strategies. A stronger involvement of domestic stakeholders in the planning process can appear to narrow the *win-set* at first sight, but might be crucial to ensure the comprehensive design and successful implementation of joint river development strategies and far-reaching policy harmonization at the basin scale.

The central governments' extensive decision autonomy and the weakness of formal veto-players make it difficult for the *chief negotiators* of both countries to credibly 'tie their hands' in the international negotiations. For instance, it is difficult for Egyptian negotiators to explain their inability to reduce the national water quota by refering to the potential resistance of small-scale farmers, when the greatest cutback to the water availability on the old lands is caused by the current expansion of modern irrigation schemes pursued by the Egyptian government itself.

The water ministries are generally not powerful enough to substantially influence the policy targets in other sectors, e.g., the national agricultural production targets. As *chief negotiators* in the Nile Basin negotiations, the water ministries may refer to this weakness in order to fend off claims by other riparian states for higher water abstraction quotas and proposals regarding the harmonization of national economic policies. Top-level national planners and decision-makers are in a better position than the water ministries to commit to far-reaching policy reforms and to address the political underpinnings of the trade-offs between domestic and international water development. However, given the significant planning uncertainties, the political leaders in both countries seem reluctant to engage more directly in the transboundary negotiations. The influential foreign ministries involved in the transboundary negotiations do little to foster the integration of cooperative Nile Basin development scenarios with different domestic policies, and rather settle for defending dogmatic claims for maximum water quotas.

In view of the limited presence of transboundary cooperation scenarios in the policies and national development narratives, the stated goal of transboundary cooperation can hardly be exploited by domestic policy-makers to rally domestic support for unpopular domestic reforms, e.g., for demand management strategies. As long as no clear vision of integrated transboundary river development emerges, most domestic actors continue to view the Nile Basin negotiations as an opportunity to increase the national water supply and avoid painful domestic reforms, rather than as a chance to face these reforms in a coordinated manner.

7.5 Conclusions

Scenarios of transboundary cooperation challenge the policy-makers in the Nile Basin to expand the national *win-sets* by exploiting trade-offs between legal claims and potential benefits from cooperative water resources development on the ground. The slow progress of the transboundary negotiations can be partly explained by constraints rooted in diverging stakeholder interests and the domestic water sector institutions. The assumption that riparian states act as unitary rational actors is of limited usefulness, even in the case of the rather authoritarian governments of Egypt and Ethiopia. Applying a specific focus on domestic factors of water policy making adds valuable insights to the understanding of transboundary river management challenges.

Despite its comprehensive design, the NBI has only partly managed to emphasize strategies for environmental conservation, demand management, and stakeholder participation at the level of domestic water policies as cornerstones of the process of transboundary policy integration. Optimistic predictions that the NBI will transform the Nile Basin into an IWRM showcase, and thereby empower water users and democratize water governance processes, might not be fulfilled. More realistically, one must expect transboundary cooperation to move ahead within the relatively narrow boundaries defined by domestic political and institutional constraints.

Based on the results discussed in this chapter, a number of suggestions for strengthening the cooperation process can be derived.

- Chief negotiators, water managers, and third parties should try to gain a maximum understanding of the inter-relations between domestic and transboundary water policy processes in order to better appreciate the full costs and benefits attached to cooperative and unilateral approaches.
- Domestic trade-offs related to different basin-wide cooperation scenarios can be addressed more effectively by strengthening the coordination between national and sectoral planning bodies, by expanding the mandates of the ministries of water and foreign affairs as the *chief*

negotiators in the transboundary negotiations, or by more directly involving highest-level decision-makers in the negotiation process.

- As the domestic costs of policy reforms for the sake of transboundary cooperation cannot be fully compensated by hydrological gains in every case, a broader range of potential beneficiaries of improved transboundary relations should be involved in the NBI process in order to broaden the domestic support base. For instance, if Egypt agrees to reduce its 55.5 bcm/y quota for the sake of upstream water uses, the domestic costs should not be borne by Egyptian farmers alone, but also by the sectors potentially benefiting from improved transboundary relations, i.e., the trade or energy sectors.
- It is important to ensure that countries be rewarded – not punished – for softening their legal claims and for strengthening demand management.

The planned establishment of a Nile Basin Commission is a major milestone on the way towards a mutually beneficial river management regime in the Nile Basin. If the domestic constraints to basin-wide policy harmonization are not addressed, however, the commission might end up merely processing the project 'wish lists' of the riparian countries for external funding, rather than effectively integrating domestic policies and favorably exploiting transboundary trade-offs. This would indeed be a missed chance for the people of the Nile.

8 Concluding remarks

The previous chapters have presented and discussed empirical results illustrating the domestic processes of water policy making in Egypt and Ethiopia, and derived implications regarding the pace and specific focus of Nile Basin negotiations. This final chapter summarizes the main results and asks to what extent the findings can be generalized and applied to other river basins. Further-reaching research questions are suggested and ideas are developed as to how domestic water policy processes and transboundary negotiations can be better integrated in practice.

8.1 Summary of main findings and generalization

Any new study on the Nile Basin can be assessed with regard to the case-specific information it produces, the value it adds to the general understanding of transboundary water management challenges, and the impulses it provides for developing innovative approaches to transform harmful international tensions into mutually beneficial interactions.

This study sheds light on the gap between 'rationally' desirable and 'politically feasible' (i.e., domestically acceptable) approaches to cooperative river development and management in the Nile Basin. It demonstrates that the willingness of the Nile riparian states to engage in projects of cooperative river development is limited not only by mistrust and by national utility-maximizing rationales, but also by pressures and constraints rooted in the domestic political and institutional settings.

Table 8.1 lists the main domestic factors that constrain the national *win-sets* with regard to transboundary cooperation in the Nile Basin as identified in this study. It also presents a – somewhat subjective – attempt

at quantifying the relevance of different factors and comparing them across the two case studies.

Major differences between Egypt and Ethiopia exist regarding the potential of local level resistance to domestic large-scale infrastructure projects (higher in Ethiopia) or to water demand management measures (currently higher in Egypt), and regarding the influence of decentralized authorities, NGOs, and donors (higher in Ethiopia). Institutional weaknesses affecting policy-making processes restrict the capacity of water authorities to design and evaluate strategies for integrated river management in both countries. These institutional constraints arise, for instance, from discrepancies between sectoral water policy processes and national target-setting processes, ineffective inter-ministerial cooperation, ineffective sector-wide information sharing, and lack of stakeholder participation. Limited research capacities constrain the planning processes mainly in Ethiopia. In both countries, unilateralist (i.e., prioritizing maximum national water shares) and infrastructure-oriented (i.e., focusing on dams, diversions and large-scale hydropower and irrigation development) positions are widespread among key decision-makers. As the potential for infrastructure projects to augment the water supply is largely exhausted in Egypt, the negative local-level effects of dam or diversion projects are more controversially discussed in Ethiopia. Demand management measures, on the other hand, are more urgently pursued, and also more politically contested, in Egypt.

In the light of the domestic-level constraints on the national *win-sets*, any conceptualization of the Nile Basin states as unitary rational actors pursuing unitary 'national interests' can only yield fragmentary explanations or predictions of the course of transboundary river management disputes and cooperation initiatives. This is also true in countries with authoritarian governments which largely exclude non-governmental actors from the processes of policy adoption and ratification. In the case of Egypt and Ethiopia, it is less the formal ratification process that constrains the national governments' room for maneuver to make water policy decisions, but rather the diverse institutional biases and the informal channels of (non-) involvement of different actor groups in different phases of the policy process. Domestic institutional reforms and political developments that affect the domestic water policies are also likely to influence the government's negotiation position in the transboundary context.

Table 8.1: Major domestic constraints to the national *win-sets*, i.e., the government's ability to evaluate, adopt, and implement a broad spectrum of water policy options. The assigned scores indicate the extent to which a given constraint is present in a country, but not necessarily the comparative magnitude of its effect on the *win-set*.

Domestic constraints	**Egypt**	**Ethiopia**
Prominence of actors primarily interested in maximizing the *de jure* water share	++++	++++
Divergence between the planning process and top-down national target-setting regarding water development and services provision	+++	+++
Prominence of 'food self-sufficiency' as a policy imperative	++	+++
Prominence of actors advocating large-scale irrigation expansion	+++	++++
Stakeholder participation in governmental decision-making: decentralized authorities	+	+++
Stakeholder participation in governmental decision-making: advocacy groups	+	++
Stakeholder participation in governmental decision-making: donor agencies	++	+++
Stakeholder resistance against irrigation expansion	+	+
Local level stakeholder resistance against large-scale supply projects	n.a.	++
Stakeholder resistance against demand management measures	++++	++
Limited implementation capacity: large-scale supply projects (dams, diversions)	n.a.	+++
Limited implementation capacity: demand management measures	+++	+++
Ineffective inter-ministerial policy coordination	++++	++++
Ineffective information dissemination and communication	+++	+++
Lack of innovative planning capacity due to limited stakeholder involvement	++++	++++
Lack of innovative planning capacity due to limited research capacity	+	+++

The focus on domestic factors applied in this thesis does not negate the critical importance of 'systemic' determinants of success and failure regarding the transboundary cooperation in shared river basins. Geopolitical shifts such as the end of Cold War rivalries, the politico-economic developments at the global and regional levels, as well as the role of third-parties in the negotiation process are key explanatory variables in a comprehensive assessment of the current status of the transboundary relations in the Nile Basin. And yet, systemic variables alone can only explain and predict a part of the observed variance and dynamics of transboundary relations in shared river basins.

This thesis shows how the remaining variance of riparian state behavior can be approached by adopting a *two-level game* perspective, i.e., by laying a stronger focus on domestic level policy processes. Clearly, systemic and domestic factors contribute to complementary rather than competing explanations regarding the success and failure of transboundary negotiations in shared river basins. The degree to which systemic and domestic factors influence the course of transboundary conflict and cooperation is likely to vary from case to case as well.

In the light of the empirical findings of this study and the theoretical considerations outlined in the introductory section and in the relevant chapters, the following conclusions regarding the interactions between domestic and international water policy processes in the Nile Basin can be drawn:

- The domestic water policies in both countries are based to varying degrees on *rational choice*, *organizational processes,* and *governmental politics* patterns of policy-making. This limits the usefulness of conceptual approaches that frame the basin states' negotiation positions solely in terms of a unified 'national interest'. The riparian countries' negotiation positions are a function of the interest divides among different domestic actors, and of the political institutions that determine the participation of these actors in the water policy process. Analytical frameworks designed to investigate the potential for conflict and cooperation in transboundary river basins should take this domestic dimension into account.
- The lack of transboundary cooperation in the past and the persistent difficulties in reaching a cooperative agreement in the Nile Basin can partly be attributed to domestic-level constraints limiting the negotiators' ability to commit to concessions in the question of *de jure* water re-allocation and in terms of far-reaching policy harmonization. For instance, domestic opposition against large-scale infrastructure development tends to limit the exploitation of hydraulic potentials, while constraints on demand management impede the convergence of national policies towards a more conservationist transboundary regime.
- The tendency of the Eastern Nile states to prioritize infrastructure projects can be partly attributed to the limited extent of both inter-

sectoral coordination and stakeholder participation. The limited ability of water authorities and national planners to evaluate and design alternative policy options at the domestic level (e.g., effective demand management strategies) also narrows the *win-set* regarding the river development scenarios at the basin level. As a result, joint river development interventions tend to align with the interests of the centrally involved water ministries that are traditionally most concerned with maximizing water supply. The limited attention and implementation priority typically given to demand management strategies, environmental protection, and stakeholder participation leads to a potentially unsustainable exploitation rather than to a joint protection of the shared river. Joint infrastructure projects can generate mutual benefits and are important as tangible signs of the countries' commitment to advancing the cooperative process. The total economic, environmental, and social costs and benefits of large-scale infrastructure projects should always be assessed, however, in comparison to alternative strategies of cooperative river management strategies.

- The extensive decision autonomy of governments in authoritarian political systems broadens the *chief negotiators*' room for maneuver to reach a transboundary agreement even against existing domestic opposition. The broadening effect on the *win-set* resulting from the absence of effective domestic veto players is put into perspective, however, by the inherent deficiencies of top-down governance systems with regard to the processes of water policy design and implementation. Non-inclusion of local-level or extra-governmental expertise and implementation capacities diminishes the water authorities' ability to design and implement innovative policies to improve the efficiency of water use. Generally, the absence of effective veto players and the limited stakeholder involvement in planning processes shifts the locus of stakeholder interference from the stage of policy formulation and adoption to the implementation phase.
- Stakeholder resistance, e.g., against domestic policies that would result in a reduced demand for river water, could increase the bargaining power of the *chief negotiators* by 'tying their hands', i.e., by decreasing

their ability to make concessions in the international negotiations. The governments of the Nile states are not especially prone to actively reinforcing such domestic constraints just for the sake of gaining a bargaining advantage, however, because a powerful domestic opposition would most of all affect their own flexibility and decision autonomy.

- The Nile Basin Initiative and the preceding transboundary gatherings and programs have fostered the emergence of an expanding, but still fragile, 'epistemic community' of water policy-makers who embrace the idea of integrated river management in the entire Nile Basin. Together, these people have gone a long way towards developing a shared vision of cooperative Nile Basin development. Domestically, however, the water sector representatives involved in the NBI struggle to spread this vision against the strong resistance of actors that either oppose any concessions to the other basin countries, particularly regarding the issue of water quota allocation, or see their interests threatened by internationally coordinated river management strategies. Constraints related to ineffective communication, inter-sectoral policy coordination, and high planning uncertainties further impede the inclusion of cooperative Nile development scenarios into the agenda of domestic stakeholders.
- Both Egypt and Ethiopia hope to increase their national 'water security' partly through favorable agreements with co-riparian countries. The *de jure* allocation of water abstraction quotas and jointly designed strategies for cooperative river management, however, are often considered as two separate issues, and are championed by different – though overlapping – sets of domestic actors. The institutional separation of these two parallel tracks of negotiation impedes the evaluation and exploitation of trade-offs – in the short and long term – between insisting on claims for maximum national quotas and effective cooperation on the ground. Institutional linkages between overall national (economic) planning and water policy making are critical in this regard. Despite the overall importance of water resources management, the institutional linkages between sectoral and national planning are relatively weak both in Egypt and Ethiopia, and trade-offs between sectoral and national policies are not transparently addressed.

These insights illustrate the complexity of the process of designing and implementing a cooperative regime in the Nile Basin, and the importance of the domestic institutional dimension underlying the transboundary negotiation processes. The applicability of the results from the Nile Basin to other transboundary watersheds, however, is limited due to the great diversity of specific water management challenges and politico-economic contexts in different basins. For instance, transboundary cooperation efforts in the context of water quality disputes in wealthy Western states can be expected to have quite different domestic underpinnings as compared to water sharing conflicts in arid basins among riparian countries relying on subsistence agriculture. Nevertheless, the following general conclusions with regard to the inter-actions between domestic and international water policy processes can be derived:

- As noted by Evans et al. (1993) and Milner (1997), the impact of domestic-level factors in a *two-level game* perspective significantly depends on the policy issue at stake. The issue of transboundary river management can be expected to draw the attention of a particularly high number and diversity of domestic actors because of 1) the intersectoral nature of water management challenges, 2) the diversity of livelihoods depending on various water services, 3) the high stakes, at least in arid regions, for the agricultural sector, which commonly employs a significant part of the population and/or is politically influential, 4) the environmental and social dimensions of water management that are highlighted by many non-governmental and external actors (e.g., donor agencies), and 5) the emotional connotations attached to different water uses in addition to their economic significance. Reforms of national water policies for the sake of transboundary cooperation are thus likely to face intense domestic scrutiny.
- Domestic actors in countries that critically depend on the inflow of river water and experience substantial internal competition for scarce water resources are more likely to stand united behind their government's claim for higher water quotas in the transboundary context. This narrows the *win-set* towards a more hawkish position and can serve as a bargaining advantage of the respective *chief negotiator*.

- The inter-sectoral nature of water policy challenges often creates inter-ministerial conflicts of interest. The assumption of a unified executive branch, as it is often applied in formal *two-level game* models, is therefore highly questionable in the context of transboundary cooperation regarding water resources management.
- Domestic constraints on the reform of water policies generally work in favor of countries that are privileged under the present conditions and benefit from a continuation of the status quo.
- The pressure on the river is highest when riparian states are domestically constrained to implement 'dovish' policies (i.e., to reduce their demand), but unconstrained to implement 'hawkish' strategies (i.e., to increase river water abstraction).
- There is a trade-off between the short-term likelihood of reaching an agreement (which is increased when authoritarian governments can ignore potential domestic veto players) and the long-term success and sustainability of river development (which is enhanced when domestic stakeholders can contribute their views and capacities to the policy process). The assessment of this trade-off varies with different utility functions applied by different actors that attribute varying priorities to national economic growth, pro-poor services, or environmental conservation.
- The costs and benefits of joint water development projects must be assessed in the context of the overall gains from improved international relations. In this sense, even joint river development projects that are locally damaging and unsustainable may catalyze the generation of substantial benefits 'beyond the river', e.g., through enhanced economic integration and trade relations. It is not *a priori* clear, therefore, whether cooperative 'fast-track' projects and agreements pushed through by authoritarian governments and based on domestically contested projects might not, at the end of the day, yield higher overall benefits than a perfectly integrated joint planning process that is constantly delayed due to the interference of domestic veto players in the negotiating states. 'No regret' projects, i.e., projects that generate

> tangible benefits and strengthen international relations without causing substantial domestic or international harm, can build trust without raising domestic opposition, and thus minimize the risk of failure and catalyze efforts towards streamlining domestic policy processes.

All possible types of adaptations to growing water scarcity – i.e., Ohlsson's (2000) three 'turns of the screw' – are likely to stir up domestic opposition. Domestic resistance to policy change may come from different stakeholder groups depending on the type of policy reform. Local opposition to infrastructure projects may be amplified by (domestic or international) advocacy groups, and amount to a major constraint, particularly if donor funding is required. Policies to increase end-user efficiency often challenge water users, e.g., if they aim to establish a water pricing system or require an adaptation of water utilization practices or local institutions. Far-reaching economic shifts giving priority to less water-intensive sectors of the economy affect the livelihoods of a large number of stakeholders, and potentially give rise to significant domestic resistance. The *two-level game* perspective can help to link such domestic constraints on policy reforms to the challenges of internationally coordinating water management strategies. By transparently addressing the domestic dimensions of transboundary water management challenges, both researchers and policy-makers can better identify mutually beneficial strategies to allocate costs and benefits arising from river development and management more equally among all affected stakeholders . More specific suggestions on how to apply the insights of the *two-level game* perspective in practice are presented in the next section.

8.2 Implications for domestic water policy reforms and external interventions in the Nile Basin

From the findings of this thesis, several suggestions for a more refined approach to foster Nile Basin cooperation can be derived.

Generally, water policy-makers, academics, and third parties engaged in transboundary river initiatives should aim for a thorough and systematic understanding of linkages between domestic water policy making processes and the states' negotiation positions and strategies. Domestic winners and losers under different development scenarios as well as their means of influencing the processes of policy design and implementation should be analyzed systematically. Trade-offs between the potential gains from international cooperation and national as well as sectoral development targets should be openly discussed. Fundamental but sensitive issues related to the government's decision autonomy and the water users' right to self-determination should not be excluded from this debate.

The *chief negotiator*s in the current negotiation set-up – i.e., the water ministers – are in a relatively weak position to make far-reaching commitments to adapt water utilization patterns that relate to policies of other sectors and governmental agencies. In order to better integrate river development with the overall economic policies of all riparian countries, higher-ranking national planners should actively engage in the transboundary negotiations, and top-level political leaders should more visibly commit themselves to addressing the difficult domestic trade-offs.

Instead of agreeing on a rigid quota allocation system, which would raise fierce domestic criticism on both sides, the Nile countries are more likely to take incremental steps towards transboundary cooperation and *de facto* water re-allocation in favor of upstream irrigation developments. This approach allows domestic actors to adapt their positions to evolving cooperative frameworks and minimizes the obstruction of ideology-based domestic opposition.

The present situation of parallel legal framework negotiations and joint water development projects potentially discourages the basin states from prioritizing demand management policies, as a reduced demand could undermine their claim for a higher *de jure* water abstraction quota. This unfavorable incentive structure could be transformed by gradually de-coupling the legal framework negotiations and the decisions on joint river development projects. Mechanisms to make any increase of river water abstraction conditional upon effective demand management strategies should be discussed. It is important to make sure that the riparian states are internationally rewarded, not punished (e.g., by non-reciprocity on the part of the other states), for softening their previously inflexible positions and for making advances in demand management.

The support base for cooperative river development and management approaches must be substantially expanded beyond the narrow core of individuals involved in the negotiations and the NBI projects. Minimizing the dependency on key individuals and the inflow of external funding is critical for the sustainability of the basin-wide cooperation process. The slow progress in this direction, despite the NBI's comprehensive design, is indicative of the inherent difficulties of institutionally anchoring a transboundary cooperation process in the domestic water policy processes.

Several projects of the NBI's Shared Vision Program create opportunities to address trade-offs between domestic and cooperative strategies of river management, to integrate domestic and transboundary planning processes, and to design frameworks for benefit-sharing. The results of this thesis underline the importance of capacity-building programs that support planning processes in water sector institutions at the domestic level.

Some of these suggestions – i.e., the option of devoting greater attention to domestic constraints in transboundary cooperation efforts, the greater involvement of top-level decision-makers in the negotiation process, and the broader anchorage of transboundary institutions in the domestic policy networks – are not only valid for the Nile Basin, but can be recommended to negotiating riparian states in other river basins and supporting third parties as well.

8.3 Critical assessment of the strength and limitations of this study

This thesis aims to improve the specific understanding of the interactions between domestic and transboundary processes of water policy making in shared river basins. It adopts a systematic – yet qualitative – approach to assess national *win-sets* and to link them to the prospects of reaching a cooperative agreement and establishing an effective transboundary river management regime. The study sheds light on the double-edged challenges faced by water policy makers and national planners that have so far received limited attention in the literature on transboundary water conflicts.

The main contribution of this study is thus the explicit and systematic exploration of a previously neglected dimension of transboundary river conflicts and cooperation. The insights gained in this thesis allow for a more differentiated picture of the constraints on cooperation regarding the management of shared rivers. This knowledge is useful for policy-makers in the riparian states and third parties engaged in cooperation initiatives. It can help to better pinpoint and transparently discuss the specific costs and benefits in different river management scenarios, and support the design of domestic institutional reforms and international regimes.

A few limitations of the present thesis have to be mentioned. As all applications of the *two-level game* framework, this study suffers from the trade-off between comprehensiveness and parsimony (Moravcsik 1993), i.e. the difficulties of 'marrying' the conceptually clear *two-level game* framework with the multiple analytical variables used to describe the complex policy-making processes at the domestic side of the bargaining game. The explorative approach adopted in this thesis allows for the analysis of a broad variety of domestic influence factors and reflects the complexity of water policy decisions, but only yields qualitative insights regarding the specific effects of different domestic factors on the national *win-set* (i.e., broadening or narrowing). National *win-sets* could not be clearly delimited in a strict sense, i.e., as the sum of all domestically ratifiable policy options of relevance for transboundary cooperation. This is in part due to the multi-dimensional negotiation challenge that characterizes the Nile Basin negotiations. Given

this complexity, the relative weight of different domestic determinants of the national *win-sets* could only be assessed qualitatively on the basis of the chosen methodology.

Another area that remains largely unaddressed in this study concerns the highest level of national policy-making, i.e., the personal policy preferences and networks of heads of states, ministers, and other powerful individuals, in the context of both domestic policy decisions and international negotiations. A better insight into the policy processes at the highest level would certainly yield a more accurate picture of decision-making patterns governing domestic water policy processes and transboundary cooperation in the Nile Basin.

8.4 Suggestions for further research

The scientific understanding of the complex processes leading to transboundary cooperation can be deepened through further-reaching theory-based and comparative investigations at the interface between domestic and international water policy making.

The relative effects of different domestic constraints on the size of the *win-sets* and the course of transboundary relations deserve closer attention. A comparative analysis of different river basin case studies could improve the specific insights as to the domestic factors that most affect the success and the specific focus of transboundary river management regimes. Such an analysis, however, will have to deal with the considerable variation of the specific water management challenges in different river basins. Moreover, the long time span of transboundary regime formation processes complicates the direct comparison of river basins at different stages of negotiation and implementation of transboundary agreements.

Data for a comparative analysis could be drawn from existing databases (for the status of international cooperation and the specific focus of transboundary agreements) and from existing or new river basin and/or country case studies (for domestic-level policy processes and the effectiveness of transboundary cooperation on the ground). The information

on domestic water policy processes in existing case studies is likely to be rather heterogeneous, and therefore might not be suitable for a quantitative operationalization of the *two-level game* approach. The types of domestic constraints addressed in this Nile Basin case study (e.g., Table 8.1) can serve as a basis for the construction of variables in a comparative analysis, but may have to be generalized, refined, or complemented.

The application of a formal *two-level game* model could also enhance the knowledge on transboundary river conflicts and point to pathways for their mitigation. The broad range of domestic stakeholders that are formally or informally involved in water policy making and the long and iterative negotiation processes, however, defy the simplifications commonly made in quantitative *two-level game* studies. The application of formal models is generally more promising for single-issue negotiations, such as the regulation of pollution loads transmitted from one country to another, and less suited to multi-dimensional negotiations such as in the Nile Basin, where legal quota allocation issues are inter-linked with the design of joint river development projects.

The analytical framework applied in this thesis could be conceptually and methodologically expanded and/or specifically fitted to particular aspects of water policy issues in order to complement and refine the picture of relevant interactions between domestic water policy processes and transboundary cooperation. Analytical perspectives that could be adopted in this regard include discourse analytical approaches, or the in-depth analysis of legal frameworks, political institutions, or systems of information management and social learning.

8.5 Final remark: the future of the Nile Basin

In the past decade, the Nile Basin countries have seen unprecedented levels of joint activities to foster cooperation on the management of the shared river. And yet, after ten years of negotiations, the direction and scope of transboundary cooperation is still unclear, and the specific river development visions remain vague. The success of the Nile Basin Initiative will be evaluated differently by different stakeholders depending on the expectations they attach to the outcomes of the negotiations. Specific targets such as regional peace and security, poverty alleviation, 'fairness' in the allocation of national water abstraction quotas, hydraulic optimizations, or the preservation of the river's environmental functions all set different thresholds for success.

Compared to a 'water war' scenario, the present situation of continuous cooperation efforts certainly gives credit to the NBI and the progress made so far. The challenges for water users and water managers in the basin countries remain daunting, however, and further efforts are required to generate more shareable benefits through an integrated approach to river basin development.

At present, both Egypt and Ethiopia appear to be rather content with the status quo of pending negotiations and parallel advancement of jointly approved water development projects. Considering the domestic pressures and the still rather low level of trust among representatives of different basin states, neither Egypt nor Ethiopia are ready to make substantial concessions in the legal and institutional framework negotiations.

Despite these constraints, the riparian state governments should be held accountable for any delay in the cooperative process that prevents the people of the Nile Basin from tapping benefits that could be generated under an integrated river management framework both in the short and in the long term. The failure to tap these benefits is particularly deplorable if it is not a consequence of 'rational' strategies to fend off real threats to the national interests, but rather results from deficient domestic policy processes that lead to fragmented approaches, neglect policy alternatives at the domestic level, disregard the co-riparian countries' water management challenges, or prioritize ideologically motivated narratives.

The low level of water development particularly in the upper parts of the basin raises the question whether the unilateralism of the past can serve as a viable blueprint for the future. For example, the long-term gains from defending Ethiopia's principled claim for a higher share – however justified it may be – must be critically assessed and compared to the potential overall benefits of a more cooperative approach that would de-emphasize the issue of *de jure* water allocation at least in the short term. At the same time, Egypt's role as a dependable partner for cooperation is also on trial. The downstream hegemon has relied on its economic and military dominance in the Nile Basin for such a long time that ending this dominance has become an implicit policy goal for upstream countries in and of itself. Bold steps are needed to regain the trust and goodwill of upstream riparian states, which are undoubtedly very precious resources in view of future developments in the Nile Basin.

A cooperative and integrated planning process taking into account the needs of all water users along the Nile is likely to generate high overall benefits that could be shared among the riparian stakeholders. However, the Egyptian peasant who presently uses the Nile water to irrigate his fields and the Ethiopian farmer who could benefit from abstracting more water from the river do not sit together at the negotiation table to define the most beneficial strategies of river development. Rather, their interests are traded off indirectly through national and transboundary institutions that struggle to produce effective river development policies due to various domestic constraints as discussed in this study. Domestic institutional reforms that aim to strengthen the cooperation between different stakeholders and bridge the 'institutional separation' between water users in different regions along the river will play an essential role in the historic effort to establish an effective and cooperative river management regime in the Nile Basin.

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Appendix

Questionnaires used in the Social Network Analysis

Note: In the actual questionnaires, each question was followed by a complete 'tick-list' encompassing all the network actors selected for this study. In this Appendix, these lists are fully reproduced only for the first question in the Egyptian and Ethiopian questionnaire, respectively.

Egyptian case study

Date:

Organization:

Interviewee:

Position:

Purpose of the analysis

Network analysis is the study of relationships between actors in a specific sector. By the analysis of networks we intend to find out more about processes such as information flow, coordination of activities or cooperation in different phases of the policy making process. Results derived from the study of networks may be used to strengthen institutional reform efforts and highlight changes in institutional arrangements.

Instructions for respondents

- All the following questions are about the relations of your institution / unit to other institutions / units. Please indicate the existing relations according to 5 definitions of relationships on the following pages. The questions are simple and straightforward (i.e., 'does a relationship exist?').
- As the total number of possible relations is quite substantial, please try to proceed efficiently through the questionnaire. Simple yes/no answers are sufficient, unless a further specification is required. Qualitative details on the relationships are not needed for the quantitative network analysis.

- Please try to give your answers on behalf of relationships of you organization / unit with other organizations / units rather than your personal relations.
- If necessary, please also indicate relevant linkages to actors of each category not featuring on the list.

Remark

The collected data will be treated anonymously and be used for research purposes only.

1 Reputation

In your opinion, which of the following actors has the greatest influence on deciding upon water management strategies in Egypt and the modes of how these strategies are implemented?

Please point out to the 10 most influential actors.

GOVERNMENTAL AUTHORITIES	
Ministry of Planning	
Ministry of Health and Population	
Ministry of Agriculture and Land Reclamation (including ARC)	
Ministry of Environmental Affairs	
Ministry of Housing, Utilities and New Communities	
Ministry of Local Development	
Ministry of International Cooperation	
Ministry of Foreign Affairs	
Ministry of Industry and Foreign Trade	
Social Fund for Development	
MINISTRY OF WATER RESOURCES AND IRRIGATION	
Planning Sector	
Irrigation Department	
Irrigation Sector	
Horizontal Expansion Sector	
Ground Water Sector	

Nile Water Sector	
Minister Office affairs Central Dept.	
Central Water Quality Management Unit	
Institutional Reform Unit	
Eg. Public Authority for Drainage Projects	
High Aswan Dam Authority	
GOVERNMENTAL COMMISSIONS	
People's Assembly, Committee on Agriculture and Irrigation	
DECENTRAL WATER AUTHORITIES	
Water Users Associations & Water Boards	
RESEARCH INSTITUTIONS	
National Water Research Center	
Sci. Res. Academy (Water Resources Div.)	
Irrig. Dept., Fac. Engineering, Univ.	
(PRIVATE) COMPANIES	
North Sinai Holding Company	
Potable Water and Sanitation Holding Company	
Other Private Companies?	
CONSULTING FIRMS	
Ahmad Abd Elwareth Consultants	
Chemonics Consultants	
Darwish Consultants	
Other Consultants?	
NGOs	
Egyptian National Committee for Irrigation and Drainage	
Arab Office for Youth and Environment	
CEDARE	
Other NGOs?	
INTERNATIONAL ORGANIZATIONS	
World Bank	
UNDP	
UNESCO	
BILATERAL DONOR AGENCIES	
USAID	
Netherlands Development Cooperation	
GTZ	
JICA	

2 Official Affiliation

With which of the following actors are you connected through contracts, agreements, institutional linkages (i.e. procedures within the governmental administration), in permanent committees, working groups, etc. ?

Excluded: Associations with more than 20 members

GOVERNMENTAL AUTHORITIES	
Ministry of Planning	
Ministry of Health and Population	
Ministry of Agriculture and Land Reclamation (including ARC)	
Etc. . .	

3 Meetings

With which of the following actors do you (or other professional staff members in your organization) regularly participate in meetings **concerning issues of water resources planning and management?**

Specify how often per year you meet with the actor.

GOVERNMENTAL AUTHORITIES	
Ministry of Planning	
Ministry of Health and Population	
Ministry of Agriculture and Land Reclamation (including ARC)	
Etc. . .	

4 Information flow

With which of the following actors do you exchange *factual* information that is essential for formulating water management strategies? *Specify whether you provide the information to the other actor (Send) or receive information from the other actor (Receive).*

Essential information understood as (for example):

- Reports on the status of the water resources and water development projects
- Scientific studies on socio-economic aspects relevant to water resources development
- Studies on the applicability of water resources management measures/techniques produced by either you or the other actor

Excluded: activity reports, advertisement, newsletters, public (published) documents…

	Send	**Receive**
GOVERNMENTAL AUTHORITIES		
Ministry of Planning		
Ministry of Health and Population		
Ministry of Agriculture and Land Reclamation (including ARC)		
Etc. . .		

5 Effective cooperation

With which of the following actors do you cooperate in a fashion that – in your opinion – has led to a tangible impact on water resources management?

Planning phase	Implementation phase
Definition	
• General national policy formulation (Including major projects) • Annual national plans	• Technical implementation plans and implementation
Tangible results understood as:	
• Decision on the formulation of a specific policy component (IF it is also sufficiently implemented) • A change in the structure of the water sector • The joint planning of a major project	• The joint implementation of a water resources development project • The production of an important document, the organization of a crucial event, …

	Planning	**Implementation**
GOVERNMENTAL AUTHORITIES		
Ministry of Planning		
Ministry of Health and Population		
Ministry of Agriculture and Land Reclamation (including ARC)		
Etc. . .		

Ethiopian case study

Note: As the prime minister could not be interviewed, data on specified linkages to the prime minister were not used in the analysis.

Date:

Organization:

Interviewee:

Position:

Interviewer:

Purpose of the Analysis

Network analysis is the study of relationships between actors in a specific sector. By the analysis of networks we intend to find out more about processes such as influence of actors, meetings, information flow, co-ordination of activities or cooperation in different phases of the policy making process. We look at forty actors divided into different stakeholder-groups.

The data gathered will be used for our Master-Thesis on the national water policy in Ethiopia which we write at the University of Berne, Switzerland.

Instructions

All the following questions are about the relations of your institution to other institutions. Please indicate the existing relations according to six types of relationships on the following pages. The questions are generally simple and straightforward (does a relationship exist?).

As the total number of possible relations is quite substantial, please try to proceed efficiently through the questionnaire. Details on the relationships are not required for the quantitative network analysis.

Please try to give your answers on behalf of relationships of your organization with other organizations rather than your personal relations.

If any questions arise, please do not hesitate to ask the interviewer.

Remark

The collected data will be treated anonymously and used for research purposes only.

1 Reputation

1A In your opinion, which of the following actors have the greatest influence on deciding upon **water management strategies** and **planning** in Ethiopia?

Please point out the 10 most influential actors in the first column.

1B In your opinion which of the following actors have the greatest influence in the **implementation** of **water policy strategies** in Ethiopia?

Please point out the 10 most influential actors in the second column.

*Actors can be pointed out twice if they are important in planning **and** implementation.*

Definition

Planning phase	**Implementation phase**
• General national policy formulation • Annual national plans • And other important strategies or planning activities	• Implementation of projects • Technical plans for realization of projects • And other implementation activities

	Influence	
	A Planning, Strategy	B Imple-mentation
		GOVERNMENT
Prime Minister's Office		
Parliament		
		MINISTRY OF WATER RESOURCES
MOWR Top Management / Ministry's Office		
MOWR Department of Basin Development Study and Water Utilization Control		
MOWR Department of Boundary and Transboundary Affairs		

MOWR Department of Rural Water Supply and Sanitation Service		
MOWR Department for Water Resources Administration and Urban Water Supply and Sanitation		
MOWR Department for Irrigation and Drainage Development Study		
MOWR Department of Dam and Hydropower Design		
MOWR Department for Planning		
MOWR Department of Policy, Development Cooperation and Foreign Relations		
MOWR Department for Women Affairs		
MOWR Department for Research and Development		
Other MoWR?		
GOVERNMENTAL AUTHORITIES		
Ministry of Water Resources		
Ministry of Agriculture and Rural Development (MoARD).		
Ministry of Finance and Economic Development (MoFED)		
Ministry of Foreign Affairs (MoFA)		
Ministry of Health (MoH)		
Environmental Protection Authority (EPA)		
Ethiopian Electric Power Corporation (EEPCO)		
Other Governmental Authorities?		
REGIONAL STATES		
Amhara		
Gambella		
Oromia		
Other regional states?		
UNIVERSITIES AND RESEARCH INSTITUTIONS		
Amist Kilo Faculty of Technology, AAU		
International Water Management Institute (IWMI)		
Siddist Kilo College of Social Sciences, AAU		
Other universities and research institutes?		
PRIVATE AND ECONOMIC SECTOR		
Ethiopian Chamber of Commerce (ECC)		
Flower Farms, Ethiopian Horticultural Producers and Exporters Association (EHPEA)		
Other private economic actors?		
CONSULTING FIRMS		
Metafaria		
Water Works Design and Supervision Enterprise (WWDSE)		
Other consultants?		

CIVIL SOCIETY AND NGOs		
Christian Relief and Development Association (CRDA), Civil Society Campaign Against Famine in Ethiopia (CS-CAFE)		
Ethiopian Economic Association (EEA)		
Ethiopian Orthodox Church/Development and Interchurch Aid Commission (EOC-DICAC)		
Ethiopian Rainwater Harvesting Association (ERHA)		
WaterAction		
WaterAid		
Other NGOs?		
		MULTILATERAL DONORS
African Development Bank (AfDB)		
European Union (EU)		
United Nations Development Program (UNDP)		
United Nations International Children's Fund (UNICEF)		
World Bank (WB)		
Other multilateral donors?		
		BILATERAL DONOR AGENCIES
Canadian International Development Agency (CIDA)		
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)		
Japan International Cooperation Agency (JICA)		
United States Agency for International Development (USAID)		
Other bilateral donor agencies?		

2 Meetings

With which of the following actors do you (or other professional staff members in your organization) regularly participate in **meetings** concerning issues of **water resources management** (planning and/or implementation)?

Please specify how often you meet with each actor according to the following categories:

1. Very seldom	*Once in six months and less*
2. Sometimes	*Once a month up to twice in six months*
3. Often	*Twice a month and more*

If you never meet with an actor, please leave it blank.

	GOVERNMENT
Prime Minister's Office	
Parliament	
	MINISTRY OF WATER RESOURCES
MOWR Top Management / Ministry's Office	
Etc. . .	

3 Information exchange

With which of the following actors do you exchange **factual information** that is **essential** for formulating **water management strategies** (planning and/or implementation)?

Examples of essential information include:

- Reports on the status of the water resources and water development projects
- Scientific studies on socio-economic aspects relevant to water resources development
- Studies on the applicability of water resources management measures / techniques produced by either your institution or the other institution

Excluded: directives, annual reports, advertisement, newsletters, other easily available public documents...

Please specify whether you provide the information to the other actor (OUT) or receive information from the other actor (IN).

	OUT	IN
		GOVERNMENT
Prime Minister		
Parliament		
		MINISTRY OF WATER RESOURCES
MOWR Top Management / Ministry's Office		
Etc. . .		

4 Joint activities

4A With which of the following actors do you engage in joint activities concerning the **water management planning process**?

4B With which of the following actors do you engage in joint activities concerning the **water management implementation process**?

Joint activities are understood as:

- Joint planning
- Joint elaboration of strategies
- Planning and implementation of common projects
- Joint research activities
- Common publications
- Joint lobbying activities
- etc.

	Planning	Implem.
		GOVERNMENT
Prime Minister Parliament		
MINISTRY OF WATER RESOURCES		
MOWR Top Management / Ministry's Office		
Etc. . .		

5 Effective cooperation

5A With which of the following actors do you cooperate in a fashion that - in your opinion - has lead to a **tangible impact on water resources management** concerning **strategy or planning**?

5B With which of the following actors do you cooperate in a fashion that - in your opinion - has lead to a **tangible impact on water resources management** in the **implementation process**?

Definition	
Planning phase	**Implementation phase**
• General national policy formulation • Annual national plans • And other important strategies or planning activities	• Implementation of projects • Technical plans for realization of projects • And other implementation activities
Tangible results are understood as:	
• Formulation of a specific policy component • A change (or prevention of a change) in the structure of the water sector • The joint planning of a major project • etc.	• The joint implementation of a water resources development project • The organization of a crucial event • etc.

	Planning	Implem.
GOVERNMENT		
Prime Minister		
Parliament		
MINISTRY OF WATER RESOURCES		
MOWR Top Management / Ministry's Office		
Etc. . .		

Curriculum Vitae

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Education

2003–2007	Ph.D. in Environmental Sciences (Swiss Federal Institute of Technology) Conducted at the Center for Security Studies, within the framework of the NCCR North South Program Supervision:	Prof. Dr. Alexander J.B. Zehnder Prof. Dr. Andreas Wenger
2002	M.Sc. in Environmental Sciences (Swiss Federal Institute of Technology) Thesis: *C^{12}/C^{13} Isotope fractionation during the degradation of chlorinated pollutants in groundwater* Conducted at the Swiss Federal Institute for Environmental Science and Technology (EAWAG) Supervision:	Prof. Dr. Stefan Haderlein
1995–2002	Studies at the Swiss Federal Institute of Technology ETH Zurich, Department of Environmental Sciences	
1988–1995	High School in Davos Platz (Matura Typus B, Latin)	

Practical Experience

2002–2003	Research work at the Swiss Federal Institute for Environmental Science and Technology (EAWAG) Topic: Arsenic removal efficiency of local household sand filters in Vietnam
1999	Internship at GTZ in Egypt Topic: socio-economic aspects related to the shift to organic agricultural production
1998–1999	Internship at Intercooperation in Madagascar Topic: sustainable use of different non-wood forest products