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Transboundary water management in Africa: challenges for development cooperation

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Studies

Transboundary water management in Africa

German Development Institute (DIE)

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Transboundary water management in Africa Challenges for development cooperation

Waltina Scheumann / Susanne Neubert (Editors)

With contributions of

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Malte Grossmann

Axel Klaphake in collaboration with Olivia Voils

Eric Mostert

Susanne Neubert

Waltina Scheumann

Lars Wirkus

Study for the research and consultancy project
"Cooperation on Africa's transboundary water resources"
*on behalf of the Ministry for Economic Cooperation and
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Abbreviations

AFD	Agence Française de Développement
AfDB	African Development Bank
AMCEN	African Ministerial Conference on the Environment
AMCOW	African Ministers' Council on Water
AU	African Union
AWIRU	African Water Issues Research Unit
BCSP	Basin Committee for Strategic Planning
BGR	Bundesanstalt für Geowissenschaften und Rohstoffe
BMBF	Bundesministerium für Bildung und Forschung / German Federal Ministry of Education and Research
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung / German Federal Ministry for Economic Cooperation and Development
BWO	Basin water organization
CAEC	Central Asian Economic Community
CAPCO	Central African Power Corporation
CAR	Central African Republic
CBO	Community-based Organization
CEDARE	Centre for Environment and Development for the Arab Region and Europe
CHEP	Chukha hydroelectricity project
CHPC	Chuka Hydro-Power Corporation
CIDA	Canadian International Development Agency
CILSS	Comité permanent Inter Etats de Lutte contre la Sécheresse au Sahel
CLVD	Committee for Lake Victoria Development
CNMC	Cameroon-Nigeria Mixed Commission
CONSAS	Constellation of Southern African States
CPA	Chukha Project Authority
DANIDA	Danish International Development Agency
DBSA	Development Bank of Southern Africa
DC	Development cooperation

DEWA (UNEP)	Division of Early Warning and Assessment
DGEF (UNEP)	Division of Global Environment Facility Coordination
DPDL (UNEP)	Division of Policy Development and Law
DSS	Decision-support system
DWAF	Department of Water Affairs and Forestry, South Africa
EABC	East African Bank for Cooperation
EAC	East African Community
EADB	East African Development Bank
EALA	East African Legislative Assembly
ECOVIC	East African Communities Organisation for the Management of Lake Victoria
ECOWAS	Economic Community of West African States
EIB	European Investment Bank
EMP	Environmental Monitoring Programme
ESA	European Space Agency
Escom	Electricity Supply Commission
ESPOO	Convention on Environmental Impact Assessment in a Transboundary Context
EUWI	European Union Water Initiative
FAO	Food and Agriculture Organization of the United Nations
FEM	Fonds pour l'Environnement Mondial
FGEF	French Global Environment Facility
FRIEND	Flow Regimes from International Experimental and Network Data
FZ	Finanzielle Zusammenarbeit / Financial cooperation
GABHIC	Cunene River Basin Commission
GDP	Gross domestic product
GEF	Global Environment Facility
GIS	Geographic information system
GLOWA	Global Change in the Hydrological Cycle
GTZ	Gesellschaft für Technische Zusammenarbeit
GWP	Global Water Partnership
HCB	Hidroeléctrica de Cahora Bassa
HCSAG	Highlands Church and Solidarity Action Group

HOORC	Harry Oppenheimer Okavango Research Center
HWRP	Hydrology and Water Resources Programme
HYCOS	Hydrological Cycle Observing System
IAH	International Association of Hydrogeologists
IBT	Interbasin transfer
ICJ	International Court of Justice
ICPM	International Commission on the Protection of the Meuse
ICPS	International Commission on the Protection of the Scheldt
ICWC	Interstate Coordination Water Commission of Central Asia
IDA	International Development Association
IDRC	International Development Research Centre, Canada
IFAS	International Fund for Saving the Aral Sea
IGAD	Intergovernmental Authority on Development in Eastern Africa
IGRAC	International Groundwater Resources Assessment Centre
IHP (UNESCO)	International Hydrological Programme
IJC	International Joint Commission
IJWC	Incomati Joint Water Commission
ILA	International Law Association
IMS	Information management system
INBO / RIOB	International Network of Basin Organizations / Réseau International des Organismes de Bassin
InWEnt	Internationale Weiterbildung und Entwicklung / Capacity Building International, Germany
IPTRID	International Programme for Technology and Research in Irrigation and Drainage
IRD	Institut de Recherche pour le Développement
IRN	International Rivers Network
ISARM	International Shared Aquifer Resources Management
IUCN	International Union for the Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated water resources management
JGE	India-Nepal Joint Group of Experts

JIBS	Joint Incomati Basin Study
JPCC	Joint Permanent Commission for Cooperation
JPTC	Joint Permanent Technical Commission / Committee
JTC	Joint Technical Committee
JULBS	Joint Upper Limpopo Basin Study
JWC	Joint Water Commission
KfW	Kreditanstalt für Wiederaufbau
KLDC	Kariba Lake Development Company
KOBWA	Komati Basin Authority
LBPTC	Limpopo Basin Permanent Technical Committee
LCBC	Lake Chad Basin Commission
LHDA	Lesotho Highlands Development Authority
LHWC	Lesotho Highlands Water Commission
LHWP	Lesotho Highlands Water Project
LHWRF	Lesotho Highlands Water Revenue Fund
LIMCOM	Limpopo Watercourse Commission
LUSIP	Lower Usutu Smallholder Irrigation Project
LVBC	Lake Victoria Basin Commission
LVDP	Lake Victoria Development Programme
LVEMP	Lake Victoria Environmental Management Project
LVFO	Lake Victoria Fisheries Organization
LVFRP	Lake Victoria Fisheries Research Project
MAR	Mean Annual Runoff
MCM	Million Cubic Meters
MDGs	Millennium Development Goals
MLTSF (NEPAD)	Medium to Long Term Strategic Framework
MRC	Mekong River Commission
MZWP	Matabeleland Zambezi Water Project
NARIS	Nubian Aquifer Regional Information System
NBA	Niger Basin Authority
NBI	Nile Basin Initiative
NC	National Committee
NELSAP	Nile Equatorial Lakes Subsidiary Action Program

NEPAD	New Partnership for Africa's Development
NGO	Nongovernmental organization
NORAD	Norwegian Agency for Development Cooperation
NRC	Niger River Commission
NSAS	Nubian Sandstone Aquifer System
NTF	National Task Force
NWSAS	North-West Sahara Aquifer System
O&HC	Organizational and human capacity
O&M	Operation and maintenance
OBSC	Okavango Basin Steering Committee
OECD	Organisation for Economic Cooperation and Development
OKACOM	Permanent Okavango River Basin Water Commission
OMVS	Organisation pour la mise en valeur du fleuve Sénégal
ORASECOM	Orange-Senqu River Commission
ORRS	Orange River Replanning Study
OVTS	Orange Vaal Transfer Scheme
PCCP (UNESCO)	From Potential Conflict to Co-operation Potential
PJTC	Permanent Joint Technical Commission
PMU	Project Management Unit
PWC	Permanent Water Commission
RBA	River basin authority
RBM	River basin management
RBO	River basin organization
RIOB	Réseau International des Organismes de Bassin
RISDP (SADC)	Regional Indicative Strategic Development Plan
RSA	Republic of South Africa
RSAP-IWRM	Regional Strategic Action Plan for Integrated Water Resources Development and Management
RSAP (SADC)	Regional Strategic Action Plan
RTF	Regional Task Force
SADC	Southern African Development Community
SADCC	Southern African Development Coordination Conference
SADC-HYCOS	SADC Hydrological Cycle Observing System

SADC-IS	SADC Directorate Infrastructure and Services
SADC-WD	SADC Water Division
SADC-WSCU	SADC Water Sector Co-ordination Unit
SADC-WSRG	SADC Water Strategy Research Group
SAED	Société d'Aménagement et d'Exploitation des Terres du Delta du Fleuve Sénégal
SAP	Strategic Action Programme / Plan
SATAC	Southern Africa Technical Advisory Committee
SEI	Stockholm Environment Institute
SIC	Scientific Information Center
SIDA	Swedish International Development Co-operation Agency
SODAGRI	Société de Développement Agricole et Industriel
SOGED	Société de Gestion et d'Exploitation de Diama
SOGEM	Société de Gestion de l'Energie de Manantali
SONADER	Société Nationale de Développement Rural
STAP (NEPAD)	Short Term Action Plan
STAP-TWR (NEPAD)	Transboundary Water Resources Strategic Framework and Action Plan
SWAPO	South West Africa People's Organization
TAS	Transboundary aquifer systems
TCTA	Trans-Caledon Tunnel Authority
TDA	Transboundary diagnostic analysis
TECONILE	Technical Committee Nile
TIGER	Topologically Integrated Geographic Encoding and Referencing System
TPTC	Tripartite Permanent Technical Committee
TRIB (UNDP)	Transboundary River Basin Initiative
TSC	Joint Dutch-Belgian Technical Scheldt Commission
TZ	Technical Cooperation
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa

UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNOWA	United Nations Office for West Africa
UNSO	United Nations Sudano-Sahelian Office
UNU-EHS	UN University Institute for Environment and Human Security
USAID	United States Agency for International Development
VNJIS	Vioolsdrift and Noordoewer Joint Irrigation Scheme
WAPCOS	Water and Power Consultancy Services (India) Ltd.
WB	World Bank
WCF (PCCP)	Water Cooperation Facility
WMO	World Meteorological Organization
WRTC	Water Resources Technical Committee
WSCU (SADC)	Water Sector Co-ordination Unit
WUC	Water Utilities Corporation
WWAP	World Water Assessment Programme
WWF	World Wide Fund for Nature
ZACPLAN	Action Plan for the Environmentally Sound Management of the Common Zambezi River System
ZACPRO	Zambezi Action Plan Project
ZAMCOM	Zambezi Watercourse Commission
ZRA	Zambezi River Authority
ZRBA	Zambezi River Basin Authority

Introduction

Water is an essential, indeed crucially vital strategic natural resource for all economies. Every country's drinking water supply, food production, energy supply, and, consequently, industrial development hinge on water availability. The resource is also the *sine qua non* for healthy human living conditions and sound ecosystems. Even today some countries, including many African countries, must be termed "water-stress economies" because to cover their water needs they are forced to fall back on water reserves generated outside their own national territory. Since developing countries use the lion's share of their water resources for irrigated agriculture, with an increasingly important share going into power generation, and in view of the fact that these two sectors are essential for economic development, dependence on water supplies from other countries is widely seen as an important indicator for the crisis proneness of entire economies.

In the past the joint use of transboundary rivers was often seen as entailing major security-related conflict potentials. In the late 1980s and particularly during the 1990s blaring headlines like "Water Wars," "Water More Precious than Gold," or "Water Seen as Fuel for Military Conflicts" drew the public's attention to potential or existing use conflicts along transboundary water bodies. Rising consumption and the asymmetrical hydropolitical relations between countries fuelled the assumption that water shortages would just about inevitably lead to violent conflict. A much-cited example was conflict among the riparian countries along the Nile and Euphrates-Tigris; the relations between the riparian countries of Southern Africa were likewise seen as a potential source of conflict.

However, actual developments have not borne out these somber forecasts. Indeed, experience shows that transboundary water resources are far more likely to serve as the motor of transboundary cooperation than of violent conflict between nations. Since the end of the apartheid regime in South Africa, it is precisely Southern Africa – a region with an exceptional number of transboundary rivers – that has a number of positive developments to show in this regard. But in other regions as well, Africa's heads of state and government have set their sights on a cooperative management that has been affirmed in many declarations and bi- and multilateral agreements.

While cooperation in transboundary river and lake basins is a necessity, it is not at all a matter of course. If it is not possible to satisfy the accumulated demand of all riparian countries sharing a river or lake system, the result may be water-use conflicts of many different kinds.¹ These conflicts are concerned quite generally with water-quantity and water-quality issues. Unlike domestic conflicts over water quantity and quality, which are generally accessible to resolution by a higher-level state authority or by informal means, i.e. by the users themselves, one particular feature of transboundary water-use conflicts is that they can be resolved only through negotiations between sovereign states. However, there is some evidence that domestic conflicts among water users lead to violence if authorities are not able to balance interests and enforce the law.

Developments in southern Africa show clearly that access to transboundary water resources depends on political and economic power relations between the riparian countries. The unequal economic power of riparian countries and their unequally developed administrative capacities furthermore have an important influence on the ability of riparians to engage in cooperation.

Africa is a continent exceptionally well endowed with river basins and large inland lakes² that extend over the territories of several countries. Both crisis-prone hotspots and a good number of promising approaches to transboundary water management can be observed here. Today there are international agreements in effect for 20 of Africa's 63 river basins, and in 16 river basins there are institutionalized forums that have the task of coordinating national initiatives.

Despite this limited number of formal coordination forums, transboundary water management has made considerable progress, especially in Southern Africa: New organizations have been founded, existing organizations have been restructured and leaned down, and some of such organizations have enlarged their fields of responsibility and redefined their functions. The

1 The term "conflict" refers to disputes and differences of interests between riparians that may occur when accumulated demand cannot be satisfied. The task of conflict resolution may be approached by cooperative or by confrontational means; under certain - restrictive - conditions, though, the riparians concerned may opt to settle a conflict over water use by violent means.

2 The term "lake" is used here for all inland lakes.

reasons for this must be sought in the overall political constellation given at present, with the Republic of South Africa, the dominant regional power, pursuing a cooperative and pro-integration course. Furthermore, the Southern African Development Community (SADC) provides an overarching political framework conducive to such efforts aimed at transboundary cooperation. Another important success factor must be seen in the incremental, pragmatic approach that has been pursued in the development of transboundary water organizations. Two features typical of the approach are confidence-building measures and the procedures and forums governing transboundary cooperation that have now been established.

Many promising developments may also be noted for older river-basin organizations like the *Organisation pour la mise en valeur du fleuve Sénégal* (OMVS), the Niger Basin Authority (NBA), and the Lake Chad Basin Commission (LCBC), and new initiatives for cooperation are presently being undertaken on Lake Victoria. In addition, the founding of the African Ministers' Council on Water (AMCOW) has established a continent-wide cooperation context that has placed transboundary water cooperation on its agenda, and is receiving external support for the purpose.

By comparison, cooperation along the region's roughly 38 transboundary groundwater systems is weakly developed, and examples of cooperation may be found only in North Africa, on the Nubian Sandstone Aquifer System and the North West Sahara Aquifer System. Even though some African countries have increasingly been tapping groundwater resources for agriculture and to supply household needs, very few forms of institutionalized cooperation have been established thus far.

The international donor community has played an important role in the foundation of nearly all river and lake basin organizations. It has contributed important financial and technical support for the building and development of such organizations, in taking stock of the current situation, in exchanging data, in developing options for and programs of action, in supporting international and local NGOs and stakeholder groups, and it is involved in the funding of infrastructure projects. Apart from international donor organizations, regional actors like the SADC Water Division, the Water Division of the Economic Community of West African States (ECOWAS), AMCOW, and the African Union (AU), via the New Partnership for Africa's Development (NEPAD) also play a role here, and they

themselves have been receiving financial and technical support for this purpose.

Germany is engaged at several levels of transboundary water management in Africa: at the international level through the G8 and the European Union Water Initiative; at the continental level (AMCOW, NEPAD); at the regional level (SADC Water Unit), in river and lake basin organizations (ORASECOM on the Orange-Senqu, the LIMCOM on the Limpopo, the Nile Basin Initiative, and the Lake Chad Basin Commission) and, indirectly, at the bilateral level, making use of the instruments of financial and technical cooperation in the water sector (water supply and wastewater disposal, water sector reforms, harmonization of water policies); in the agricultural and in the energy sector.

In order to further promote international cooperation on the African continent, the German Federal Ministry for Economic Cooperation and Development (BMZ) has funded the project **Transboundary Water Resources Management in Africa**. It asked the German Development Institute (DIE) to commission a number of studies (see below), the themes of which were defined by DIE in communication with development and water experts. On the basis of these studies, a results workshop was held at the DIE in Bonn on April 14, 2005, where participants from universities and development organizations reached agreement on some core recommendations for development cooperation. The recommendations given in the studies and during the discussion process were condensed in a policy paper (see below). It provides further grounding of and some new ideas for transboundary water management, a relatively new field of development cooperation.

Wirkus and Boege take an in-depth look at the present state of transboundary water management and the experiences made with it on selected African transboundary rivers and in lake regions, including the Orange-Senqu, the Limpopo, the Zambezi, Lake Victoria, and Lake Chad. For each of these cases the study presents hydrological, economic, and general political background data and analyzes risks, conflict factors, and the potential and need for development cooperation. One focus of the presentation is water-related agreements and international institutions with their mandates and procedural rules. Wirkus and Boege show that apart from promoting individual river basin organizations, one other strategy that has proven successful is support for continental and regional actors like

AMCOW and SADC's water sector unit, respectively. At present transboundary lake basin management is still in a rudimentary state of development and could be expanded; a promising window of opportunity appears to be opening up for Lake Victoria. The authors also stress that more attention should be paid to the development potential of transboundary groundwater reserves as new field of activity for development cooperation on the African continent.

Klaphake, in collaboration with Voils, investigates the concept of benefit-sharing, which plays a prominent role in the international discourse on transboundary water cooperation. Making use of the concept could provide crucial impulses for water cooperation, despite divergences in interests and the upstream-downstream problems typically involved here. The study looks into 18 concrete cases, a number of them on the African continent, in which riparian countries have concluded agreements with a benefit-sharing character. Most projects with benefit-sharing features are concerned with dam construction designed to jointly generate and use water power, a development that is due in large measure to the simple and rarely contentious predictability of the benefits stemming from energy generation. On the other hand, there are as good as no benefit-sharing agreements for projects designed to improve water quality or to achieve other ecological objectives.

Klaphake identifies a number of factors that may have conducive or obstructive impacts on benefit-sharing agreements. Such agreements, with their reciprocal benefits, become increasingly important in situations marked by growing water scarcity, since this case entails rising economic costs for non-cooperation. There are, for instance, substantial problems involved in implementing win-win projects if the countries concerned pursue conflicting interests, uncertainties over project impacts have not been clarified, and administrative and economic capacities are underdeveloped. Since benefit-sharing can best be realized in connection with river development and acquisition of new water resources (e.g. interbasin water transfer), development cooperation should work to implement standards of project monitoring and design of the kind set out in the guidelines of the *World Commission on Dams*.

Development cooperation should also undertake efforts to render transparent the potential economic benefits of other forms of water cooperation. In view of the fact that successful international win-win projects hinge cru-

cially on competent and effective project organization, funding, and control, development cooperation can provide support for national administrations in the form of assistance for capacity-building. Promotion of regional water agreements and river basin organizations also increases the likelihood that benefit-sharing agreements will in fact be concluded, since such efforts serve to create an environment that is at the same time stable and conducive to confidence-building.

In view of the fact that a substantial share of the expenditures of many transboundary water management projects goes into data gathering and processing, **Grossmann** starts out by discussing the general need for a shared database. In the author's opinion the concern here is not simply to generate as many data as possible; a more promising approach would be to work on data which serve to illustrate the specific advantages and drawbacks of different strategies for the parties concerned. One aspect of central importance here is that the database find acceptance among the parties to negotiations; such acceptance could be supported through jointly organized river basin studies and water resource assessments.

Grossmann investigates, in a number of African river basins, the role that individual river basin organizations have played in this process. The findings clearly indicate that the capacities required to collect and process the relevant data needed to address transboundary water management issues hinge in particular on the spectrum of tasks assigned to a river basin organization (operational management of transboundary infrastructure systems and/or strategic water resource planning) and the way in which such river basin bodies are organized. Development cooperation should provide support for those approaches designed to strengthen information management that are at the same time conducive to achieving the core functions of a given river basin organization.

Promotion of transboundary water management organizations is regarded as an important priority by the Southern African Development Community, and other regional and continental associations have also placed transboundary water management on their agenda. These efforts are supported by the international community, e.g. by the G8 Africa Action Plan and the EU Water Initiative, but also by the World Bank and the Global Environment Facility (GEF), the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the African Development Bank (AfDB), and other influential organizations. How-

ever, according to **Mostert**, the influence of donors should not be overestimated, although donors could play an important role in the different phases involved in establishing systems of transboundary water management. With a view to these phases – e.g. initial meetings, negotiations, conclusion, implementation, and monitoring of agreements – the article discusses the instruments that are presently in use. These include the organization of opportunities to exchange information and experiences, capacity-building, funding of infrastructure projects, and financial support for national delegations and the development and design of international forums.

Hardly any studies have been published that assess the issue of donor engagement in the development of transboundary water management and point to approaches that appear especially promising. This is one reason why the only way to identify the promising fields and instruments used by individual donors is to take a specific approach, i.e. one not devised against the background of years of experience and not geared to coming up with universally applicable solutions. This in turn depends, among other things, on regional interests and the strengths of individual donors. Engagement, though, need not necessarily take shape at the international level, since solutions to use conflicts are often best found at the national or local level. Donors could play a supportive role in harmonizing national water legislation and policies. Only a limited number of river basin organizations provide for any form of public participation, although examples can be found among North American and European organizations. Development of approaches for, among others, the African context might prove to be a promising field of activity in its own right. It would also be important to develop innovative approaches for a sustainable funding policy for river basin organizations.

Mostert generally advocates the principle of building on existing developments and potentials and responding to concrete needs of the riparian countries concerned. As a final point, he emphasizes the need to evaluate the effectiveness and sustainability of donor engagement, in the interest of both the donor community and regional and national actors.

In all African countries investigated, water resources will be further exploited by means of constructing dams and interbasin water transfer projects in order to satisfy increasing economic demand and social needs. In order to avoid negative impacts on riparian states and to balance benefits

and costs, the promotion of coordinating forums is significant. However, promoting their establishment and their management capacities is one instrument of development cooperation. **Scheumann and Neubert** assume in their recommendations that development cooperation will also continue to be bilateral in nature. Of all the instruments referred to here, it is the funding of infrastructure projects that poses a particular challenge. While some projects can be agreed upon directly with river or lake commissions (the KfW e.g. is conducting energy-sector projects together with the OMVS as the contract partner in charge of the projects), this is more the exception than the rule. As a rule credits for infrastructure investments (dam construction, irrigation and drainage systems, municipal water supply and wastewater disposal, etc.) are provided on a bilateral basis. Since some projects may tend to aggravate existing conflicts, it would be important to conduct, in advance, risk analyses concerning their inter-country conflict potential. These may e.g. be projects designed to expand irrigated agriculture in a given country or on the upper course of a river. Furthermore, this may also apply for projects that are designed to promote certain industries and may have impacts on downstream water quality. Our recommendation is therefore generally to review DC projects to determine whether there is reason to assume that they may entail transboundary impacts and what types of impacts these may be.

In providing bilateral support for water measures that are likely to have impacts on other riparian countries, DC should insist that the countries planning such measures adhere to the principle of prior notification, and it should become engaged only in the case that countries that may be faced with adverse impacts raise no objections. The principle of prior notification and the no-objection rule should also be applied precisely for projects for which Germany provides Hermes credit guarantees. This recommendation is more political than technical in nature.

Finally, Scheumann and Neubert sum up the findings of the studies in a number of strategic recommendations covering several fields of action, viz.:

- (i) Improving transboundary coordination by identifying economic and noneconomic incentives
- (ii) Supporting the establishment of coordination and cooperation forums

- (iii) Giving due consideration to water-quality and environmental issues
- (iv) Supporting efforts to develop disaster-prevention plans
- (v) Strengthening information exchange and management
- (vi) Capacity-building for monitoring and for public participation
- (vii) Promoting the sustainable funding of river- and lake-basin organizations
- (viii) Extending cooperation to cover groundwater management
- (ix) Strengthening donor coordination.

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Bonn, in November 2006

Waltina Scheumann / Susanne Neubert

Transboundary water management on Africa's international
rivers and lakes: current state and experiences

Lars Wirkus / Volker Böge

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Transboundary water management on Africa's international rivers and lakes: current state and experiences

Lars Wirkus / Volker Böge

1 Introduction

The 2003 UN World Water Development Report makes note of a worsening global water crisis. This crisis, it notes, is not least a crisis of water governance. The political parameters, institutions, and mechanisms required to ensure that water resources are used sustainably are in need of optimization, particularly in the countries of the South. Good water governance, in particular along transnational lake and river basins, is a necessary – but not sufficient – condition for achieving the water-related Millennium Development Goals.

This goes in particular for transnational lake and river basins. While they hold considerable potential for conflict and escalation, they also offer a variety of different possibilities for transnational cooperation. German development policy and development cooperation thus may be said to have good reason to define support of transboundary cooperation along international waterbodies and promotion of relevant institutions as one of its priority areas in Africa. What is called for here is special political efforts to support crisis prevention and to make optimal use of cooperation potentials. A donor country like Germany can use support for institution- and capacity-building to gain substantial influence on transnational river-basin management. Support for transboundary water management should directly serve the ends of conserving and making sustainable use of natural resources and supporting civil conflict resolution. Furthermore, in regions faced with a situation of weak statehood good water governance can serve indirectly – above and beyond the field of water utilization – to strengthen forces operating in the direction of stabilizing social and state structures, thus generally contributing to crisis prevention, development, and securing the foundations of peace.

Support for transboundary water management in Africa must be seen in the context of two interlinked task areas. The one concern is water management as a means of promoting sustainable (ecological) development; i. e. as a means of coming closer to the objective of achieving the water-

related international development goals. The other is water management as a means of crisis prevention. This is noted, not least, in the German government's action plan on "Civil Crisis Prevention, Conflict Resolution, and Peacebuilding" of May 2004. "Transboundary cooperation in the water sector," the documents states, plays a particularly important role for the field of crisis prevention. Transboundary cooperation serves to stabilize peace, and this is a central precondition for achieving the international development goals. Viewed in these terms, the two fields of action may be seen as interdependent.

The manifold significance of transboundary water resources management in Africa is addressed in various international documents with guideline character; these include e. g. the G8 Africa Action Plan, the New Partnership for Africa's Development (NEPAD) Action Plan, and the Abuja Declaration of the African Ministers Council on Water (AMCOW). Furthermore, the G8 Water Action Plan, with its commitment to support improved management and development of shared river basins and to promote *"river basin co-operation throughout the world, with particular attention to African river basins"* (G8 Water Action Plan, 1), offers an important point of reference for relevant German DC efforts. These efforts also have reference to the work of the UN Secretary-General's Advisory Board on Water and Sanitation and the International Water for Life Decade proclaimed by the UN General Assembly (2005–2015).

The study's aim and methodological approach

The aim of the research and advisory project "Transboundary Water Management in Africa" is to provide advisory support for relevant German DC activities in this field by formulating recommendations on promotion of transnational cooperation on international rivers and lakes. In the framework of the overall project, which consists of five individual reports, the task of this report is to present a *review and analysis of the experiences made thus far*.

As a desk study, the report evaluated available literature and documents, and made use of written and oral queries addressed to national and international experts. For this purpose the authors developed and used a number of different questionnaires that factor in regional and national givens.

The design of the questionnaires and the literature evaluation were geared to the analytical grid for investigating river-basin organizations stipulated in the terms of reference for the project:

- agreements on which cooperation is based;
- membership;
- mandate;
- tasks and functions;
- organizational structure;
- linkages to national decision-making structures;
- mode of operation;
- means by which a river-basin organization is funded;
- engagement of third parties / donors;
- conflict management / resolution;
- stakeholder participation;
- relationship to regional agreements and institutions;
- implementation and efficiency.

However, the report shows all limits set to a desk study. In view of the low response rates to the questionnaires, the authors were quite often unable to verify whether the information obtained from the literature is in fact correct. This goes both for the implementation and efficiency aspect and for the aspect of geopolitical classification and assessment, the reason being that up-to-date knowledge and information from experts and local actors are essential in this connection. Unfortunately, the authors were not always able to deal with this point in the depth required because the review of the literature as well as oral and written expert interviews are not sufficient to meet some of the criteria in the level of detail that would have been desirable. This would have required a longer stay in the region to conduct *in situ* interviews.

Selection of transboundary rivers and lakes

In coordination with the project sponsor, the German Federal Ministry for Economic Cooperation and Development (BMZ), the following five trans-

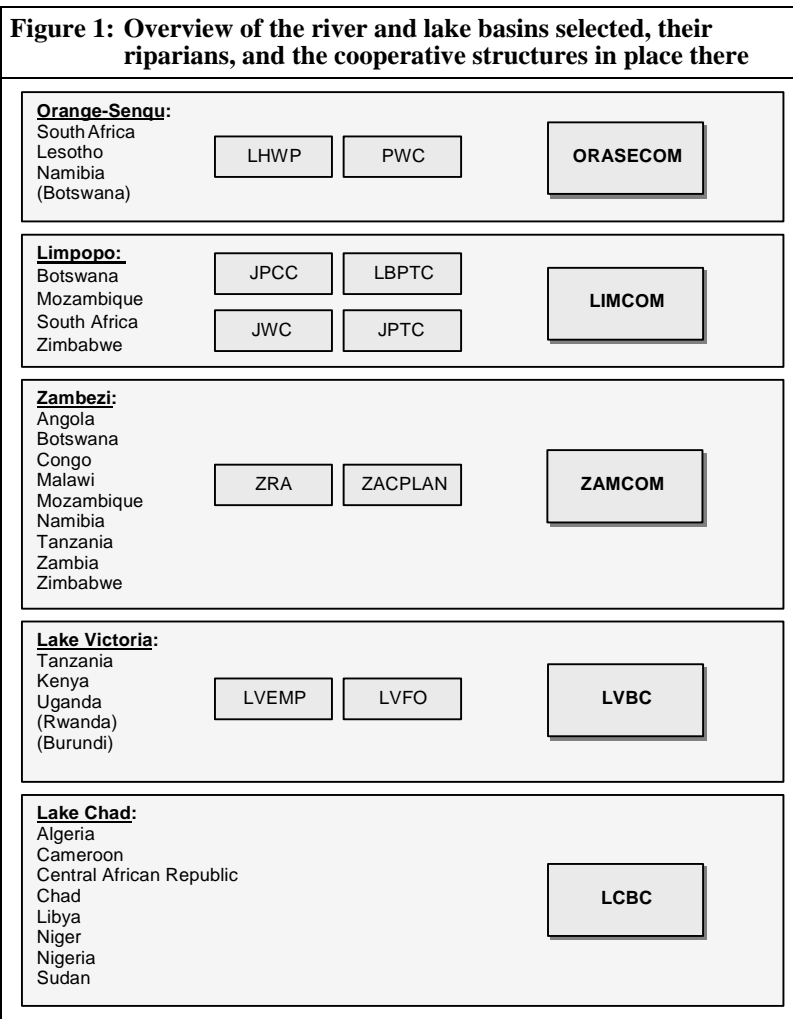
boundary waterbodies were selected for more exact analysis: Orange-Senqu, Limpopo, Zambezi, Lake Victoria, and Lake Chad (see Fig. 1). The budget available for the study was not sufficient to cover any further lake and/or river basins. This restriction of the scope of the study to five basins ruled out any comprehensive discussion and analysis – at least in the strict scientific sense of the term – of the kind stipulated in the terms of reference. This limitation is known to the project sponsor. The recommendations are therefore based in essence only on the river and lake basins referred to below. The individual basins were selected as follows:

Orange and Limpopo are the southern African river basins in which (a) economic development is furthest advanced and (b) there is an especially great need for transnational regulation on account of the heavy use of water resources made there. In these river basins, German DC has supported basin-related institutions for some time now, and done so with a good measure of success. Orange and Limpopo are generally regarded as relative successes of institutionalized international cooperation.

The *Zambezi* is the largest river in southern Africa, and the one with the most riparians. Its basin holds substantial development potential. Efforts aimed at transnational management have been slow in making headway; however, recent events (i. e. establishment of the Zambezi Watercourse Commission (ZAMCOM) in July 2004) seem to indicate that development in this area could take a more dynamic course.

Lake Victoria is Africa's largest lake, one that has substantial economic significance for its riparians. The establishment here of a lake-basin commission in November 2003 set in train a new and promising course of development. In addition, the basin is directly linked to the Nile, no doubt Africa's politically most sensitive river basin, as well as to the efforts underway there to further develop transboundary water management. Lake Victoria and Lake Chad are transnational waterbodies that involve problems quite unlike upstream-downstream problems normally encountered along transboundary rivers.

Lake Chad, which has a very large basin, has in recent years been exposed to extremely high levels of ecological degradation. In addition, the basin has a long history of institutional cooperation (or at least attempts at such cooperation) – it should be noted in this connection that the Fort Lamy /



N'djamena Convention on Lake Chad was signed as far back as 1964 – a fact which holds promise of a number of informative insights. German DC plans to step up its engagement on Lake Chad in the future.

2 Outline of the problem: International waterbodies in Sub-Saharan Africa

Sub-Saharan Africa is a region with an extraordinary number of trans-boundary river basins. Sixty-three of the world's 261 international river basins are located on the African continent. Here we find both crisis-prone hot spots and many promising incipient approaches to water governance and transboundary water resources management. Sub-Saharan Africa is for this reason especially well suited to serve as a paradigm to identify both lessons learned and deficits in the implementation of transboundary water management – and to derive recommendations from successes and deficits alike.

One feature typical of the hydrogeographic conditions found in Africa is the *often markedly uneven distribution of water resources in the continent's basins*. Apart from water-rich regions, i. e. those with abundant precipitation that contributes significantly to the volume of available water resources, there are also regions with low precipitation that contribute relatively little to the overall volume of water resources available and obtain a substantial share of the water they use from high-precipitation regions. The classic case for this constellation is the Nile, whose upstream riparians are located in high-precipitation regions, while Egypt, the downstream riparian, is located in an arid region.

The situation on the Zambezi and in other river basins in southern Africa is a similar one. Here the riparians to the north (Angola, Zambia, DR Congo, Mozambique) have abundant water resources, while the riparians to the south (in particular South Africa (RSA), Botswana, and Namibia) lack sufficient water resources. These latter countries are highly reliant on water resources generated outside their borders. While, for instance, the RSA consumes 80 % of all the water resources used in the SADC region, it contributes only 8 % to the region's water resources. *A constellation of this kind necessarily holds potential for conflict.*

It is not without good reason that the example of the Nile is again and again cited in the popular discourse on "water wars." Egypt is wholly dependent on the waters of the Nile for its economic development, and for this reason Egypt has declared a secure supply of water from the areas beyond its border to be a vital national security interest. In the past there have been repeated conflicts between Egypt and the upstream Nile

riparians over the allocation of the waters of the Nile, and these conflicts have even led to threats of war in times of particular stress (i. e. in periods of drought). Egypt, a strong military power, once threatened Ethiopia, the far weaker upstream riparian, that there would be *"no alternative to war"* (Anwar Sadat 1979, African Recorder, cited in Anderson 1991) if Ethiopia failed to respect *"Egypt's full rights to the waters of the Nile."* And it was the then deputy Egyptian Foreign Minister and later UN Secretary-General Boutros Ghali who, in 1990, made a statement that was often to be cited later, namely that the next war in the region would not be over oil but over water (Scheumann / Schiffler 1998, 1). Thus far this war has not happened. Indeed, for some years now the Nile riparians have been talking, in the Nile Basin Initiative (NBI), about a joint utilization of the waters of the Nile that would entail benefits for all parties.

This positive development is a good indication that the constellation outlined above also offers incentives for international cooperation. Decision-makers throughout the world, and precisely in Africa, have come to recognize in principle that transboundary waters call for cooperative transboundary management (see also Mostert 2005). This has found expression in numerous bi- and multilateral declarations and agreements on individual waterbodies as well as in framework agreements that lay down general principles governing the management of transboundary river basins. One agreement that deserves to be underlined in this connection is the UN Convention on the Law of the Non-Navigable Uses of International Watercourses (April 1997). Thus far the convention has been signed by only 20 countries and ratified only by 12, among them no more than two African countries – the RSA and Namibia – and it is therefore not yet in force. The convention, based on earlier documents (in particular the ILA's 1966 Helsinki Rules on the Uses of the Waters of International Rivers), lays down a number of central principles, including the principle of *"equitable and reasonable use,"* the obligation not to cause *"significant harm to other watercourse states,"* and the principle of *"optimal utilization and adequate protection of an international watercourse"* (UN Convention 1997, Articles 5, 7, 8). Despite the fact that the convention is not yet in force, it sets standards that provide orientation for international water management in the river basins analyzed here.

Also on the African continent, a number of multilateral declarations of intent and documents have been adopted that take a positive stance on the

need for transboundary cooperation. These would include the NEPAD Action Plan or the AMCOW Abuja Declaration. While there are still no such agreements or understandings for the majority of African river basins, agreements have already been signed for 20 African river basins, including all of the continent's important transboundary waterbodies. Furthermore, river-basin organizations (RBOs) – in fact, in some cases even more than one per basin – have been established in 16 African river basins.¹ Some African countries are members of several such RBOs. With membership status in 18 RBOs, the RSA leads the field, followed by Swaziland (8), Tanzania (5), and Namibia, Uganda, and Zimbabwe (each 4). Even though these figures tell us nothing about the quality of the agreements and organizations concerned (e. g. about the scope and levels of concretization of the cooperation agreed on, or about organizational structures, mandates, modes of operation, effectiveness, implementation), they do indicate an awareness of the problem and a will (at least at the declaration level) to engage in joint searches for solutions.

Furthermore, international water management plays, at least in some cases, a prominent role in the framework of higher-level efforts aimed at regional integration. This is most clearly in evidence in the case of SADC. The 14 SADC member states have committed themselves to an integrated and cooperative management of the transboundary waterbodies in the SADC region. This declaration of intent accords well with SADC's overarching goal of using economic cooperation and integration as a means of promoting development and prosperity in the member countries. It may be seen as characteristic of this situation that the first cooperation protocol signed in the SADC framework was the SADC Protocol on Shared Watercourse Systems (1995). This is a good illustration of the great importance that the SADC member countries attach to the issue. This is further underlined by the fact that in creating the SADC Water Sector and the SADC Water Division, the community has also given itself the institutional un-

1 The general tasks of RBOs may be seen as including: *"Reconciling and harmonizing the interests of riparian countries; Technical cooperation; Standardisation of data collection; Exchange of hydrologic and other information; Monitoring water quantity and quality; Submission for examination and approval of proposed activities, schemes or plans which could modify the quantity and quality of the waters; Development of concerted action programmes; Enforcing agreements; Dispute resolution."* (Savenije / van der Zaag 2000, 27).

derpinning it needs to implement the SADC water protocol. There has also been a relatively intensive and continuing discussion underway in the SADC context. It has led, among other things, to a revision of the water protocol to bring it into line with the 1997 UN convention. The so-called Revised Protocol was adopted in 2000.

Transboundary water management also plays a role in connection with other African regional organizations – e. g. ECOWAS, EAC, and IGAD – as it does for some important pan-African institutions (AfDB, AU, AMCOW).

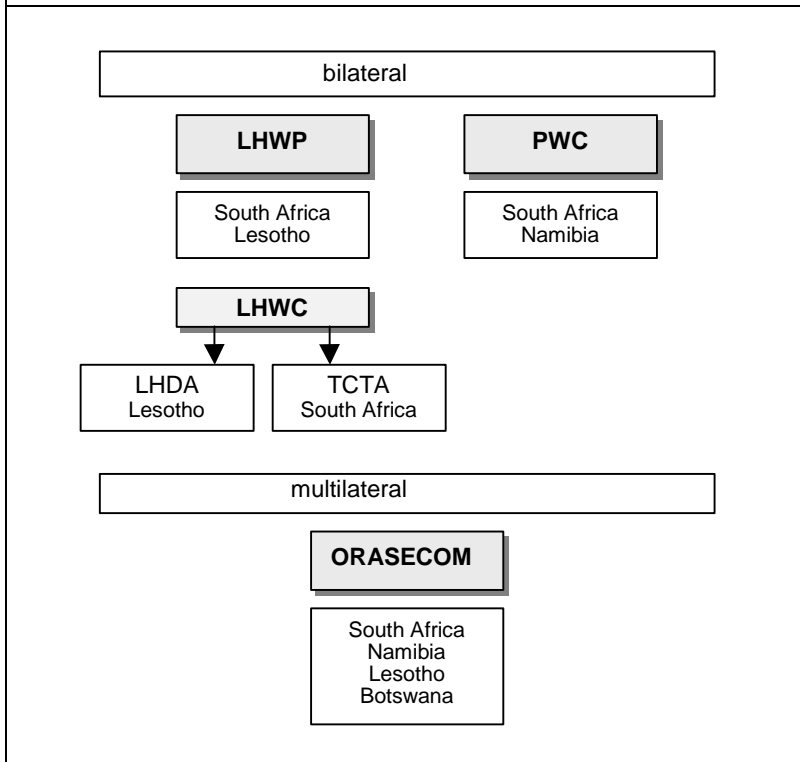
3 Transboundary water management in Africa with reference to selected rivers and lakes

What follows will present some key hydrological, economic, and political framework data on the waterbodies selected for analysis in the present study: the Orange-Senqu, the Limpopo, the Zambezi, Lake Victoria, and Lake Chad. These are used as the basis to assess risks and conflict factors as well as cooperation potentials and needs. The presentation focuses on water-related agreements and institutions (see Fig. 1) and the actors involved in lake- and river-basin management.

3.1 Orange-Senqu

3.1.1 Characterization of the basin

The Orange River is roughly 2,300 km in length. Its immediate riparians are Lesotho (source), the RSA, and Namibia (estuary). Botswana also shares the Orange River Basin, which has an area of close to 1 million km². The RSA holds the largest share of the basin (60 %), followed by Namibia (25 %), Botswana (12 %), and Lesotho (5 %). The river's headwaters, located in Lesotho's northeastern highlands, receive abundant precipitation (an annual mean of 2,000 mm); otherwise the basin's climate is for the most part arid (annual average precipitation of 44 mm). The Orange's mean annual runoff (MAR) is 11,000 million m³; to this the RSA contributes 55 %, Lesotho 41 %, Namibia 4 %, and Botswana a negligible amount (Heyns 2003; Heyns 2004). The river's most important tributaries are the Senqu in Lesotho, the Vaal in the RSA, and the Fish in Namibia.

Figure 2: Overview of the Orange-Senqu basin institutions

The Vaal is the main source of water in the Gauteng region of the RSA. This is the most highly developed region in South Africa, indeed in all of Sub-Saharan Africa. The region is home (mostly in urban areas) to 40 % of the RSA's population, and it accounts for 85 % of the country's energy demand.

The Orange River Basin is one of the most highly developed basins in all of southern Africa. There are a total of 37 large-scale dams (height: over 25 m; storage capacity: over 12 million m³) in the basin, most of them (24) located in the RSA. The largest dam in South Africa is the Gariep Dam (storage capacity: 5,600 million m³), while the largest dam in the basin is the Katse Dam in Lesotho. Industry, mining, (urban) households, and irrigated agriculture generate substantial demand for water that the Vaal

itself is unable to meet. For this reason the Vaal has been linked via a complex system of interbasin transfers (IBTs) with eight other river basins, tapping them to meet Gauteng's water needs. This has meant that the Orange-Vaal system has a negative water balance. At the same time, economic activities in Gauteng are 100 % dependent on IBTs. And this in turn means that the Orange has huge strategic significance for the RSA, a fact which casts some light on the importance of the Lesotho Highlands Water Project (LHWP) (Turton et al. 2004, 99).

Most of this water is used for irrigated agriculture. In the RSA 800,000 ha of land are presently under irrigation, and 300,000 ha of this total is located in the Orange River Basin (Heyns 2003, 21; Heyns 2004, 8). But some urban centers and mining projects are also among the region's major water consumers. The problem of water quantity is increasingly aggravated by a water-quality problem caused by pollution from towns, industry, mining projects, and saline return flows from irrigation projects. Future development will hinge in crucial ways on an adequate, secure supply of water. Namibia, for instance, has plans to sharply expand irrigated agriculture on the Lower Orange (currently some 2,200 ha) with a view to producing grapes for the European and North American markets, in this way creating 10,000 new (seasonal) jobs. *"It is clear that the future development of the labour intensive export grape industry is economically viable, but is heavily dependent on the availability of water."* (Heyns 2004, 7) Namibia is therefore very interested in building a new dam on the Lower Orange (ibid.).

In the future it would also be conceivable to supply Botswana's capital Gaborone with water from Lesotho, and this would give Botswana a strategic interest in the Orange River Basin, even though no water flows into the Orange from Botswana and at present the country makes no use of the Orange.

The Orange River forms the border between the RSA and Namibia. There are some problems concerning the actual course of the border between the two countries. In 1890 the boundary was defined on the basis of the high-water level along the northern banks of the river, and this meant that Namibia was without direct access to the river's waters. Prior to independence, Namibia was promised that the boundary would be shifted to the middle of the river; but the promise was not respected, and since then there

have been disputes over the border. Although this state of affairs has served to tarnish South Africa's image as far as water policy is concerned, it does not appear to constitute a danger to the relations between the two countries (Turton et al. 2004, 99–100).

3.1.2 Description and analysis of river-basin institutions

The Lesotho Highlands Water Project and the Lesotho Highlands Water Commission

The Lesotho Highlands Water Project (LHWP) was conceived as a means of resolving the problem posed by South Africa's need for a secure water supply by tapping the water-rich Senqu in Lesotho to meet water needs in the Gauteng region. The project is designed to divert the waters of the Senqu (in Lesotho) to Gauteng via a complex system of dams and tunnels and at the same time to generate hydroelectricity. The idea is that water transfer and power generation will benefit the development of both of the countries involved. Lesotho, a country that uses only a small part of its abundant water resources, provides low-cost water to its water-poor neighbor South Africa for purposes of power generation. Lesotho is paid royalties in return (Klaphake 2005).

Most of the costs for the project were borne by the RSA, which was given loans from national and international banks. The LHWP is one of the world's largest transboundary water projects.² The project has served to solve Gauteng's water-scarcity problems while at the same time benefiting Lesotho in economic terms.³

2 The centerpieces of the first phase of the LHWP are an electricity plant in Muela and two large-scale dams (Katse, 185 m in height, and Mohale, 145 m in height) with tunnel systems (the longest of which extends for 45 km) to convey the water to Gauteng. The first phase was concluded in 2004; since then water has been transferred at a rate of 29 m³/s – the equivalent of roughly one quarter of the Senqu's total flow. The projected following phases of the LHWP (originally there were to be four phases by the year 2020) have been suspended, since it became clear that project planning had overestimated by far South Africa's future water needs, and because the RSA's water policy has since undergone a marked shift toward water demand management.

3 It is, however, important not to ignore the ecological, social, and political costs involved. These include the flooding of grazing land, resettlement of larger population groups (who were forced to wait to receive their inadequate compensation), and

The legal basis for the project is a bilateral government *treaty* signed in October 1986. This is one of the most comprehensive and detailed water-related agreements concluded in Sub-Saharan Africa (Turton 2004, 274). It lays down clear-cut and binding rules governing the behavior and the duties of the parties (LHWP Treaty 1986). Since then six protocols have been added to the treaty; they may be seen as reflections of the experiences made in connection with implementation as well as of newly emerging problems, not least several concerning the project's institutional underpinning.

Originally, each of the two parties established an independent implementing *organization* of its own; in Lesotho the Lesotho Highlands Development Authority (LHDA, responsible for dam construction and operation), in the RSA the Trans-Caledon Tunnel Authority (TCTA, responsible for the construction and operation of the tunnel system as well as for financial and credit management) (LHWP Treaty 1986, Articles 7 and 8).

A Joint Permanent Technical Commission (JPTC) was created as a coordinating and oversight body; each of the parties delegated three representatives to it (*ibid.*, Article 9). Since this structure proved unwieldy, a comprehensive reform was undertaken in 1999: The JPTC was reorganized to form the Lesotho Highlands Water Commission (LHWC), a body with markedly strengthened competences and capacities (permanent secretariat, biweekly LHWC meetings). LHDA and TCTA were restricted to a number of highly specific powers and made more subordinate to the LHWC, a move that served to streamline the organizational structure (Protocol VI 1999). "*The LHWC has monitoring and advisory powers over the administrative, technical, and financial activities of the project*" (Turton et al. 2004, 241).

One special feature of the LHWP's institutional structure is its *dispute-settlement mechanism* (see Annex and LHWP Treaty 1986, Article 16). If a dispute emerges between the parties that cannot be settled through negotiations, a dispute-settlement body, the Arbitral Tribunal, is called in. The members of the tribunal are appointed on an ad hoc basis; the tribunal is made up of three members, none of whom may be from one of the parties to the treaty. Each side appoints one member; the members in turn appoint

widespread corruption in connection with the project and the management of project funds.

a third person as their chairman. If they are unable to reach agreement, the president of the International Commission on Large Dams appoints a tribunal chairman, who may not be a citizen of either the Kingdom of Lesotho or the RSA. The body issues binding decisions on a majority basis.⁴

Engagement of third parties / international donors has contributed appreciably to the LHWP's success. The World Bank (WB) deserves special mention here. While the role it plays as a provider of credit is quite limited – the bank has financed no more than three percent of overall project costs – the WB's engagement has encouraged other donors – the chief of which is the European Investment Bank (EIB) – to become involved in project-financing. Furthermore, the WB has also had an influence, in the broadest sense of the term, on the projects political context. It worked for incorporation into the project of minimum social and environmental standards, obtained permission for the project from the South West Africa People's Organization (SWAPO, which was at that time the internationally recognized representative of Namibia, then still under South African control), and made its engagement conditional on a Namibian no-objection statement (Conley / van Niekerk 2000, 144 f.). Finally, the WB's engagement also served to strengthen the hand of Lesotho, the far weaker partner, in its dealings with its powerful neighbor (Turton 2003, 147).

Originally, no institutionalized stakeholder participation was provided for in the framework of the LHWP. But over the course of time a number of national and international environmental and human rights NGOs took up the cause of the project, voicing criticism of its environmental, social, and political impacts, objecting to its lack of social and environmental compatibility, and working for the interests of the affected population. To cite only two examples, the Highlands Church and Solidarity Action Group (HCSAG) from Lesotho and the International Rivers Network deserve to be mentioned in this connection. Following several meetings of representatives of these two NGOs, WB representatives, and representatives of the governments involved, in 1999 agreement was reached, under the pressure of civil society, on a memorandum of understanding between the LHDA and interest groups in Lesotho. It provides for cooperation in the following

4 *"The award of the Arbitral Tribunal shall be definitive and binding on the Parties, and they shall duly and expeditiously give effect thereto."* [see LHWP Treaty 1986, Articles 16, (15) (b)].

areas: *"monitoring and evaluation activities; advocacy activities; community empowerment activities; service provision; and delivery activities (...)"* (Meissner 2000, 26).

The Orange-Senqu River Basin Commission

The LHWP and its institutional framework have now been amalgamated with the Orange-Senqu River Basin Commission (ORASECOM), an RBO that was created in 2000 and includes all four basin riparians (RSA, Namibia, Lesotho, Botswana). ORASECOM neither replaces earlier bilateral agreements nor precludes additional future bilateral projects. However, it does oblige its members to share information (Turton 2004, 275 f.). ORASECOM is in line with the principle that the integrated and sustainable management of international river basins should involve all riparian countries (while LHWP and PWC are bilateral projects in a multilateral river basin).

ORASECOM, established on November 3, 2003, is the result of protracted discussions and negotiations that were made possible by the process of political change in the RSA. According to its founding document, ORASECOM is an international organization with a legal status of its own (for information on the following, see ORASECOM Agreement 2000). The organization's founding document makes reference to, and explicitly recognizes, the Helsinki Rules, the 1997 UN Convention, and the SADC Water Protocol. The parties are obliged to exchange data on a regular basis (Articles 7, 4) and to provide prior notification of *"any project, programme, or activity with regard to the River system which may have a significant adverse effect upon any one or more of the other Parties."* (Articles 7, 5). They furthermore commit themselves to undertake joint efforts to protect the basin. Existing bilateral agreements and institutions are not affected by the new organization (obligation to inform only); future bilateral agreements must be in line with ORASECOM.

ORASECOM functions as an advisory body to the parties on issues concerned with the development, utilization, and conservation of the water resources of the Orange River Basin (Article 4). ORASECOM is authorized to conduct appropriate feasibility studies. In cases involving differences of opinion, matters are referred back to the political level for decision. The organization's founding document makes reference to the SADC Tribunal as a dispute-settlement mechanism. The commission is thus only

authorized to make recommendations based on joint water-yield assessments, the findings of feasibility studies, and joint assessments of water allocation and appropriate infrastructure development.

ORASECOM still lacks a differentiated *organizational structure*. At present it has only a council consisting of the delegations of the parties. Each delegation has three permanent members; additional advisers may be consulted from case to case (Article 2). The delegations meet twice a year, as a rule for three days. Decisions are reached by consensus (Article 3). The meetings are supported by a task team (advisers, donor representatives, and others) which usually meets for a separate, one-day session prior to commission meetings. Thus far the commission has presented several reports. The council is authorized to set up working groups and to appoint technical experts and advisers if this seems called for (Article 6). There is a desire to establish a secretariat; a study has been prepared on the matter, and there are now plans to set up a secretariat in Pretoria (in May 2005).

Thus far there are no plans to have ORASECOM manage infrastructure projects. One aspect central to ORASECOM's work is its task of elaborating an integrated water resources management (IMRM) plan, which is set to be presented in two or three years time.

Disputes that cannot be resolved through commission negotiations are (according to Article 8) to be brought before the SADC Tribunal, whose decisions are to be recognized as "*final and binding*" (Article 8).

ORASECOM is *funded* by the water ministries of the countries concerned. It also receives financial support from Germany (through the GTZ), France, and the EU (in the framework of the EU Water Initiative). The Orange River Basin / ORASECOM is one of the five regions selected for EUWI support. ORASECOM has presented the EU a project portfolio "*relating to the harmonization of the legislation in the different countries, the study of transboundary aquifers, water demand management, a basin information system, capacity building and stakeholder participation*" (Heyns 2004, 9).

Germany is providing support for the preparation of an integrated water resources management plan, a study on the establishment of an ORASECOM secretariat, appropriate organizational consulting services, and additional capacity-building projects. In 2001 the German funding contributions amounted to €0.167 million, while the figures for 2004 and

2005 were €0.335 million and €0.385 million, respectively; the figures projected for 2005 and 2006 are €0.217 million and €0.05 million, respectively. France has contributed to a feasibility study on the sustainable development of the Molopo-Nossab River system, a project designed to promote environmental and water protection, as well as other water projects of transboundary interest (groundwater in the Molopo sponges in Lesotho etc.) (Heyns 2004, 9).

The Permanent Water Commission

Mention must, finally, be made of the Permanent Water Commission (PWC), a bilateral institution created by the RSA and Namibia in September 1992. The commission's task is to provide the governments of the two parties with advice on the development of the Lower Orange (the section along which the Orange forms the border between the two countries). The PWC replaced a Joint Technical Committee (JTC) set up in 1987.

The PWC acts in the capacity of a *"technical adviser to the Parties on matters relating to the development and utilisation of water resources of common interest to the Parties"* (see PWC Agreement 1992, Article 1; for aims, see Article 3). This advisory function consists mainly in the preparation of reports. The commission is made up of three delegates from each party; it can appoint additional advisers. The PWC has a weak organizational structure; this consists in meetings convened from case to case as well as *"sub-committees dealing with joint irrigation and planning tasks"* (see Conley / van Niekerk 2000, 141). Decisions are taken by consensus. Each of the parties is responsible for bearing the costs of its own delegation, with each host country assuming the costs for the meetings held there. Otherwise the parties share all other costs that may accrue. ORASECOM is regularly informed on all PWC activities. Disputes and differences are settled in consultations between the parties.

One other aspect associated with the 1992 PWC Agreement is the establishment of a Joint Irrigation Authority for a large-scale irrigation system on both sides of the Lower Orange (Noordoewer in Namibia; Vioolsdrift in the RSA: the Vioolsdrift and Noordoewer Joint Irrigation Scheme – VNJIS, 800 ha). A special dispute-settlement mechanism was set up for this purpose, a so-called Arbitral Tribunal and a separate institution for the Orange River Mouth, an area listed in the Montreux Record of Wetlands Under Threat. Government representative of both parties as well as repre-

sentatives of the private sector (mining) have seats on this Orange River Mouth Interim Management Committee.

These institutions have remained in existence even after ORASECOM was created. Between the RSA and Namibia there is now a bilateral agreement in force that guarantees water deliveries of 50 million m³ per year for Namibia; this amount is set to rise to 60 million m³ by the year 2007. For this point of time, though, the RSA has announced some new demands of its own, and this will call for new negotiations or efforts to find a new solution. In this connection the PWC started out in 2001 with a series of studies on the future development of water resources on the Lower Orange, including one to examine the possibility of building a new dam on the Lower Orange (Heyns 2004, 8).

3.1.3 Destabilization risks, cooperation potentials, options for German Development Cooperation

The task of securing a sufficient supply of water for the economic development of the Orange River Basin will remain a challenge in the future as well. The problem of water quantity will soon be exacerbated by an increasingly pressing quality problem due to water pollution. Conflicts may develop between the RSA and Namibia over the development of the Lower Orange. But in view of the good record of cooperation between the two countries, these should not pose any serious risk of destabilization. On the other hand, any forced, exaggerated attempts to push through further phases of the LHWP could well entail risks. What we mean here is less the relations between the countries concerned than the growing resistance of civil society forces in Lesotho and the RSA (and at the international level) that would have to be anticipated. Here too, though, we find no destabilization risk. Yet the issue of "the future of the LHWP" does point to the need for more intensive participation of civil society actors in transboundary river-basin management. Support for relevant efforts could prove to be a new field of activity for German DC (capacity-building, organizational development, training). Furthermore, German DC should continue with its support of ORASECOM (assistance in setting up a secretariat and in working out an IWRM plan) and undertake efforts to ensure that the positive experiences made in connection with

ORASECOM are disseminated and made use of in other river basins (ORASECOM as the core of a center of competence).

3.2 Zambezi

3.2.1 Characterization of the basin

The Zambezi is some 3,000 km in length. Its basin encompasses an area of roughly 1.4 million km². This means that it is Africa's fourth-largest river system. The Zambezi has eight riparians – Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe – the highest number in all of Sub-Saharan Africa. Zambia holds the largest share of the river basin (41 %), followed by Angola (18 %), Zimbabwe (16 %), Mozambique (12 %), Malawi (12 %), Tanzania (2 %), Botswana (1.5 %), and Namibia (1.5 %). The Zambezi's mean annual runoff is 94,000 million m³. Its most important tributaries are the Luene and Lungoe-Bungo in Angola, the Chobe in Botswana, the Shire in Malawi, the Luinana in Namibia, the Kabompo, Kafue, and Luangwa in Zambia, and the Manyame, Sanyata, and Gwayi in Zimbabwe. Precipitation levels in the basin range between 600 and 1,200 mm per year; while Angola and Zambia are riparians with high precipitation levels, Mozambique and Zimbabwe are relatively arid by comparison. Malawi and Tanzania are not immediate Zambezi riparians; they are linked to the river through Lake Malawi and the Shire River. The Zambezi River Basin is home to over 40 million people, most of whom live in Malawi (31 %), Zimbabwe (29 %), and Zambia (22 %). The Zambezi's water resources are used by households as well as for irrigated agriculture, mining, power generation, and – to a lesser extent – industry; the river is also used for fishery and shipping.

Several large dams built to generate power are the most conspicuous water projects in the basin; the largest of these are the Kariba Dam (Zambia and Zimbabwe) and the Cahora Bassa Dam (Mozambique), followed by dams on the Victoria Falls, the Kafue River (Kafue Gorge), and on the Lunsefwa River (the Mita Dam). There are a total of 12 larger dams (over 15 m in height) in the basin. At present these waters are used to irrigate some 200,000 / 250,000 ha of agricultural land (Shela 2000, 69 f.; Heyns 2003, 28).

In view of the region's relatively high population growth (on average almost 3 % p. a.) and the ambitious development projects underway there, pressure on water resources is bound to increase in the future. Angola, the upstream riparian, could – now that the protracted civil war has been ended which for years blocked any major measures in the water sector – prove to be interested in making more use of the waters of the Zambezi in the future. Botswana and Namibia, also upstream riparians, are water-poor. Namibia plans to hugely expand a sugar-cane irrigation project in the Caprivi Strip; Botswana intends to utilize the waters of the Zambezi by building a pipeline to supply Gaborone, its capital (Heyns 2003, 28). Zimbabwe, also a water-poor country, has plans to supply the water needs of the city of Bulawayo with water from the Zambezi (Bulawayo Water Division Project / Matabeleland Zambezi Water Project).⁵ Thanks to its population density, Malawi, a country whose territory is almost completely within the basin, will see itself faced with increasing water scarcity in the future. Malawi currently has plans for a 40,000 ha irrigation project on the Shire (Heyns 2003, 28). Finally, the RSA, itself not a Zambezi riparian, has also become involved by announcing its interest in supplying the Gauteng region with water from the Zambezi via an IBT system (using a 1,200 km-long pipeline from the Caprivi Strip through Botswana to Pretoria).

As things stand now, the water yield in the Zambezi Basin still far exceeds consumption levels (except for recurrent drought periods that periodically assume the character of natural disasters). And for this reason there are at present no serious conflicts over the waters of the Zambezi.⁶ It should,

5 At the end of July 2004 reports on a planned Malaysia-Zimbabwe joint venture caused some unease among politicians and the general public in Mozambique. These plans are for a 450 km-long water pipeline from the Zambezi to Bulawayo. The project would have immediate impacts on the lower-course riparian Mozambique and in particular on the operations of the Cahora Bassa Dam. But there have been delays, evidently on account of financing problems. At present only one Chinese company is engaged in preparatory work set to lead up to the construction of Gwayi-Shangani Dam, which is likewise a component of the MZWP.

6 Ciuta (2000, 143 ff.) sees the matter differently: *"In recent years, a number of serious conflicts haven been observed in the Zambezi basin"* (ibid., 143). He mentions: the conflict between Zambia and Zimbabwe over Zimbabwean plans to build a dam in the Batoka Gorge; conflicts in the East Caprivi region between *"tourism facility operators and fishing communities"* (ibid.), conflicts between Namibians and Botswanans living along the Chobe River over different use types (tourism versus agriculture); similar use conflicts between Zimbabwe (tourism) and Zambia (fishery); water-use conflicts

though, be noted that Angola and Zambia are the only riparians that will have sufficient water resources in the future. All the other riparians today or soon will be forced to contend with water scarcity. In view of this state of affairs it is impossible to rule out future conflicts between the riparians over water use and water allocation. As far as both crisis prevention and sustainable development are concerned, transboundary water management would therefore be the approach best suited to serving the needs and increasing the welfare of all riparians.

3.2.2 Description and analysis of river-basin institutions

The Zambezi River Authority

The beginnings of transboundary cooperation in the Zambezi River Basin go back to colonial times, and the Zambezi River Authority (ZRA), for which Zambia and Zimbabwe are jointly responsible, was founded during the colonial period.

Zambia and Zimbabwe are the most important Zambezi riparians. Zambia, a water-rich county, is heavily dependent on the river, and a good part of its territory and the majority of its population are located in the basin. Roughly the same goes for the downstream riparian Zimbabwe. The Zambezi forms the border between the two countries for a stretch of some 750 km. The two riparians for the most part share the Zambezi's water resources; the most important vehicle of their cooperation is the Kariba Dam, a large structure (128 m in height) which plays a key role in their electricity supply. Thirty-four percent of the electricity consumed by both countries is generated by the Kariba Dam. The dam has a capacity of 1,266 MW (600 MW on the northern, Zambian side and 666 MW on the southern, Zimbabwean side). Work got underway on the Kariba Dam in

between Malawians and Mozambicans along the Lower Shire; a conflict between Namibia and Botswana over the course of the border in Lake Liambezi. However, there is little reason to suppose that these conflicts hold all that much conflict potential at present. Heed should though be paid to Chiuta's observation: that "... *localised conflicts are found in all the riparian states and these are mostly caused by pollution, dam and tourism developments that have dispossessed the local communities of their access rights to the water resources*" (ibid., 146).

1955 and was concluded in 1976.⁷ Starting in 1963, the Central African Power Corporation (CAPCO), founded by South and North Rhodesia, was in charge of building and operating the dam. In 1987 CAPCO was dissolved through decisions taken by the parliaments of Zambia and Zimbabwe, now independent states, and replaced by the ZRA.

Equal shares of the ZRA are held by each of these two countries. The authority has an independent legal status, and is based in Lusaka. The objective of the ZRA is

"to obtain for the economic, industrial and social development of the two countries, the greatest possible benefit from the natural advantages offered by the waters of the Zambezi River and to improve and intensify the utilization of the waters for the production of energy and for any other purposes beneficial to the two countries" (ZRA Agreement 1987, Preamble).

Despite this more generally formulated aim, the ZRA is clearly focused on the joint operation of the Kariba Dam. The ZRA is responsible for water allocations to both parties, and their electricity companies are in charge of power generation. The relevant arrangements are set down at length in the ZRA Agreement (see *ibid.*, Annexes I and II on Articles 22 and 23). Other ZRA tasks include data collection, examination of the need for new dams and their acceptance, elaboration of recommendations on the effective use of water and other resources (*ibid.*, Article 9).

The ZRA's *organizational structure* includes a Council of Ministers consisting of two ministers from the governments of each of the parties (*ibid.*, Article 4), a Board of Directors, three of whom are appointed by each government (*ibid.*, Article 8), and a chief executive, who is appointed by the board and confirmed by the council. The chief executive may not be a citizen of the signatory country in which the authority is headquartered (*ibid.*, Article 11). A secretariat and three ZAR departments and their heads report to the chief executive (Tumbare 2002, 107). In organizational terms, the ZRA has a hierarchic structure. Its various departments are located in Lusaka, Harare, and Kariba. The ZRA employs some 200 persons, most of whom come from Zimbabwe (Tumbare 2002, 107).

7 Several thousand people were forcibly resettled in connection with the project, and most of them received inadequate compensation, or indeed no compensation at all.

The ZRA has a secure *financial base*. Since 1999 the authority has levied fees on the two national electricity companies for the water supplied to them for power generation. This enables the authority to earn the revenues it needs for its own work; at present it has water-sales revenues amounting to roughly US\$ 10 million per year (Tumbare 2002, 107). The ZRA's financial and administrative autonomy makes it largely independent of the national water authorities (and their weaknesses). Still, some important areas have remained under the responsibility of the national authorities of the parties and are thus out of bounds for the ZRA (e. g. environmental policy).

The ZRA Agreement does not provide for any *dispute-settlement mechanism*. Article 32 simply states that differences between the parties are to be referred to an arbitrator or an arbitration body / commission set up by the parties. Arbitration awards are binding on the parties.

Even though the ZRA generally functions smoothly, there are some differences between the parties that go back to the beginnings of the Kariba Project. Back then North Rhodesia was in favor of a project on a Zambezi tributary on its own territory (the Kafue Project), while South Rhodesia was in favor of the Kariba Project on the Zambezi itself. The latter proposal finally won the day. The so-called Batoka Hydroelectric Project has been in planning since the early 1990s. While Zimbabwe, facing energy and water problems, is pushing to have the project realized as soon as possible, Zambia has little interest in it (Chiuta 2000, 143). Despite the positive findings of a feasibility study, the project has made no headway since 1993. Other joint projects that have been envisaged – Devils Gorge and Muputa Gorge – have yet to reach a concrete planning stage. The ZRA-related differences between Zambia and Zimbabwe must be seen in the larger context of the relations between the two countries, which are not always free of tensions.

The main *donor* active here is SIDA. Since 1998 SIDA has provided financial support for the ZRA's Environmental Monitoring Programme (EMP).⁸ A number of measures have been conducted in the EMP framework; to cite a few examples: an Environmental Policy and Strategy has been elaborated for the ZRA (adopted by the board in 2000), a Water

8 The program also receives technical support from the Stockholm Environment Institute (SEI).

Quality Monitoring System has been created, a Water Hyacinth Control Plan has been developed, and information management has been improved by the introduction of GIS (ZRA Overview 2003). In addition, a special focus has been placed on capacity-building. *"Capacity building has been an important component of the programme (...). The programme has provided an opportunity for both ZRA staff and stakeholders to develop their technical capacity through various hands-on and class-room style training programmes"* (ibid.). The FGEF (French Global Environmental Facility) has also been supporting a ZRA environmental project: Support to Pollution Monitoring and Management on the Zambezi River (feasibility study in 2000, project begin 2003, €1.5 million for 36 months) (ZRA-FGEF Project). But the donors are engaged only in marginal areas of the ZRA's spectrum of tasks. In large measure the ZRA operates independently of donor engagement.

As far as environmental issues are concerned, more and more nonstate stakeholders have recently become involved in the ZRA's activities, even though the ZRA Agreement does not provide for any participation of this kind. SIDA has set up participation-related workshops and supported the establishment of a Stakeholder Working Group (with a secretariat of its own) (ZRA Overview 2003).⁹

The ZRA may be seen in large measure as a success story of trans-boundary water management. This is due to the many shared interests that have brought the parties together (border rivers, no upstream-downstream problems) as well as to the authority's organizational strength and administrative / financial autonomy, but also to its clear-cut and limited mandate: operation of the Kariba Dam. As soon as it steps beyond this mandate (as it did e. g. in the case of the Batoka Gorge project) problems emerge that have more to do with general Zambian-Zimbabwean relations than with specific water issues.

9 The working group's members include e. g. the African Wildlife Foundation, the Lake Kariba Fisheries Research Institute, the Environmental Council of Zambia, the National Heritage Conservation Commission Zambia, and the University Lake Kariba Research Station, Zimbabwe.

The Zambezi Watercourse Commission (ZAMCOM) and the Action Plan for the Environmentally Sound Management of the Common Zambezi River System (ZACPLAN)

The ZRA may be seen as an expression of bilateral water management in a multilateral river basin. Establishing the authority was a relatively easy task. By comparison, attempts to develop an integrated, comprehensive transboundary river-basin management that includes all riparian countries was faced with far greater difficulties, and has accordingly taken much longer to realize. Even today these efforts have not progressed beyond some rudimentary groundwork.

In May 1987 the governments of Botswana, Mozambique, Tanzania, Zambia, and Zimbabwe adopted the Action Plan for the Environmentally Sound Management of the Common Zambezi River System (ZACPLAN). The three remaining riparians, Angola, Malawi, and Namibia, have joined ZACPLAN plan since the early 1990s. Despite the implications of the term "Action Plan", the document is little more than a relatively loose-knit framework program. While the plan does contain quite a number of ideas and project proposals, it lacks any binding commitments when it comes to implementation or means of securing the plan's institutional and financial viability. ZACPLAN includes 19 subprojects, the so-called Zambezi Action Plan Projects (ZACPROs), which are devoted to goals of both a more or less short-term and a long-term nature. These extend from a compilation of all existing and planned water projects and creation of a monitoring system for water quantity and quality to the formulation of an integrated management plan for the overall basin and proposals on programs to combat the tsetse fly (ZACPLAN 1987, Appendix II).

There is no point in looking through ZACPLAN for binding agreements, clear-cut definitions of implementation responsibilities, and precise timetables. Nor did ZACPLAN have an *organizational structure*. The original plan to create an independent organization (River Basin Coordinating Unit and Zambezi Intergovernmental Monitoring and Co-ordinating Committee) did not get off the ground (see Nakayama 1999, 403 f., for reasons

and background information).¹⁰ In other words, ZACPLAN remained largely in the realm of the declaration of intent and symbolic politics. Some riparians were unwilling to have their hands tied by ZACPLAN, in particular when it came to ITB systems designed to supply the RSA, which were regarded as extremely lucrative (Nakayama 1999, 406). Also, the countries concerned were largely unwilling to accept any meaningful financial commitments. ZACPLAN meetings were 100 % donor-funded. The lack of an organizational structure and sufficient funding has proved to be a crucial impediment to ZACPLAN. One point that came in for special criticism by Lamoree / Nilsson (2001, 35) was that in general capacity-building efforts were either insufficient or lacking altogether; the advisers, they reported, had done only what was absolutely necessary, leaving behind little more than a handful of reports. The problem was evidently that the higher decision-making levels showed too little engagement. In fact, not one single ZACPRO has yet been realized. Only ZACPRO6, which is concerned with the elaboration of an integrated river-basin management plan and funded by the Scandinavian donors SIDA, NORAD, and DANIDA, has led to some promising interim results. For instance, the first phase of ZACPRO6 saw the creation of a database (Zambezi River Basin Information System and Database) (1998), and seven sector studies were conducted on water uses in the basin. Work is currently underway on an integrated basin development plan (ZACPRO6, Phase 2, since October 2001). This task has been taken over by the Zambezi Watercourse Commission (ZAMCOM), which was set up in July 2004.

The establishment of ZAMCOM, planned since the end of the 1980s, was preceded by a number of negotiation rounds that were plagued by set-backs. It was only in 1996, when the ZRA, supported by the SADC Secretariat, was placed in charge of ZACPRO6, that the efforts to institutionalize basinwide cooperation finally got off the ground. The crucial phase began in 2002. Since then four rounds of talks on ZAMCOM have been conducted under the leadership of the SADC Secretariat. The main points of contention included the commission's structure, the makeup of its staff, its headquarters, its funding, and the relationship between ZAMCOM and

10 Annex VI of the ZACPLAN Agreement – "Institutional and Financial Arrangements" – contained only *"some suggestions on institutional and financial arrangements (...) for information."* However, these "suggestions" were not implemented.

existing (national and international) institutions (Tumbare 2002, 104). In the end, though, the Agreement Establishing the Zambezi Watercourse Commission was finally signed by the riparian parties (on July 13, 2004).¹¹

The aim of ZAMCOM is *"to promote the equitable and reasonable utilization of the water resources of the Zambezi Watercourse as well as the efficient management and sustainable development thereof"* (ZAMCOM 2004, Article 5). The commission's functions are indicated as follows:

"(...)

- (a) *collect, evaluate and disseminate all data and information on the Zambezi Watercourse (...);*
- (b) *promote, support, coordinate and harmonise the management and development of the water resources of the Zambezi Watercourse;*
- (c) *advise Member States on the planning, management, utilization, development, protection and conservation of the Zambezi Watercourse as well as on the role and position of the Public with regard to such activities and the possible impact thereof on social and cultural heritage matters (...);*
- (e) *foster greater awareness among the inhabitants (...);*
- (f) *co-operate with the institutions of SADC as well as other international and national organisations where necessary;*
- (g) *promote and assist in the harmonization of national water policies and legislative measures (...)" (Ibid.).*

The parties have committed themselves to a number of principles, namely *"sustainable development, sustainable utilization, prevention of harm, precaution, inter-generational equity, assessment of trans-frontier impacts, co-operation and equitable and reasonable utilisation"* (ibid., Article 12). They also place special emphasis on the principles of *"equitable*

11 Zambia was the only party not to sign the document at the founding conference in Botswana on July 13, 2004. The official reason given was that domestic debates with various stakeholders had not yet led to a consensus on ZAMCOM and that more time was needed.

and reasonable utilization" and *"prevention of harm,"* which are taken over from the UN Convention (extra Articles 13 and 14).

ZAMCOM is an international organization with an independent legal status (*ibid.*, Article 4). In organizational terms, it is to be structured in three levels (ZAMCOM 2004, Articles 6–11):

1. A Council of Ministers in which the national ministers responsible for water resources management are represented. The council is responsible for policy development; as a rule it meets once a year.
2. A Technical Committee consisting of – at most – three-person delegations from the member countries. The committee is chiefly responsible for implementing decisions of the Council of Ministers and elaborating the Zambezi water-management strategy. The Technical Committee meets once a year.
3. A Secretariat supervised by the Technical Committee and tasked with providing technical and administrative support for the Council of Ministers. It is headed by an executive secretary.

The greatest challenge facing ZAMCOM in the near future will be the development of the integrated water management strategy for the basin and the task of harmonizing the water policies of the member countries.

ZAMCOM is explicitly assigned the task of water-related *dispute settlement and prevention*. Article 5 states that ZAMCOM will advise the parties *"on measures necessary for the avoidance of disputes and assist in the resolution of conflicts among Member States with regard to the planning, management, utilization, development, protection and conservation of the Zambezi Watercourse."* Article 21 lays down a procedure for *"settlement of disputes."* The parties to a dispute are first obliged to enter into *"consultations and negotiations in the spirit of good faith."* The Council of Ministers may offer recommendations on such cases. If no agreement is reached in this way, a dispute may be brought before the SADC Tribunal. Disputes between ZAMCOM and a member country are also expected to be brought before this tribunal. Each member country is obliged to report to the commission secretariat on *"any programme, project or activity with regard to the Zambezi Watercourse."* If a dispute emerges between member countries over any such activity (e. g. because one or more countries fears harmful impacts from a project), *"such Member States shall, on the*

request of any one of them and utilising the good offices of the Commission, promptly enter into consultations and negotiations with a view to arriving at a settlement of such dispute" (Article 16). During the course of talks on points under dispute, work on the project in question is to be suspended (for a period of time set by the parties to the dispute or by the commission). In the interest of coming up with a settlement, the commission can initiate a "fact finding study" (ibid.).

The ZAMCOM Agreement makes explicit reference to the 1997 UN Convention and the Revised SADC Water Protocol of 2000 as the "*basis*" of ZAMCOM agreements (ZAMCOM 2004, Preamble). The ZAMCOM Agreement remains without prejudice to other existing agreements (e. g. the ZRA), although it does oblige the parties to harmonize such agreements with the ZAMCOM Agreement (Article 18).

The agreement is somewhat vague when it comes to the question of *funding* ZAMCOM (Article 19). All parties are expected to contribute to ZAMCOM's budget. The Council is responsible for the actual concrete arrangements.

Under ZACPLAN *linkages to national structures* were weak. The parties' administrative, financial, and technical capacities in the field of water policy and management are weak in any case, and ZACPLAN did not have any particular priority at the national level. In addition, the only ministries involved in the elaboration of ZACPLAN were those responsible for environmental protection and nature conservation, which at that time served as UNEP liaison units, while other important ministries were simply not involved. This meant that the latter were not engaged, and it also led to interministerial conflicts, all of which served to undercut support for ZACPLAN at the national level (Nakayama 1998, 406 f.).

UNEP played an important part in the process that led to ZACPLAN. In 1986 UNEP had launched its Environmentally Sound Management of Inland Waters program, and ZACPLAN took on the role of a pioneering and model project (see Nakayama 1998, 199 ff., on the role that UNEP played in the preparations for ZACPLAN). Other international (donor) organizations like the WB and UNDP as well as international NGOs (e. g. IUCN) were also involved in the elaboration of ZACPLAN, although they were unwilling to contribute much to the funding of the plan (Nakayama 1998, 407). UNEP was not only a driving force behind ZACPLAN, it also

announced its intention to play a leading role in its implementation once the plan had become established. However, subsequent resistance on the part of the riparians concerned, and the problems to which this led soon forced UNEP to withdraw (Nakayama 1998, 405 f.).

Later ZACPRO6 was provided conceptual and financial support mainly by SIDA, NORAD, and DANIDA. These agencies also contributed to the formation of ZAMCOM by funding rounds of negotiations that finally led to its establishment. Canada was also engaged in the process. It may thus be said that *ZACPLAN / ZAMCOM is in large measure donor-driven*. There have evidently been coordination problems among these donors (Granit 2000, 8), and even individual donors have had problems in coordinating between the sectors responsible for national water issues and the sectors dedicated to transnational, regional water issues – one of which is ZACPLAN / ZAMCOM.

While *stakeholder and civil society participation* was welcomed in principle, in fact these groups played as good as *no role* whatever. ZACPLAN was a project of government water bureaucracies (Lamoree / Nilsson 2001, 35); water users and the general public had very little voice in the countries involved. It remains to be seen whether this will change when ZAMCOM is established. In any case, Article 16 of the ZAMCOM Agreement states:

"Member States shall ensure that the Public in an area likely to be affected by a proposed programme, project or activity are informed thereof and are provided with the opportunity for making comments thereon or objections thereto as well as on the transmittal of such comments or objections to the Commission."

There are plans to use a project steering committee and a national steering committee to ensure that stakeholders are able to participate. SIDA provides support for *"awareness raising activities carried out by a regional NGO in partnership with SADC-WSCU and ZRA which has broadened and opened up the process"* (Granit 2000, 8).

3.2.3 Destabilizations risks, cooperation potentials, and options for German Development Cooperation

At present water yield in the Zambezi Basin still far exceeds consumption. This is why there are currently no serious conflicts over the waters of the Zambezi. But in view of growing population pressure and a number of ambitious new development projects, pressure on the Zambezi's water resources is bound to increase in the future. Risks may also emerge when Angola, the upstream riparian, having ended its civil war, starts to make heavier use of the waters of the Zambezi. Another serious risk would also emerge if the RSA sought to realize its plans to use the waters of the Zambezi to supply the Gauteng region via an interbasin transfer. In other words, conflicts between riparians over water use and allocation cannot be ruled out for the future.

To be sure, the constitution of ZAMCOM has meant a real breakthrough for basinwide water resources management. This development appreciably boosts the chances that cooperative arrangements will be found, especially in view of the fact that the ZAMCOM Agreement makes explicit reference to the 1997 UN Convention and the Revised SADC Water Protocol of 2000 as the "basis" of the ZAMCOM agreements. The greatest challenge facing ZAMCOM in the foreseeable future will be efforts to develop an integrated water management strategy for the basin and to harmonize the national water policies of the member countries. This could be an interesting field of activity for German DC. But it is important to bear in mind here that the Scandinavian countries have been active on the Zambezi for some time now, and further studies would be needed to determine whether there are needs and niches for German DC activities on the Zambezi.

3.3 Limpopo

3.3.1 Characterization of the basin

The Limpopo is roughly 1,800 km in length. Its riparians are Botswana, Mozambique, the RSA, and Zimbabwe. The RSA holds the largest share of the ca. 415,000 km²-large basin (44 % as compared with 31 % for Mozambique, 20 % for Botswana, and 15 % for Zimbabwe). The upper

course of the Limpopo (Crocodile River) forms the border first between the RSA and Botswana and then between the RSA and Zimbabwe. The Limpopo's MAR is 7,330 million m³. The riparians contribute as follows to this volume: RSA 66 %, Zimbabwe 16 %, Mozambique 12 %, and Botswana 6 %. Average annual precipitation in the basin is no more than 500 mm.

The Limpopo's water resources are intensively exploited to supply urban centers, industry, and irrigated agriculture. Beside the Orange, the Limpopo is the southern African's most important river in economic terms. Its basin is home to some 14 million people (43 % in urban centers), the majority in the RSA. The Limpopo Basin is thus one of Africa's most densely settled and urbanized river basins.

There are numerous dams in the basin, 44 of them with a storage capacity of more than 12 million m³ (Heyns 2003, 14). Most of these dams (28) are located in the RSA, on Limpopo tributaries. The largest of these is the Loskop Dam on the Olifants River (348 million m³). The RSA's north-western province of Mpumalanga as well as power-generation facilities for Gauteng are supplied with water from this reservoir. The Limpopo is the receiving basin for four ITBs and itself has two ITBs (Turton et al. 2004, 263). The RSA and Zimbabwe together come close to fully exploiting the water resources of the Limpopo.

The RSA's economy, and in particular the country's industrial heartland, the Gauteng region, is heavily dependent on water resources from the Limpopo. Some 200,000 ha of agricultural land in the RSA are under irrigation (together with another 50,000 ha in other riparian countries). The Limpopo receives additional water through ITBs from other river basins (Orange, Inkomati, and Maputo). Botswana recently inaugurated operation of the Letsibogo Dam on the Motloutse, a tributary of the Limpopo, the aim being to use a north-south carrier to improve the water supply for its capital Gaborone. Eastern Botswana, a densely populated region, depends on the Limpopo for its water supply. Mozambique, the downstream riparian, fears further reductions of its water supply, in particular for a large-scale irrigation project in the country's south and with a view to the Massingir Dam on the Olifants, a Limpopo tributary (Heyns 2002, 15). In addition, industrial and mining uses on the river's upper course have adverse impacts on the quality of the river's waters. In other words, what is at stake here is not only water quantities but water quality as well.

Since all of the upstream riparians have plans to make more use of these water resources, Mozambique's concerns are not unjustified (Pereira / Vaz 2000). What is called for to avoid any future conflicts is therefore an integrated approach to managing the overall river basin.

3.3.2 Description and analysis of river-basin institutions

The Limpopo Basin Permanent Technical Committee (LBPTC) and the Limpopo Watercourse Commission (LIMCOM)

In 1986 the riparian parties signed, in Harare, an agreement on founding the Limpopo Basin Permanent Technical Committee (LBPTC), which was to advise the parties in their efforts to develop the Limpopo's water resources (LBPTC Agreement). However, the LBPTC remained inactive for close to a decade, thanks above all to the extremely tense political situation in southern Africa in this period. The LBPTC had no organizational structure and no formalized procedural and decision-making rules. Only in 1995, following the political transformation of the RSA, was a second meeting of the LBPTC convened. At it, agreement was reached on the joint preparation of a hydrological study on the Limpopo. The aim of the study was to lay the groundwork for an integrated river-basin management plan. The study, the first tangible result the LBPTC produced in its 13 years of existence, was completed in 1999. In view of Mozambique's persistent complaints that it was being provided absolutely no data or information by the upstream riparians, this may be seen as an important confidence-building measure. In addition, at the 1995 meeting the parties committed themselves to basinwide cooperation and decided to create an RBO to lay the groundwork for it. However, several rounds of negotiations (1998 in Gaborone, 1999 in Maputo, 2000 in Harare) on the creation of a Limpopo River Commission ended without any tangible results. The proposed organization's status remained a matter of dispute. The project was dogged by difficulties and delays of the kind experienced during the efforts undertaken to establish ORASECOM. Zimbabwe missed several meetings (on account of the domestic crisis in the country); as the downstream riparian, Mozambique felt discriminated against and placed at a disadvantage by the routinized cooperation between the RSA and Botswana. There were disagreements over the responsibility to be transferred to an RBO as well as over the relationship the new RBO was to have to

existing bilateral institutions and the question of how binding water allocation decisions were to be achieved.

The stage was finally set for an agreement when the parties consented to involve the SADC Water Sector and to use the SADC Water Protocol as a frame of reference. An additional impulse was provided by the 2002 Johannesburg Earth Summit. It was there, too, that the SADC Water Sector and the LBPTC reached agreement on a project to elaborate a joint action plan to combat water-borne diseases in the Limpopo Basin.

Finally, in November 2002, the agreement to establish the Limpopo Watercourse Commission was adopted (LIMCOM 2003 Agreement). LIMCOM is the successor organization to the NBPTC (Article 12). While all other existing agreements and institutions remain intact, the parties have agreed to harmonize them with the new LIMCOM Agreement. Also, the parties continue to have the right to conclude separate Limpopo-related agreements, to the extent that such agreements are consistent with the LIMCOM Agreement. The agreement makes explicit reference to the 1997 UN Convention and the SADC Water Protocol, and the commission has committed itself to abide by the latter's principles of cooperation.¹²

LIMCOM has an independent legal status. It is a technical advisory body whose aim is to guarantee that the water resources of the Limpopo River Basin are developed, utilized, and conserved for the common good of all four riparians (Articles 3 and 7). Recommendations, presented in the form of reports, are to be developed with a view above all to the following aims and measures:

"... to determine the long term safe yield of the water (...) the equitable and reasonable utilisation of the Limpopo to support sustainable development in the territory of each Contracting Party (...) all aspects related to the efficient and effective collection, processing and dissemination of data and information (...) contingency plans (...) investigations and studies" (Article 7).

LIMCOM's central organ is the Council (Article 4). It is made up of delegations of the four parties. Each delegation has three permanent members;

12 *"...equitable and reasonable utilisation, sustainable development, intergeneration equity principle, prevention principle und transboundary impact assessment principle" (Article 3).*

additional advisers may be appointed from case to case. The council meets at least twice a year; decisions are taken by consensus. The council can set up ad hoc working groups, engage advisers and technical experts, and appoint administrative service providers. The council is authorized to set up a secretariat (Article 4).

Article 9 of the agreement covers *dispute settlement*: When disputes arise, the parties are first expected to conduct negotiations. If these fail to come up with a result within six months, the dispute can be brought before the SADC Tribunal "*unless the parties to the dispute agree otherwise*". Decisions of the tribunal are to be recognized as "*final and binding*".

The parties to the agreement are responsible for covering the costs of their own delegations. When the council meets, the host delegation is responsible for meeting the costs involved in preparing and conducting the meeting. All other "*costs or liabilities incurred by the Commission*" are shared equally by all of the parties (Article 11).

In its further (in particular organizational) development, LIMCOM intends to seek *orientation in ORASECOM*.

As an external actor, *Germany*, i. e. the GTZ, played an important role in the formation of LIMCOM. As in the case of ORASECOM, the GTZ provided support for the negotiation processes and provided legal support in drafting the commission's founding document. The German financial contributions amounted to: €0.17 million in 2001, €0.34 million each for 2002 and 2003, and €0.39 million in 2004. In the framework of the EU Water Initiative, the EU is providing support for a survey of resources and activities as well as for modeling work and data-sharing.

The Joint Permanent Technical Commission and the Joint Water Commission

Beside the basinwide institutions there are also bilateral institutions that go back some years.¹³ Botswana and the RSA had cooperated along the upper

13 The Tripartite Permanent Technical Committee (TPTC) (agreement: 1983, member countries: RSA, Mozambique, and Swaziland) cannot be dealt with at any length here. While it was supposed to concern itself with water resources shared by all three parties (including the Limpopo), the tense political situation at the time prevented it from gaining any significance in practice.

course of the Limpopo before Botswana won its independence; once it became independent, it continued on with this cooperation, despite the apartheid regime in the RSA. In 1983 the two parties established a Joint Permanent Technical Committee (JPTC) which was tasked, among other things, with preparing a Joint Upper Limpopo Basin Study (JULBS). The joint work on the JULBS, which required the parties to exchange data and information, served to strengthen confidence between the RSA and Botswana. The JPTC meets once a year, and its work may be said to be wholly effective. The committee was upgraded to a commission in 1989 (Joint Permanent Technical Commission).¹⁴ Gaborone is supplied with water from the Molatedi Dam on the Marico River in the RSA. Botswana contributes to the dam's operations. The concessions South Africa has made to Botswana are due not least to the fact that the former is reliant on Botswana's good will for possible future water projects – e. g. water transfer from the Zambezi and / or the Okavango – since such projects would require that pipelines be laid through Botswana's territory.

In 1997 the two countries also set up a Joint Permanent Commission for Cooperation (JPCC), the task of which is to strengthen cooperation in various areas (including water resources).

In 1996 the RSA and Mozambique signed an agreement on a Joint Water Commission (JWC) which was to serve as an advisory body on issues concerning shared watercourses, including the Limpopo. In view of a history of extremely tense and strained relations between the two countries, the bilateral cooperation between the RSA and Mozambique has proven more difficult than the cooperation between the RSA and Botswana, particularly since Mozambique, as the downstream riparian, is in an incomparably weaker position and has – unlike Botswana – little to offer the RSA by way of water resources.

The bilateral institutions exist side by side with the multilateral LBPTC / LIMCOM. The reason why these institutions have worked out thus far is,

14 In June 1989 the JPTC was replaced by a Joint Permanent Technical Commission on the Limpopo Basin and this, in turn, was replaced by another Water Commission in November 1995.

evidently, that two partners are better able to reach quick agreement than more than two partners.¹⁵

3.3.3 Destabilization risks, cooperation potentials, and options for German Development Cooperation

The RSA and Zimbabwe are exploiting the water resources of the Limpopo nearly to full capacity. The RSA's economy – and in particular its industrial heartland Gauteng – is heavily dependent on Limpopo water resources. IBTs are used to supply the Limpopo with additional water from other river basins. The quality of the waters of the Limpopo suffers from the industrial and mining activities. In other words, the concern on the Limpopo is with both water quantity *and* water quality. In view of the fact that all of the upstream riparians have plans to increase their utilization of water resources, Mozambique has good reason to be concerned about its own water resources. This constellation has what it takes to make a classic upstream-downstream conflict.

The creation of LIMCOM has appreciably improved the prospects for cooperative basinwide solutions, especially since LIMCOM is explicitly integrated into the context of the SADC Water Sector, and the riparians have also committed themselves to cooperation in the framework of other river-basin organizations. LIMCOM plans to orient its further (above all organizational) development to ORASECOM. German DC could focus on supporting this linkage. As an external actor, Germany, i. e. the GTZ, has already played an important role in the formation of LIMCOM. It should continue to play this role over the medium term, perhaps focusing on efforts to further strengthen LIMCOM in organizational terms and to set the stage for more civil society participation. Furthermore, German DC could provide special support for the country that must in many ways be seen as the weakest link here, viz. Mozambique (efforts to strengthen national

15 *"Although bilateralism in multilateral basin is not a sustainable approach to cooperate in the long-term, it operates however more practically. In multinational river basins, bilateral framework for cooperation has technical advantages and short-term benefits while multilateral framework, if possible, has political advantages and long-term benefits for all. A bilateral cooperation as part of multilateral framework could be an alternative approach for basin-wide cooperation"* (Mohamed s. a., 3).

water management capacities, capacity-building aimed at setting the stage for participation on an equal footing in the international water framework).

3.4 Lake Victoria

3.4.1 Characterization of the lake basin

Lake Victoria has an area of roughly 69,000 km² and a basin about 193,000 km² in size. This makes it the world's second-largest and Africa's largest lake. It has a volume of 2,760 km³; its shoreline is 3,450 km long (1,750 km in Tanzania, 1,150 km in Uganda, and 550 km in Kenya). It has an average depth of 40 m, and a depth of 80 m at its deepest point. The lake is 412 km long from north to south and 355 wide from east to west. The lake's altitude is 1,135 m. The region receives relatively abundant precipitation (1,015 mm / annum). 85 % of its water is from precipitation, 15 % from tributaries (including the Kagera, Nzoia, Sio, and Yala rivers). The evaporation rate is equivalent to 85 % of the water that flows out of the lake. The largest tributary is the Kagera, which comes from Burundi. The waters of Lake Victoria overflow into the Nile, in Uganda, through the Ripon Falls / Owen Falls.

Three riparian countries share the lake, namely Kenya (6 % of its surface), Tanzania (49 %), and Uganda (45 %). Burundi and Rwanda also share its basin (7 and 11 %, respectively, compared with 44 % for Tanzania, 22 % for Kenya, 16 % for Uganda). The basin is home to some 35 million people, roughly one third of the overall population of the three riparians.

The lake and its resources are used to supply water to households, industry, and agriculture as well as for fisheries, transportation, to acquire building materials, to generate power, and to dispose of household, agricultural, and industrial wastes. The lake basin is fertile and densely populated, and it is farmed intensively (to produce coffee, tea, cotton, sugar cane, etc.). Some 3 million people in its riparian countries earn their livelihood from fishing and fish-processing. The average annual catch ranges between 400–500,000 tons, with Tanzania accounting for a share of 40 %, Kenya 35 %, and Uganda 25 %. The region is marked by high population growth and high levels of rural-urban migration. Kenya, the riparian with the smallest share of the lake, is especially dependent on its resources:

Over 50 % of the country's water resources come from Lake Victoria. Kenya's part of the basin is very densely populated.

The basin is troubled by a variety of environmental problems: introduction of exogenous fish species (Nile perch and Nile tilapia) that have tended to displace native species; overfishing; eutrophication; algae growth due to nutrient inflows (phosphorus and nitrogen); massive propagation of the water hyacinth (the consequences: decline of fish stocks; impeded transportation and fishing activities); degradation of wetlands along the lake's banks; pollution and toxicity due to discharges of wastes and untreated wastewater from urban areas, industry (including tanneries, breweries, fish-processing plants, paper producers) as well as from agriculture (herbicides and pesticides). Water-borne diseases like bilharziosis, schistosomiasis and malaria are widespread.

The conflicts encountered here are mainly between export-oriented and traditional fisheries. There is also a full-blown conflict between Kenyan fishermen and Ugandan authorities, who quite often stop Kenyan fishing boats and arrest fishermen for allegedly fishing in Ugandan territorial waters. This has already led to one international conflict (EALA Study 2005). Widespread piracy furthermore poses a threat to the security of fishing and transportation activities on the lake.

Tanzania is currently building a 179 km-long pipeline to supply the country's arid northwest with water from Lake Victoria, and Kenya has developed similar plans in connection with its Kenyan National Water Master Plan. Such projects have impacts that are felt as far downstream as Egypt, the lower-course Nile riparian, which is reliant on Lake Victoria as the source of the Nile.

3.4.2 Description and analysis of lake-basin institutions

The Lake Victoria Fisheries Organization

On June 30, 1994, the three riparians founded the Lake Victoria Fisheries Organization (LVFO) (LVFO Convention 1994, LVFO Convention Amendment 1998). The organization came about in the context of the Lake Victoria Environmental Management Project (LVEMP) (see below). The LVFO is an international organization with an independent legal status. Its aim is *"to promote the proper management and optimum utiliza-*

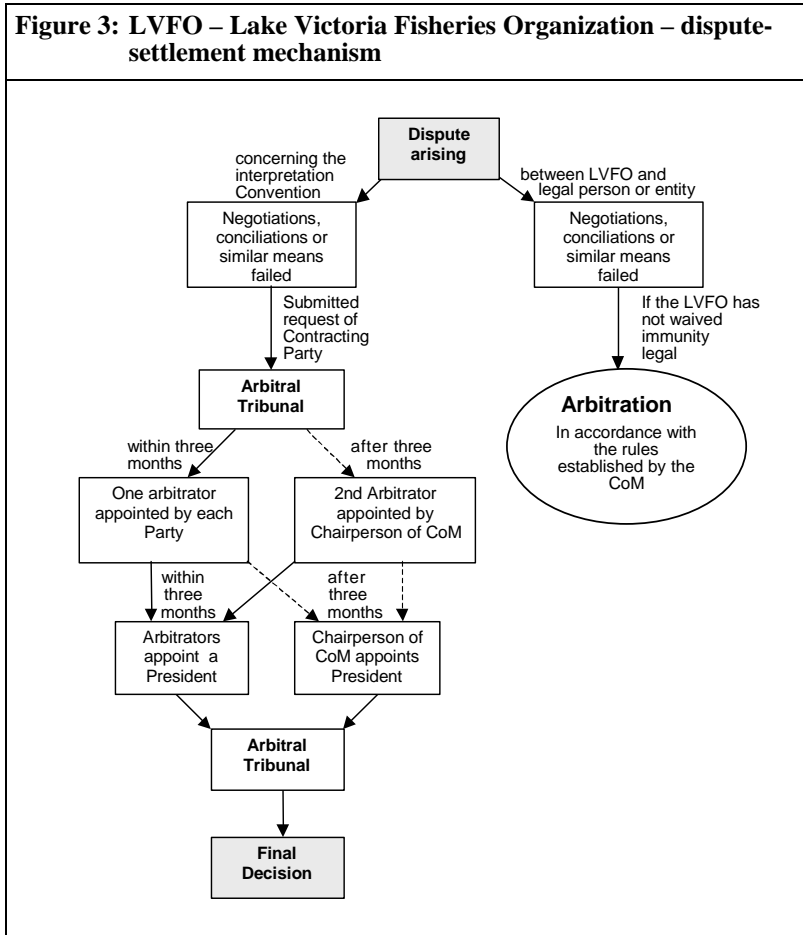
tion of the fisheries and other resources of the Lake" (Article 2). This in turn entails efforts to harmonize the national policies of the parties and to develop joint concepts for the protection and utilization of the lake.

The body's organizational structure provides for:

- a Council of Ministers; a Policy Steering Committee (made up of undersecretaries from the ministries of the parties responsible for fisheries; these bodies meet once a year);
- an Executive Committee (six members, heads of the departments responsible for fisheries and heads of fisheries research institutions of the parties; these meet once a year);
- a Fisheries Management Committee (heads of department of fisheries management);
- a Scientific Committee (heads of departments of fisheries research); and
- a Permanent Secretariat (Articles 4–12).

The Council of Ministers, the LVFO's highest organ, which is made up of the parties' fisheries ministers, has thus far met only on relatively rare occasions for regular meetings (every two years, the fifth session took place on May 27, 2004). But thanks to the Permanent Secretariat, which is headquartered in Jinja, Uganda, the LVFO has been able to work on a continuous basis. The secretariat is headed by an executive secretary appointed for a five-year term by the Council of Ministers. The post rotates regularly among the parties. The secretariat employs a good dozen persons as its full-time staff. The establishment in all three parties of National Committees made up of national advisers – which may be seen as the LVFO's base – has also contributed to the organization's operational effectiveness.

Since the fish stocks are this transboundary waterbody's most important economic resource, it is understandable that efforts aimed at institutionalizing transboundary management started out by focusing on fish resources. Pressure and support were also forthcoming from abroad: The EU at one point temporarily banned the import of Nile perch from Lake Victoria for reasons of inadequate hygiene, while at the same time offering assistance.



When the EAC was (re)established, the LVFO became an EAC institution. A stakeholder workshop held in July 1998 elaborated a vision statement for the LVFO that is to serve for purposes of strategic orientation from the period from 1999 to 2015 (the so-called LVFO Strategic Vision).

The most recent session of the Council of Ministers (in May 2004) adopted a "Regional Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing" (RPOA-IUU) on Lake Victoria.

Its aim is *"to ensure compliance to fisheries laws and regulations, facilitate monitoring, control and surveillance; enhance collection of fisheries statistics to control fishing effort to ensure optimum utilisation of the resource and guarantee sustainability of the Lake Victoria fisheries"* (Joint Communiqué LVFO 2004), i. e. to take action on the problem of overfishing and to prevent conflicts over fisheries.

External actors / donors were involved in the establishment of the LVFO. WB / GEF became indirectly involved by financing the LVEMP, the EU by funding the Lake Victoria Fisheries Research Project (LVFRP), and the FAO was directly involved in drafting the agreement. The LVFO works together with the FAO on a close and regular basis. The EU Commission is presently (2003–2008) contributing Tsh 35.7 billion (2003: €35.3 million) to the funding of the Lake Victoria Fisheries Management Project. The LVFO has a budget of its own, which is prepared by the executive secretary and adopted by the Council of Ministers. The parties make contributions to the budget that are set by the Council of Ministers.

The LVFO has a well-devised dispute-settlement mechanisms (see Fig, 3). If a dispute between the parties cannot be settled through negotiations, each party to it is entitled to call for arbitration. In this case an arbitral tribunal is appointed. It is made up of three persons: Each party to the dispute appoints one arbitrator, these then appoint a third arbitrator who serves as the tribunal's president. If no arbitrators are appointed within a given period, the chairperson of the Council of Ministers appoints the remaining arbitrator(s).

The Lake Victoria Environmental Management Project

On August 5, 1994, the three riparians concluded an agreement on the *Lake Victoria Environmental Management Project (LVEMP)*. The practical work began in 1997; it was first projected to last for five years. The project has since been restructured: After completion of a first phase (in 2005) preparatory work is set to start on Phase II, which is projected to take some 15 years (the program for Phase II is scheduled to be ready for decision at that time). The aim of Phase I was *"management and control of water hyacinth, improvement in the fisheries management and fisheries research, water quality monitoring, management of industrial and municipal wastes, conservation of biodiversity, catchment forests and wetlands,*

sustainable land use practices and capacity building" (see LVEMP website: <http://www.lvemp.org/>).

In the framework of the first project phase, 144 microprojects were launched in the fields of health, water supply and wastewater disposal, education, road-building, fisheries, forestation. Phase II is to focus on three components: research and development; management; socioeconomic development.

An organizational structure with the following elements was created for implementation purposes:

- a Regional Policy and Steering Committee made up of three representatives from each of the parties. Its task is to clarify open questions and to contribute to settling disputes among the parties. The committee has a regional secretariat headed by an executive secretary (country in charge: Tanzania);
- a Regional Task Force 1, which is responsible for fisheries management and water hyacinth control (country in charge: Uganda);
- a Regional Task Force 2, which is responsible for management of water quality and land use (country in charge: Kenya) (LVEMP Agreement 1994, Articles 2, 3).

In addition, two National Working Groups and a National Secretariat were set up in each of the countries party to the agreement; their function was to support the LVEMP institutions. Alongside government representatives, these national bodies also contained *"academic institutions, private sector parties and local non-governmental organisations, with a special effort (...) made to incorporate local riparian community interests"* (ibid., Article 2).

Regional Task Force 1 was given the task of creating the Lake Victoria Fisheries Organization (see below).

The LVEMP evidently was successful in its capacity-building efforts, in particular in the government institutions involved, above all because the national secretariats had a key role to play in project implementation.

Initially the LVEMP was funded largely by the International Development Association (IDA) and the Global Environment Facility (GEF), each of which contributed US \$ 35 million (1997–2001). Each of the three parties

contributed a total of US \$ 7.8 million (in equal amounts). "*Cooperation between the LVEMP and EAC/donors (was) poor*" (Swedish Strategy 2004, 31). For Phase II, Norway and Sweden made funds available through the World Bank that are to be used to elaborate a Shared Vision and Development Strategy as a basis for Phase II. In addition, since April 2004 (date of approval) the GEF has funded a project entitled Transboundary Diagnostic Analysis and Strategic Action Program Development for the Lake Victoria Basin. The LVEMP's regional secretariat is the "implementing entity" for the project.

Several stakeholder workshops were held in the LVEMP framework. Special emphasis was placed on participation of local fishing communities. This led to good results, while the participation of so-called catchment communities – aimed at avoiding discharges of sediments and nutrients – proved less successful. The National Task Forces (NTFs), which organized the process of developing visions and strategies for the second phase of LVEMP, contained both government representatives and representatives of NGOs, the private sector, and the academic community. The NTFs organized a number of stakeholder meetings involving a total of some 15,000 stakeholders (Swedish Strategy 2004, 13). And the Regional Task Force (RTF), which developed a transnational Vision and Strategy Proposal, contained both government representatives and "*civil society, the business community, and academic community*" (ibid., 13). NTFs and RTF were funded by SIDA. The largest of the some 40 NGOs engaged in the LVEMP context is the East African Communities Organisation for the Management of Lake Victoria (ECOVIC), an association of several smaller NGOs and community-based organizations (CBOs). While NGOs and CBOs have evidently been involved in developing visions and strategies, their involvement appears to have been accepted only on a case-by-case basis (mainly participation in workshops); and there still are some open questions as to their involvement in the implementation of visions and strategies. It remains to be seen whether this state of affairs will be different in the framework of the LVBC. Moreover, several international NGOs in the basin have been engaged, with SIAD support, in active cooperation with the EAC (e. g. IUCN, WWF, ICRAF).

The Lake Victoria Basin Commission

In 1999 the East African Community (EAC) was (re)established by Kenya, Tanzania, and Uganda. The EAC agreement provides, among other things, for joint management of transboundary catchment areas. The agreement explicitly refers to Lake Victoria as the parties' most important shared natural resource. It describes the lake as an element linking the members of the EAC, declaring the community's goal to be the lake's sustainable development for the economic and social benefit of all three riparians. The Lake Victoria Basin was declared to be a so-called economic growth zone. The EAC secretariat served as a vehicle to set up the Lake Victoria Development Programme (LVDP) and a Committee for Lake Victoria Development (CLVD). Two other riparians, Rwanda and Burundi, have since applied for membership in the EAC, and in 2004 Rwanda and the EAC signed a memorandum of understanding on regional cooperation.

The establishment of the EAC and its engagement on Lake Victoria have given new impulses to efforts to set up a lake-basin organization for Lake Victoria. The conclusion of a Partnership Agreement between the EAC and various donors (Sweden, France, Norway, the World Bank, the East African Development Bank (EADB, April 24, 2001)) on a longer-term partnership to promote sustainable development in the Lake Victoria Basin has also contributed to this end. A Partnership Consultative Committee (which meets twice a year) and a Partnership Fund were set up to implement these goals. For its part, the EAC set up a unit (made up of two officials) with the EAC secretariat and a Policy Advisory Board to implement the program. At the 2000 Johannesburg Earth Summit the heads of government, the state of Sweden and the EAC countries committed themselves to the sustainable development of the lake basin (Swedish Strategy 2004, 17). Sweden has pledged SEK 1.5 billion (€165.8 million) over the coming ten years for this purpose (*ibid.*, 36).

It was this background that paved the way for the conclusion of a comprehensive agreement on transboundary lake-basin management and the creation of a commission devoted to the task. On November 29, 2003, at a meeting of the EAC's Council of Ministers, the three riparians signed a protocol on the sustainable development of the Lake Victoria Basin and the establishment of a Lake Victoria Basin Commission (LVBC). The commission is an EAC institution, and the agreement is an integral ele-

ment of the 1999 EAC agreement. The LCBC, in its capacity as an implementing agent, has been given the task of implementing the Protocol for Sustainable Development of the Lake Victoria Basin. The protocol outlines the commission's general competences: support and coordination of the activities of various actors in the field of sustainable development and poverty reduction in the Lake Victoria Basin (Mngube 2004, 2).

The agreement sets out the following *goals*: promotion of "*equitable economic growth, measures aimed at eradicating poverty, sustainable utilisation and management of natural resources, protection of the environment, compliance on safety of navigation*" (Protocol Lake Victoria 2003, Article 33).

The commission's *tasks and functions* are to include: "*harmonisation of policies, laws, regulations and standards; promotion of stakeholder participation; guidance on implementation of sectoral projects; promotion of capacity building and institutional development; promotion of safety and security; promotion of research development*" (ibid.).

The commission is to have a highly differentiated *organizational structure*. It is made up of the Sectoral Council, the Coordination Committee, the Sectoral Committees, and a secretariat headed by an executive secretary (Articles 34–42). The Sectoral Council is the political decision-making body, the Coordination Committee is responsible for implementation. Both meet at least twice a year. The Sectoral Council's "core members" are to include the ministers responsible in the partner countries for water, fisheries, agriculture, transportation, the environment, and natural resources. Its "essential members" will continue to be the foreign ministers and the ministers for internal security. The Sectoral Council "shall link" with other EAC sectoral councils to the extent that this proves necessary (Mngube 2004, 4).

The Coordination Committee is to be made up of the permanent secretaries responsible for water, fisheries, agriculture, transportation, the environment, and natural resources and the permanent secretaries responsible for external relations and internal security (Mngube 2004, 3).

From case to case, Sectoral Committees are to be set up by the Sectoral Council on the recommendation of the Coordination Committee. The committees *may* include both government officials and representatives of business, industry, and civil society (Article 37).

In addition, so-called National Focal Points are to be set up in all of the countries concerned; their task is to coordinate between the national level and the commission.

The task of the secretariat, a permanent institution, is to support the work of the other commission levels. The secretariat is the commission's executive arm, responsible for cross-cutting coordination, providing support for the commission's work, and cooperation with the EAC secretariat, the partner countries, and development partners / donors (Mngube 2004, 2). It is headed by an executive secretary appointed by the council to a five-year term of office. Among other tasks, the *secretariat's functions* are to:

"establish a regional database and promote sharing of information and development of information systems and data exchange (...) disseminate information on the Commission to stakeholders and the international community; mobilise resources for the implementation of the projects and programmes of the Commission; develop a sustainable funding mechanism for facilitating sustainable development in the Basin" (Article 42).

On the LVBC's *funding*, the protocol states:

"The sources of funds for the Commission shall be from the East Africa Community budget, stakeholders' contribution, development partners and such other sources as shall be established by the Council" (Article 43).

While the LVBC is not to replace other institutions, it is to have the role of a lead organization:

"The Commission, as established by the Protocol, shall perform its functions as provided for by the Protocol, however, in relation to other existing or new institutions, programmes and projects, it shall be the lead organization in formulating, reviewing and coordinating proposals for in-house policy and strategy towards development activities in the Basin. The EAC Secretariat will commission a study to work out the operational linkage between LVBC and Lake Victoria Fisheries Organization" (Mngube 2004, 4).

Since that time a so-called Vision and Strategy document has been adopted (EAC 2004). This

"shall be the guiding document in identifying the scope, priorities and type of activities, which could be included in the Commissions work

programme. Other stakeholders, governments, international organizations, NGOs and scientific institutions should ensure that their activities are also guided by the same document. This will also include the activities of the Local Authorities and the other organs of the EAC." (Mngube 2004, 4)

The protocol explicitly provides for *cooperation with "development partners"* (Article 44). By funding a study examining the legal and institutional aspects, SIDA played a key role in the development of the protocol. In the framework of the Swedish Lake Victoria Initiative (since 2000), Sweden has generally committed itself to a 20-year engagement.¹⁶ Canada is also strongly engaged here. German DC is providing support for the EAC secretariat on the one hand, and bilateral support for water management in individual riparian countries (Kenya, Tanzania, and Uganda) on the other. The EU Water Initiative is to concentrate on the Kagera River Basin and providing support for the NELSAP program (Nile Equatorial Lakes Region Subsidiary Action Programme), both of which belong to the NBI context. This EUWI Kagera Programme (EUWIKP) follows up on an existing SIDA-NORAD program.

Article 46 of the protocol covers *dispute settlement*. If a dispute between two parties cannot be resolved by direct negotiations, each party, or the EAC executive secretary, can bring the dispute before the East African Court of Justice. This body's decisions are final and binding (Article 46).

It is noteworthy that the agreement also obliges the parties to define a *common policy vis-à-vis third-party countries*.¹⁷ This may prove significant in the context of the Nile River Basin. It is furthermore noteworthy that the new agreement *supersedes other existing agreements*: Article 48 states that the provisions of the protocol have precedence over any existing agreements concerning the Lake Victoria Basin. If other agreements prove to be inconsistent with the protocol, these agreements are null and void.

16 Sweden is focused here on the five following areas: *"capacity building for sustainable development, empowering communities and individuals, sound environmental and sustainable use of natural resources, combating HIV / Aids, private sector development for economic growth"* (Swedish Strategy 2004, 22).

17 Article 33 of the LVBC requires the partner countries to prepare and harmonize joint negotiating positions vis-à-vis all other countries as far as the Lake Victoria Basin is concerned.

The protocol has now been ratified by all of the parties (communication from Mngube Jan.3, 2005). It remains to be seen whether the commission will be able to contribute to improving transboundary lake-basin management. Lake-basin activities continue to be organized largely at the national level, and there is at present little harmonization between the parties' policies. While all three riparians have been engaged in reforming their national water legislation, policies, and strategies, these efforts lack coordination both at the national level (between different ministries / departments) and in the transnational context.

3.4.3 Destabilization risks, cooperation potentials, and options for German Development Cooperation

Apart from environmental problems, Lake Victoria continues to be faced with – escalation-prone – conflicts between different users, not the least of which is an international conflict between Kenya and Uganda. In addition, the lake is also part of the larger Nile conflict constellation. Destabilization risks are thus given at different levels, particularly in view of the fact that the riparians are pursuing plans for further utilization of the lake's waters. On the other hand, the prospects for successful cooperation have improved appreciably since the (re)establishment of the EAC, and in particular since the establishment of the LVBC. The organizational structure planned for the LVBC is a promising one, although not much of it has been realized thus far. This could be one starting point for German DC (organizational development, capacity-building). And in view of the fact that there is a risk that incompatibilities may emerge between managing Lake Victoria and the Nile Basin, German DC could furthermore work for a linkage between Victoria Basin management and the Nile Basin Initiative. This risk should be avoided at all costs. At present a window of opportunity seems to be opening up on Lake Victoria, and German DC should undertake efforts to make use of it and to expand it. This could play a key role for crisis prevention in particular; and beyond that, German DC, which until now has focused mainly on river basins, could build expertise bearing on support for lake-basin management. However, it would first be essential to reach understandings with other donors already active in the field.

3.5 Lake Chad

3.5.1 Characterization of the lake basin

The Lake Chad basin has an area of roughly 2.39 million km².¹⁸ The lake's surface is extremely variable, fluctuating as a function of season and macroclimatic events (droughts). One of the features typical of the lake is its dramatic shrinkage since the mid-1960s, a development due on the one hand to climate change and on the other to man-made environmental degradation (overexploitation of the lake's waters, overgrazing, deforestation, unsustainable irrigated agriculture). In the 1960s the lake had an area of some 25,000 km², today its average size is 2,500 km². In extreme cases it has even shrunk to 2,000 km². The lake is very shallow (with an average depth of 1.5 m and a max. depth of 12 m). Its most important tributaries are the Chari (Shari) (950 km in length), its tributary the Logone, and the Komadougou-Yobe river system (as well as the El Beid and the Yedeseeram). The Chari and Logone account for 90 % of the lake's inflows. In recent years natural factors and the damming up of the lake's tributaries have severely reduced the quantity of water flowing into it.¹⁹

The annual average precipitation in the basin is distributed very unevenly. The southwest receives an average of 1,600 mm/annum, while the north has less than 155 mm / annum. The evaporation rate, i. e. 2,300 mm / annum, is very high.

The countries that share the Lake Chad Basin are Chad (45.5 %), Niger (28 %), the Central African Republic (CAR) (9 %), Nigeria (7 %), Algeria (4 %), Sudan (4 %), Cameroon (2 %), and Libya (0.5 %). Over one half of the territory of Chad and Niger are located in the Lake Chad Basin. The lake's direct riparians are Chad, Niger, Nigeria, and Cameroon. Three quarters of the lake's waters come from the CAR and Cameroon, countries that themselves either do not border on the lake (CAR) or share only a

18 The so-called conventional basin that falls under the responsibility of the Lake Chad Basin Commission originally encompassed an area of 443,000 square kilometers. Since the CAR's accession to the commission the figure is 967,000 km² (Burchi / Spreij 2003, 2).

19 "The total annual mean river inflow decreased from the pre-drought value of 39.8 km³ to the present value of 21.8 km³. This reflects a decrease of 47%. During the same time, the total lake input (including direct rainfall on the lake) decreased by 50%" (Odada et al. 2004, 8).

small part of it. There is also a discrepancy between the relatively rain-rich south, which feeds the lake, and the arid north. One typical feature of Lake Chad is its extensive inundation areas (Sategui-Deressia in Chad, Yaeres in Cameroon, and Hedejia-Nguru in Nigeria).

The environmental degradation of the lake and its basin is described as follows: shrinkage of the lake's surface, constant decline in the quantity of water in its tributaries, decline of the groundwater table, soil erosion, loss of plant and animal species, pollution and toxicity from agricultural chemicals, sedimentation, salinization, overfishing, and invasive plants (water hyacinth).

The Lake Chad Basin is home to some 22 million people; population growth is high (2.4–2.6 %). The lake provides livelihoods for over 150,000 fishermen. The average catch per year is 60–70,000 tons (as compared with 130–140,000 tons in the 1970s). Both (nomadic) pastoralists and settled farmers are dependent on the lake's waters and groundwater. Farmers use the fertile lake soil when its waters recede for seasonal reasons. At present the land used for irrigated agriculture in the basin amounts to some 115,000 ha. Nigeria accounts for most of this (some 83,000 ha), followed by Chad (14,000 ha), and Cameroon (13,000 ha). The basin's potential is estimated to be 1.16 million ha; realizing this potential would mean utilizing some 80 % of the volume of the lake's present tributaries. Water use for irrigated agriculture has experienced a fourfold increase since the early 1980s. The larger irrigation projects are generally regarded as inefficient.²⁰ Several larger-scale irrigation projects, e. g. the South Chad Irrigation Project in Nigeria and the Mambi Polder Project in Chad, have already been abandoned or indefinitely suspended because of the lake's shrinkage.

The largest project currently under planning is an IBT system designed to stop the lake's shrinkage by supplying it with water from the Congo River Basin. The plan is to divert 900 m³/s of water from the Oubangui River in the Congo Basin to Lake Chad through a pipeline and a navigable canal some 2,400 km in length. In addition, there are plans to build a dam near

20 The WWF has come up with a devastating assessment of these irrigation projects: "A few large-scale irrigation schemes (polders) developed on some parts of the lake shore have proven totally unsuited to the hydrological, climatic and cultural conditions in the Lake Chad region, and can be considered as complete failures" (WWF Lake Chad, 2).

Palambo (CAR) on the Oubangui to generate electricity. The aim of this project is to expand irrigated agriculture to an area of 5–7 million ha; the Republic of Congo (Brazzaville) has already signed a no-objection statement. The countries involved have earmarked US\$ 1 million for the project and intend to tap donors for an additional US\$ 5 million for feasibility studies. These studies, on which a decision was reached by the Lake Chad Basin Commission in January 2002, are set to look into the project's social, economic, and environmental impacts.

Environmental changes in the lake region have given rise to a good number of conflicts at different levels, some of which have taken a violent course. There have been conflicts between upstream and downstream communities along tributaries concerning dam projects, and there have also been heated conflicts between nomadic pastoralists and settled farmers. These groups are in competition for the region's growingly scarce natural resources, land (for grazing) and water. Some have organized in well-armed militias that combat one another. There are, however, also numerous nonstate, traditional dispute-settlement mechanisms in place for farmers and cattle breeders that are used to address disputes over grazing and transit rights, access to water, etc.

There have at times also been conflicts between the lake's riparian states. In the late 1970s, for instance, there were clashes between Nigeria and Chad along their 85 km-long border, which runs through Lake Chad, and in April 1983 fighting between the armed forces of the two countries claimed more than 100 lives. The conflict was settled only in 1986. The Lake Chad Basin Commission was also involved in the mediation efforts.

There is also a more serious, continuing border conflict between Nigeria and Cameroon that in 1993 led to fighting between the armed forces of the two sides. The conflict involved the whole of the border between the two countries (1,600 km in length) as well as the Bakassie Peninsula far to the south. The Lake Chad Basin is also part of the conflict, since the shrinkage of the lake has blurred the course of the borders: local groups, formally Nigerian citizens, followed the receding waters and founded villages on Cameroonian territory; the Nigerian administration moved in to fill the vacuum, and this triggered official protests from Cameroon. For some years now the two sides, with international support, have been working to settle the conflict, and a special Cameroon-Nigeria Mixed Commission was established for the purpose (see below).

In addition, in the countries of the region there have been massive tensions between different user groups, upstream-downstream conflicts along the tributaries, and disputes over (planned) dams (e. g. on the Mape River in Cameroon) – and in particular in Nigeria between the county's individual federal states.

3.5.2 Description and analysis of lake-basin institutions

Lake Chad Basin Commission

On May 22, 1964, the four riparians Cameroon, Niger, Nigeria, and Chad signed the Fort Lamy (today N'Djamena) Convention, creating the *Lake Chad Basin Commission* (LCBC). In March 1994 the CAR became the fifth member of this intergovernmental institution. In July 2000 Sudan was also granted membership; Sudan, however, has yet to ratify the founding convention and therefore has only observer status. The LCBC is Africa's oldest river- /lake-basin organization. In its *founding document* (the Convention and Statutes relating to the Development of the Chad Basin) the parties commit themselves to a shared use of the basin's natural resources. Individual countries are required to provide other member countries with prior notification, and they are furthermore obliged to rule out any adverse impacts on these countries:

"The Member States undertake to refrain from adopting, without referring to the Commission beforehand, any measures likely to exert a marked influence either upon the extent of water losses, or upon the form of the annual hydrograph and limnograph and certain other characteristics of the Lake, upon the conditions of their exploitation by other bordering States, upon the sanitary condition of the water resources or upon the biological characteristics of the fauna and flora of the Basin. In particular, the Member States agree not to undertake in that part of the Basin falling within their jurisdiction any work in connection with the development of water resources or the soil likely to have a marked influence upon the system of the water courses and levels of the Basin without adequate notice and prior consultations with the Commission..." (LCBC Convention and Statutes 1964, Statutes, Article 5).

In practice, however, these obligations have been violated again and again by the member countries (dam construction and irrigation projects without prior notification).

The functions of the LCBC

"are advisory and coordinating, and can be summarized as follows: Preparing joint rules, which will enable the application of the principles defined in the Convention and Statutes, and ensuring their effective application. Collecting, examining, evaluating, and disseminating information on projects prepared by member states and recommending planning for joint works and research programs within the basin. Maintaining liaison among member states in order to facilitate the most efficient use of the waters of the basin. Following up the execution of works and studies. Promoting regional cooperation and the coordination of regional projects. Examining complaints and proposing the settlement of disputes" (Burchi / Spreij 2003, 3).

The LCBC has an independent legal status; the commission is made up of three commissioners from each member country. It meets at least once a year (Statutes, Art. 8). Decisions are taken by consensus. The commission's supreme body is the assembly of the heads of government and state (which is supposed to meet once a year, although it rarely does so). Its organizational underpinning consists of an office (original seat: Fort Lamy) headed by an executive secretary (appointed for a three-year term by the heads of state and government on recommendation of the commission). An assistant executive secretary, a financial controller, and four departments (Administration and Finance; Planning and Project Execution; Documentation, Information, Remote Sensing and Advanced Technologies; Water Resources) report to the office. Since the adoption of the Strategic Action Programme (SAP) in the framework of the GEF (see below), the commission has also had a Steering Committee responsible for implementing the SAP; it has two directors, one responsible for the technical management of large water resources projects, the other for aspects of environmental management.

The LCBC has also set up a Basin Committee for Strategic Planning (BCSP) whose task is to serve as a liaison body for LCBC work and local activities in the member countries. The BCSP is made up of *"senior country officials, across key ministries such as environment, agriculture, and finance"* (Odada et. al. 2004, 8).

LCBC staff is recruited from the ministries and administrations of the member countries. Its executive secretary is always a Nigerian (because Nigeria contributes the largest share to the LCBC's budget) (Communica-

tion from Issa, Dec. 12, 2004). No single member country is allowed to provide more than one third of the LCBC's staff; the salaries of LCBC staff members are paid from the LCBC's budget (communication from Lambert, 20 Dec. 2004).

It is not possible here to go into the LCBC's work at any length. Evidently, longer phases of inactivity are followed by more brief phases of activity. The noteworthy results of the LCBC's work include: elaboration of an Accord Pertaining to the Creation of Funds for the Development of the Chad Basin Commission (1973, not yet implemented), an Agreement on Common Regulation of Flora and Fauna in the member countries (Enugu Accord, signed in December 1977, ratified only 11 years later), and a Master Plan for the Development and Environmentally Sound Management of the Natural Resources of the Lake Chad Conventional Basin (concluded in 1992, ratified in 1994). It should also be noted here that the mere existence of the LCBC for several decades now in a region that has almost constantly been the scene of civil and international strife and other violent conflicts is a fact that must be judged positively. This has ensured that communication between the member countries has never wholly broken down – even in times of severe crisis – one of which, the civil war in Chad, forced the commission to move its headquarters out of N'Djamena, leaving behind some important collections of documents.

The member countries make contributions to the commission's *funding* based on an agreed-upon key. At present the contributions are assigned as follows: Nigeria 52 %, Cameroon 26 %, Chad 11 %, Niger 7 %, the CAR 4 % of the commission's US\$ 1 million annual budget (Niger and Chad are in arrears with their payments).

Harmonization of the *national water legislation / policies* of the individual member countries is a task that still needs to be addressed. Each of the LCBC member countries pursues its own water policy, largely without reference to the other members and the LCBC, which is "not always informed of national projects (communication from Lambert, Dec. 20, 2004). However, since 2002 the WB has made its support for national water projects conditional on the consent of the LCBC, a move that has certainly served to strengthen the commission's hand (communication from Lambert, 12 Dec. 2004).

More recently, *numerous external actors / donors* have become involved, a fact that appears to have given a new boost to the LCBC's activities. These actors / donors include above all France (which also provides bilateral support for the water sectors of all LCBC member countries), but also the Netherlands, the UK, Finland, Italy, the US, Canada, the EU, the World Bank / GEF, UNDP, the African Development Bank, the Islamic Development Bank, the Arab Bank for Economic Development in Africa, and the BMZ. The BMZ – together with EUWI – has provided €1 million in support of the LCBC and is set to provide €2 million for each of the years 2006 and 2007. Concretely, the funds will be used to support the collection, processing, and exchange of data prepared in accordance with agreed-on, formalized methods. Furthermore, Germany also provides bilateral aid to the individual LCBC member countries for their work in the area of water supply.

At present the largest support program is the above-mentioned GEF project with the SAP, which was adopted in 1998 (see GEF, s. a.). The program involves a long-term vision (projected for 20 years) as well as a five- and an eight-year program of action. Initial projects were approved by the GEF in January 2003 and got underway in September 2003. The program (GEF title: Reversal of Land and Water Degradation Trends in the Lake Chad Basin Ecosystem) presently has US\$ 9.6 in funds from the GEF (plus an additional US\$ 350,000 from UNDP, US\$ 412,000 from the LCBC, and US\$ 618,000 from the BMZ). The aim is to set up a coordinated, integrated, and sustainable management of the international waters and natural resources of the Lake Chad Basin and to reverse the trend toward degradation of the soils and water resources of Lake Chad and its basin (GEF, s. a.).

The organizations in charge of implementation are WB and UNDP. An environmental and social assessment and a transboundary diagnostic analysis (TDA) have been conducted in connection with the program; five other projects are in the pipeline. The project is run by a project management unit with lead agencies in the individual member countries. One point of criticism voiced in connection with the GEF projects is that:

"Projects are often run from thousands of kilometers away resulting in unnecessary project delays. The Lake Chad GEF PDF-B project took over three years to come up with a report, instead of 8 months initially planned. Even then, the output was far short of expectations by the ba-

sin stakeholders. The Lake Chad PDF-C project has taken the same pattern since 2000" (Odada et. al. 2004 , 27).

Some additional projects are linked with the GEF program: In November 2002 the LCBC signed an MoU with the Bureau of the Convention on Wetlands (Ramsar Convention) (in July 2000 Lake Chad was declared a Transboundary Ramsar Site of International Importance). The aim is to create a network of national and regional conservation areas in the lake basin and to set up institutions dedicated to their sustainable management (Memorandum 2002). In this connection the Chad Wetlands Initiative (CHADWET) was launched in June 2003, organized by the Ramsar Bureau and its Mediterranean Coordination Unit. With the support of MEDWET (Mediterranean Wetlands), the Mediterranean branch of the Ramsar Convention, and its Coordination Unit, CHADWET is set to be developed on the model of MEDWET, again in the framework of the GEF program. With a view to obtaining funding, there were plans to present CHADWET to the Ramsar Conference in November 2005 as a Ramsar Regional Initiative.

The EU has supported the Inland Fisheries Project since 1999. AMCOW, in cooperation with the LCBC, also took steps to ensure that Lake Chad was placed on the priority list of the EU Water Initiative. Germany is providing support for Lake Chad activities in the framework of the EUWI.

Since 2001 UNEP and Belgium have been supporting a so-called Mega Chad Project designed to control land degradation; the project is run by the LCBC and the University of Maiduguri (Nigeria).²¹

Several *international NGOs* are also engaged in this context, namely IUCN and WWF. WWF (the Living Waters Campaign) is providing support for a study of Lake Chad conducted by the riparian governments and the CAR as well as for efforts to identify and designate new Ramsar sites in the five LCBC countries (this in turn is linked with the CHADWET Initiative). IUCN's West African Regional Office is providing support for a study on wetlands in Nigeria, Niger, and Chad. As part of its Water and Nature Initiative, IUCN is also supporting a project on water governance

21 "Promotion of the Use of Renewable Energy Resources and Conservation of the Flora Species in the Drylands of Mega Chad of the West African Sub Region: Good Practices Model Village Approach in Land Degradation Control."

in the Komadugu-Yobe Basin the aim of which is to develop an integrated water resources management plan.

In the projects they support, the international NGOs involved attach great importance to stakeholder participation, an aspect that is still underdeveloped in the LCBC context. There are some approaches aimed at organizing various user groups (fishermen, farmers, cattle breeders). The central institutions of participation are (or are to be) so-called water users associations (WUAs, which have been set up with some delay) in several large-scale irrigation projects, e. g. in the Kano River Irrigation Project or the Hadejia River Barrage Project. One case that is cited as an example of successful stakeholder participation is the settlement of upstream-downstream disputes in the Komadugu-Yobe subbasin (IUCN project, see above). The GEF "Reversal..." program (see above) also attaches great importance to participation of the local population. But on the whole very little has been done to involve civil society actors in the LCBC context; the general public in the member countries is as good as unaware of the LCBC (communication from Issa, 15 Dec. 2004; Lambert, 20 Dec. 2004).

The 1964 Convention and Statutes see dispute settlement as a commission task. Article 7 of the Convention also stipulates:

"Any dispute concerning the interpretation of implementation of the present Convention, which has not been determined by the Commission, shall be submitted to the Commission of Mediation, Conciliation and Arbitration of the Organisation of African Unity for the purpose of decision."

When environment-related conflicts escalated in the basin in the 1980s, the LCBC, on instruction of the heads of state and government of the member countries, even took the step of setting up two special committees,

"one on security and one on the border demarcation exercise. The Security Committee held a series of meetings and finally came out with a recommendation that to ensure lasting peace and security in the zone, a joint patrol system should be introduced. This was adopted and every member country contributed security agents who jointly patrolled specifically demarcated areas of Lake Chad" (Odada et. al. 2004 , 13).

Beyond that, though, the LCBC has not become active in the field of dispute settlement, the reason being that it lacks the appropriate mechanisms (communication from Issa 15 Dec. 2004).

One organization that has been created outside the LCBC structure is the Cameroon-Nigeria Mixed Commission (CNMC); it was set up in December 2002. Its task is to come up with a final settlement of the border conflict between the two countries. In doing so, it can find support for its work in a decision of the ICJ of October 19, 2002. The case was brought before the court in 2001, and the court decided basically in favor of Cameroon. The CNMC set up a subcommission to demarcate the border between the two countries. The UN and the EU provided financial support for the subcommission's work. In June / July 2004 the Nigerian authorities withdrew from the disputed area on Lake Chad, although the problem of the Bakassie Peninsula has yet to be resolved. The LCBC provided advice to the CNMC, and it once again, on the occasion of the Nigeria-Cameroon conflict, called on the member countries to ratify a treaty on national borders in the Lake Chad Basin. The LCBC conducted a boundary survey in the Lake Chad region, and while its findings were accepted by Chad, Niger, and Cameroon, they were rejected by Nigeria. Discussions between Nigeria and Chad and Cameroon continue on the border issue.

There is also another organization, the Nigeria-Niger Joint Commission, tasked with finding a settlement for issues of concern to the two countries, which include the Komadougou-Yobe subbasin (Nigeria-Niger Agreement Concerning the Equitable Sharing in the Development, Conservation and Use of Their Common Water Resources, Maiduguri, July 1990). Other bilateral agreements between LCBC member countries include the Moundou Accord between Cameroon and Chad, which covers abstraction of water from the Logone River for agricultural purposes (Aug. 1970), and a Nigeria-Cameroon Protocol

"on exchanging information about hydraulic works and daily hydrological data, on coordinated actions concerning dams and water retaining, concertation and accord prior to any hydraulic construction, joint actions for the mutual benefit of the rural population, inventory of equipment etc." (Niasse 2004, 10)

The existence of these bilateral agreements may be seen as an indication of deficits in the regional LCBC approach. Yet even these bilateral agreements have yet to be translated into real practice. The main problem in-

volved in water management on Lake Chad must be sought in the need for coordination between different levels and approaches.

"Poor coordination is perhaps the most critical managerial problem confronting Lake Chad Basin and its national components. The sub-basins are often granted limited autonomy, which produces artificial divisions and precludes long-term planning. Consequently, the project approach to development in the basin area involves schemes which are developed in isolation" (Odada et. al. 2004 , 23).

And:

"There is lack of co-ordination at national level between the various tiers of government, the private sector and the organized civil society. There is need for the authorities of the Basin Countries to evolve necessary mechanisms for co-ordination, for listening to and consulting with various stakeholders to ensure the awareness of and involvement in policy formulation, implementation, monitoring and decision-making. There is also need for better environmental education at different levels" (Odada et. al. 2004 , 25 f.).

Capacity-building in the LCBC context is described as virtually "non-existent" (communication from Issa 15 Dec. 2004). Tam Lambert, the LCBC's assistant executive secretary characterizes the problems facing the commission as follows:

"Main problems concerning the performance of the LCBC nowadays are the strong national sovereignty, the slow integration of LCBC programmes into the national programmes, and the failure of states to pay their due contributions to the budget (...). Finally, the commitment to implementation by the member states is low. The (water, environment etc.) policies remain mostly national (...). Difficulties are also due to the consensus principle, the managerial capacities of the Executive Secretary, and the human resources in general" (Communication from Lambert, 20 Dec. 2004).

3.5.3 Destabilization risks, cooperation potentials, and options for German Development Cooperation

Lake Chad is massively impacted by environmental degradation. And existing plans for overdimensioned, ecologically doubtful, and unsustainable projects are good reason to anticipate major problems in the future as

well. Environmental changes in the region have led to a good number of conflicts at different levels; some of these, including border conflicts between riparian countries, have already been played out by violent means. In the individual countries there are in some cases also massive tensions between various user groups, upstream-downstream conflicts along tributaries, and conflicts over (planned) dams. Destabilization risks can thus be identified at different levels. On the other hand, the willingness of the countries concerned to engage in cooperation must be seen as weak, and the reason for this must be sought not least in weak statehood and markedly underdeveloped civil society structures in the region.

Despite its long history, the LCBC, too, is a weak institution. Recent efforts to strengthen and improve the commission and lake-basin management in general are certainly a good sign, although the future prospects of these efforts are uncertain. In cooperation with the LCBC, AMCOW has seen to it that Lake Chad was placed on the priority list of the EU Water Initiative. In the framework of the EUWI Germany has taken the lead on the Lake Chad Basin / LCBC and therefore now has a duty to act. In view of the numerous positive experiences that have been made with transboundary water management in other Sub-Saharan countries, there are now good chances for a new start. Efforts to transfer these experiences to the Chad context may be an important first step toward such a new start, and German DC would be well advised to become engaged here. It would also be important to include the issue of groundwater in such efforts. This could make Lake Chad into a model case for groundwater-related issues. In view of the fact that more will have to be done to include groundwater in efforts concerned with transboundary water management, the case of Lake Chad could assume substantial significance in this connection.

4 Higher-level African institutions and the role they play for transboundary water management

In the past both higher-level African institutions and programs such as the African Union (AU), the African Development Bank (AfDB), the New Partnership for Africa's Development (NEPAD), and the African Ministers' Council on Water (AMCOW) and regional communities like the East African Community (EAC) and the Southern African Development Community (SADC) have played different roles as far as transboundary water

management in general and river-basin organizations in particular are concerned. Calls for cooperation projects involving transboundary water resources have been made by all of the above-named institutions and programs and can be found e. g. in AMCOW's Abuja Declaration (Points 3a, 4a) and the NEPAD environmental action plan, and they play a prominent role in connection with cross-cutting regional integration efforts in Africa. The important role played by regional actors in the formation and work of RBOs is best illustrated by SADC. Its members have committed themselves to integrated and cooperative management of the transboundary waters in the SADC region. The SADC Water Sector and the SADC Water Division may be seen as the institutional groundwork needed to implement the – now – Revised Water Protocol on Shared Watercourses (see below).

4.1 South African Development Community

SADC has developed from an anti-apartheid coordinating conference of southern African countries (Southern African Development Coordination Conference – SADCC, founded in 1980) into a regional community of states dedicated to the task of supporting the development-related efforts of its member countries. SADC has 14 members: Angola, Botswana, the Democratic Republic of the Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Zambia, the Seychelles, South Africa, Swaziland, Tanzania, and Zimbabwe. The goals and institutional structure of SADC were laid down in a treaty signed in 1992 by the heads of state of the member countries.

SADC's genesis is closely linked with the community's water policy. In the early 1980s South Africa's later President P. W. Botha, in connection with his "*total national strategy*," proposed the establishment of a Constellation of Southern African States (CONSAS) (Turton 2003a, 144). Botha's idea was that intensive mutual economic ties would increase the dependence of South Africa's neighbors on the country. One essential element of this policy was to make more intensive use of transboundary rivers and to step up South Africa's water imports from water-rich countries in southern Africa. In 1980 Zimbabwe, then an independent nation under President Robert Mugabe, countered by initiating SADCC – SADC's predecessor organization – together with Botswana, Lesotho,

Swaziland, Mozambique, Angola, Zambia, Malawi, and Tanzania. The idea behind this conference of the so-called frontline states was to reduce these countries' dependence on South Africa. With the political changes underway in South Africa in 1989 / 1990, SADCC seemed to have lost its *raison d'être*; but when, in 1994, one-time foe South Africa was accepted for membership, the community was reestablished as SADC, a regional organization dedicated to intensified integration. SADC has now also set its sights on market-based integration and cooperation in politics and on security issues (Croll / Wirkus 2003).

SADC's declared goal is to promote political, economic, and environmental cooperation and regional integration among its 14 member countries. With the "Revised Protocol on Shared Watercourses," the "Regional Strategic Action Plan," and the "Report on Environmental Sustainability in Water Resources Management in Southern Africa," SADC operationalized this goal in the water sector, and it now plays a pioneering role both within Africa itself and in relation to other regional organizations.

4.1.1 SADC Protocol on Shared Watercourses

Based on Articles 22 (1) and 21 (3) of the SADC Treaty, the Protocol on Shared Watercourses was adopted in 1995 as the community's first legally binding framework program (Ramoeli 2002, 104). In 2000, in view of the adoption of the UN Convention on the Law of Non-Navigational Uses of International Watercourses, the protocol was replaced by a new, thoroughly revised document, the SADC Revised Protocol on Shared Watercourses, which was signed by all of the member countries in 2000 and has, since 2002, been ratified by a two-thirds majority of member states, thus obtaining legal force.

But the path leading to 2002 was a thorny one, and several countries were reluctant to sign; Angola, for instance, because of the protracted civil war raging there, and Mozambique, which harbored political reservations vis-à-vis South Africa. This was the beginning of a long consultation process involving regular national and regional meetings of the parties concerned. The Revised Protocol adopts the principles of the UN Convention as the basis of the community's practical action and constitutes the legal framework for integrated water resources management. Four river-basin commissions have since been established in connection with the protocol. All

of them, keyed to the principles of integrated water resources management (IWRM), are tasked with jointly – i. e. together with all riparians – managing the transboundary rivers and aquifers concerned: ZAMCOM on the Zambezi (see Chapter 3.2), OKACOM on the Okavango, ORASECOM on the Orange-Senqu (see Chapter 3.1), and LIMCOM on the Limpopo (see Chapter 3.3). The protocol thus, for the first time, provided the SADC countries with a framework for cooperation projects binding under international law as well as with the tools they need to settle possible disputes. This meant that SADC had left the path defined by purely bilateral agreements and embarked on a course keyed to cooperative agreements involving all of a river's riparians. It should be noted in this connection that all bi- and multilateral agreements that had been signed up to this point remain unaffected by these developments, that is, they continue in force alongside the newly created RBOs.

SADC's framework for action is defined by the Regional Strategic Action Plan for Integrated Water Resources Development and Management (RASP-IWRM) (see below). The experts who conducted an evaluation of the RASP-IWRM are right in noting

"that the RSAP-IWRM of the southern African community is a unique experiment in international co-operation directed at achieving an integrated approach to water use development and management crossing national borders and river basin boundaries. It is the most advanced and comprehensive multi-country freshwater programme in the world and it has no parallel on this scale anywhere else in the world. It is a quite remarkable achievement that the original and amended Shared Watercourse Protocol, which codify the regional IWRM policy, have been signed by all SADC Member States and ratified by a working majority" (Halcro-Johnston et al. 2004, 3).

4.1.2 Dispute settlement in the Revised Protocol on Shared Watercourses

In addition to adaptation to the UN Convention, Article 7 of the Revised Protocol provides the member countries with a legal framework and a set of dispute-settlement instruments. *"It follows the spirit of the SADC Treaty in its focus on amicable settlement, failing which arbitration can be pursued"* (Ramoeli 2002, 109). Article 7 (2) covers disputes between member countries concerning the interpretation and / or application of the

provisions of the Revised Protocol that cannot be settled amicably. In accordance with Article 16 (1) of the SADC Treaty, such disputes are referred to the SADC Tribunal for final and binding decision. Should a dispute occur between SADC and a member country, Article 7 (3) of the Revised Protocol, in accordance with Article 16 (4) of the SADC Treaty, stipulates that an advisory opinion be obtained from the SADC Council.

4.1.3 SADC Water Sector Coordination Unit SADC Water Division

In the Revised Protocol on Shared Watercourses, the member countries defined the SADC Secretariat's tasks as regards the water sector. The Water Sector Coordination Unit (WSCU) was set up to monitor the implementation of the Revised Protocol.²² The process of structural reform of SADC, which got underway in 2001 and took two years to complete, had important implications for the SADC water sector. *"The core of the reform was to concentrate the 21 coordinating units formerly located in the member states in four directorates and to place them with the SADC Secretariat in Gaborone"* (Adelmann 2005, 2). The dissolution or transformation of the SADC Secretariat's former coordinating units was a step-by-step process. Following a lengthy discussion process, the Water Division (WD) was relocated with the Directorate of Infrastructure and Services in April 2003, and since then it has been responsible for the tasks of the former SADC-WSCU. In addition, it is also responsible for the implementation of the Regional Strategic Action Plan on Integrated Water Resources Development and Management (RSAP-IWRM). Even though the reform process was officially declared complete at the end of 2003 (Adelmann 2005, 2), there are still some open questions that have provided for frustration both within the SADC member countries and in the RBOs. This situation has appreciably slowed down processes and prevented stakeholders from developing a sense of ownership for these processes. One factor that has contributed to this situation is lack of

22 *"The Revised Protocol on Shared Watercourses is very explicit on the role of the SADC Water Sector Co-ordinating Unit (the Water Division (WD) in the restructured SADC). The main function of the WD is overseeing and facilitating the full implementation of the provisions of the Protocol, which will require a number of activities to be carried out by countries who are signatories to the Protocol"* (Mushauri 2004, 17).

communication between the parties during the restructuring process. SADC-WD's role in managing the implementation of the RSAP is not defined adequately,²³ as the RSAP-IWRM Mid-Term Review Report notes (Halcro-Johnston et al. 2002, 6). In addition, prior to the restructuring process, the SADC Sectoral Committee of Ministers Responsible for Water, the Water Resources Technical Committee (WRTC) and its technical subcommittees, and the RSAP Focal Persons Forums played a far more instrumental role in integrating the member countries into the RSAP, and thus also into the WSCU. In dissolving well-established institutions like the Sectoral Committee of Ministers Responsible for Water and by slowing down the work of the technical committees, the restructuring process has had a markedly negative impact on the implementation of the Revised Protocol.²⁴ The newly created institutions, i. e. the Integrated Committee of Ministers, which oversees and coordinates the directorates' work, and the National Committees (NCs), which are responsible for implementing the measures at the national level, have yet to be sufficiently revitalized. A good number of member countries have transferred the NCs to departments in their foreign or development ministries, burdening them with an additional task, and this has meant that the committees are still "(...) *far removed from being able to exercise the role assigned to them as an interface between the member states and SADC headquarters*" (Adelmann 2005, 3). However, the task of

23 *"However, the function of the unit is sometimes to manage projects, sometimes to procure Implementing Agents and to act as the facilitator/co-ordinator, and sometimes to do both. This reflects well on the unit's ability to adapt to changing requirements but it demonstrates a fundamental weakness in administration, which undermines the confidence of international donors. Also, there is no defined hierarchy in the institutional structure of the professional staff within the unit, and most of the staff are appointed on short term contracts. Again, this creates uncertainty and a lack of confidence in the future of the unit"* (Halcro-Johnston et al. 2004, 6).

24 *"(...) that with the uncertainties surrounding the restructuring exercise, the SADC Water Division (WD) was a ghost of its former self. It is manned by a skeleton staff whose tenure of office is not clear and are poorly resourced. This compromises the vital coordination and facilitation role they should play. In addition the 'restructuring SADC' seems not to be recognising vital SADC Water Sector institutions such as the Committee of Water Ministers and the Committee of Senior Officials. (...) This action has left a huge decision-making gap which is also negatively impacting on RBO activities. Most RBOs are now caught-up in no-man's land without the necessary support"* (Mushauri 2004, 16).

breathing life into these new institutions is essential precisely for the water sector if new success are to be added to those already achieved by the SADC-WD, e. g. in coordinating and moderating the critical processes involved in developing RBOs or in raising funds for these RBOs (Mushauri 2004, 17). This would enable the SADC-WD to better live up to its responsibility²⁵ toward RBOs. Mushauri sums up the present state of the SADC-WD in the following words

"(...) the WD itself seems to be in a state of paralysis as it has to both manage its present responsibilities, with limited resources, whilst planning and negotiating its future and stature in the restructured SADC" (Mushauri 2004, 17).

In order to support the development of existing RBOs and to forge on with the establishment of new ones, it is absolutely essential that the tasks and functions of the SADC-WD be more clearly defined, that these tasks and functions be transparently communicated, and that the WD be staffed in accordance with its tasks.

4.1.4 SADC Regional Strategic Action Plan on Integrated Water Resources Development and Management

The Regional Strategic Action Plan on Integrated Water Resources Development and Management (RSAP-IWRM), developed by the SADC Water Sector in 1997 / 1998 and approved by the member countries in 1998, is SADC's framework program for integrated water resources management. Conceived as a water-sector program to support regional integration among member countries, its aim is to create the conditions required for the joint management of regional water resources. The idea behind the RSAP was to create the institutions and the conditions required to implement infrastructure projects and development initiatives. It serves at the same time as a mechanism to coordinate potential donors and regional needs and / or demand.

The RSAP includes 31 projects designed to remove the most pressing impediments to integrated water resources management. These projects

25 *"(...) liaising with and guiding RBOs on matters of interpretation and implementation (of the Protocol)" (Mushauri 2004, 17).*

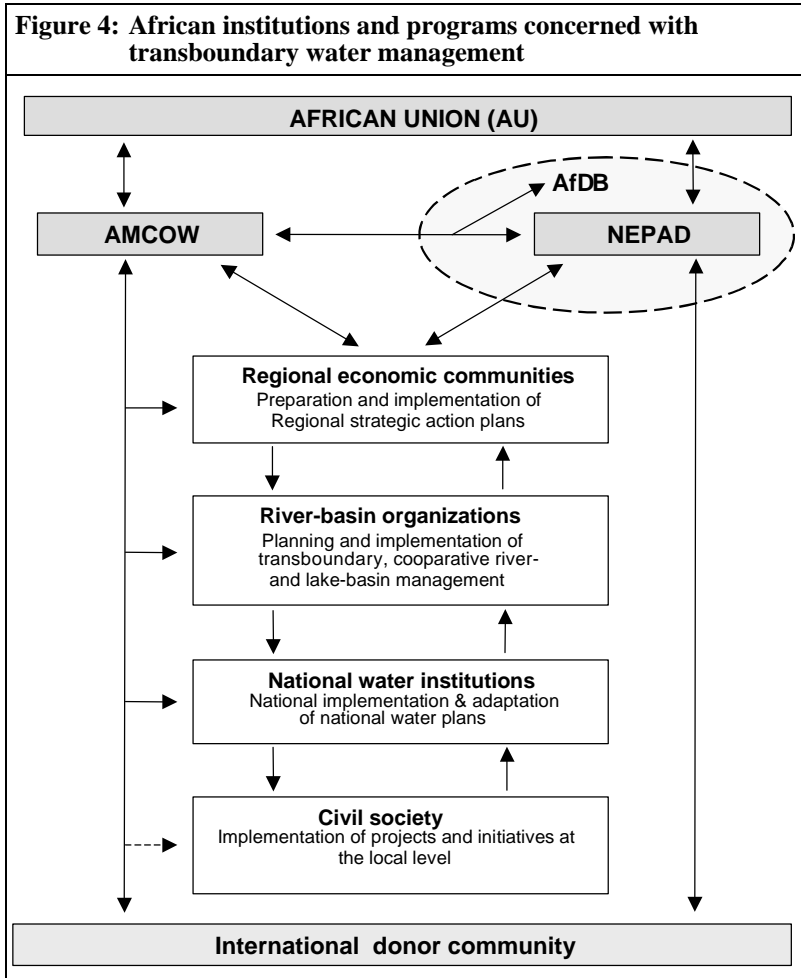
were summed up in seven categories, one of which is "River Basin Management."

The RSAP-IWRM, and with it projects and initiatives on river-basin management, are largely funded by the international donor community, and this of course also implies that the success of the RSAP depends in large measure on this donor community.

"The procurement of funding for projects is therefore one of the principal determinants of the rate at which the programme can be implemented. (...) The success of projects (...) is therefore to a large extent a reflection of the degree to which the projects are aligned with the changing agenda and priorities set by the international donor community. This factor more than any other, has impeded the ability of SADC to implement a well coordinated and integrated programme toward achieving the original goals of RSAP-IWRM" (Halcro-Johnston et al. 2004, 3).

The RSAP-IWRM is a component of the Regional Strategic Indicative Development Plan (RISDP), the long-term strategy paper on SADC's economic and development sector, and it is therefore immediately linked with the community's higher-level economic development goals. This is also visible in the great number of overlaps between the goals set out in the RASP and the water-related goals of the RISDP (Halcro-Johnston et al. 2004, 33–35). As Halcro-Johnston et al. (2004, 22) point out, dependence on other SADC regional programs is highly important to the implementation of the RSAP-IWRM, whose River Basin Management category is relevant for all transboundary projects and initiatives in SADC:

"(...) a number of other programmes at regional level need to work together in order to ensure that the goals of integrated development are met. Such a co-operative approach means that the full delivery of intended outcomes of the RSAP-IWRM are dependent on the performance of divergent role-players and a variety of actions that serve as essential 'links' in the 'delivery chain.'"



4.2 AU, AMCOW, NEPAD, and AfDB: The role they play for transboundary water management

As mentioned above, there are in Africa a total of 63 international river basins. Agreements have already been completed for 20 of these basins, including all of Africa's important transboundary waterbodies, and river-basin organizations have also been set up in 16 of these basins. In Africa

the uneven distribution of water resources, different levels of demand, and the role played by water resources for the further development of individual countries has already given an international character to competition for water resources. This is shown e. g. by the discussion over the export of water from central Africa to southern Africa.²⁶ This is not the only reason why there is a need for a coordinated Africa-wide approach to the management and utilization of transboundary water resources. This problem has been identified and given programmatic shape by both regional organizations like SADC and Africa-wide initiatives like NEPAD and AMCOW. Alongside the NEPAD Water Programme, with its Short-Term Action Plan (STAP) for Transboundary Water Resources, it is not least AMCOW, with its Abuja Declaration and its first Pan-African Implementation and Partnership Conference on Water (December 2003), that has injected a promising dynamic into the development of African capacities in the water sector. It must also be noted here that beside the national engagement of individual donors, the international initiatives of the G8 – the Africa Action Plan – and the EU – the EU Water Initiative (EUWI) – play an important role in this connection.

There is still a lack of effective institutions and sufficiently developed inter institutional processes and procedures, although it must be said that some of the institutions and initiatives referred to here are still relatively new. In the course of the consolidation process some ideas have been developed on what roles the institutions under discussion here should be assigned in the future in addition to their political mandates (if they have been given a political mandate in the first place). It is safe to assume that the present obstacles to the coordination of programs and the implementation of projects will gradually be broken down. Thus far these initiatives have not been particularly relevant for the formation or the work of RBOs. However, all levels – AMCOW, NEPAD, SADC – underline the importance of RBOs for the implementation of any basinwide water resources management. NEPAD STAP for Transboundary Water Resources notes in this connection:

26 *"There is no doubt that water resource planning should look north for a strategic supply on which the economic development of the more arid south can be based. This is already happening with a desktop level study currently underway to determine the feasibility of transferring water from the Congo down to Namibia"* (Halcro-Johnston et al. 2004, 3).

"River Basin Organisations (RBOs) are the main agencies for cooperative development and management of water resources in the respective river basins. RBOs would be responsible for planning, implementation, and monitoring of basinwide activities in water resources development and management" (NEPAD 2004, 45).

4.2.1 African Union

The African Union (AU) was founded in 2002 to succeed the Organisation for African Unity. It has direct influence on the NEPAD water program through its Commissioner for Agriculture and Water. It defines the political framework, lays down the course for policy, and generally influences the overall development agenda. When disputes or conflicts arise, the member states have recourse to the Peace and Security Council (AU 2002) and the Court of Justice of the African Union. The Court of Justice also has a close partnership with the dispute-settlement institutions and mechanisms of various regional organizations (AU 2003).

4.2.2 African Ministers' Council on Water

The African Ministers' Council on Water (AMCOW) was established in 2002; it sees its role as the supreme political organ for the continent's water sector. Its legal basis is the Abuja Declaration on Water of April 30, 2002. In programmatic terms, AMCOW is closely linked with NEPAD (AMCOW 2002b). AMCOW has a four-person secretariat in Abuja, Nigeria. AMCOW serves as a partner for the European Water Initiative (EUWI) and a central liaison partner for other donors (AMCOW-TAC 2004). In the near future AMCOW is set to assume the function of a *ministerial technical management group* in the AU. But it will be some time before AMCOW is actually equipped to meet its own goal of assuming the task of supraregional coordination of water management in Africa. This point is clearly illustrated by the low frequency of the joint meetings of the Council and the Executive Committees; while two meetings per year are planned, only one took place in 2004. In other words, it takes some time for important decisions to be taken, and they then have to be adopted politically at the national level and implemented by national water ministries. In 2003 the Technical Advisory Committee was set up to prepare decisions and to accelerate the overall process. The committee is made up of

three experts from each of the AU's five subregions.²⁷ The AMCOW initiative finds very different levels of acceptance in these five regions, a fact due not least to the cultural diversity and the different political orientations encountered in the countries involved. Not unlike the case of SADC, some of AMCOW's members harbor a suspicion that Nigeria and South Africa, the continent's most successful and influential countries when it comes e.g. to river-basin management, have hegemonic ambitions. This of course does nothing to simplify the coordination process in AMCOW's bodies, which is complicated enough the way things stand (oral communication from T. Schmidt, 16 Dec. 2004).

Still, AMCOW may safely be referred to as "*the continental voice for water issues in Africa*" (oral communication from T. Schmidt, 16 Dec. 2004). As a ministerial steering group made up of Africa's water ministers, AMCOW is the political arena for water issues in Africa, and it will play an increasingly important role in coordinating and moderating development processes, above all at the national level (NEPAD 2004, 45). It is becoming evident that AMCOW is increasingly assuming the role of the initiator and promoter of a sustained political dialogue on the cooperative development and management of Africa's transboundary river- and lake-basin organizations.

4.2.3 New Partnership for Africa's Development and the African Development Bank

The New Partnership for Africa's Development (NEPAD), whose supreme organ is the Summit of Heads of State and Government, is an AU program. It is supported as such by the G8, the UN, and the overall donor community, and it plays an important role in the African dialogue with these donors. The program, which was initiated in 2001, has several so-called task teams. NEPAD's water program, managed at present by only one person, is represented with the African Development Bank (AfDB) by the infrastructure task team. The AfDB also serves as NEPAD's implementing agency. The AfDB's water activities are largely derived from NEPAD's programs and action plans. Since NEPAD itself has no implementing powers, its role vis-à-vis AMCOW may be characterized

27 North, West, East, Central, and Southern Africa.

more as a "continental voice for water issues in Africa" (oral communication from T. Schmidt, 16 Dec. 2004). This is how NEPAD defines its own role under the political leadership of the AU:

"As NEPAD, we will focus on facilitating implementation by mobilising technical and financial resources to ensure speedy actions on capacity building, project preparation and also direct investment in projects"
(Prof. Wiseman Nkuluh, Head of NEPAD Secretariat, on 2 Dec. 2004)
(NEPAD Dialogue 74).

NEPAD has a so-called Short Term Action Plan for Infrastructure (STAP) designed to realize its water program. One element of this STAP is the Transboundary Water Resources Strategic Framework and Action Plan (STAP-TWR). It defines several focal points aimed at promoting regional cooperation, including development of national IWRM plans and management of transboundary water resources. In this context NEPAD sees a key role for RBOs. On the initiative and with the support of the AfDB, the STAP has commissioned studies to assess the present situation and to take stock of the status quo of transboundary water resources management in seven important African river and lake basins,²⁸ and in December 2004 it held a workshop to discuss these issues with stakeholders. Also with the support of the AfDB, NEPAD is presently working on a Medium to Long Term Strategic Framework (MLTSF) (NEPAD 2004).

5 Conclusions and recommendations

5.1 General conclusions

Transboundary river-basin management in southern Africa is a relative *success story* – at least as far as intergovernmental and regional efforts (SADC) are concerned, and this despite the problems outlined above. Various reasons can be cited for this. It is important to bear the overall political constellation in mind here. The RSA, the region's leading economic and political power, is pursuing a pro-integration policy in the region. It has decided against pursuing power-backed unilateral policies geared solely to its own interests, although its sheer weight would certainly permit it to engage in such policies. Indeed, it endeavors to pursue

28 Niger, Senegal, Congo, Lake Chad, Nile, Zambezi, Okavango.

its own interests in such a way as to allow for consensus with its neighbors and to engage them. This is why the RSA attaches special importance to policy-making in the SADC context. This approach is also reflected in transboundary water policy.²⁹ Here, too, the RSA would certainly be in a position to go it alone; but instead it has opted for a cooperative approach and makes relevant resources (know-how, personnel, administrative and financial capacities) available to its neighbors.

SADC in general and the SADC Water Sector in particular are a further factor conducive to transboundary water management. They constitute a shared, relatively open framework for transboundary cooperation. The SADC Water Protocol serves as an orientation point and reference variable for specific cooperation projects. *All institutional progress made in individual river basins is closely linked with SADC and the SADC Water Sector.* This facilitates and paves way for future institution-building efforts. It is realistic and appropriate to regard SADC (Water) as the prime point of contact and to channel support for individual RBOs through the SADC-RSAP. SADC is rightly seen as an advanced economic community in general and a leading force in the water sector in particular. It may to this extent assume a model function for ECOWAS, IGAD, and EAC and their water policies.

It is at present becoming clear that AMCOW is in the process of establishing a continental context of cooperation that embraces the region's economic communities and that may serve to promote the exchange of experience among the regions of Africa. By comparison, NEPAD must be seen more as a discussion forum that can provide AMCOW with additional impulses; but AMCOW is and will remain the key structure here. What we see emerging at present is a tripartite structure consisting of AMCOW / AU, regional economic communities like SADC (Water), and river-basin organizations. In the future the latter are also to assume the role of implementing organizations.

It is important in political terms to make reference to the overall context in that it clearly shows that it is not possible to view individual river basins and RBOs in isolation. In southern Africa e. g. problems and progress in a

29 The South African National Water Act (Act 36, 1998) acknowledges in Article 2(i) the RSA's "international obligations" as regards the "use, development, conservation, management, and control" of the water resources of transboundary river basins.

river basin are always bound up with problems and progress in other river basins – and inevitably have reference to the joint SADC framework. This sets the stage for a good measure of wheeling and dealing. When one country makes concessions to an other country in one river basin, it may well expect concessions from this other country in a second river basin shared by the two countries. The fact that several countries may share several river basins sets the stage for a good number of different tradeoffs. This wheeling and dealing is encouraged not least by the fact that are *substantial personnel overlaps among the institutions involved*, and these make it possible to make use of relationships of personal trust that have developed over years, indeed decades.

Furthermore, relatively weak states (e. g. Namibia, whose rivers all originate in other countries, or Mozambique, a country that finds itself in the classic situation of the downstream riparian) are always able to invoke the SADC context. And the reason why this is possible is that heavyweight RSA is pursuing a SADC pro-integration course that renders it vulnerable to pressure brought to bear through SADC. The political level of SADC can define targets and propose clarifications that remove obstacles which have accumulated in the 'nuts and bolts' of negotiations between those responsible for water policy at the RBO level. It is in this way that the primacy of politics unfolds its positive effects. To cite an example, *one of the main driving forces behind the process involved in forming organizations must be sought in political considerations* aimed at leveling the playing field. As a rule, relatively weak countries push for the creation of new organizations because they lack the national resources that would give them a reasonably equal voice in transboundary river-basin management. The RSA, on the other hand, is in possession of national structures that are so strong that the country does not necessarily need secretariats or the like for an RBO; the picture is of course quite different for Namibia or Mozambique.³⁰

Even though the present study has dealt separately with the Orange, Zambezi, and Limpopo basins, it is important not to lose sight of these complex

30 Unlike its neighbors in southern Africa, the RSA's state water sector is in possession of sizable financial, technical, and administrative capacities. Its Department of Water Affairs is relatively well funded and has a good number of well-trained experts among its staff.

interrelationships. They are also one of the reasons why ORASECOM may have model character for the further development of other basin commissions.

Another important factor is the incrementalist, pragmatic approach to institution-building pursued in this context, with the relevant actors showing the patience and taking the time they need to get the job done. While existing – for the most part bilateral – institutions, which actually run counter to the concept of basinwide water management (e. g. since not all riparians are represented in basin organizations), have been retained, they have at the same time been obliged to harmonize their own work with the newly created institutions (as well as with SADC Water). Much time has been taken to clarify roles in these institutions. This time has been used to build confidence and develop procedural rules (see also Mostert 2005).

What we find confirmed is that the *"management of international river basins thus involves a long learning process; a process the participating countries have to go through, and for which there are no short cuts. Outside assistance can only play a very modest role"* (Savenije / van der Zaag 2000, 28). Once this process has been completed, work can begin on the task of assigning RBOs larger, more complex tasks: e. g. development and implementation of water-sector plans for an overall river basin, or development of action plans to implement the Millennium Development Goals. It must therefore be seen as a welcome development that German DC is prepared to embark on a longer-term engagement instead of thinking merely in terms of brief, one- or two-year cycles; and another welcome fact is that German DC has involved the KfW in the implementation of transboundary infrastructure measures.

5.2 Options for action and recommendations

It has turned out that a longer phase of conceptual and political discussion was needed to reach the state we have today. But now the time seems ripe to inaugurate a new stage, one that should have a focus on strategic considerations geared to efficient and effective implementation. The RBOs could in this way develop gradually into implementing agencies, while the political, standard-setting dimension could be covered by regional economic communities like SADC and AMCOW. This phase will also call for

patience and perseverance. German development policy and DC would be well advised to pay particular heed to the following points:

1. Transboundary water management is not a purely technical issue – indeed, it is a highly political enterprise. German DC should make use of this circumstance to realize positive effects above and beyond the narrow field of "water management." Such effects may also materialize for the fields of crisis prevention and regional security, for efforts to strengthen participatory / rule-of-law structures, for civil society, and for promotion of economic and political integration.
2. The SADC region is a "rewarding" addressee for support measures concerned with transboundary water management. The political parameters are relatively favorable, and successes should therefore be within reach over the medium term. German development policy / DC is well positioned with the support it provides for the SADC water sector and the river-basin organizations on Orange and Limpopo. In the interest of sustainability it would be important to stick with a given support policy over the longer term. Efforts aimed at enlarging and intensifying activities in several directions would be both conceivable and recommendable.
3. As far as existing support for SADC and river-basin organizations is concerned, German DC should give some thought to further strengthening the organizational structures (RBO secretariats with permanent staff) and possibilities for civil society to participate. The latter can contribute both to boosting the intrasocietal legitimacy of transboundary basin management and strengthening democracy, the rule of law, and civil society in general. There is, however, some question as to how far official development policy and DC – which are of course aligned with state counterparts – can in fact actually go in this regard. It would therefore be important to look into indirect approaches, e. g. support for German and international NGOs, which could in turn provide support for NGOs and CBOs in recipient countries in their efforts to work for participation in transboundary water management.
4. It should also be examined whether other river basins in the SADC region could be included for support, along the lines of the Orange and the Limpopo. There are still a good number of transboundary rivers without cooperative transboundary structures in the region, to say

nothing of the rest of Africa. By providing support for transboundary water management in "out of the way" river basins, it would be possible to overcome the present concentration on a relatively limited number of countries.

5. The experiences made on the Limpopo and the Orange could be turned to account by providing support for the exchange of South-South experience. Instead of being restricted to the SADC region, this could be extended to include other regions in Africa (and the South). In the future more efforts should be made to step up information-sharing between river basins / basin organizations. This could be done in both the North-South context (twinning) and the South-South context. The German DC approach of supporting the creation of centers of competence as a means of sharing experience and disseminating best practices is one that points in the right direction. In addition it might also be conceivable to support other forms of information-sharing: mutual working visits, exchange of staff, expert conferences, and the like.
6. Furthermore, efforts should be made to utilize and to support the potential inherent in AMCOW. While AMCOW is at present weak in organizational terms and would be overburdened if it had to assume new, concrete tasks, the council could develop into a structure that would be in a position to assemble and focus the experiences made by individual RBOs and to provide crucial impulses needed to create new RBOs and to optimize the work of existing ones. Targeted support for AMCOW would furthermore give additional momentum to efforts to strengthen pan-African cooperation and integration. German DC should promote networking between AMCOW and individual African RBOs. In the long term AMCOW could become a vehicle for specifically African approaches to transboundary water management. Over the longer term this could possibly mean gradually terminating the support provided to individual RBOs.
7. Transboundary lake-basin management (Lake Victoria, Lake Chad) involves problems of a very specific nature. It could prove interesting for DC to become more intensively engaged here. At present a promising window of opportunity for new activities appears to be opening up on Lake Victoria. To identify specific niches, more exact information would be needed on the activities of other donors, with under-

standings being sought with them in given cases. Such niches could include the field of crisis prevention.

8. Lake Chad can look back on a long, though not particularly successful, history of efforts in the field of transboundary water management. At present an attempt to make a new start appears to be underway, and German DC would appear to be called upon to act. In view of the numerous positive experiences that have been made with transboundary water management in other regions of Sub-Saharan Africa, prospects would appear good. One important first step would be to transfer these experiences into the Lake Chad context. It would in any case be essential to include the issue complex of groundwater in any such efforts. This might possibly make Lake Chad a model case for transboundary groundwater management. In view of the fact that in the future efforts will in any case have to be stepped up to include the issue of groundwater in transboundary water management, this could prove to be a very important move. Any DC engagement on Lake Chad should be prepared for a long haul, and one that is not without its potential pitfalls.
9. One important desideratum is to improve the communication between and coordination of the actors involved and to ensure that policy is coherent. This applies for coordination of both donor countries and the German agencies and units involved (i. e. interagency and interdepartmental coordination). Agencies geared more to bilateral country-specific work and agencies oriented to regional sector-specific work should aim for closer coordination, for one of the basic prerequisites of transboundary water management is that the countries involved harmonize their national water policies – to name only one example that calls for communication and coordination.
10. Another aspect in need of due consideration is the time factor. While the logic of DC more or less requires recipient countries to adapt to donor timeframes and rhythms, efforts should be made to open up time spaces as far as possible. One way or the other, successful transboundary river-basin management takes time – and this time should be provided.
11. In the future more attention will have to be paid to the fact that in the end sustainable transboundary river-basin management can be suc-

cessful only if the approach pursued is a multilevel and a multiactor one. Experience shows that the competence and skills needed for water resources management are not the monopoly of the governments and authorities of riparian countries in transnational river basins. For some time now such river basins have, to one extent or another, been "internationalized": with regional organizations, international organizations, international NGOs, transnational corporations, and a globalized civil society and public taking part, more or less intensively and through more or less formalized channels, in transnational water governance. And on the other hand a good number of subnational, often nonstate actors are also involved: local communities, diverse groups of water users, traditional authorities, and private sector actors.

Precisely in regions with relatively weak statehood and a relatively weakly developed economy (i. e. in large parts of Africa), it will be essential to undertake far greater efforts to include nonstate actors, their so-called informal activities, and their traditional forms of water management (and water-related dispute settlement) in modern (inter-)national water management if the aim is to achieve a more effective and efficient water management at the grassroots level in the interest of pro-poor and sustainable development (and at the same time to strengthen democratic structures rooted in the rule of law). A water governance that is in this sense networked and process-oriented will be in a far better position to involve stakeholders, and involve them more intensively, than RBOs have been until today – and we are talking here about stakeholders that have thus far not been perceived by a development policy and DC oriented toward state structures and modern civil society structures (e. g. traditional religious and political authorities and traditional associations). In the end, the task is to view together the various and in many ways interwoven levels of water policy – from the local to the global – and the various actors engaged at each of these levels, and to give meaningful organization to their combined efforts.

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Cooperation on international rivers from an
economic perspective:
the concept of benefit-sharing

Axel Klaphake,
in collaboration with *Olivia Voils*

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Cooperation on international rivers from an economic perspective: the concept of benefit-sharing

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1 The study's aims and methodological approach

The basic principle of benefit-sharing is simple: Countries located on transboundary rivers are well advised to focus on the benefits that may result from a cooperative management of water resources and to reach agreement on solutions that benefit all of the parties involved (so-called win-win solutions). Following the concept, countries should focus less on the potentially conflictual issue of water allocation than on the benefits that may accrue to all parties if they reach agreement on some form of joint management.¹

The concept of benefit-sharing, i. e. distribution of the benefits resulting from cooperation, is an important building block in the programs of nearly all actors engaged in development cooperation and international water policy. The World Bank is without doubt the one actor who especially accentuates this concept, assigning particular priority to pursuing its realization. The Nile Basin Initiative is generally seen as a prime example of ongoing efforts to develop shared visions and win-win solutions on rivers marked by a high degree of competition between possible uses. This "Nile approach" differs in terms of both its sequencing and priorities from the policy pursued in the framework of the SADC process. At present the focus in southern Africa is less on shared programmatic visions linked with the realization of mutual benefits at project level. Here the driving force of cooperation is more the conviction that it is preferable to start out by establishing joint legal rules and agreements on transboundary water use and creating functioning river-basin organizations.

However, the marked emphasis placed on benefit-sharing when it comes to political rhetoric and programs continues to contrast sharply with the quite limited state of our knowledge of the conditions and success factors

1 Stated in the terms of economic game theory, the point is to transform the zero-sum game of negotiations on water rights into a positive-sum game. Viewed from a theoretical perspective, the latter offers far better prospects of reaching agreement.

required to come up with effective agreements on transboundary rivers. Against this background, the present study aims to present an overview of the actual practice of win-win solutions on international waterbodies and to analyze this practice with a view to its potential usefulness for the further development of development cooperation.

The present study's aim is to systematically describe existing forms of benefit-sharing and to identify factors both conducive and obstructive to efforts to forge relevant agreements. The findings obtained will then be used to formulate recommendations for action by development cooperation. Particular attention will be devoted to the question of whether, going beyond context-specific particularities, it is possible to come up with generalizable propositions on benefit-sharing in an overall strategy conceived to foster transboundary water cooperation. The discussion of the practical experiences made with benefit-sharing will be applied to the present framework involved in developing transboundary water cooperation in Africa (including e. g. the Nile Initiative, the SADC process).

The present investigation is conceived as a desk study; it focuses on evaluating available literature and documents. This approach was broadened to include a few written and oral queries to national and international experts, although due to the narrow timeframe involved only a limited number of responses were received, and they did little to broaden the study's knowledge base. For purposes of information-gathering, the study made use of existing databases and carried out a comprehensive literature search based on the snowball principle.

Eighteen cases were chosen from the universal set of internationally identifiable benefit-sharing approaches obtained through a literature search; these 18 cases are presented in a systematized manner. The criteria used to select the case examples were (i) geographic location of the waterbody in question, with priority assigned to cases from Africa; (ii) availability of material and data; (iii) the nature of the coordination problem addressed by a given case of benefit-sharing (e. g. water power, flood protection, water abstraction, irrigated agriculture, water pollution), (iv) the form of the benefit-sharing mechanisms concerned, with special attention being paid to possibly innovative approaches.

2 The study's limitations

One of the weakness of a desk study is that the approach largely rules out access to insider knowledge. Nor can a desk study check whether or not the information obtained from the literature is in fact correct – e. g. as far as efforts are concerned to assess whether certain organizations operate in an effective manner. Finally, another important factor involved is that many of the relevant agreements with win-win character have not been documented. This applies e. g. for linkages between water agreements and "tradeoff deals" in other sectors. While the latter play a major role in negotiations, they tend to be reached behind closed doors and are often not referred to either in public or in scholarly discussions. It is also difficult to gain access to decentral forms of transboundary water cooperation (e. g. between municipalities on either side of a border) which might well be conceived with an eye to benefit-sharing, even though little heed is paid to them in the international discussion. Generally speaking, the literature available strongly emphasizes the benefit-sharing involved in "big projects" agreed to between national governments (e. g. bilateral dam construction), while smaller or informal win-win solutions are not documented in the same way.

3 Terminological issues and conceptual principles

Even though benefit-sharing plays an important role in many programs and political statements, the term itself has not been defined exactly and is used differently in the literature. There is, however, general agreement on the starting hypothesis:²

Cooperation on transboundary rivers entails benefits, the reason being that such cooperation increases the overall utility derived from water use involving coordination and optimization across national borders.³ Conse-

2 The first authors to deal with the benefits of cooperation on rivers from an economic perspective include Kneese and Bower (1968) and – for transboundary rivers – Krutilla (1967). LeMarquand's (1977) approach is the first to link economic and political-science research on cooperation along international rivers.

3 The economic reasoning is that countries that go it alone in their water-use policies will achieve suboptimal results as regards water use in an overall river basin. To cite an example, water used in one country for low-productivity irrigation could, used on the

quently, noncooperation entails economic costs because it bears the possibility of taking advantage of efficiency gains.

Furthermore, the concept is based on the assumption that these cooperation-related gains exceed the costs associated with cooperation (e. g. costs bound up with negotiations, administration, and monitoring). In keeping with this assumption, *transboundary cooperation may thus be said to give rise to net benefits.*

One particular feature encountered on international waterbodies is that, as a rule, instead of being distributed uniformly, the (net) benefits of cooperation tend to accrue to the riparian countries in very different quantities, with the distribution and the level of cooperation-related gains being influenced by the location of the countries in a river basin, the uses to which water has until now been put, the economic context, as well as other parameters. Due to the incentive structure resulting from the unequal distribution of cooperation-related gains, agreement on cooperation, and with it the possibility to achieve cooperation-based efficiency gains, is bound up inextricably with the often contentious issue of how cooperation-related benefits are allocated among riparian countries (see Just et al. 1998).

Cases involving transboundary rivers inevitably center on upstream-downstream problems that as a rule lead to a spatial divergence of the benefits and costs of transboundary cooperation. Often the decision situation encountered on transboundary watercourses is typified by the fact that individual countries would actually be negatively affected by a transboundary water management geared to optimization of the total utility involved, e. g. in the case that former water uses were set to be given less consideration under a new, future water regime. *If it proves impossible in such situations to reach agreements designed to compensate for relevant cooperation costs, as a rule no agreement will be reached. Benefit-sharing thus generally implies that means must be found to compensate all riparians for benefits that do not accrue uniformly or symmetrically to all countries concerned.*

other side of the border, achieve greater marginal utility. The level of the efficiency gains that could be achieved through cooperation of course depends on water scarcity in the river basin concerned as well as on the specific water productivities in the countries involved.

Even though the economic discussion on benefit-sharing tends to focus on benefits that can be assessed in economic and – as a rule – monetary terms (Sadoff et al. 2002; Barrett 1998; Rogers 1997), the net utility arising from cooperation may also be non-monetary in nature. In some cases it is difficult if not impossible to monetize certain utility variables. Similarly, it is also conceivable that the mechanisms used to allocate the benefits of cooperation are themselves not (exclusively) monetary in nature, and here, viewed from an economic point of view, transboundary monetary transfers or cost-sharing are plausible instruments of benefit-sharing. What effects of cooperation are in fact perceived by the countries concerned as benefits is context-specific and strongly dependent on interests that may be more accessible to articulation in one national context than in another.

It can generally be said that it is not supposedly "objective" benefits and drawbacks that play the key role in defining riparian countries' propensity to cooperate; indeed, one important determinant at work here is the domestic "market" for transboundary cooperation that exists in given countries (Durth 1997). Put differently: Country interests are themselves often heterogeneous, and the pursuit of given objectives in water negotiations is dependent on national political contexts.⁴ To cite an example, on some international rivers differences in transboundary interests may be masked by intersectoral or policy-related conflict lines (e. g. energy generation versus agriculture, river development versus environmental interests). Furthermore, cooperation-related benefits that may be of central importance for some countries may play as good as no role as a decision-relevant parameter for other countries, since their political systems do not honor the pursuit of such goals.

A distinction proposed by Sadoff and Grey (2002) has now gained widespread acceptance in the international discussion when it comes to outlining and systematizing the totality of conceivable cooperation benefits. Accordingly, in analyzing win-win solutions we can distinguish the following categories (see Table 1): (I) benefits for water resources; (II) benefits from the use of water resources (e. g. hydroenergy, irrigated agriculture, shipping); (III) benefits stemming from fewer conflicts over water

4 The question of the political perception of benefits as well as the way in which they may be articulated and asserted in given national political systems is not addressed in most of the literature on benefit-sharing; see e. g. Sadoff et al. (2002).

resources; (IV) economic and political benefits that extend beyond the actual water resources in question.

Table 1: Benefits from the cooperative management of transboundary water resources		
Categories	Problem structure	Possible benefits
(I) Benefits for water resources	Water quality, ecosystems, biodiversity	Improved water quality, improvement of land / soils in catchment areas, morphological structure of waterbodies, etc.
(II) Benefits from water use	Suboptimal use and development of water resources	Improved energy generation and irrigated agriculture, flood protection, etc.
(III) Fewer costs stemming from water conflicts	Regional political and, in given cases, military tensions	Altered political relations tending toward cooperation, lower costs due to self-sufficiency in food and energy supply; lower military costs
(IV) Benefits extending beyond water use	Low degree of political and economic integration	Cost reduction based on integrated infrastructure planning (e. g. energy), development of trade relations
Source: Based on Sadoff / Grey (2002)		

Generally, the literature distinguishes two forms of benefit-sharing (Table 2).

In the first place, an immediate transboundary compensation (and as a rule one linked directly to the project in question) can be used to strike a balance between the benefits and costs of cooperation, and this compensation may be provided in the form of money (sharing of project costs, price guarantees) or noncash benefits (e. g. certain quantities of water).

In the second place, it is conceivable to link a given cooperation with cooperation on another project with an opposite allocation of costs and benefits (so-called issue linkages). For instance, a win-win situation may be achieved if one party offers to improve lower-course navigability in exchange for improved water quality, requiring another party to reduce pol-

Table 2: Different forms of benefit-sharing		
Benefit-sharing mechanism		Examples of applications
1. Compensation	Monetary	Untied international financial transfers
		Sharing of project costs for infrastructure financing or other measures (e. g. reduction of harmful discharges)
		Payments for water-use rights to their previous holders
		Acquisition of shares / joint ventures / direct investments
		Price- and/or quantity-related agreements on deliveries of water or energy
		Assignment of water-use rights
2. Issue linkages	Non monetary	Assignment of water-use rights
		Agreement on quantitative allocation energy
	Within water sector	Realization of tradeoff deals with opposite cost-benefit allocation (e. g. improvement navigability to sea against reduction of discharges on upper course)
		Concessions on water allocation in other river basins
	Outside of water sector	Trade concessions, transportation agreements, immigration issues, border controls, supply agreements (e. g. energy, oil), and the like

lutant or nutrient discharges on the upper course of a river.⁵ Issue linkages (or package deals) may be effected within the water sector or they may be extended to tradeoff deals in other policy fields (e. g. trade concessions). The literature also refers to outright compensation as a direct incentive mechanism, terming issue linkages an indirect incentive mechanism (Marty 2001).

5 This constellation is given for the example of the Scheldt.

In looking at benefit-sharing from an economic standpoint, the most marked accent is generally placed on the benefits deriving from water use itself. This goes in particular for the development context, where, in both substantive and institutional terms, issues associated with energy generation and irrigated agriculture are very closely linked with water policy. Table 2 points out some possible forms of benefit-sharing. However, it is not always possible to unambiguously assign actual cases of benefit-sharing to one of these categories.

Another aspect constitutive for our understanding of benefit-sharing and the implementation-related difficulties that may be involved is that, unlike negotiations on water quantities, this case implies a change or a need to wholly redefine both the object and the style of negotiations. While negotiations on water quantities are concerned with a relatively easily quantified, tangible variable that is often bound up with historical claims to sovereignty, possession, and power, the matter under negotiation here, "utility or "cooperation-related benefits," is a variable that is not always immediately tangible for the negotiating parties and may be associated with substantial uncertainties as to anticipated levels (Elhance 2000).

It may furthermore be assumed that the feasibility of benefit-sharing agreements depends in large measure on the preferences of the riparians concerned as regards the possible relationship between water rights and financial transfers or other "tradeoff deals." Countries that, as a matter of principle, do not regard "sovereign" water rights as "tradable" against money or other benefits are very unlikely to accept such arrangements. On the other hand, countries that tend more to see a substitutive relationship between these two variables may be regarded as open to such arrangements.

In any event, the relationship between the variables "water rights" and "benefits from a resource" is a quite complex one. The conventional economic view, with its marked tendency to simplify matters, proceeds on the assumption that it is possible, starting out at the conceptual level, to maximize the economic utility stemming from water cooperation; the next step would then be to negotiate the allocation of the benefits of cooperation, in order then, finally, to reach agreement on transfers designed to apportion the benefits. However, this view presupposes that agreement has already been reached on the water rights in question, in other words, that, viewed in economic terms, the property rights to a given transboundary

waterbody have already been clearly defined and are no longer a contentious issue. This, though, is typically not the case on transboundary rivers. This in turn is the reason why it is often necessary to negotiate simultaneously over water rights and allocation of the benefits stemming from cooperation, and that efficiency and allocation issues are inseparably intertwined from the outset of negotiations (Rogers 1997).

Finally, we can formulate the hypothesis that growing water scarcity has a positive influence on the probability that benefit-sharing agreements will be reached, since as a rule growing scarcity goes hand in hand with an increase in the potential of cooperation-related benefits. Accordingly, any failure to accept appropriate mechanisms designed to equitably allocate benefits could, in the future, have more or less grave economic repercussions for the countries concerned (Elhance 2000). In any case, growing water scarcity increases the relevance of the logic of economic efficiency in resource use in connection with compensation mechanisms.

4 Differentiation of coordination problems and implications for benefit-sharing

The need for benefit-sharing results from the fact that optimization of water use is associated with distributive effects that, in view of present or planned water uses, are not seen as acceptable by all countries concerned. This coordination problem can be further differentiated (see especially Marty 2001; as well as Dombrowsky 2005; Haftendorn 2000; Eaton / Eaton 1996; Rogers 1997).

Case 1: Coordination problems involved in infrastructure provision

Generally speaking, the countries concerned will have a parallel interest in realizing certain measures, and cooperation will be beneficial for all parties. Examples would include flood-protection measures on rivers forming a border, navigability, or water-infrastructure development, in which the countries concerned normally pursue compatible interests. When collective goods are involved, the cooperation problem typically has two sides, since the riparians concerned must on the one hand find the project with the highest overall efficiency benefits (the so-called production problem) and on the other hand come up with decisions on the allocation of efficiency-related benefits (the so-called distribution problem). Even though

reaching agreement on the allocation of costs and benefits is in no way a politically trivial problem, thanks to the symmetrical incentives and homogeneous interests involved, the chances that agreement will be reached are relatively high here.

Case 2: Cooperation problems in the management of transboundary waterbodies

In this case, too, the countries concerned may achieve cooperation-related benefits by working together on international waterbodies. Unlike Case 1, however, the main aspect of the cooperation problem here is that noncooperation may be more advantageous than cooperation for some of the parties concerned.⁶ One example would be joint management of groundwater resources when scarcity problems are involved. Here coordinated and sustainable management would be advantageous for all countries concerned, and compared with fully uncoordinated water use, each individual country could also realize benefits in this case. However, there is a strategic incentive problem involved here, since individual countries would fare best if all other countries were to opt for cooperation while they themselves managed to evade any restrictions (the so-called free-rider problem). Compared with Case 1, in this case the probability that the countries concerned will opt for cooperation to solve relevant cooperation-related problems will be lower if it is not possible to use negative or positive incentives to encourage and support cooperation.⁷

Case 3: Unidirectional externalities / upstream-downstream coordination

Upstream-downstream problems are among the classic problem constellations encountered on transboundary rivers. Activities on the upper course of a river are inevitably bound up with positive or negative externalities downriver. This limits the possibilities available to engage in co-

6 This is the classic situation of the so-called prisoner's dilemma. Viewed from their own perspective, individual actors / players would be better off if other actors / players showed cooperative behavior, while the former were not themselves forced to cooperate.

7 Viewed in terms of game theory, another factor relevant to free-rider problems is whether the decision situations are unique in nature or recur regularly. It is in turn far more likely that agreement will be reached in recurrent decision situations, since in this case the other countries involved are in a position to "penalize" noncooperative behavior.

operation in that individual countries may have no interest in coming up with cooperative solutions which, at least initially, entail no benefits for them. One example would be reduction of discharges into waterbodies or the realization of flood-protection measures on the upper course of a river, which would benefit only the countries on the river's lower course.⁸ Reallocation of water rights in a river basin faced with scarcity problems also involves similar characteristics, since present water users will not be interested in any such reallocation unless they are provided (financial) compensation. Haftendorn (2000), for instance, distinguishes between cases of relative water scarcity – in which, in principle, all parties obtain water, though not the quantities they desire – and the situation of absolute water scarcity. The latter case is characterized by the fact that there is no possible way to satisfy some legitimate claims to water use. Even though in actual cases it may be quite difficult to distinguish between these two forms, it may plausibly be assumed that the chances of reaching agreement will be lowest in cases involving absolute water scarcity.

Under the condition of water scarcity, rational actors will in any event only agree to limitations on their water use if they see a possibility of gaining compensation, e. g. of sharing with another country the benefits accruing to it from the use of additional water resources. It is, for instance, conceivable – despite national borders – to link water rights to use productivity or to reallocate water rights from low-productivity users to economically more efficient uses. But any such efficiency-oriented water allocation in international river basins is realistic only in the case that previous users are given financial compensation for their (temporary or permanent) surrender of their water rights. In fact, however, the probability of that agreement will be reached on compensation in such cases also hinges on the power-political setting given in river basins, and one critical variable here is the position taken by lower-course riparians, who may lay claim to additional quantities of water from upper-course riparians (Mitchell / Keilbach 2001).

The probability of cooperation declines from Case 1 to Case 3, and in Case 3 agreement may in general be expected only if the losers of cooperation are given compensation in exchange for their cooperation (Rogers 1997;

8 One example here is the Euphrates, where dams in Turkey have a positive effect for flood protection in Syria and Iraq (see Scheumann 2003).

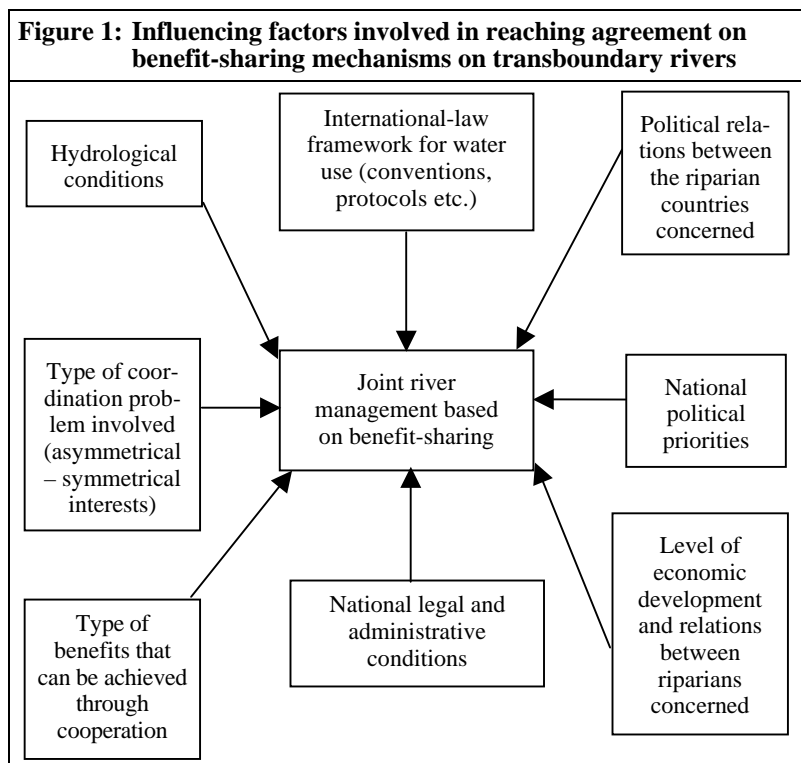
Marty 2001). Generally, compensation of this kind should not be allowed to fail for lack of means, since, on the whole, cooperation at the river-basin level leads to benefits for all. But transboundary benefit-sharing may also be called for in Cases 1 and 2 as a means of facilitating or realizing an agreement.

Against this background there is reason to expect in principle that in practice benefit-sharing mechanisms will materialize far more often and prove easier to implement when the interests involved are homogeneous and symmetrical (Case 1) than in situations in which upstream-downstream problems are at stake.

Here we can distinguish between cooperation-related benefits depending on whether they occur in concentrated or more diffuse forms. Due to the lobbying activities and clientelist policies normally associated with them, concentrated benefits that will clearly accrue to a limited number of actors and can be pinned down spatially generally have far greater chances of being politically articulated and realized across borders than diffuse benefits that are more scattered in spatial terms and often are advocated by actors with less influence (Bernauer 2002). It may thus as a rule be said that these diffuse and less tangible benefits are also more difficult to estimate reliably in terms of their levels as well as in terms of monetary variables, and this in turn tends to render them less communicable when it comes to benefit-sharing mechanisms. Examples of benefits that are at the same time concentrated and relatively easy to quantify can be found in the field of hydroenergy. Examples of more diffuse benefits from cooperation would include small-scale farming, flood protection, or measures designed to protect aquatic ecosystems. As far as benefit-sharing mechanisms are concerned, concentrated cooperation-related benefits also have another advantage: They are easier to "tap" in a transboundary setting; examples here would include setting up joint ventures, allocation of energy quantities, or agreements on prices.

In addition to a symmetrical interest structure, it is thus also easier to implement benefit-sharing mechanisms when the cooperation-related benefits involved pose no problems to quantification and tend at the same time to accrue in concentrated form; this tends to tangibly highlight the benefits of joint projects and then to set the stage for the process of allocating them.

Finally, it can generally be assumed that there are a number of factors influencing the realization and, in given cases, the effectiveness of benefit-sharing; these factors can be broken down in keeping with the fields of action presented in Figure 1.



5 Benefit-sharing in practice: Subject matter and articulation

This section is devoted to a description of the forms of benefit-sharing that have been implemented in practice and the relevant parameters involved. Section 5 analyzes factors that may prove obstructive or conducive to the implementation of win-win solutions on transboundary rivers in Africa. Box 1 lists all cases on which the assessments are based.

Box 1: Selected case studies	
<p>Africa</p> <p>Lesotho Highlands Project (Senqu-Orange) (South Africa, Lesotho)</p> <p>Infrastructure development on the Senegal River (Mauritania, Senegal, Mali)</p> <p>Infrastructure development on the Cunene River (South Africa, Portugal)</p> <p>Owen Falls (Nile) (UK)</p> <p>Aswan Dam (Nile) (Sudan, Egypt)</p> <p>Dam construction on the Komati-Lomati (South Africa, Swaziland)</p> <p>Incomati / Maputo Agreement (2002) (South Africa, Swaziland, Mozambique)</p> <p>Kariba Dam (Zambezi) (Zambia, Zimbabwe)</p> <p>Cahora Bassa Dam (Zambezi) (Portugal, South Africa, Mozambique)</p> <p>Molatedi Dam (Limpopo) (South Africa, Botswana)</p> <p>Incomati River, KaNgwane (South Africa, KaNgwane)</p>	<p>North America</p> <p>Columbia River (Canada–US)</p> <p>Tijuana River (US – Mexico)</p> <p>South America</p> <p>Parana (La Plata Basin) (Brazil, Paraguay)</p> <p>Salto Grande region (Uruguay River) (Argentina, Uruguay)</p>
<p>Asia</p> <p>Syr Darya (Aral See) (Kyrgyz Republic, Kazakhstan, Uzbekistan)</p> <p>Infrastructure development (Mekong) (Thailand, Laos)</p> <p>Pancheshwar Project (Ganges – Brahmaputra – Meghna) (India – Nepal)</p> <p>Kosi Project (Ganges – Brahmaputra – Meghna) (India – Nepal)</p> <p>Chukha Hydro-electric Project (Ganges – Brahmaputra – Meghna) (Bhutan, India)</p>	<p>Europe</p> <p>Scheldt / Meuse (The Netherlands, Belgium, France)</p> <p>Rhine (Chloride Prevention Agreement, 1976) (The Netherlands, France, Germany, Luxembourg, Switzerland)</p>

As far as the general diffusion of benefit-sharing mechanisms is concerned, it can be said that several relevant agreements have been concluded on transboundary rivers, and that, generally speaking, existing agreements are more and more keyed to water uses and related needs/demand. Some such agreements explicitly state that the allocation of water resources will be geared not to the principle of equal water quantities but to the principle of equal benefits from water-resource use – as is the case e. g. in the agreements between the U. S. and Canada on waterbodies forming the border between the two countries (Wolf 1999). Still,

the overall number of existing win-win solutions involving agreement by the parties on sharing the economic benefits stemming from cooperation is still relatively modest, above all when viewed in relation to the number of agreements involving purely qualitative allocation or technical cooperation. The Oregon State University Transboundary Freshwater Dispute Database shows that less than ten percent of the transboundary river agreements covered involve arrangements on compensation or tradeoff deals designed to strike a balance in the allocation of (economic) benefits; but the great majority of existing agreements contain no linkages providing for financial transfers or package deals (Wolf 1999).

The known cases are broadly dispersed in spatial terms, and there are no clear-cut regional tendencies or accumulations recognizable. It can be said that – at least – the information available provides no evidence to confirm the higher frequency of benefit-sharing in political and economic integration spaces assumed by some relevant authors (Bernauer 2002; Durth 1997).

The best-known cases in Africa are the cooperation project between South Africa and Lesotho in the so-called Lesotho Highlands Water Project, the cooperation-based infrastructure-development project between three riparians on the *Senegal*, and the joint South Africa-Swaziland river-development project on the *Komati River*. In addition, we may also cite here the more recent agreements on water allocation for the *Incomati-Maputo* Basin, which also display features of a win-win solution. There are also some older agreements, most of which are concerned with the use of hydropower in colonial contexts or must be viewed against the background of South Africa's foreign-policy situation before the era of apartheid came to an end. The present study does not document the more recent development of cooperation on the Nile in the context of the Nile Basin Initiative. For one thing, the initiative is well known and documented (see e. g. Nicol 2003a); for another, the brief span of time involved is not really sufficient to come up with any reliable statements on the effectiveness of the shared-vision approach pursued in the Nile Basin.

Table 3: Cases of benefit-sharing in Africa

Project / case	Coordination topic	River basin	Benefit-sharing mechanism	Organizational setup	Treaties Dates & Signatories
Lesotho Highlands Water Project	Hydropower & regulation water provisions	Senqu-Orange	Direct payments for water, purchase agreements, financing arrangements	Bilateral Commission; task-specific national authorities for implementation; High-level administrative involvement (ministries)	1986: S. Africa & Lesotho
Cunene River Basin	Water quantity, flow of Cunene, hydropower, irrigation, water supply	Cunene	Direct payments for water, direct payments for benefits, financing agreements	Joint Commission (technical cooperation); national operating Authority; Cunene River Basin Commission	1969: S. Africa & Portugal
Owen Falls Dam	Construction of dam in Uganda, hydropower; control of Nile	Nile	Cost-sharing; Egypt pays Uganda for flooding and loss of power	Uganda Electricity Board (national)	1949: UK & Egypt 1952: UK & Egypt
Kagera	Joint management, hydropower and cross-cutting sectors	Nile	Member states contribute on an equal basis to the KBO operational budget	Multilateral Basin Organisation	1977: Uganda, Rwanda, Burundi, Tanzania 1981: Uganda's accession

continued Table 3:						
Manantali Dam (Mali), Diama Dam (Senegal)	Economic development, hydropower, water storage, flood control	Senegal	Cost-sharing; joint ownership;	Joint Organization with broad mandate and competences (Senegal River Development Organization) Private holding companies	1972: Mauritania, Mali, Senegal 2002: Senegal River Water Charter	
Kariba Dam Project	Hydropower, dam on Zambia-Zimbabwe border and power stations on each side	Zambezi	Joint ownership in equal portions. ZRA funded by direct disbursement from the two countries.	Central African Power Corporation (CAPCO) Zambezi River Authority (ZRA) Water sector within Southern African Water Community (SADC) Kariba Lake Development Company (KLDC)	1963: Northern Rhodesia (Zambia), Southern Rhodesia (Zimbabwe)	
Cahora Bassa Project	Hydropower, conservation dam and works	Zambezi	Joint venture, specific agreements on electricity prices.	Tripartite Permanent Technical Committee (TPTC) established 1983, multilateral	1984: Portugal, South Africa, Mozambique	
Maguga and Drieskoppies Dam Incomati	Hydropower	Incomati	Cost sharing Maguga Dam (60:40), water allocation	Bilateral Basin Authority (KOBWA), Joint Water Commission (JWC)	1992: South Africa, Swaziland	

continued Table 3:

Incomati River KaNgwane	Water quantity	Incomati	Compensation payment by South Africa to KaNgwane for land	Permanent Water Commission (PWC)	1992: South Africa, KaNgwane
Tri-Partite Agreement Incomati-Maputo	Water allocation	Incomati-Maputo	Issue linkages (water sharing in the two sub-basins)	Tri-Partite Permanent Technical Committee (TPTC)	2002: South Africa, Swaziland, Mozambique
Molatedi Dam on Marico River in South Africa	Water allocation	Limpopo	Water transfer in exchange for Botswana contributing to operation and maintenance of dam; issue linkage in negotiation	Joint Permanent Technical Committee (JPTC), bilateral Water Utilities Corporation (WUC)	1988: Botswana & South Africa 1989: Memorandum of understanding (50 / 50 water utilization)

Aside from these African cases, several non-African cases have also been reviewed with a view to better capturing the possible breadth of benefit-sharing mechanisms. In the European context these would include efforts to reduce the saline load of the Rhine (Chloride Agreement 1976) and the cooperation between Belgium, the Netherlands, and France on the Scheldt and Meuse rivers. The North American Columbia Treaty may be seen as one of the most extensive cases of benefit-sharing between industrialized countries; this can also be said of the US-Mexican cooperation project on wastewater treatment on the Tijuana River. Two more recent large-scale projects with clear-cut benefit-sharing mechanisms are relevant for the development context: the cooperation between Nepal and India in the Pancheshwar Project and the Thailand–Laos cooperation on hydropower generation. Other relevant cases would include the agreements concluded in 1998 between the Syr Darya riparians (Aral Sea); this case, which involved a decision not to use upstream water resources for hydropower, included agreement on compensation in kind (fossil energies). Finally, two cases from South America have been used.

Table 3 presents some of the central parameters used to describe the benefit-sharing mechanisms for the African cases investigated in the present study. These cases have the following characteristics:

(i) Development phases across time

The cases presented clearly indicate that benefit-sharing – even though the concept has gained popularity only in recent years at international water conferences – has played a role in practical international cooperation for many years now, and thus cannot at all be said to be a new phenomenon in water cooperation. For the situation in Africa we can distinguish three phases.

An *early phase* can be identified in the colonial context; it includes, among other things, some first agreements with benefit-sharing character on the Nile from the 1940s and 1950s (e. g. the Aswan Dam).⁹ One of the

9 Wolf also reports on some cases from the early 19th century that are not documented here; these include an agreement between the UK and the Sultan of Abdali on financial transfers for the use of Aden groundwater (1910) or payments by the UK to Eritrea, the upstream riparian in the Nile Basin, as its share of the profits from cultivation of the Gash Delta (1926) (Wolf 1999).

particular features of the colonial phase of river cooperation was that despite sharply divergent interests the colonial powers in part pursued parallel interests and embraced similar organizational concepts when it came to managing large river basins; these were keyed to the model of the US Tennessee Valley Authority, which at that time figured prominently in the international discussion. Examples would include early proposals on developing cooperation on the Senegal (1930s) or plans to set up a Zambezi Valley Authority, which, in keeping with notions current among the colonial powers in the 1930s and 1940s, was to have extensive powers in the field of river development.

A *second phase* can be made out between the end of the 1960s and the end of the 1980s. The projects relevant here must be viewed in the context of the newly won independence of a number of countries on the one hand and a positive perception of river development on the other. The latter also led to support being provided by major donor organizations like the World Bank, which saw promotion of large-scale projects as a good means of fostering the economic independence of newly independent countries. The typical cases include the above-mentioned cooperation on the Senegal and the Lesotho Highlands Water Project. Two other projects on the Zambezi River are the Kariba and Cahora Bassa projects, both of which, however, had already been planned in the colonial era. The special features typical of this second phase include the existence of the apartheid regime in South Africa and the external (in part military) tensions associated with it as well as a number of specific political coalitions that emerged in southern Africa. The projects agreed on in this phase (Lesotho Highlands, cooperation in Botswana) bear marked traces of this particular regional situation (Turton 2003; Meissner 2003), one in which countries willing to cooperate on other bilateral issues (e. g. security) could in part count on South African concessions on water issues.

Finally, we can distinguish a *third phase*, the period from the end of the 1980s to the beginning of the 1990s. It was marked by new set of political parameters (the end of the Cold War and the apartheid regime in South Africa, processes of political and economic integration, e. g. SADC etc.). This phase saw the adoption of extensive institutional reforms, above all in southern Africa in the context of the SADC process. The implications at the level of concrete benefit-sharing agreements have, though, been more or less modest. The cooperation in the Incomati Basin can, however, be

specified as a prime example of the possibilities offered by the new set of political conditions (above all the 2002 agreement). There are also a number of planned projects that cannot be discussed in detail here and that will not be able to be implemented without agreements on benefit-sharing mechanisms. This applies in particular for a number of international water-transfer projects (Heyns 2002; Turton 2003) that will also alter the water-policy situation in southern Africa. One factor of relevance for this phase of water cooperation is the growing role played by environmental issues, and this has already found expression e. g. in agreements on minimum ecological runoffs.

(ii) Types of benefit-sharing mechanisms

Section 2 breaks down conceivable forms of benefit-sharing into *direct mechanisms*, in which compensation or benefit-sharing are immediately project-related, and *indirect mechanisms* (i. e. intra- or intersectoral issue linkages). Based on this classification, we find that the examples under consideration, as few in number as they may be, reveal a sizable range of practiced forms of benefit-sharing. Table 4 provides an overview focusing on direct incentive mechanisms.

The arrangements made in connection with the Lesotho Highlands Water Project are extensive and highly differentiated. The project consists in the joint realization of a number of river-development measures, although it basically focuses on classic infrastructure projects (dams, water pipelines). In this project benefit-sharing hinges largely on allocation of water-use rights, South Africa's willingness to assume a large measure of the project costs, and payments that are keyed to given shares of water, which are explicitly defined with an eye to allocating the benefits of cooperation. In general terms, it was agreed that 56 % of the benefits from the project would go to Lesotho. The basis used to calculate these cooperation benefits – an overall volume of some US\$ 1 billion is expected when all stages of the project have been completed – is the cost differential between this project and a technically alternative project (the so-called Orange Vaal Transfer Scheme) which South Africa could have realized on its own territory, though at costs (both fixed and variable) that would have been far

Table 4: Forms of benefit-sharing mechanisms used in practice		
Benefit-sharing mechanism	Allocation of cooperation-related benefits / compensation for losses	Selected examples from practice (year of agreement or project completion in parentheses)
(Re)assignment of water rights	(Additional) water rights used to allocate cooperation-related benefits and / or to compensate for losses	Allocation of water rights for the Lesotho Highlands Project (1986), Tri-Partite Interim Agreement Incomati-Maputo (2002)
Agreement on allocation of hydropower and water for use in irrigation	Allocation of generated hydropower used to distribute the benefits stemming from new infrastructure	Allocation of hydropower from various dams (Senegal, Cunene, Cahora Bassa)
Payments for water-use rights	Benefits from use allocated among the countries involved	Payments for water use on the Cunene River (1969) Lesotho Highlands Project (1986)
Payments for cooperation-related benefits	Compensation for losses related to cooperation Payments for other forms of water use (License) fees for water use (e. g. hydropower) Cost-sharing in efforts to improve water quality	Payments for inundation and license fees for hydropower (Cunene River) (1969) Compensation for flood damage resulting from dam construction on the Nile (Aswan Dam, Egypt – Sudan) (1959) Compensation for loss of land resulting from flooding from the Drieskoppies Dam (South Africa to Swaziland) (1992)

continued Table 4:		
<p>Assumption of costs for improvements in water quality</p>		<p>Treatment plant on lower course (US territory) Lower-course riparian shares costs for erosion protection on upper course (Kosi-Project, Nepal – India) Lower-course riparians (Netherlands and Germany) share costs for reduction of saline emissions on upper course (France) (Rhine Chloride Agreement, 1976)</p>
<p>Purchase agreements (electricity, agricultural goods)</p>	<p>Cooperation-related benefits allocated on the basis of agreements on prices and/or quantities</p>	<p>South Africa obliged to purchase hydropower from Lesotho Highlands Project Electricity sales to South Africa from Cunene River; prices keyed to water runoff (1969) Preferential sale of electricity from Cahora Bassa to South Africa</p>
<p>Joint funding (and in some cases operation) of infrastructure projects</p>	<p>Countries involved share the costs for infrastructure measures in keeping with the cooperation-related benefits accruing to them</p>	<p>Joint funding of the Maguga Dam – South Africa (60 %) and Swaziland (40 %) (1992, completion 2001) Joint funding and operation of large dams on the Senegal (from 1972) Joint funding of the Lesotho Highlands Project (1986)</p>
<p>Alignment of project planning and infrastructure management</p>	<p>Projects planned in such a way as to use positive upper-course effects (reduction of seasonal fluctuations, flood protection) to compensate for negative effects downstream (e. g. reduced water quantities)</p>	<p>Later correction of dam management on the Senegal – artificial flooding for agricultural purposes Flood protection on the Limpopo</p>

higher than the Lesotho project. Above and beyond the payments it receives from South Africa, Lesotho also derives a further benefit from the option it now has to generate hydropower. One factor of considerable importance for the constellation involved in the Lesotho Highlands Water Project may be seen in the low opportunity costs of selling water to South Africa, and it was this that made the project attractive from the perspective of Lesotho, a country which, by regional comparison, is very well endowed with water resources. The breadth of the agreements reached on the Senegal is seen as exemplary; here the parties agreed on an allocation of the benefits stemming from two dams – cost-sharing in connection with allocation of electricity and water resources. Another interesting aspect here is the far-reaching and legally innovative institutional context: The parties acknowledged in an earlier treaty (1972) that the riparian countries would regard the Senegal's water resources as a "common resource" and recognize the Senegal as an "international river," and for this reason – and unlike the case of most other African rivers – the negotiations were from the outset focused less on sovereignty issues than on aspects of water use.

Generally speaking, cost-sharing in joint infrastructure projects appears to be the most widespread form of benefit-sharing, and in some cases purely cost-related agreements have been concluded. In other cases both the realization and the operation of the infrastructure concerned have been underpinned by transboundary shareholdings or joint ownership of the plant and equipment involved (e. g. Senegal). One common practice used in infrastructure development projects is to reach agreement on deliveries or sales of given quantities of water or electricity, and here, in a number of projects (dam construction on the Senegal, the Cunene, and the Zambezi), transfers in kind (primarily hydropower) constitute a central mechanism of benefit-sharing. Allocation of irrigation areas also plays a role in cooperation between the Senegal riparians. Here agreements have been reached on volumes and locations in a joint development program. As far as the architecture of shared benefits is concerned, the Senegal is in any case a highly illustrative example in that here the parties succeeded in linking a number of different benefits – benefits that are substantially more significant for some of the countries involved than for others – to form an overall package acceptable to all.

Some projects also feature complex linkages involving allocation of water and energy. One example here would be the Kagera Dam; according to the

terms of the relevant agreement, each of the two countries involved in the project are entitled to 50 % of the water resources, while power allocation depends on the amount of water available. In other words, instead of being allocated on the basis of absolute variables (e. g. kWh), the quantities of power to be distributed are determined by the amount of water available. The Lesotho Highlands Water Project operates with a flexible benefit-sharing mechanism in which changes in water availability affect the rules governing the allocation of financial transfers between Lesotho and South Africa. The agreements on the Lesotho project thus also implicitly entails a distribution of risks between the project parties concerning future water availability, although this arrangement is heavily biased in favor of Lesotho. The ways in which (primarily hydrological) risks are dealt with in agreements on benefit-sharing mechanisms is a central aspect that will be addressed again in Section 5.

As far as the context of dam construction is concerned, apart from allocation of water or electricity, we also find cases in which simple compensation-based solutions are used to address immediate disadvantages suffered by other riparians in connection with projects. Such disadvantages, which may be compensated for either in money or in kind, include e. g. loss of or damage to land in connection with backwater zones in border regions or temporary flooding, both of which are as a rule compensated for by financial means (e. g. Aswan Dam; South Africa / KaNgwane; Drieskoppies Dam South Africa / Swaziland).

On the other hand, there are no known cases of compensation for consumptive uses of additional quantities of water, e. g. for irrigation purposes, on Africa's transboundary waterbodies. Nor are there any cases in which countries on the upper course of a river are obliged to compensate downstream riparians for lower water availability, or to share the benefits they derive from their own increased water use with downstream riparians. While there have been numerous discussions on a mechanism of this kind for the Nile, the talks have failed as a result of political problems and mistrust between Egypt and Ethiopia (Barret 1998; Schiff / Winters 2002; Niol 2003a). In addition, another limiting factor at work in this context is Egypt's marked power position, which has in the past helped Egypt to push through its own interests in obtaining given quantities of water, largely without having to engage in any benefit-sharing.

Outside of Africa we can cite in this context one recent and interesting agreement concluded in the catchment basin of the Aral Sea. Here irrigation-related water losses incurred in connection with power generation are compensated for in kind (i. e. in the form of fossil energy resources) (see the fact sheet on the Syr Darya), although, in practice, the effectiveness of this agreement between the three riparian parties is still limited. This benefit-sharing agreement on the Syr Darya provides for compensation for seasonal fluctuations in water availability or for reduced upstream energy generation in periods of cold weather; it does not entail any permanent transfer of water rights.

Worldwide, only very few cases have been documented in which downstream riparians are required to share costs bound up with reduced discharges upstream of a transboundary river. But upstream compensation of this kind was included in the Rhine Chloride Agreement (1976) (Bernauer 1995). This situation is similar in the case of the plant built on the Tijuana River to treat Mexican wastewater, roughly 90 % of the costs of which were borne by the U. S. (Marty 2001). In Africa, where thus far virtually no transboundary emission-control agreements have been concluded, there are at present no such mechanisms.

There are some projects in which no (financial or in-kind) benefit- or cost-sharing is provided for; in these cases the intention is to use project planning to achieve, *uno actu*, positive effects for lower-course countries that will serve as compensation for any possible disadvantages these countries may have to contend with. Examples would include agreements on the use of dams to reduce the risk posed by downriver floods or artificial flooding designed to reduce damage in connection with regulated water runoff on the lower course of a river. Agreement was reached on the latter point e. g. on the Senegal in the 1990s with a view to providing compensation for negative effects of dam operation. There are no reports from Africa on more complex agreements on the economic effects stemming from a combination of flood control and power generation of the kind concluded between Canada and the US in the 1960 for the Columbia River.

There are several examples for *issue linkages within the water sector*, although these are as a rule highly context-specific in nature. Aside from the above-mentioned example of infrastructure development on the Senegal, other examples would include the more recent Incomati-Maputo Agreement between South Africa, Mozambique, and Swaziland (2002),

which managed to resolve (at least provisionally) a seemingly intractable conflict over allocation of the waters of the Incomati by including the Maputo, another transboundary river, in the negotiations. Concessions that South Africa made to Mozambique on use of the waters of the Maputo paved the way for an agreement on allocation of the waters of the Incomati. In any case, the context defined by the overall water-policy complex in southern Africa has increased regional interdependencies,¹⁰ and this has increasingly meant that, apart from the project under consideration, water negotiations are conducted with an eye to the willingness of the parties to cooperate on other projects that may involve different interest complexes.

To cite an example, one reason why agreement was reached on South Africa–Botswana water transfers was that Botswana had legally recognized certain claims to water use raised by South Africa, and South Africa itself was – based on water cooperation between the two countries extending back to the apartheid era – able to assume that Botswana would adopt a cooperative stance on other water projects. The cooperation between Botswana and South Africa in the water sector may thus already be said to be characterized by a good measure of *diffuse reciprocity* (LeMarquand 1977), and this means that, instead of insisting on achieving a balance of benefits for every project, the two countries may look to diffuse reciprocal benefits that accrue from a large number of projects that entail different transboundary impacts.

Looking beyond Africa, we find examples of creative tie-in deals in the water sector between riparian countries such as the Netherlands and Belgium on the Scheldt, where the parties came up with a linkage between efforts to improve navigability and measures designed to control pollutant discharges (Meijerink 1999; Mostert 2003). Generally speaking, it may be said that efforts to link navigability with other management issues on transboundary rivers have a high level of plausibility for smoothly func-

10 This applies in particular in the context of international water-transfer projects, the reason being that such projects not only modify hydrological interactions but also alter specific future benefit flows stemming from water cooperation. It is interesting to note that some projects planned with a view to increasing the availability of water in South Africa would require the country to seek cooperation with countries with which, at present, it has no cooperation-based relations in the water sector. Another important example for the significance that water transfers may have for the realization of win-win solutions is the Okavango River.

tioning issue linkages in that countries on the upper course of a river for the most part stand to benefit more from improved navigability, while as a rule lower-course countries benefit more from improvements in water quality. At the international level, for instance, intensive discussions have been conducted on water-related issue linkages between the US and Mexico, e. g. regarding the Colorado and the Rio Grande (LeMarquand 1977).

While *cross-sectoral issue linkages* play a major role in water negotiations – most instances cited in the literature are concerned with countries with markedly different levels of development (Wolf 2001) – very few such cases have been documented for Africa. But it is emphasized in the literature that during the apartheid era South Africa used cooperative behavior on water issues to pursue clear-cut foreign policy objectives and security interests (Turton 2003). On the Euphrates, water-related conflicts between Turkey and Syria have long been heavily intertwined with security aspects, and here positive developments in security cooperation have had markedly conducive effects on water cooperation.¹¹

Hardly any example has been reported in which countries suffering from water scarcity or water stress have agreed to a reallocation of water resources in connection with financial benefit-sharing with a view to maximizing their overall utility from water use. Most existing benefit-sharing agreements are concerned with the distribution of benefits from "new" water resources, most of them deriving from dam construction. There are no cases known in which one country has permanently relinquished a given water use in favor of another riparian, receiving compensation in return.

(iii) Types of coordination problems addressed by means of benefit-sharing

With reference to the differentiation of cooperation problems undertaken in Section 3, we can assign a large share of the benefit-sharing mechanisms identified here to Case 1 (coordination problems involved in infrastructure provision) a case characterized largely by homogeneous interests and a symmetrical incentive structure, the reason being that here, in prin-

11 Even the Turkish-Syrian negotiations on the 1987 Protocol covered energy and security issues alongside water issues.

ciple, all parties involved stand to benefit from the realization of a given project. This would apply, for instance, for a number of dams built to generate hydropower for joint use (including e. g. the Kariba Dam on the Zambezi, infrastructure on the Senegal).

But it is not possible in all cases addressed to cleanly assign all such cases to the three categories set out above, because certain aspects of given projects would place them under Case 1 (parallel interests/benefits), while others would best be assigned to Case 2 (unidirectional – positive – externalities). And in many instances it is not possible to assign a given project "objectively" to the one case or the other, because assignment depends on the way in which the cooperation problem is defined specifically in the countries concerned. The forms that are more hybrid in nature would include e. g. the Lesotho Highlands Water Project; due to its financial impacts and the energy-policy interests involved, the project was more in line with Lesotho's overall interests, but for Lesotho the project would not have been possible without the cooperation of South Africa and a substantial engagement on the part of international donors. While cases of compensation for largely unidirectional, positive effects of a transboundary nature provide little in the way of hard evidence, the case of cooperation on the Cunene River (which for many years was very limited because of the civil war in Angola) has been assigned to this group.¹² Looking beyond Africa, however, we find few examples of compensation for river development or protection measures with unidirectional downriver effects; these would include e. g. India's assumption of the costs for erosion-protection measures on the upper course of the Kosi River (India – Nepal Kosi River Project).

Apart from joint infrastructure projects, there are few examples in Africa of compensation for negative transboundary externalities. Interestingly, these cases are concerned primarily with "upstream" externalities involving land utilization for dam backwaters, e. g. in the cases of the Driesskopjes Dam in the 1990s and the agreements on the Aswan Dam in the 1950s.

12 However, this, too, is not a case involving purely unidirectional externalities, since it also entails positive effects for the upstream riparian (Angola).

(iv) The functional and sectoral focus of the relevant agreements

The points addressed thus far clearly indicate that most existing forms of benefit-sharing have a comparatively narrow and functional focus and are as a rule legally anchored in *functionally specific* agreements on joint water-infrastructure planning and management. Important examples here would include the treaties on the Lesotho Highlands and Kagera projects or the cooperation between Swaziland and South Africa on the Komati River. These initially involved project-specific agreements that, at least in part, were later anchored in a broader treaty framework. For instance, the Komati cooperation project was given a new framework in the agreement signed in 2002. The cooperation between South Africa and Lesotho has also been embedded in a broader institutional framework through the agreements reached on the Orange / Senqu River – although this has no immediate effects for the Highlands Project. Put differently: The functionality of bilateral river-development projects does not depend directly on the existence of cross-sectoral, multilateral agreements (Mohammed 2003; Marty 2001).

The situation on the Senegal was different in nature from the very start. Aside from project-specific – and decidedly multisectoral – provisions, the treaty lays down basic rules governing the joint use of water resources by the three riparian parties. But on the Senegal, too, not all of the riparian countries are among the signatories; Guinea withdrew from the cooperation project at an early point of time, and has only recently shown renewed interest in developing closer ties to this river-basin cooperation project.

It can thus generally be said that in the majority of cases close functional cooperation has preceded any broader agreements on cooperation on water management, not vice-versa (Marty 2001). Some agreements provide explicitly for further development and enlargement of cooperation as soon as a given project has been successfully realized; one example here would be the agreement on construction of the Kagera Dam.

In southern Africa the sectoral focus is primarily on joint power generation, a benefit that is very well suited for such agreements because of its tangible character. Such monosectoral agreements include e. g. those on the construction and management of the Kagera and Cahora Bassa dams. One cooperation venture with a multisectoral perspective is the project on the Senegal, which, in addition to power generation – an area in which

thus far little headway has been made in implementation – is geared to improving watercourse navigability, and the joint transboundary development of *irrigated agriculture*. The focus of the older, 1972 Senegal agreement has recently been appreciably enlarged through two new agreements, which include protection of freshwater ecosystems (wetlands in the river delta) and artificial flooding designed to promote small-scale agricultural structures. The cooperation project on the Komati River extends to efforts to coordinate the objectives of power generation and development of irrigated agriculture.

The examples from southern Africa also show that use of shared water infrastructure only for agricultural purposes may not justify the high investment costs involved. For South Africa e. g. the economic profitability of the Lesotho project is bound up with the context of urban and industrial water use in the country's economic centers, i. e. of highly productive water uses that require relatively low subsidies. On the other hand, a joint South Africa – Botswana dam project failed because South Africa would have been able to use the projected dam only for purposes of irrigated agriculture, and the economic utility that could have been derived from the dam would not have justified the investment costs.

In fact, ecology-oriented win-win cooperation is still the absolute exception on the African continent. Benefit-sharing and win-win solutions are nearly always associated with river development and large-scale dam projects. It is therefore not particularly surprising that some of the positive examples of win-win solutions referred to here include projects that are highly controversial at the international level because of their social and environmental impacts (Senegal, Lesotho, Kagera, and others).

(v) The mainly bilateral character of cooperation

Finally, nearly all forms of cooperation involve *bilateral approaches*; we find virtually no cooperation projects that include all riparian countries in a benefit-sharing agreement. One reason for this is that the countries not involved in such cooperation projects are not affected by them and thus do not pursue any particular interests bound up with them. In some other cases, though, other countries were not included, even though there was reason to expect that a project would give rise to impacts extending beyond the borders of the negotiating parties (Kagera Project). In some cases the intention may well have been to exclude individual countries from the

benefits of cooperation (e. g. power generation), a state of affairs that must be interpreted in the context of the political tensions and coalitions that emerged in southern Africa in the course of the 1970s and 1980s.

This bilateralism may also be due to more intensive sociocultural, language, and religious relations between individual riparian countries, a state of affairs that may impede multilateral forms of cooperation and, at least initially, prove conducive to bilateral cooperation; examples here would include the cooperation between Egypt and Sudan on the Nile or cooperation projects in Muslim, Francophone West Africa.

In fact, the question of bi- or multilateral cooperation projects hinges, as might be expected, in large measure on the type of benefit-sharing agreement under consideration. It is mainly cooperation on concrete water projects that displays a functionally narrowly defined and bilateral character. These projects in turn are for the most part forms of cooperation in which the countries involved pursue parallel interests (Mohamed 2003). On the other hand, cooperation in the form of issue linkages has other particular features in that the precondition required for their realization is inclusion of all interests and countries in a river basin (e. g. the Incomati Project or the efforts undertaken in the framework of the Nile Basin Initiative). Inclusion of additional countries from the river basin in question may prove to be a key precondition for cooperation if, in negotiations that lack a generally accepted mediator, one riparian is able to assume the mediator role, and that country pursues no specific interests of its own.¹³

Outside Africa as well, an approach that is at once relatively narrow in functional terms and generally bilateral, is one of the most important characteristics encountered in water-infrastructure projects. Even recent agreements reached in regions marked by a large measure of political and economic integration – e. g. in the EU – continue to be far removed from any fully multilateral and integrated perspective (one need think here only of the example of the Scheldt). With its river-basin agreement and the Mekong Commission, the Mekong region also has a multilateral and integrated framework for cooperation; but the actual cooperation here on so-called win-win projects is as a rule bilateral in nature and has a functional focus.

13 Some commentators see Swaziland in this role in the negotiations between South Africa and Mozambique.

Some of the examples discussed here also show that benefit-sharing agreements may have negative impacts on third parties – as a rule lower-course riparians – although these effects may play no role or only a subordinate role in the agreements themselves. This is an obvious feature of e. g. the Laos – Thailand cooperation in energy generation: The effects of the dam on the Mekong impact negatively on the downstream riparian (Vietnam). The case is generally seen as similar for the Kagera Dam and Lesotho Water Highlands projects.

(vi) Organizational implementation of projects

Although we find a quite broad range of variation in the organizational implementation of projects, one salient feature shared by the treaty-based forms of cooperation in the SADC region is the existence of solidly institutionalized forms of organization, most of which have been conceived as multilevel systems. Most of them have joint, functionally specific commissions with a legal status of their own, and these commissions are responsible for project development, monitoring of implementation, and, in some cases, for project operation as well. Implementation itself – construction, for instance – tends more to be in the hands of national authorities or of authorities or organizations created specifically for the purpose (e. g. in Lesotho). Finally, most projects have specific, multilevel organizational approaches to conflict resolution or mediation; an example here would be the use, in the context of the Lesotho Highlands Project, of a neutral arbitrator to settle technical disputes, e. g. on the appropriate levels of water-use fees.

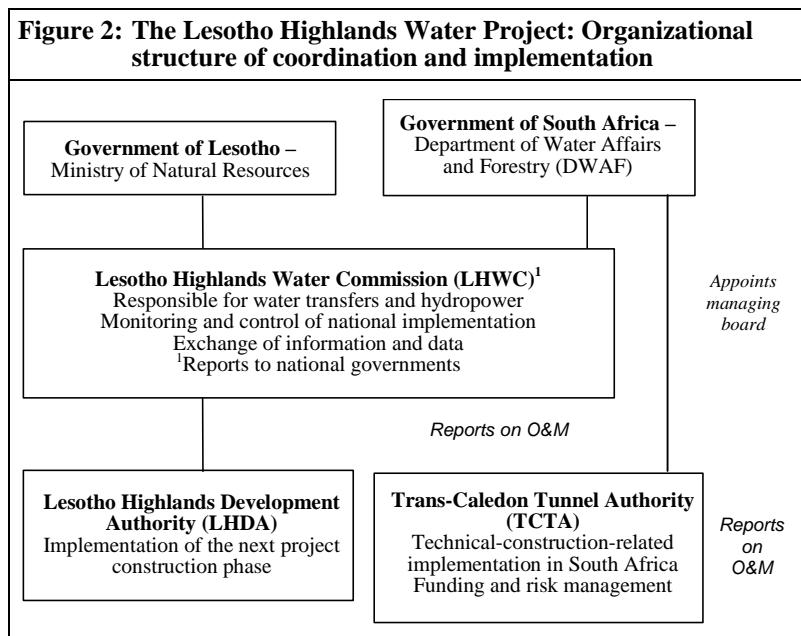
The Kagera Dam on the Zambezi also has a multistage organizational framework. There, in a bilateral cooperation project, Zambia and Zimbabwe are jointly operating the dam. While the Zambezi River Authority (ZRA) has far fewer powers than originally provided for in plans devised by the colonial powers, and is in fact responsible for little more than power generation, the ZRA is seen as a possible organizational nucleus for the development of multilateral cooperation on the Zambezi – although this would call for a separation of regulatory and operational responsibilities (Chenje 2003).

Figures 2 and 3 document the administrative implementing structures of the Lesotho Highland Project and the cooperation project on the Senegal with a view to outlining some of the organizational options available for

transboundary benefit-sharing mechanisms. Unlike the cooperation between Lesotho and South Africa, the cooperation between the West African Senegal River riparians shows an even more pronounced focus on joint transboundary commissions in combination with private-sector forms of organization in dam operation.¹⁴ While in most cases in Africa it is state authorities that assume the key functions in developing and implementing cooperation projects involving the construction and operation of dams, we find outside of Africa a number of more clear-cut approaches geared to the involvement of private-sector investors (e. g. the hydropower cooperation between Thailand and Laos). Another interesting observation is that the organizational anchoring of the Lesotho Highlands Water Project has changed over the course of time, with, to cite one important example, the Joint Permanent Technical Commission (JPTC) being upgraded in 1999 to the status of a Lesotho Highlands Water Commission (LHWC). This change is also designed to do justice to the altered challenges that emerged in connection with the transition from the building phase – construction of dams, tunnels, and pipelines – to the operational phase, which involves water delivery in connection with targeted financial transfers and control mechanisms (Turton 2004).

One aspect of major practical relevance must be seen in the joint structures developed to monitor cost development in project implementation, since experiences made in connection with various African (but also European) projects (e. g. development measures on the lower course of the Scheldt) show that cost overruns hold considerable conflict potential. Another factor relevant in this context is that most of the agreements signed thus far, e. g. the Komati River agreement between South Africa and Swaziland, provide for a phased approach to project implementation, with the signatories committing themselves only to implement the next phase of a project. This permits the parties to condition further project phases on the effectiveness of the implementation of previous project phases.

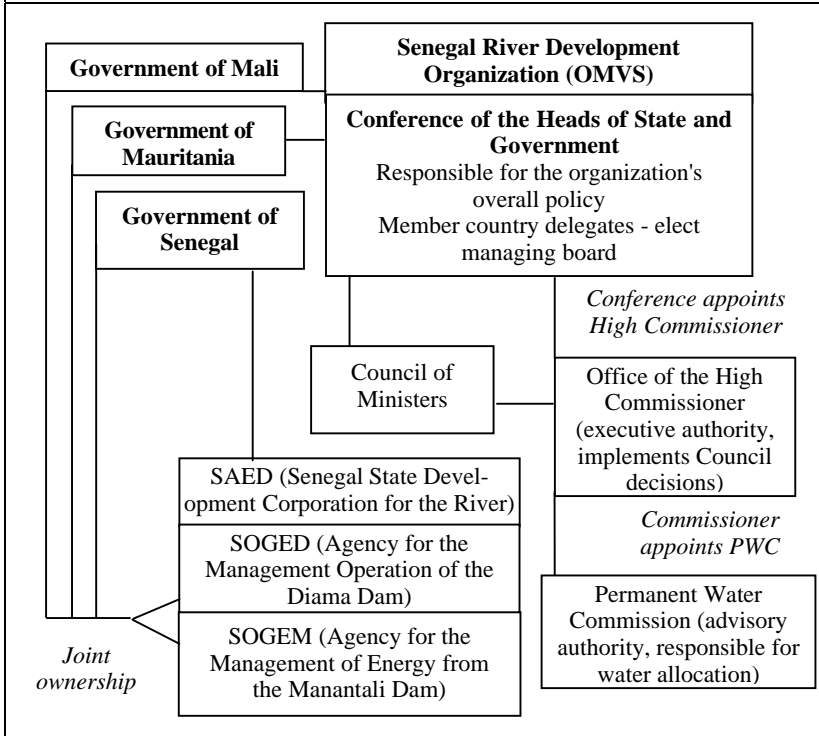
14 A similar form of organization may also be found on the Komati.



(vii) Allocation of benefits and water

While the concept of benefit-sharing would seem to suggest that the countries concerned negotiate not on the allocation of water rights but merely on the allocation of benefits stemming from water use, possibly also seeking to avoid conflictual negotiations on water-use rights, the practice associated with such mechanisms in fact indicates more that negotiations on water rights and projects with win-win character are complementary – and not substitutive – in nature. In practice, benefit-sharing mechanisms have evidently not replaced agreements on water rights; indeed they either presuppose the latter or may serve to facilitate agreements on water quantities, the reason being that e. g. water allocation tends to be linked to concessions on cost-sharing or deliveries of electricity. Viewed from the angle of individual countries, however, an offer to engage in joint projects as a rule implies that such countries are interested in gaining water rights.

Figure 3: Senegal River : Organizational structure



What this means, precisely in cases involving the development of additional water resources, is that the allocation of water rights offers a good opportunity to reach agreement on (implicit) benefit-sharing instead of financial transfers.

Thus all of the major infrastructure projects in the basins of the Incomati, the Orange-Senqu, the Senegal, the Cunene, and the Zambezi are not only conditioned on agreement on the "output side" of water use, i. e. hydro-power, for example; the relevant treaties also contain precise water-allocation targets. The Lesotho Highlands Project e. g. could only be realized because the agreement set out ex ante quantitative allocation targets – it should be noted that the large water reserves that occur in Lesotho, the

upstream riparian, define the relevant context here. Aside from cost-sharing provisions, one integral element of the agreement between South Africa and Swaziland on river development on the Komati is an agreement governing the allocation of certain water quantities between the two parties, and without such an agreement no rational operation of the infrastructure involved would have been possible. An initial agreement on qualitative water allocation that turned out to be detrimental to a third party – Mozambique – was corrected by the agreement reached in 2002.

But in other cases contentious, nonconsensual water-rights issues have thwarted agreements on benefit-sharing mechanisms. This was the case e. g. in the attempts of the Nile Basin Initiative to reallocate water rights for the countries on the upper course of the Nile. The reason why these attempts failed must be sought not only in a lack of trust in the willingness of the relevant riparians to cooperate but also in specific controversies over water rights.

In other words, what we have here is a two-sided relationship between water-use rights and benefit-sharing. On the one hand, many agreements on the distribution of the benefits of cooperation presuppose first of all safeguards for (or at least acceptance of) existing water rights. Many forms of transboundary compensation depend in crucial ways on acceptance by the country expected to provide compensation (e. g. in the form of financial transfers) of the relevant riparian's water-use rights. In political terms, this is of course by no means a trivial condition, e. g. because this may, on some rivers, run counter to established environmental principles (e. g. the polluter-pays principle).¹⁵ On the other hand, agreements on water-use rights themselves offer a possibility to allocate benefits deriving from joint projects, e. g. benefits derived from joint dam projects on rivers that form borders. In this case, the use of quantitative units of water as a basis for allocating benefits has the one advantage that it is relatively easy to calculate.

15 To cite an example, U.S.-funding for a treatment plant for pollutant loads from Mexico in the Tijuana was delayed because of major resistance in the U.S. against the (implicit) abandonment of the polluter-pays principle which the deal entailed.

(viii) Calculation of benefits deriving from water cooperation

Although the data used as a basis for given agreements tend to be quite heterogeneous, in most cases the rough estimates used to calculate the benefits expected from water cooperation are based on highly complex hydrological and – in some cases – econometric models. Some more recent examples of the modeling approaches that have been used in actual negotiations include those used in the Incomati-Maputo talks to calculate water runoffs and impacts on infrastructure as well as those used as a basis for infrastructure development on the Komati. The models used for preparatory calculations for the Lesotho Highlands Project might also be cited as an example here. A complex approach was also selected for the cooperation project on the Senegal; it served as a basis for a model of the multisectoral use aspects relevant for dam management and as a means of modeling the sectoral implications involved.

One interesting, and at the same time pragmatic, approach used to calculate the net benefits expected from the water cooperation between Lesotho and South Africa was the decision to use as a frame of reference a purely national river-development project on the South African side – the national OVTS Project, a second-best solution that was used as an anchor to calculate the additional benefits expected to accrue to South Africa from the Lesotho project. The cost data for the theoretical alternative project were then used for the actual agreement on the Lesotho Highlands Project, specifically as a basis for cost-sharing calculations and to come up with rough estimates of water-use fees. But despite the use of this approach, differences of opinion and disputes still emerged on the levels of expected benefits as well as over the water-use fees to be paid by South Africa. Use of a different project as a reference variable to calculate cost savings does not always prove acceptable to all parties. To cite an example, in the negotiations on implementation of the Pancheshwar Project the Indian government rejected any use of purely national costs as a reference variable for calculating costs for the irrigation water and the flood-protection benefits expected from the project, arguing that this approach would lead to exaggerated estimates of the value of these benefits.

Another relevant aspect is that in many cases third parties have been invited to participate in negotiations as "neutral" or "objective" experts with a view to coming up with a set of data acceptable to all parties; these experts were in most cases representatives of international organizations or

private consultants. In some cases all of the parties have included private international consultants in their delegations at the negotiating table, a state of affairs that most authors regard as conducive to efforts to reach agreement.

While hydrological models of water availability and – depending on the problems involved – flood events or water quality constitute a central precondition for negotiations, the same cannot always be said of economic models. Some agreements have been concluded without any detailed economic assessments of project benefits and drawbacks, relying instead on "rule-of-thumb" estimates of expected effects.

(ix) Time requirements for benefit-sharing agreements

Even though the numerous context-specific parameters involved invariably mean that the time required – to say nothing of the complications that may emerge in the process – to conclude any given agreement will vary substantially, the experience made thus far in establishing benefit-sharing mechanisms do indicate a) that there is every reason to assume that such efforts are very time-consuming (this is often true of water-related planning cycles) and b) that hardly any projects have been planned and implemented in no more than a few years. To cite an example, the period that elapsed between the initial, more or less concrete planning for the Lesotho Highlands Project and the final agreement on the project was over 30 years; the time required for the Senegal project was 20 to 30 years – and that despite a relatively conducive postcolonial regional setting and strong support provided by donor organizations. The case studies indicate that this is due to the following factors:

First, the long period of time needed is due to extensive project-planning efforts, especially when possible alternatives are looked into and comprehensive economic and impact assessments are conducted. If the process of project scrutiny and planning are bound up with uncertainties, one important variable – and one that may prove very time-consuming, depending on the initial situation given – is the availability of complex and consensus-based decision-support systems. This phase may even prove to be the end of the planning cycle – e. g. in the case that a years-long project cost-benefit assessment leads one of the countries involved to conclude that no positive outcome may be expected. This in fact happened on the Limpopo (Botswana / South Africa) after a close look into the possibility of devel-

oping joint infrastructure projects there indicated, at least to South Africa, that the overall project was not worthwhile.

Second, the progress made on projects depends on the political dynamics that develop in the course of negotiations, and here issues bound up with the allocation of benefits or costs may prolong the negotiations. Changes in the political situation in the countries involved may also lead to rapid progress – or to seemingly insurmountable blockades; e. g. in the case that a new government has no interest in further pursuing a project or when it becomes necessary to clarify disputes over the responsibilities of different levels of administration.

Third, general intergovernmental relations are a central determinant that may contribute importantly to accelerating or blocking the progress of a project. To cite an example, for years agreement on the Lesotho Highlands Project was thwarted by the conflictual relations between the parties; then, however, a coup brought Lesotho a new government, and this paved the way for finalization of the agreement within a period of months.

Fourth, project completion may be obstructed by funding shortfalls that may lead to delays of many years. Examples here would include the long-delayed power-generation project on the Manantali Dam in Senegal or problems that long delayed the rehabilitation and maintenance of the infrastructure on the Cunene.

(x) Cases of dual asymmetries in negotiations

A good number of transboundary water cooperation projects point to the difficulties that may emerge from a problem structure involving what is known as dual asymmetry (Marty 2001). While asymmetric interest complexes of riparian countries result as a rule from the specific problem constellation given on transboundary waterbodies (upper-course-lower-course problems), strongly divergent interests may also develop between national governments and local or regional actors, e. g. in cases concerning the realization of river-development measures. Local interests or resistance may focus e. g. on land rights and resettlement issues, damage feared in connection with dammed-up water, or dangers to subsistence farming or fisheries that may result from reduced or regulated water flows. However, such decentral interests have not been integrated into most of the benefit-sharing agreements presented here, and only in a few cases have specific

arrangement been added later to take account of local interests (e. g. in the Lesotho Highlands project, stakeholder forums in connection with the environmental and social programs implemented in the 1990s, including arrangements to compensate the local population).¹⁶

The positive assessment given here of the functionality and effectiveness of individual benefit-sharing agreements, at least in terms of the way in which they serve to balance out transboundary interests, would consequently have to be enlarged to include a detailed look at the ways in which local-national asymmetries are dealt with and how these asymmetries are integrated into the relevant bilateral, international negotiations. A look at the Kariba Dam e. g. shows that there were far fewer problems involved in transboundary, sectoral cooperation on power generation than in efforts to find a balance for the interests of the rural population as well as for negatively affected environmental interests. This situation is similar on the Senegal and in the Lesotho Highlands Project, where local interest groups have raised massive objections. There is no doubt, for instance, that the river-development project on the Senegal has positive effects on irrigated agriculture and power generation, though not to the extent originally envisioned. But there is also no doubt about the negative economic and social consequences for water use in small-scale agriculture in the river's overflow areas or the impacts on freshwater fisheries.

Even though progress has recently been made in efforts to integrate local interest groups, the question is whether and to what extent national political systems are sufficiently capable of integrating local interests into international negotiations. The consequences of dual asymmetries for the establishment and formulation of transboundary benefit-sharing agreements played an important role e. g. in the extremely tenacious negotiations on the Tijuana River (U.S. – Mexico), where local U.S. interests did not really get a fair hearing.

16 Yet one aspect of the Lesotho project that continues to be controversial is whether or not sufficient efforts have been undertaken to provide for compensation for the negative impacts on the population and the environment. While an economic assessment would come to the conclusion that compensation has been provided for the negative impacts, and that Lesotho's population is thus left with a net benefit, various actors in the region see the matter quite differently.

6 Factors central to reaching agreement on benefit-sharing mechanisms

The assessments of international water cooperation found in social-science publications indicate that the present state of our knowledge does not permit us to derive any propositions on the conditions required for successful cooperation on transboundary rivers (Bernauer 2002; Dombrowsky 2005; Mostert 2003). All of the studies referred to clearly indicate the context-specific determinants that result in the countries concerned from the interplay between given natural-spatial and climatic conditions, political and economic relations, and the legal, administrative and cultural conditions given in the countries concerned. But despite the large number of individual studies that have been published in the field, the present state of research on international river cooperation is not sufficient to permit us to draw any viable general conclusions on the determinants essential for cooperation (Bernauer 2002). In particular, as far as fundamental issues bound up with the formulation and design of water cooperation are concerned (functionally specialized versus integrated multisectoral approaches; bilateral versus multilateral agreements and forms of organization), research in the social sciences has yet to come up with any really clear-cut statements. Even as far as prioritization and sequencing and time-scheduling are concerned, what we find at best are statements on trends, but not any viable findings.

Bearing this proviso in mind, we will nonetheless attempt to derive some conclusions from the case studies under consideration here.

6.1 Factors obstructive to the establishment of benefit sharing

a) Sovereign national water rights

One central obstacle to agreements on benefit-sharing mechanisms must be seen in the claims to sovereign water rights often raised by riparian countries. The most clear-cut example in the African context is the situation on the Nile, where this continues to be a crucial aspect in negotiations. But the same also goes for most rivers in southern Africa, where efforts continue to center on water-allocation issues and water-related legal agreements.

In principle, contentious claims to certain quantities of water regularly lead to the failure of efforts to establish benefit-sharing mechanisms. Put differently: Since the (legal or de facto) allocation of water rights determines the point of departure for water negotiations, and thus as a rule also defines the framework for benefit-sharing agreements, any failure to reach agreement on this issue *ex ante* constitutes a serious obstacle to negotiations. The only negotiations in which this problem is not so relevant are talks that are not conducted under pressing scarcity problems and/or that are concerned with the allocation of "new" water resources (obtained e. g. through dam construction).

When in this context countries insist on national sovereignty, they for the most part have national energy or agriculture-related objectives in mind. Development of joint sectoral goals – e. g. in the context of energy cooperation in regionally integrated areas – may, however, serve to relativize national self-sufficiency ambitions and thus to facilitate agreements.

b) Water projects as prestige projects

The cases under consideration here also make clear that for those in positions of political responsibility decisions on large-scale water projects may also be linked with various external and domestic interests. Water projects are often highly symbolic and prestigious in nature (Blatter 2003), and for this reason the actors involved often are unwilling to forgo a major project for lack of adequate compensation. This hidden agenda in the planning of large-scale projects tends to function as a brake on negotiations concerned with location issues when the primary issue at stake is the planning of transboundary water projects. In many countries even irrigation projects tend to be seen as prestige projects, because they (are thought to) symbolize national autonomy and sovereignty. The situation is often further aggravated, e. g. in most countries of the Middle East, by continuing ambitions to achieve self-sufficiency in food production, and this aim implies as a rule a need to further develop irrigated agriculture in national territories.

c) External obstacles

Studies on the influence of general external relations on intergovernmental efforts to resolve water-related conflicts indicate that this variable plays a key role in this connection (Giordano 2002). Put differently: Countries that

maintain close and cooperative mutual relations as a rule resolve their water conflicts by cooperative means, while countries that maintain highly conflictual mutual relations often show precisely the opposite pattern.¹⁷ The situation becomes problematic above all when water issues have already become part of an overriding conflict involving contentious claims to national sovereignty. There is little reason to expect benefit-sharing agreements in a context of this kind, because the basic prerequisites are simply not given.

The experience available indicates that progress in such constellations presupposes the inclusion over the long term of conflict mediators, moderators, and donor organizations. One of the few examples for the realization of a benefit-sharing project in a conflictual setting is the cooperation between Thailand and Laos in the field of hydropower and the agreement on barter trade on the Syr Darya, although in the latter case implementation does not appear to be making much effective progress (Wegerich 2004). In southern Africa the cooperation project on the Cunene River was kept up for a relatively long period of time, despite high levels of tension.

d) Uncertainty as to the benefits to be expected from cooperative agreements

Often individual countries are unable to estimate with sufficient certainty the economic utility that would accrue to them from water cooperation. The usual uncertainties involved in hydrological modeling and the extreme fluctuations in precipitation and runoffs encountered in parts of Africa are exacerbated by the problems posed by the need to precisely estimate future economic utility variables, since the latter depend on a good number of in part highly variable parameters (e. g. market prices for agricultural goods, electricity prices), and it is more than difficult to predict reliably how these variables will develop over long project cycles. These uncertainties are often bound up with economic conditions and related priorities in riparian countries, and this makes it quite difficult to come up with a consensual

17 Although water cooperation may be possible even in such situations involving difficult external relations, in some cases individual countries may use cooperation in the water sector as a targeted means of improving their general external political relations. Examples here would include the India-Pakistan cooperation on the Indus or efforts to improve water cooperation on the Rio Colorado, which were also bound up with foreign-policy objectives.

assessment of all of the economic implications involved for different water uses and countries.

The more uncertain the economic benefits from cooperation are, however, all the more probable it is that the negotiations will be geared to the "tangible" variable of "water quantity" and all the more likely it will be that the parties will insist on retaining the status quo instead of seeking to trade water rights for benefits that may be uncertain. Elhance (2000) e. g. sees the difficulties involved in coming to a safe estimate of all cost-and-benefit variables as a crucial obstacle for the further development of water cooperation. Viewed against this background, the use of accepted, methodologically well-developed approaches to assess the impacts of projects is obviously one central building block for the development of such agreements.

Yet even reliable modeling of anticipated effects is bound up with uncertainties as to the economic benefits of win-win projects. In addition, due to the long investment cycles involved, water projects tie up capital for long periods of time and require long-term commitments on quantitative water allocations. Countries that have a marked preference for keeping their water-development options open will therefore be reluctant to make long-term commitments – as regards e. g. any permanent surrender of water rights.

Realistic assessments indicate that some countries will – despite their positive cooperation rhetoric – insist on achieving their long-term interests (Nicol 2003b). Precisely countries that hold a dominant economic and political position may, however, not see themselves in an improved situation in the long run if they trade water rights for benefits, since for them such benefits are not sufficiently calculable and may prove very difficult to secure in a problematic political environment.

Finally, the ways in which costs and benefits are anchored in agreements is a highly important factor with regard to possible conflicts, particularly if such agreements fail to define precisely the ways in which the specific variables involved are to be estimated. To cite an example, the Mahakali agreement between Nepal and India provides for apportionment of project costs in direct relation to the benefits that accrue to the parties. However, major disputes over the dimensions of the benefits accruing to India in the fields of irrigated agriculture and flood protection have served to impede

project implementation. This example is also a good illustration of the importance of careful treaty design, i. e. of the need to ensure that provisions are unambiguously defined.

e) Uncertainties as regards project costs and strategic behaviors

It was shown in Section 4 that financial transfers play a relatively small role as a mechanism of compensation on transboundary rivers; the exceptions would include the bilateral dam projects in Africa outlined above, the Chloride Agreement on the Rhine, or the project on improving the navigability of the Scheldt. The fact that international financial transfers are not particularly frequent is bound up with some fundamental problems involved in cost-oriented financial transfers: They tend to foster strategic behaviors on the part of recipients, who may e. g. exaggerate their costs in negotiations or not adhere to agreed-upon budget frameworks when it comes to implementation (see e. g. the example of the Scheldt) (Finus 2003).

But strategic behavior may also be assumed on the part of paying countries, e. g. in cases where the levels of payments depend on the specific benefits that a given country derives from a cooperation project. As a means of getting around this problematic, some successful projects have chosen a "real" anchor as a basis for calculating their benefits, e. g. the costs of other projects with a similar thrust as far as their effects are concerned.

But the fact that the benefits involved in energy cooperation can generally be calculated reliably goes to explain why the majority of win-win projects cited are taken from this sector. In the energy sector there is as a rule consensus on the use of market prices as a reference parameter, and this fact is thus also often reflected in relevant agreements. However, uncertainties and information asymmetries regarding the costs associated with water cooperation go to explain why – with the exception of the limited number of examples cited – at the international level financial transfers, which are actually highly plausible as an instrument of compensation, have not become very widespread (Finus 2003).

f) Weak administrative capacities

This factor is of central significance, because the countries involved must be able to demonstrate credibly in international negotiations that they are capable of implementing the agreements in question. In Africa, however, there is, in most cases, little reason for any such confidence in national administrative capacities. Benefit-sharing agreements on the Nile, for instance, have, in concrete cases, failed to materialized precisely for this reason. Similar difficulties are also encountered in southern Africa, where administrative capacities and know-how in the water sector tend to be very unequally distributed.

Another key obstacle to agreement on and implementation of joint projects must be seen in unstable domestic political situations, a fact that can be unambiguously demonstrated with reference to the large measure of erosion experienced in water cooperation in civil-war-torn countries like Angola (the case of the Cunene project).

One possible way to work around weak national implementation structures is to upgrade forms of bilateral cooperation and to delegate competences to these structures. Structures of this kind have in fact been set up in successful benefit-sharing projects in Africa, e. g. for the Lesotho project, where South Africa has been accorded extensive control functions in the implementation of the project in Lesotho. One alternative would be joint operation of the infrastructure in question or having projects implemented by authorities in possession of a legal status and sufficient resources of their own; examples of this may be found on the Senegal and the Zambezi.

g) Low economic capacities and lack of creditworthiness

Countries that could engage in benefit-sharing need to have a minimum of economic capacity and creditworthiness; otherwise any bi- or multilateral cooperation on long-term, investment-intensive infrastructure projects is virtually inconceivable. In fact, however, we sometimes find huge disparities between African countries as regards the refinancing options open to them; this also applies for the situation in some SADC countries, where South Africa tends to be the dominant factor in negotiations – not only on account of its water situation but also because of its economic clout.

Creditworthiness and investment climate are the main factors that determine the possibility to attract private capital into benefit-sharing projects, and precisely this will become more and more important in the future because of growing funding needs.

h) Unequal negotiating situations due to marked disparities in development levels

The basic idea of benefit-sharing is the economic principle of exchange. However, such agreements presuppose that the countries concerned are not hobbled by disparities in their bargaining power so extreme as to allow a hegemonic water power to reach its goals even without have to "trade." If one country is able to use its position of hegemony to push through its own interests unilaterally and without having to make concessions to other riparians – e. g. by threatening to take coercive steps – the principle of benefit-sharing has no chance of realization, since the principle of course implies that every country involved can (at least in principle) improve its own position in negotiations. One view found in the literature is that there is reason to expect that compensation will be provided on transboundary rivers only if lower-course riparians do not play the role of a dominant political, economic, or military power in their own basin area (see Mitchell / Keilbach 2001).

Looked at against this background, efforts designed to level the playing field between the negotiating parties are highly desirable and plausible in that they increase the probability that cooperative win-win solutions will be adopted. And one reason why the efforts underway to intensify cooperation in the SADC region must be seen as positive is that these efforts have served to define rights and obligations as well as procedural rules that are binding for all countries concerned.

Experiences with issue linkages in water-related situations marked by sharp inequalities between the negotiating parties also show that efforts to broaden the object of negotiations may help to break down obstacles that result from lopsided power relations. To cite an example, it turned out in the negotiations between the US and Mexico that creation of linkages between water issues and security and immigration questions facilitated agreement, one of the reasons being that in this case a purely unilateral approach to water use no longer appeared feasible to the US side. Instead, willingness to cooperate on water use proved to be conducive to coopera-

tion on other issues (e. g. illegal immigration). In other words, marked disparities in national development levels may well prove to be a good reason to seek to broaden the topic under negotiation.

i) One-sided water-policy constellations

Conditions unfavorable to agreement on projects with benefit-sharing character tend – as was noted in the differentiated view of coordination problems presented in Section 3 – especially to be bound up with highly one-sided water-policy constellations of the kind encountered e. g. in the Nile Basin, where there are no waterbodies with a different upstream-downstream configuration. Accordingly, the possibility of forging issue linkages within the water sector are quite limited here. Instead, it would be essential that – often costly and time-consuming – political and administrative efforts be made to reach agreement across different sectors.

The problems posed by unilateral water constellations may be exacerbated by certain types of water scarcity. If, e. g. in the context of absolute water scarcity, agreements on a reallocation of water use would require one riparian to surrender a present form of water use, no success should be expected unless substantial compensation is provided. Even economically appropriate forms of compensation may, however, not prove sufficient in the case that reduced rights to water use should imply any surrender of high-priority sectoral objectives. This appears to be particularly relevant in the context of the agricultural objectives pursued by many African countries. Many such countries regard any surrender of water-use rights as incompatible with their stated goal of self-sufficiency in the production of agricultural goods. In a context of this kind, benefit-sharing presupposes that fundamental political objectives be revised, or at least scaled back.

Furthermore, in cases involving one-sided water-policy situations, financial transfers often fail because lower-course riparians see themselves unfairly treated or are unable to gain domestic acceptance for the goals at stake. To cite an example, in constellations in which a government may be bound at home by the polluter-pays principle for resource use, transboundary payments have little chance of success as compensation for efforts to reduce harm to ecosystems.

Summary of obstacles: Political factors and high transaction costs in negotiations, due to uncertainties and possibly the breadth and complexity of

the matter under negotiation, may constitute crucial obstacles to reaching agreement on benefit-sharing mechanisms.

6.2 Factors conducive to the establishment of benefit sharing

a) The existence of confidence-building forums and organizations

In view of the fact that benefit-sharing mechanisms powerfully affect economic interests of the countries concerned and are as a rule bound up with complex situations involving considerable uncertainties, cooperation would appear to call in crucial ways for a confidence-inspiring environment capable of stabilizing expectations. Such an environment might include e. g. river-basin commissions, which are generally seen as a favorable organizational framework for arriving at win-win solutions. In terms of data and information exchange, these forms of cooperation can prove to be a central determinant for the development of joint projects. Still, empirical observations of the work of long-established river-basin commissions offer no good reasons to equate river-basin commissions with benefit-sharing.

b) Functional focus as a gateway

The international discussion has not come to any uniform conclusions as to the pros and cons of functional, bilateral cooperation versus integrated, multilateral approaches. It is clear, though, that benefit-sharing can be developed without a multilateral, broadly defined cooperation framework, as long as this is understood to mean joint cooperation projects in the water sector. In a good number of cases, cooperation defined in narrowly functional terms even appears to have been a success factor that contributed to lowering transaction costs (costs involved in negotiation and coordination) and boosting the durability of certain forms of cooperation (Waterbury 1997), the reason being that the projects concerned have not been burdened by negative political developments in other sectors.

On the other hand, what appears more to be called for to develop larger deals is a cross-sectoral approach that leaves room to include trade-off deals in negotiations. In other words, context-specific influences are in

volved here, although it can be observed that in most cases of successful water cooperation the parties have engaged in functional cooperation before proceeding on to integrated approaches.

Here we find one of the central tradeoffs involved in the development of benefit-sharing mechanisms: While a multilateral and integrated management approach generally serves to broaden the options open for compensation-based solutions and package deals, thus boosting the chances of cooperation, such approaches also hugely increase the transaction costs involved in developing and realizing cooperative projects, a factor that makes it accordingly difficult to achieve win-win agreements.

c) Development perspectives with a similar orientation

Parallel development strategies, e. g. in the context of energy policy, tend to markedly foster the propensity to cooperate. To cite an example, similar ideas on development have worked in favor of the joint development of irrigated agriculture on the Senegal. In another constellation parallel energy-policy interests proved to be a central factor working in favor of water cooperation (Zambezi). In southern Africa it is generally assumed that energy cooperation is a factor of considerable influence for cooperation in the water sector.

d) Organizational prerequisites

Looking at the positive forms of cooperation found in Africa (Lesotho Highlands, Senegal, Kariba), we find that the factors conducive to cooperation include clear-cut organizational competences, precise standards for monitoring project progress, including (transboundary) cost control. Other important factors include a clear-cut delineation of competences between international commissions or transboundary committees on the one hand and national authorities on the other. One important prerequisite is a separation of regulatory and operational functions; experiences with private-sector forms of organization in transboundary projects, e. g. on the Senegal, are still relatively limited in scope, and it is therefore too early to make any predictions on their effectiveness.

e) The conducive role played by international water law

There is no doubt that acceptance of shared basic rules governing the use of transboundary water resources has a markedly positive effect on the possibility of reaching agreements on win-win solutions. Such rules may serve in certain ways both to clarify the scenario for negotiations and to reduce asymmetries between the countries concerned.

In fact, however, due to their broad scope for interpretation and the limited possibilities available to enforce them, the abstract principles set out in international law have very little real significance for negotiations on benefit-sharing mechanisms. But in the sense of leveling the playing field, the procedural rules laid down in international water law may be seen as highly relevant; these would include e. g. the obligation to share information and to engage in consultations and agreements on public participation, which may have appreciable impacts on the negotiating situation.

Furthermore, principles of international law have an important influence on the ways in which fairness is perceived in riparian countries. For instance, the international-law principle of equitable and reasonable use is of great importance for the further dissemination of benefit-sharing, since the principle itself is rooted in a use-oriented approach and thus provides a legal framework for relevant agreements in individual river basins. When disputes develop over the appropriate allocation of cooperation-related benefits, the principle of equitable and reasonable use may play a helpful role, even though no consensus has emerged at the international level on criteria that could be used to apply the principle in negotiations and in coming to decisions on allocation issues.

One positive example for the extensive use of an international water-rights agreement in connection with a benefit-sharing mechanism is the Senegal, where a joint treaty-based recognition of the Senegal as an "international river" played an important role in facilitating later negotiations.

f) The role of third parties, in particular of donor organizations

Although the economic discussion on benefit-sharing very seldom explicitly addresses the matter, in the practice of relevant agreements the involvement of third parties – and here above all large multilateral donors organizations – has an important impact on the probability that agreement

will be reached on cooperative win-win solutions. In fact, hardly a single noteworthy agreement on benefit-sharing has been concluded in Africa that does not involve international actors and make use of the financial transfers and technical and administrative know-how such actors are in the position to make available. The World Bank is e. g. heavily involved in financing the Lesotho Highlands Project; and infrastructure development on the Senegal has been supported by a number of multi- and bilateral donors.

On the one hand, international actors may play the role of mediator; on the other, they may make available the funds needed for compensation, in this way helping to pave the way for agreements. One factor that has played an important role in a number of cases is the no-objection rule, which requires all of the countries concerned to declare that they have no objections to a given large-scale water project. This requirement has gone some way, e. g. on the Komati River, toward fostering the willingness of the parties to cooperate. In providing support for transboundary water cooperation, the World Bank generally makes reference to the norms of customary international law, which entail e. g. an obligation to inform neighboring countries in advance of projects with transboundary impacts and to apply the so-called no-harm rule. Finally, the engagement of major donor organizations tends to stabilize the expectations of the governments concerned, and it may also serve to appreciably attenuate funding-related uncertainties. In addition, internationally financed projects (are required to) meet certain financial and organizational project-management standards, and this in turn may serve to reduce uncertainties regarding the national administrative capacities of negotiating partners.

g) Fairness an important factor; economic optimization less so

Another important factor is that a given cooperation project be regarded as fair by all countries concerned. Put differently, what is relevant for the decision-makers is not optimization of a generally abstract overall economic utility but a concrete outcome that appears adequate in terms of equity and political communicability. Fairness aspects have, in one way or another, played a key role in all of the agreements assessed for the present study. It is also important to bear in mind here that countries engaging in water negotiations are not only interested in ruling out losses of their own; they are as a rule also unwilling to agree to any overly one-sided allocation

of the net benefits involved. This played an important role e. g. in the agreements reached on the Senegal, and it was (in a negative sense) always an important issue in earlier negotiations on the Nile. Looking outside of Africa, the water cooperation between India and Nepal may be seen as an illustrative example. Here, Nepal was long reluctant to sign an agreement because it took a dim view of the benefits that the project was expected to entail for India – even though these benefits would, admittedly, not have entailed any immediate negative impacts for the Nepalese side. Fairness issues were also at the center of the negotiations on the Incomati, which were threaded with deadlock in the 1990s.

It is also important to understand here that the communicability of economic benefits hinges in large measure on their quantifiability and tangibility. An abstract economic utility derived from the preservation of certain freshwater ecosystems e. g. will certainly not play the same role in talks as economic benefits from power generation, because the latter are immediately quantifiable and therefore translate out into "effective" revenues. Accordingly, agreements on benefit-sharing may be fostered by emphasis on tangible economic utility variables, which may at the same time also facilitate coming up with reliable estimates (see above).

h) External events as windows of opportunity

One of the central findings of social-science research on cooperative, international water management is that external, singular events may alter the political constellations in a river basin, paving the way for solutions by opening up windows of opportunity. These events may include floods, extreme droughts, or severe water pollution due to accidents, all of which may serve to bring about a new orientation toward water management.

i) The influence of regional interests pursued by regional powers

The cases looked into for the present study also show that the actions of the countries concerned are not guided by a purely economic balance of the costs and benefits involved, and that economic considerations may well be masked by political rationales. Examples here would include South Africa's cooperation both on the Incomati and in the Lesotho project. It turned out in the Lesotho project that the agreements reached, which were highly beneficial to Lesotho, would not, in terms of the "logic" of the negotiations, have been necessary to convince Lesotho of the advantages

the project held for it (Barrett 1998; Barrett / Senanona 1998). This state of affairs must be interpreted in the light of the international isolation of the South African apartheid regime and the unstable political situation in Lesotho.

j) Inclusion of other river basins may facilitate benefit-sharing

Finally, the agreements looked into show that negotiations on water allocation for entire river basins or the inclusion of other rivers in negotiations may have a conducive influence on efforts to achieve win-win solutions. It should, however, be noted that the water-policy situation given at present often restricts the potentials for such agreements that would extend to more than one river basin.

Turton (2003) pointed out that the chances of reaching agreement on benefit-sharing in southern Africa could be substantially improved if the negotiations included possibilities of water transfers between river basins. Concretely, this would apply for the possibility of water transfers from the water-rich Zambezi to the Okavango River Basin, an option that could go some way toward mitigating the controversy there over water-use rights. It must be noted here, though, that large-scale water-transfer projects are a contentious issue in the international discussion on account of the negative ecological and social impacts they may have (Niemann 2005).

Summary of conducive factors: The critical organizational issues associated with cooperation include the existence of institutionalized forums or commissions that may play a role in negotiations. Another important factor is the need – in the sense of confidence-building – for transparent data to estimate the economic effects of different management options. Procedural issues are likewise of key importance; generally speaking, in the context of water scarcity benefit-sharing must be viewed more as a process than in terms of a (one-off) project.

Functional and bilateral cooperation projects have appreciable advantages as far as the costs of cooperation are concerned – although in the future benefit-sharing agreements should aim to include more countries and interest groups, e. g. in the context of negotiations on water transfers in southern Africa.

7 Special considerations involved in the promotion of benefit sharing in the African context

In the African context there are several particularities that in part tend to facilitate the conclusion of benefit-sharing agreements, in part, though, must also be seen as potential stumbling blocks that must be taken into consideration in attempts to promote transboundary water cooperation. Although these aspects cannot be discussed in any depth in the present study, they will at least be outlined in what follows.

One important aspect of the given situation is the huge disparities in levels of political, administrative, and economic development that we encounter in the African context and that are bound to have a marked influence on the form and the scope of the further development of water cooperation. Egypt is the regional hegemonic power in the Nile Basin, and Egypt's economic and military capacities far exceed those of the largely agrarian countries on the upper reaches of the Nile. In southern Africa the Republic of South Africa has assumed the role of a politically, militarily, and economically dominant regional power whose geographic location as an upstream riparian on a number of transboundary rivers has at the same time placed it in the role of a major player in the water sector. However, South Africa has become increasingly cooperative in the water sector, and it now plays an active and constructive role in the further development of relevant international institutions. The background here must be sought in the SADC integration process, which is in South Africa's immediate economic and political interest. However, the hugely differentiated hydrological and socioeconomic situation in southern Africa implies a powerful need to build organizations and institutions that may contribute to leveling the playing field there. Cooperation in the water sector must be placed in the context of the SADC integration process, and this is why there is every reason to take a positive view of the multitude of efforts underway there to build transboundary organizations and river-basin commissions.

In the end, however, this does not permit us to draw the direct conclusion that the SADC approach – i. e. primarily promotion of water-cooperation organizations and institutions – can be transferred to other regions. The history of SADC or its predecessor organization in southern Africa is simply too context-specific, and there is certainly little reason to assume it could be repeated in other regions, e. g. in the Nile Basin. Nor is the water-

related international-law framework comparable with that in other regions of Africa, where no agreement has yet been reached on a fixed institutionalized form of cooperation at the river-basin level.

Against this background, and in view of differences in the political and economic context conditions given there, the approach pursued in the Nile Basin appears at first entirely adequate to the problem in that it demonstrates more clearly the economic advantages that water cooperation may entail for the countries concerned and is conducive to benefit-sharing projects. However, the approach is faced with the problem of extreme economic imbalances and, in some cases, conflictual intergovernmental relations. The basic question is thus what long-term (economic) benefits e. g. Egypt could derive in this situation from any permanent shift in water-use rights in the Nile Basin. The factors relevant in this connection include not only the extreme disparities in the economic situation, in the role played by irrigated agriculture, and in the use of hydropower but also the domestic and intercountry conflicts in the region, which are at present more virulent in the Nile Basin than in southern Africa.

While we find among several countries in southern Africa clear-cut signs of political and institutional convergence, the situation in the Nile Basin is far removed from any such convergence. This gives rise to a paradox not untypical for benefit-sharing agreements. On the one hand, in a situation, like that on the Nile, that is typified by a lack of common institutions, a focus on concrete projects with prospects of mutual benefits may be conducive to cooperation, or indeed induce a propensity to cooperate among individual countries. But on the other hand, the realization of such joint projects generally presupposes both confidence in cooperation and an institutional and organizational framework between the countries concerned that is not yet given. It is therefore clear that water cooperation cannot be discussed independently of the political context and the degree of integration between the countries concerned. It may certainly be concluded that the efforts needed to promote water cooperation on the Nile – i. e. time, external funding, mediators, etc. – are far greater than they are in the SADC context.

Another aspect particular to benefit-sharing agreements in Africa is that the forms presently encountered are strongly associated with the *classic supply paradigm of water management*, with water problems mainly being solved through dams and water transfers, i. e. by increasing the water

supply, while both the demand side and, above all, efforts to increase water-use efficiency have played a more subordinate role. One factor of major importance in this connection is the *agricultural orientation of the most of the countries concerned (national self-sufficiency)*; this often works counter to effective cooperation in the water sector and constitutes a barrier to the objective of an economically more efficient use of the resource. In the future efforts to broaden water cooperation on individual rivers will therefore also require inclusion of agricultural issues, and here one possible approach may be seen in the concept of *virtual water*, i. e. the countries concerned will have to abandon their aim of achieving self-sufficiency and developing of water-intensive agriculture, while at the same time stepping up their imports of agricultural goods.

Another consideration of great importance in the African context is that intercountry hydrological and socioeconomic disparities are masked by extreme national social, economic, and ecological disparities and the inequalities in resource use that these entail. This in turn means that the ability of resource users to articulate their interests is of great significance here, as is the question as to what and whose benefits are to be taken as the basis of cooperation agreements on transboundary rivers. Thus far, however, the international water discourse has tended to reduce the benefit-sharing approach to the intergovernmental level, while as yet no adequate conceptual framework has been developed for the integration of general development-related goals (poverty reduction, economic development, improvement of the environment) into intergovernmental water cooperation. The analysis of existing benefit-sharing projects has, however, clearly shown that some projects that have proven quite successful – in the sense of promoting transboundary cooperation – have entailed appreciable negative ecological and social impacts and tended to marginalize certain population groups. Viewed against this background, the approach pursued by the Nile Basin Initiative – support for various programmatic initiatives and efforts to include development goals in water cooperation – appears wholly adequate and promising, even though it is still too early to adequately estimate the effectiveness of the approach. In fact, the benefit-sharing approach has yet to prove its worth as a vehicle for improving the integration of social and ecological goals.

This aspect also raises the question of the *criteria and indicators that should be used to assess intergovernmental water cooperation*. While a

good part of the discussion in the political sciences regards intergovernmental conflict reduction and conflict resolution as key – with intergovernmental cooperation in the water sector seen as positive per se – an approach to assessment making use of different criteria would be called for in view of the far broader development goals at stake.

Finally, it should be noted that, both internally and externally, not all African countries may be regarded as fully sovereign states, as is assumed in the concept of benefit-sharing. While some countries that suffer from weak political leadership, inadequate administrative capacities, or internal conflicts are, in formal terms, sovereign decision-makers when it comes to water issues, they are in actual practice unable to play this role and / or are dominated by other countries or international organizations. And this in turn means that their ability to define and articulate "national" interests is a critical variable in the present context. The case studies clearly indicate that both the propensity of countries to cooperate and their interest in benefit-sharing mechanisms hinge in very large measure on national political developments – and thus far international research has paid far too little attention to these as determinants of water cooperation.

8 Conclusions for development cooperation

The thoughts developed in the present study permit us to formulate some basic conclusions for development cooperation. They will be outlined briefly in what follows.

(i) At first sight the benefit-sharing approach appears generally to be an adequate conceptual and instrumental approach for promoting intergovernmental water cooperation. The discussion of the approach's conceptual foundations also leads us to the basic insight that, viewed in the context of growing water scarcity, benefit-sharing agreements are bound to come to play a growingly important role, since the economic costs of noncooperation are on the increase.

(ii) However, this generally positive assessment of the concept stands in contrast to the relatively low dissemination of benefit-sharing mechanisms in practice, and a number of substantial problems would seem to indicate that relevant agreements are not likely to increase in number at a rapid pace. The problems involved in reaching agreement on and implementing

win-win projects must be sought in part in extremely conflicting interests on the part of the countries concerned; other obstructive factors include existing claims to national sovereignty focused on water rights, uncertainties over project impacts, low administrative capacities, and/or conflicting sectoral interests (e. g. the agricultural sector).

(iii) One other reason why benefit-sharing agreements fail in practice is that the economic benefits do not take on a visible aspect for individual countries. Development cooperation therefore can and should start out with a comprehensive assessment of the consequences of water cooperation, since such assessments have proven to be an essential communicative condition for relevant international agreements.

(iv) The effects of benefit-sharing agreements reached thus far must be seen as a mixed picture. Most such agreements are concerned with water-infrastructure development, and joint dam construction may be seen as prototypical, although such projects have come in for criticism for – at least in the past – according insufficient consideration to ecological, social, and economic impacts. The majority of the dams jointly financed and in part operated by riparians are used to generate hydropower or in some cases for irrigated agriculture and flood protection. At present, the only example that can be cited for the prototype of joint dam construction, including transboundary water transfer in exchange for financial compensation, is the Lesotho Highlands Project. Due to the ease with which the benefits involved can be estimated – and usually estimated on a consensual basis – hydropower can be said to have the largest measure of plausibility for benefit-sharing agreements.

(iv) Due to the structural conditions discussed above, there is good reason to expect that benefit-sharing agreements will continue to be concentrated heavily on river development and development of additional water resources. In the development cooperation practice the programmatic call for win-win solutions in water cooperation may imply (possibly unintended) support for dam construction and water transfers, because such projects offer the greatest probabilities of coming up with intergovernmental win-win cooperation, the reasons being that it is relatively simple to calculate their economic affects and that their utility variables are quite tangible. Accordingly, development cooperation should also undertake efforts to work out and present the potentially positive economic benefits of other forms of water cooperation (e. g. improvement of water quality,

conservation of freshwater ecosystems, minimum runoffs) with a view to more strongly promoting their inclusion in relevant, economically inspired agreements.

(v) Viewed against this background, implementation of recognized standards of project control and process design – e. g. in keeping with the guidelines of the World Commission on Dams – would be a factor of great significance in the context of intergovernmental water cooperation. In any case, there are still a number of ways in which donor organizations may intervene in the field of benefit-sharing, since, at least in Africa, no relevant projects have been carried out without massive financial and/or organizational involvement of donor organizations.

In southern Africa above all, interbasin water transfers could prove to be an important option on the water-supply side that could be used to improve intergovernmental water cooperation and to reduce conflicts, because allocation of these additional water resources is politically far more simple than reallocation of existing water-use rights under the conditions of absolute water scarcity. However, a comprehensive examination of the economic, social, and ecological consequences of some planned water-transfer projects has yet to be conducted.

(vii) It is not possible to derive any blueprints for successful agreements from the analysis of the forms of benefit-sharing that have been engaged in thus far. There is a need for further studies to deepen our understanding of whether and how different institutional and organizational approaches can be transferred.

(viii) It would be important to embed the potential social risks and environmental impacts of transboundary benefit-sharing agreements in a comprehensive development strategy, since the crucial lines of conflict over water use in Africa run not only between countries but within societies and between different sectors and forms of water use. In this context it would be highly important to ensure that both the general public and interest groups are involved in transboundary water cooperation. In the African context, benefit-sharing is thus also a question of the distribution of benefits within the countries concerned, above all against the background of the socioeconomic situation given at present.

(ix) In considering benefit-sharing projects, development cooperation should not lose sight of the interactions between the building of national

water-management institutions and the development of related inter-governmental cooperation. Successful international win-win projects are predicated on a variety of national givens in the organization, financing, and control of projects, and this means that efforts to strengthen relevant national capacities have direct effects on the ability of countries to engage in international cooperation.

(x) At present it is not possible to derive any general statements on whether a functional and more bilateral approach could serve to increase the likelihood that benefit-sharing mechanisms will be realized or whether a multilateral and integrative management approach on transboundary rivers would prove more promising. In the past a more bilateral and sectoral approach has gained ground and proven to be functional in the development of water infrastructure and, above all, in dam construction.

(xi) Lower transaction costs are one good reason for a narrow definition of the object of cooperation as well as for limiting cooperation to those riparians that are immediately affected by a cooperation project. On the other hand, in certain problem constellations multilateral and comprehensive approaches to transboundary water management offer the possibility of negotiating larger packages, which may be necessary e. g. to establish intersectoral issue linkages.

(xii) Against this background, development cooperation might be well advised to adopt a multilevel approach in the development of water cooperation, one which seeks to promote benefit-sharing agreements that are at the same time concrete and – in many cases – more bilateral in nature as well as to support further development of general institutional frameworks in given river basins. Depending on the given – historically predetermined – situation and the relevant political and economic context factors, the focus in many river basins will be more on developing the institutional framework, while in others it will first be necessary to work out the economic benefits in the process of cooperation with a view to promoting a propensity to cooperate among the key countries involved, an approach that could later be given a more concrete institutional underpinning.

(xiii) Further development of international and regional water agreements can facilitate the establishment of benefit-sharing agreements in that such efforts can serve to clarify the situation given for negotiations and to re-

duce obstructive asymmetries between the riparians concerned. Further development of river-basin commissions can also serve to increase the probability that win-win projects will come about in that such efforts provide for a stable and confidence-building institutional environment.

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Cooperation on Africa's international waterbodies:
information needs and the role of information-sharing

Malte Grossmann

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Cooperation on Africa's international waterbodies: information needs and the role of information-sharing

Malte Grossmann

1 The study's aim and methodological approach

Transboundary water resources management can be described as a cyclical process involving the negotiation and implementation of relevant international agreements (Mostert 2005; Turton et al. 2003). For riparians to recognize the potentials for development and cooperation, they must be in possession of the information they need to both recognize and negotiate win-win outcomes. Information has to be both generated and made available for this process. Organizing the transmission of information into the realm of the transboundary decision making process is one of the core tasks involved in transboundary water resources management. The required information transmissions cause costs in the broadest sense, and these costs may at times be prohibitively high. This is reflected in the substantial share that information related project components have in the funds made available for development cooperation projects aiming to promote transboundary water resources management.

In accordance with the overall aims of the research project to explore strategies for development cooperation which have proven to be successful in promoting transboundary water resources management, this paper sets out to sketch important functions of information-sharing. It begins with a theoretical perspective on the role of information in negotiation processes and proceeds to look more precisely at types of information and instruments for information transmission that are relevant for basin management in general. The paper then proceeds to explore the instruments that basin organizations in Africa have assumed to date to facilitate the transmission of information. The paper concludes with lessons to be drawn from the theoretical and empirical analysis for development cooperation. The present study is conceived as a desk study and as such is limited by all the

well known constraints this procedure entails. It is focused on an evaluation of the literature as well as of available documents on the internet.¹

2 Why is information important for successful transboundary water resources management?

2.1 Transboundary water resources management as a negotiation problem

The term "transboundary waterbodies" refers to water resources that cross national boundaries. These may be either surface waters (rivers or lakes) or subterranean waters (aquifers and groundwater reservoirs). There are a number of different reasons why it may become necessary to give water resources management a transboundary orientation: Water use in one country may entail transboundary impacts that are not viewed as acceptable to all of the actors affected in view of their present or planned water uses. In this context, upstream - downstream problems may be seen as the classic problem constellation on transboundary rivers. While, for instance, abstraction of water on the upper course of a river may entail external effects for the lower course, by physically reducing water flows, developments on the lower course may diminish the quantity of water available in the future on the upper course, if downstream riparians appropriate water-use rights by developing their water uses.

As available water resources grow increasingly scarce and competition for their use intensifies, efficient water allocation between upstream and downstream riparians and between water-using sectors assumes new and greater significance. This is the core of proposals to classify water as a good in the economic sense of the term (Sadoff et al. 2002). Viewed from the economic perspective, suboptimal water utilization within a basin may result when countries seek to achieve their water use goals unilaterally. This view is based on the concept of system value, which refers to the aggregate utility that can be generated by a given quantity of water while it is moving through a water-use system and before it is finally lost through consumption or evaporation or by flowing into the sea. The paradigm shift

1 I would like to extend my thanks in particular to Volkmar Hartje (TU Berlin), Ralf Klingbeil (BGR) and Waltina Scheumann (TU Berlin) for valuable suggestions.

implied by the concept of system value calls for an integrated, systemwide perspective when it comes to investments.

This is best illustrated with the example of dam construction. Potentially, the water resources in question can for the most part be used at a number of potential locations to generate energy. However, power generation at more favorable locations involves lower costs. An efficient use of scarce investment funds would thus, call for development to begin at the most favorable location. Yet the economic benefits of systemwide management are for the most part not equitably distributed among the individual riparians concerned, and, viewed from a system perspective, the most favorable development path need not necessarily be the most favorable one from the perspective of the riparians affected. Under these circumstances, for riparians to come up with a cooperative solution, possibilities of compensation or a different allocation of the benefits that accrue have to be negotiated. But negotiations will appear worthwhile to the parties only if they see prospects of benefiting from such a cooperation. If the negotiating parties reach agreement on cooperation, this may give rise to a surplus value, which is also referred to as the negotiation surplus. In attempts to systematize conceivable benefits of cooperation, a differentiation among the following categories has been established: (i) benefits for water resources; (ii) benefits from the use of water resources; (iii) benefits stemming from reduced conflicts over water resources; and (iv) economic and political benefits that extend beyond the actual water resources in question (Sadoff / Grey 2002).

To differentiate different types of negotiation problems, we can use two concepts from economics which are used to describe the outcomes of negotiations: Pareto-efficient and Pareto-superior outcomes. Pareto-efficient are outcomes that can not make one party better off without negatively affecting the other party's position. An outcome is seen as Pareto-superior when all parties are able to improve themselves. Depending on whether or not the Pareto efficiency of possible outcomes is evident and the problems involved can be clearly identified, negotiation problems can be differentiated into a distribution problem, an integration problem, and a construction problem (Hauser 2002). When it comes to distribution problems, the parties know from the outset which outcomes will maximize the negotiation surplus (are pareto efficient). The concern then is merely to negotiate the best distribution of this surplus. The aforementioned problem

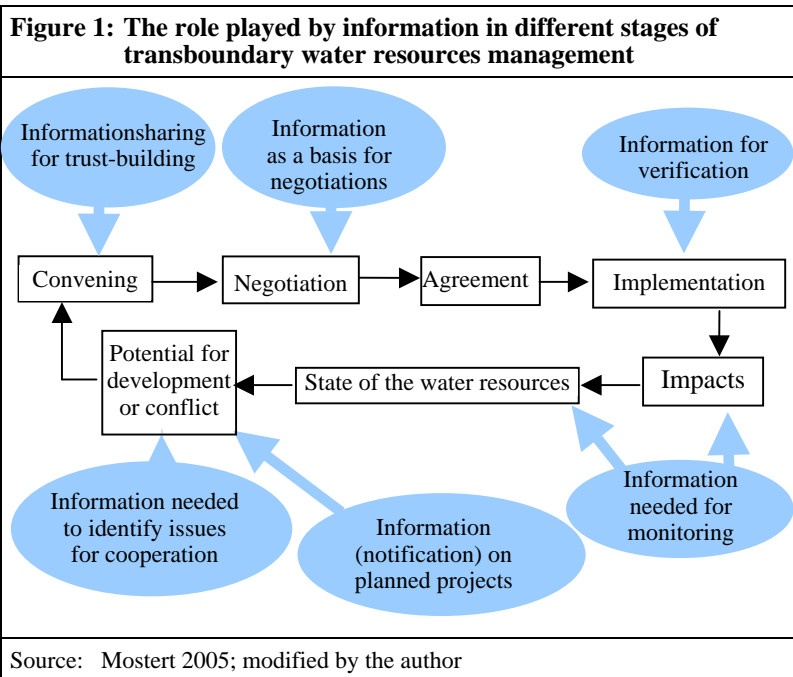
of site selection for dam construction may serve as an example. When integration problems are involved, it is furthermore necessary to determine which outcomes can no longer be improved to the benefit of both parties at the same time. On account of the negotiating dilemma involved, the sharing of information required for this outcome to be determined cannot be taken for granted. Finally, we can speak of a construction problem when, even though Pareto-superior improvements would theoretically be possible, the parties are unable to recognize any such possibility or to believe in the possibility of improvements for all parties. In this case the parties will describe their situation as a zero-sum game, without yet noticing that they could improve their own position without worsening the position of the other party. Construction problems can be transformed into integration problems if the parties discover the possibility of achieving joint improvements.

Confronted with the problems involved in allocation and management of transboundary resources, the parties may opt for one of four different conflict strategies:

- A passive aversion to or disinterest in the negotiation problem will result in exit strategies.
- Attempts to exercise power, either directly or indirectly, will result in escalation strategies.
- Communication that leads to a consensus on action will result in negotiating strategies.
- The use of common standards will result in delegation strategies.

Instead of engaging in action, however, parties with a common but unresolved problem may play for time; this is an alternative to pursuit of a conflict strategy. Whether or not the parties are actually willing to negotiate is a matter of their own meta strategic decision.

Transboundary water resources management can be described as a cyclical process involving the negotiation and implementation of relevant international agreements (Mostert 2005; Turton et al. 2003). An ideal cycle of this kind can be characterized by breaking it down into three phases. The first phase involves the formulation of a metastrategic decision to seek to resolve the problems concerned via a negotiating strategy. Such strategies



typically include agreements on the sharing of information on water resources, on mutual prior notification of planned measures, and on understandings that any possible disputes will be resolved by way of negotiation, and if needed by means of arbitration. The second phase involves negotiations on concrete agreements on carrying out joint water resources assessments or river basin studies, the aim being to work out more precise shared information on the potentials of and problems involved in joint water-resource use. Such studies may, for example be initiated in response to a notification on planned projects, when the interests of the riparians concerned are divergent in nature. The third phase, finally, involves negotiations on the basis of shared information on an equitable and reasonable allocation of remaining water resources or on joint infrastructure investments.

2.2 Negotiation strategies and the role of information

Resolving a complex public policy dispute requires that interested parties share an understanding of the technical dimensions of the problem they face. Different conflict strategies affect the types of information that influence decisions on bargaining problems. In choosing a conflict strategy, a party is also implicitly defining the type of information that can be used. The reason is that information types differ in terms of their accessibility, and different conflict strategies call for unequal accessibilities (Hauser 2002).

What exactly is meant by the term information? Information may be seen as having two basic features: information amounts to the selection of observations from the universe of observations. Taken on its own, this choice is no more than a datum. If we are to speak of information, the datum must enable the receiver of the datum to initiate an action. While data per se can be recalled and reproduced, they have no further behavioral relevance unless they are understood. Understanding in this context means that data are assimilated and processed in such a way as to create a new starting situation. In other words, information is a new and understood (or newly understood) datum with the potential to initiate action. Data on their own do not make a difference: it is only as information that they may influence decisions. Since the only information relevant to a negotiation problem is information that has been understood, the crucial point is what information is both available and understood by the negotiating parties.

Private, shared, and public information

The availability of information is determined by the accessibility of data and information, and their transmission through communication. The accessibility may be differentiated into private, shared, and public information (Hauser 2002). Privately accessible information is information accessible only to one negotiating party. In negotiations there are various reasons why private information may remain private, for example if a party chooses not to transmit information for strategic reasons, because it sees a possibility of turning its information edge to account or because it fears disadvantages from a piece of information that is known only to it and that it is unwilling to communicate to the other party. Strategic with-

holding of information in negotiations leads to a bargaining dilemma, since negotiations of course live from the exchange of information.

In a negotiation process information remains private if there is no communication between the parties. Communication leads to a duplication of information, and communication enables both parties to have the same information. But shared information may also be the result of common observations, e. g. those made in the framework of a joint monitoring program. In this case there is no information asymmetry of the kind found in principal-agent constellations. If there is any information asymmetry, it exists between the negotiating parties on the one side and outsiders on the other (e. g. the public, uninvolved government authorities, donor organizations etc.). Regardless of whether or not shared information has come about through joint observation or through communication, it must be distinguished from public information, i. e. information that is universally accessible. Public accessibility is given for example when one party publishes its information, either on paper or on the Internet, and this information is accessible to everyone.

One aspect of communication important for the negotiation problem has not yet been elaborated: it does not necessarily follow from the fact that information is understood, that this information is accepted or taken for the truth. This is given only if a party takes the deliberate decision to accept or reject the information communicated to it. If, despite communication and understanding of information, the party denies the underlying data, the effects of information, communication, and understanding are invalidated. This may for example be the case when scarce hydrological data is contested by one of the negotiating parties, for example if it is felt that the presented data does not reflect the true availability and use of water in one of the negotiating countries. Turton et al. (2003) report an example for the Okavango Basin, where the main difficulty relates to the disagreements between stakeholders over the use of the scant and often incomplete baseline data. While there is agreement at national level between the respective government departments on the correctness or accuracy of the available data for river flow measures, other stakeholders have questioned the validity of the data. This further emphasizes the need for stakeholders at all levels to reach agreement on the accuracy or acceptability of the available baseline data.

Information transmission and conflict strategies

Information is used differently depending on the conflict strategy involved. Conflict strategies place different demands on the accessibility of information (Hauser 2002; Turton 2003a). In the delegation strategy (arbitration) the arbitrator uses publicly accessible sets of facts as a basis for a decision, and will assess these facts on the basis of publicly accessible systems of norms or contractual law. Shared information, on the other hand, must first be made accessible for the arbitration procedure on the basis of a procedure of taking evidence. In negotiations between the parties, shared information can be used directly, assuming it is acceptable to both sides. While, in other words, acceptance of the relevant information is sufficient in negotiations, an arbitration procedure requires evidence for the truth of the information.

The four conflict strategies also differ in terms of the arena in which a decision is made. In a negotiation strategy this space comprises the parties involved. A decision to exit a conflict (exit and escalation strategy), leaving the bargaining problem to the remaining parties, is taken in the realm of a single party, without regard to any other party. This is the reason for the attractiveness of the exit strategy: If there is nothing to be gained, the party concerned will at least not make itself dependent on others. In the delegation strategy the decision on the conflict involved is taken in a public arena (public at least compared to other conflict strategies) that extends beyond the bargaining parties; the decision is delegated to a third party entitled to reach a decision. The public nature of arbitration may be attenuated somewhat to the extent that e. g. the processes and decisions involved in an arbitration procedure may require that the broader public be excluded. In this sense, an arbitration tribunal will come to its decision in a quasi-public space.

These qualitative differences in the spaces in which decisions are taken in the four different conflict strategies call for different levels of information accessibility (Hauser 2002). Any change in the accessibility of information may be referred to as transmission. Transmissions are transactions, although it must be noted that the concept of transaction is more comprehensive than the concept of transmission. Every transmission causes costs

in the broadest sense of the term, and these may at times be prohibitively high. A first transmission is the transformation of data into information and the realization of its relevance for the negotiation problem by at least one of the parties. Decisions taken in the context of a negotiating strategy are based on information that is at least jointly accessible. Private information will certainly influence the decisions taken by a party to negotiate; but it cannot be used to jointly work out a win-win outcome. If private information is to be used in a negotiation, it must first be transmitted into the negotiation arena. This requires a process of communication and the willingness of both parties to accept this information. The exit strategy on the contrary prevents communication between the parties. This may be intended by a party determined to prevent strategic private information from being communicated or made public. In the escalation strategy all types of information may play a role. Escalation makes the transmission of information unpredictable.

Figure 2: Information accessibility requirements (shaded) for different conflict strategies, required information transmissions (dashed arrows), and possible exit strategies (diagonal arrows) from a negotiating strategy

		Conflict strategy			
		Arbitration	Negotiation	Exit	Escalation
		Decision in (quasi-) public space	Decision in space shared by parties	Decision in private space of each party	No decision
Information accessibility	Public information	X			
	Shared information	Evidence	X		
	Private information	Communication		X	
	Data not understood	Realization			

Source: Hauser (2002)

Different approaches exist to compile and pool relevant information and to "translate" it into a form that can be used in arbitration and negotiations by decision-makers and others to create the foundation for broad-based consensus. McCreary et al. (2002) contrast three styles of science advising for public policy: joint fact-finding, the technical "blue ribbon panel" and the model of opposing scientific experts ("adversary science") common in administrative hearings and litigation. The joint fact-finding method is specifically suited for negotiating cooperative transboundary water resources management. The concept rests on a few key ideas. The first is that rather than withholding information for strategic advantage, the interested parties pool relevant information. A second feature is that joint fact-finding involves face-to-face dialogue between technical experts, decision-makers, and other key stakeholders. Usually, a nonpartisan facilitator or mediator assists in orchestrating this dialogue. Third, this process places considerable emphasis on "translating" technical information into a form that is accessible to all participants in the dialogue. Another significant aspect of the process is that while joint fact-finding is geared to building consensus, it tries clearly to "map" areas of scientific agreement and to narrow areas of disagreement and uncertainty. A fifth idea is to use a single negotiating text to record the results of the joint fact-finding process. The concept of a single text, borrowed from the arena of international diplomacy, simply means that participants in negotiation use a single document to focus discussion, rather than arguing over competing versions of facts and recommendations. Usually this document is revised through several working drafts and produces a tangible record that brings the joint fact-finding effort to closure. Focussing on sharing of information and inclusion of key parties, joint fact-finding stands in contrast to two more traditional methods of bringing science to environmental decision-making: "adversary science" and the "blue ribbon panel". Table 1 summarizes these differences.

2.3 International water law and the role of information

The obligation to share data and information on a regular basis is a principle of international customary water law, one that finds concrete expression in the 1997 Convention on the Law of Non-Navigational Uses of International Watercourses (Box 1). Article 9 of this UN convention

Table 1: Comparison of three models of science advising for public policy: "adversary science," the blue ribbon panel and joint fact finding			
	Blue Ribbon Panel	"Adversary Science"	Joint Fact finding
Host Auspices	Scientific Organisation	Court or Administrative Agencies	Neutral, credible organisations with strong access to scientific community
Convenor	Senior Scientist	Hearing Officer / Arbitrator	Scientist or research administrator teamed with a non-partisan facilitator
Participants	Scientific Experts	Experts aligned with each side and guided by attorney	Experts, decision makers, other stakeholders
Methods of introducing information	Written reports and group discussions	Depositions, interrogation and cross examination	Various oral briefings, memos, short reports, facilitated dialogue
Extent of information sharing	Information is shared mostly within the panel; often strong emphasis peer reviewed findings or academic research	Information is strategically withheld to bolster argument. Choice is between two information packages.	Information is pooled; may be a mix of peer reviewed and non peer reviewed studies as well as other documents.
Technical level of discussion	Comparable to a scientific conference	Translated to language of decision makers – judge, jury, legislator	Strong effort to translate technical information and to make it policy relevant
Emphasis on policy implications	Moderate; may be more of a focus on methods	Strong emphasis	Strong emphasis
Level of effort devoted to seeking consensus	Strong effort to produce consensus; minority reports are sometimes issued	Seeking technical consensus is incidental to deciding the issue	Emphasis on clarifying areas of technical disagreement and uncertainty
Source: McCreary et al. (2002)			

obliges states to share water-related data; this obligation is derived from the general obligation, laid down in the Article 8, of all states to cooperate.

Article 9 of the UN convention obliges countries that share a watercourse to regularly share available data on the condition of a watercourse (in particular hydrological, meteorological, hydrogeological, and environmental data), but also relevant forecasts (in particular of flood events). It furthermore calls on all riparian countries to undertake all possible efforts to collect and keep additional data and information that could be required, even if they are not readily available. Article 11 calls on countries to share information on planned measures (including technical data and assessments of environmental impacts), and Article 12 calls for prior and timely notification of countries that may be affected by planned projects. An example of how this principle of prior notification is translated into trans-boundary agreements is given by the Incomati-Maputo Interim Agreement summarized in Box 2.

Box 1: Obligations to share information under the Convention on the Law of Non-Navigational Uses of International Watercourses

Article 9 of the Convention on the Law of Non-Navigational Uses of International Watercourses, entitled 'Regular exchange of data and information,' states:

1. Pursuant to Article 8, watercourse States shall on a regular basis exchange readily available data and information on the condition of the water course, in particular that of a hydrological, meteorological, hydrogeological and ecological nature and related to the water quality as well as related forecasts.
2. If a watercourse State is requested by another watercourse State to provide data or information that is not readily available, it shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting State of the reasonable costs of collecting and where appropriate processing such data or information.
3. Watercourse States shall employ their best efforts to collect and where appropriate to process data and information in a manner which facilitates its utilization by the other watercourse States to which it is communicated.

Article 8 of the Convention, referred to in Article 9, sets out a 'General obligation to cooperate': Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse.

Source: United Nations (1997)

Box 2: Notification obligations for projects and activities in the Incomati-Maputo Interim Agreement

- (a) Industrial installations for energy production or mining activities which can impact significantly on water quality and quantity;
- (b) pipelines carrying oil or chemical products;
- (c) installations (facilities) for storage of dangerous products;
- (d) reservoirs for river water regulation and storage with a capacity above 250000 m³;
- (e) river training and canalisation of river beds with a length exceeding 500 m, provided they are situated in the bordering rivers or in their tributaries;
- (f) surface water abstraction facilities, regardless of their use or destination, when the minimum effective consumption exceeds 110 l/s, and in any case of water transfers to other river basins in volume exceeding 3.5 million m³ per year;
- (g) groundwater abstraction facilities, regardless of the use or destination of the water, above 3.5 million m³ per year;
- (h) artificial recharging of aquifers with volumes above 3.5 million m³ per year;
- (i) waste water treatment plants with capacity above 1,000 equivalent inhabitants;
- (j) waste water discharges of urban, industrial, cattle raising or other origin, in which the polluting charge is above 1,000 equivalent inhabitants;
- (k) use of water causing the cross border water temperature to change by more than 3° C in the aquatic environment;
- (l) deforestation and reforestation works, affecting an area above 500 hectares and that have the potential to increase the sediment production or to increase flood peaks or to decrease the river flow.

Source: Incomati-Maputo Interim Agreement (2000)

It is obvious that the obligation to share information is not absolute and that it requires interpretation in the light of the specific constellation of a transboundary setting (Burchi 2001). The requirements of the first three elements of the obligation are, however, defined in such a way as to ensure that all riparian countries have the facts they need to (a) negotiate an equitable and reasonable allocation of water resources and (b) to avoid any significant damage beyond their borders. In other words, the convention sees the obligation to share information as directly instrumental as regards the fundamental right of the countries concerned to acquire an equitable and reasonable share of the use of the watercourse in question and also

sets out an equally fundamental obligation not to cause any significant damage to other countries. Basically no country can be certain that the use it makes of an international watercourse is equitable and reasonable compared to the uses to which other countries put it, unless the one country is supplied with regular information on the status of the water resources in the other countries.

The principle of reasonable and equitable use, however, is defined in general terms, and is thus prone to subjective interpretation. These principles have to be translated into concrete agreements through negotiations between the countries involved. The information needed to reach agreement on an equitable and reasonable share of the uses of water resources is, in essence, far more comprehensive than what could be provided on the basis of a mere determination of the quantity of water available; this is clearly shown by the criteria of the UN convention listed in Box 3. Van der Zaag et al. (2002) attempt to define six measurable criteria on the basis of which water resources can be allocated to the riparian countries in an equitable manner. Such measurable criteria may facilitate negotiations between riparians that are in conflict over the issue. Jointly defining such criteria is in fact a central activity during negotiations.

The simplest and most straightforward criterion for the equitable sharing of international waters may be formulated as:

- Criterion 1: All surface waters generated in an (international) river basin should be shared by the riparian countries equally (as far as possible).

Criterion 1 is insensitive to differences in surface area of the riparian countries in the basin. If this is taken into account, the criterion may be slightly modified:

- Criterion 2: All surface waters generated in an (international) river basin should be shared by the riparian countries in proportion to each country's area in the basin.

If water is considered a right of every citizen, the criterion can be based on population size:

- Criterion 3: All surface waters generated in an (international) river basin should be shared by the riparian countries in proportion to the population.

If all water resources are considered, including the green water used for the production of rainfed crops, then three new criteria can be formulated:

- Criterion 4: All blue and green water generated in an (international) river basin should be shared by the riparian countries equally (as far as possible).
- Criterion 5: All blue and green water generated in an (international) river basin should be shared by the riparian countries in proportion to each country's area in the basin.
- Criterion 6: All blue and green water generated in an (international) river basin should be shared by the riparian countries in proportion to the population.

An example of the problems associated with defining these kinds of "simple" criteria, is the debate about the extent of the Okavango Basin (Turton et al. 2003). The Okavango Basin is hydraulically part of the Zambezi, while the most affected riparian States have agreed among themselves that, for the purpose of management, the Okavango Basin consist of three states – Angola, Namibia and Botswana. One of the tributaries arising in Zimbabwe is not considered to be part of the Okavango, because it only flows into a terminal pan system.

Box 3: Criteria of the Convention on the Law of Non-Navigational Uses of International Watercourses

- | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">(i) Geographical, hydrographical, hydrological, climatical, ecological and other factors of a natural character;(ii) the social, economic and environmental needs of the Watercourse States;(iii) the population dependent on the shared watercourse;(iv) the effects of the use on other watercourse States;(v) existing and potential uses of the watercourse;(vi) conservation, protection, development and economy of use of the water resources of the shared watercourse and the costs of measures taken to that effect; and(vii) the availability of alternatives of comparable value. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Source: United Nations (1997)

The principles of free exchange of information are also set out in a resolution of the World Meteorological Organization on "exchange of hydrological data and products" (see Box 4). The resolution reaffirms the obligation to freely exchange hydrological data and products, in particular if these data and products that serve the purpose of meeting the obligation not to cause any damage to other riparians. In concrete terms, we can distinguish here between the exchange of raw data and the exchange of products which are based on an evaluation of these data (Mosely 2001b).

Box 4: Examples of hydrological data and products that should be exchanged to avoid damage
<p>1. Data (for all available time intervals): Precipitation data,* stage and flow data,* reservoir inflow, pool levels and outflows*</p> <p>2. Information and reports on: Dam breaks,* levee failure,* mud flows, landslides,* toxic spills,* storm / flood surge*</p> <p>3. Products: Floods: hydrographs, flood travel times,* flood forecasts,* peak discharges, peak stage Droughts: hydrographs,* droughts and low flow forecasts,* minimum discharges and stage</p> <p>* to be provided in real time</p>
Source: Mosley (2001a)

2.4 Organization and instruments of information transmission

Organization of transboundary cooperation

Organization of the required transmissions of information is one of the core tasks of transboundary water resources management. Today transboundary water resources management is oriented along the principles of integrated water resources management (IWRM) (Global Water Partnership 2000; Millington 2000; Allan 2003). These principles are grounded in transparent mechanisms designed to allocate and protect water resources

Box 5: WMO resolution on "Exchange of hydrological data and products"

To ensure the most effective and efficient use of scarce resources, the international exchange of water-related data and products must meet current and foreseeable future requirements and purposes. WMO Resolution 25 identifies three types of requirements:

- (1) "those hydrological data and products which are necessary for the provision of services in support of the protection of life and property and for the well-being of all nations" (shall be provided on a free and unrestricted basis);
- (2) "additional hydrological data and products, where available, which are required to sustain programmes and projects of WMO, other UN agencies and other organizations of equivalent status, related to operational hydrology and water resources research at the global, regional and national levels" (should also be provided, where available);
- (3) "all hydrological data and products exchanged under the auspices of WMO, for the non-commercial activities of the research and education communities" (should be provided, on a free and unrestricted basis).

Source: WMO (1999)

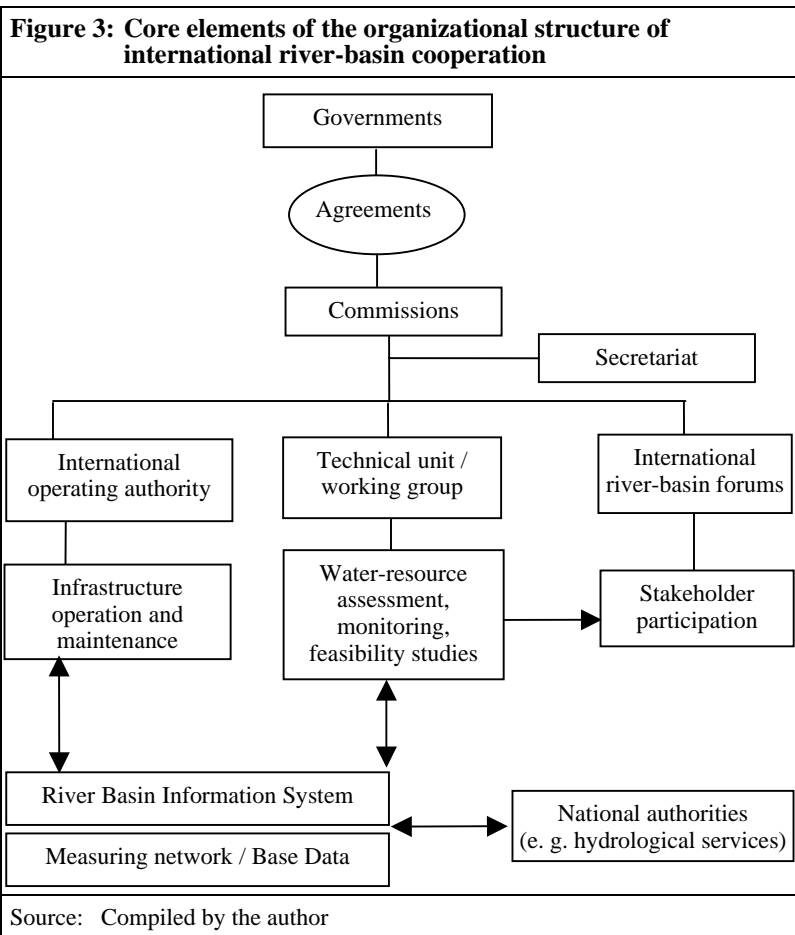
and to ensure a basic water supply on the basis of clear, nonoverlapping institutional arrangements. In addition, the principles provide for planning and management at the lowest possible level (principle of subsidiarity), involving the participation of all actors affected as well as a clear-cut organizational division between the tasks of regulation, resources management, and infrastructure operation. Whilst this is a normative concept, this typology of tasks is helpful for the empirical analysis of organizational setups that can be found in practice of river basin cooperation. The regulatory task entails the definition of the political framework and the goals of resources management as well as to assess the success of resources management. The resource management task includes the responsibility for the implementation of goals, including the necessary strategic analysis and planning of water resources and water allocation. Infrastructure operation tasks include the design, operation and maintenance of water infrastructure, but also the operation of monitoring networks. Information needs for these various functions are many and varied. Data collected for one purpose, such as operational management, may be of use for other purposes such as planning. Often requirements differ, so that data collected for one purpose are not usable in another. It is therefore helpful to distinguish between the information transmissions

needed for regulation and management (strategic analysis and planning and negotiation of water resource allocation) and those required for the operational management of infrastructure with transboundary impacts.

The relationship that exists between different information providers and the users in a transboundary context is a function of the institutional and organizational framework that has evolved over time. The nature of the transaction between the data providers and users may be hierarchical, commercial, informal or statutory or it may not be clearly defined. Responsibility for the various information related tasks ranging from data collection, through processing and analysis to storage and retention may also be distributed in various ways between different national actors and river-basin organizations. The nature of the relationships between data providers and the users for transboundary water resources management governs the manner in which data are shared. An ideal-type of organizational setup of a transboundary cooperation is presented in Figure 3. The spectrum of organizational forms extends from intergovernmental agreements that do not establish any additional organizational structure, to agreements that provide for the establishments of commissions with planning tasks (with or without a secretariat and/or technical working groups), or to agreements establishing both commissions with planning tasks and international management authorities with operational tasks. The way the organizational framework and information flows are structured evolves over time and depends on the intensity of cooperation.

Information needs and basin development

A useful concept is to distinguish three phases in the development of basins; initial development, full use and reallocation (Molden et al. 2005; Molle 2003). Information needs differ in each of these phases (Burton / Molden 2005). These are summarized in Table 2. In the initial development phase information-gathering is geared to individual projects, with each project developing its own database. Data acquisition is keyed to the needs of the project cycle: planning, dimensioning, construction, operation, and maintenance. Over the course of time the individual data-acquisition tasks are gradually assumed by one or more authorities and the measuring networks are operated in a more systematic manner. In this



phase, however, data collection may be increasingly determined by established routines, and not by the specific needs of basin management. As water scarcity increases, the focus shifts from supply expansion to demand management. This entails an increase in the demand for information needed for integrated water resources management, and, accordingly, measuring networks are expanded and increasingly complex analysis

methods, like water resource models, are used. Requirements for modeling increasingly determine data collection, the aim being to make the best possible use of the analytical capacities potentially available. Information management also changes during the development, use, and reallocation phases: While at first authorities collect data for their own needs, later more and more data are made available to the various actors involved (Mosley 2001b). Power, which resides in control over data, is increasingly shared with additional actors with a view to paving the way for a broad dialogue on water resources management (Mody 2004; Bruch 2003).

Phase	Data needs	Typical data collected	Developments in information processes
Infancy <ul style="list-style-type: none"> • Localized use only 	<ul style="list-style-type: none"> • Rudimentary, limited to water levels and extent of flooding 	<ul style="list-style-type: none"> • Flood water levels, flooded areas (through experience) 	<ul style="list-style-type: none"> • Demarcation (and avoidance) of flooded areas, correlation of flood extend and flood levels
Development <ul style="list-style-type: none"> • Water allocation is supply focussed • Data collected and used by small number of agencies for specific uses and projects 	<ul style="list-style-type: none"> • Availability of water during the year and extend of agricultural land • Main focus is on surface water, though some interest in groundwater for urban and irrigation development • For initial planning for river basin development 	<ul style="list-style-type: none"> • Project-wise collection of river flow and quality data • Climatic data, particularly rain-fall • Land use in riverine plains and extend of agricultural land • Topographic surveys • Aerial photography • Land ownership, traditional / existing water rights 	<ul style="list-style-type: none"> • Initial data collection systems established for individual projects; gradually these are linked up and coordinated by the development agency(s) • Basin-wide hydrometric stations established to gather base data

continued Table 2:			
<p>Utilization</p> <ul style="list-style-type: none"> • Water allocation is supply focussed • Data related processes and procedures well established 	<ul style="list-style-type: none"> • Detailed knowledge of the available water resources, both surface and groundwater, particularly over-year to establish storage patterns for reservoirs and recharge patterns for groundwater • For river basin master planning 	<ul style="list-style-type: none"> • River flow data throughout the basin • Climatic data throughout the basin • Land ownership and traditional / existing water rights • Groundwater level and quality • Some monitoring of pollution levels 	<ul style="list-style-type: none"> • Data collection procedures standardized and coordinated • Procedures established for monitoring pollution levels • Procedures established for monitoring groundwater depth and quality • Publication of water resources and climatic data • Development of simple water resources models for river basins
<p>Re-allocation and restoration</p> <ul style="list-style-type: none"> • Demand and supply focussed • Data related processes and procedures refined and more widely disseminated 	<ul style="list-style-type: none"> • To obtain detailed knowledge of the annual and inter-year water resource situation both for supply and demand • To monitor and control water abstraction by users • To make projections of supply and demand 	<ul style="list-style-type: none"> • River flow and water quality data throughout the basin • Climatic data throughout the basin • Groundwater level and quality • Pollution levels • Water abstraction by all users • Data for prosecution for over-abstraction and / or pollution 	<ul style="list-style-type: none"> • Hydrometric network extended and automated for direct transmission to data collection stations • Groundwater monitoring network extended • Pollution monitoring extended • Further computerization of data collection, processing and analysis

continued Table 2:			
	<ul style="list-style-type: none"> • For water resources modelling, using remote sensing and GIS • For scenario analysis • For river basin master planning • To refine and update supply and demand projections, scenario analysis • To formulate rules for allocation of water during droughts / shortages 	<ul style="list-style-type: none"> • Data analysed from perspective of different water users • Water needs for various environmental processes 	<ul style="list-style-type: none"> • Development of sophisticated water resource models for river basins, with refinement to become an operational tool • Remote sensing incorporated into water management and decision making • Publication of water resources supply and demand information • Analysis and presentation of data for a wider range of stakeholders • Scenario analysis to enable participation in decision making
Source: Burton / Molden (2005)			

Information Management Strategy and Information Management Systems

It is essential for any transboundary water resources management initiative to formulate a management information strategy and from that develop a management information system. The information strategy is the pattern or plan that aligns the information needs with the management requirements. It deals with information needs, the resources required for their collection and processing. The information system is the bundle of procedures that implement this strategy. The strategy and associated management information system should address the following questions (Burton et al. 2005):

- What are the key management processes to be negotiated at a transboundary level?
- What data and information are needed for managing these processes and evaluating the success of management interventions?
- How and by whom will data be collected, analyzed and used?

Box 6: Measuring networks

The core of any water resources management is a river-basin water balance. A water balance requires time-series analyses of water yields and uses as well as of the ultimate losses from the system. The balance must cover both groundwater and surface ('blue') water. It must also consider soil ('green') water. To prepare a water balance, data are needed from a network of hydrological, hydrogeological, and meteorological measuring points. It takes several years to build such networks, and it also takes a number of years of observation to ensure that the results meet minimum standards of reliability.

In many cases measuring networks have been financed through external projects, and once such projects are completed, the means needed to continue to operate and maintain the networks are often lacking. While it costs time and money to build measuring networks and to train personnel to operate them and evaluate the data, measuring networks tend very quickly to fall into disrepair if the funds needed are not available or if the networks are poorly managed.

Sources: Burton / Molden (2005); Rutashobya (2003)

- How much will the data collection, processing and analysis cost?
- What quality control measures are required?
- How transparent will the information system be for third party users?

As far as transboundary rivers or groundwater resources in Africa are concerned, the operational management tasks include in particular the regulation of water flows and management of large aboveground or underground storage basins, reservoirs, and dams. Real-time information is needed to adapt management to events as they occur, e. g. floods, or droughts. In contrast strategic planning does not require real-time information, but a much broader range of information. These needs include information on water yield as well as on water demand and water uses – under both current and projected future conditions (HR Wallingford / DIFID 2003; Nichols et al. 2000). Figure 4 sums up the typical components of and steps needed for a strategic basin study or a water-resource assessment. There is not necessarily any need to collect enormous amounts of information for a basin study. The actors involved should first reach agreement on what types of information they need and what level of detail this information must have if it is to be used to deal with the specific planning and management issues concerned. This does, however, presuppose rough knowledge of the problem structures. Preliminary studies like trans-

Box 7: Basin information management systems (IMS)

<p>Information-management systems include various electronic systems used to prepare, store, and exchange data and information. Three types that are especially important for river-basin management are bibliographic information systems, geographic information systems, and databases used to store hydrological, meteorological, and hydrogeological time-series data. Using integrated datasets for an overall river basin, it is possible to derive an analysis of the condition of water resources from both the river-basin and the national perspective. Information systems provide a standardized method of data collection and input. This furthermore ensures that the input parameters needed for water-yield models and water management are readily available. Many regional river-basin information systems attempt to maintain a spatial database with the aid of geographic information systems (GIS). Developing a database of this kind involves compiling the relevant maps (especially of administrative and basin boundaries, issue-related maps on geology, hydrogeology, soils, wetland areas, land cover, surface waterbodies, annual precipitation as well as potential evapotranspiration, land uses, water uses), a tasks which often requires maps to be digitized and projections to be standardized, with the results assembled to form a unified map base for an entire river basin.</p>

Source: Global Water Partnership (2005); UNEP (2004)

boundary diagnostic analysis (GEF 2004) can serve to determine (a) what information is already available and (b) what information still needs to be compiled. Scoping in early phases of transboundary initiatives can help to minimize the costs of information acquisition. In this context it will be necessary to examine to what extent a more elaborate set of possible management options may be developed by improving the information base, and whether or not the effort and expense this would involve is worthwhile.

3 Information transmission in the practice of cooperation in transboundary African basins

3.1 Senegal²

The Senegal River is shared by Guinea, Mali, Mauritania, and Senegal. The *Organisation pour la mise en valeur du fleuve Sénégal* (OMVS) is responsible for the development and management of the water resources concerned. Agencies that report to the OMVS are in charge of the operation of the Manantali und Diama dams, which are jointly owned by the three member countries Mali, Mauritania, and Senegal. Flow data from the Senegal have been recorded since 1904, and the large quantities of hydrological data that have been collected are stored in a database operated by the OMVS' technical department. The department publishes a monthly information sheet for member-country hydrological services as well as for other actors. The changes in the Senegal's flow regime that set in once the dams were completed have had numerous negative impacts on environment, health, and traditional water uses. In response to this situation, the French *Institut de Recherche pour le Développement* (IRD) and the OMVS conducted a series of comprehensive analyses of the river's hydrological behavior in relation to abstraction and regulation, and the findings were used as a basis to improve dam regulation. In this context a water management model was developed to assess the effects of different regulation practices. But since Guinea is not an OMVS member, the reliable data needed by lower-course riparians to forecast inflows from the upper river basin into the reservoirs are unavailable. Whilst data are regularly collected on water quality, population, health, livestock, agriculture, fishery, climate, and the environment, the data are dispersed across a number of different institutions (e. g. government agencies, universities, research institutes or projects). Comprehensive datasets have been collected for numerous projects, but the databases are either incompatible or were abandoned prior to completion.

2 See Adams (2000); Varis / Lahtela (2002); OMVS (2003b); Uhlir (2003); World Bank / GEF (2003); OMVS (2003a).

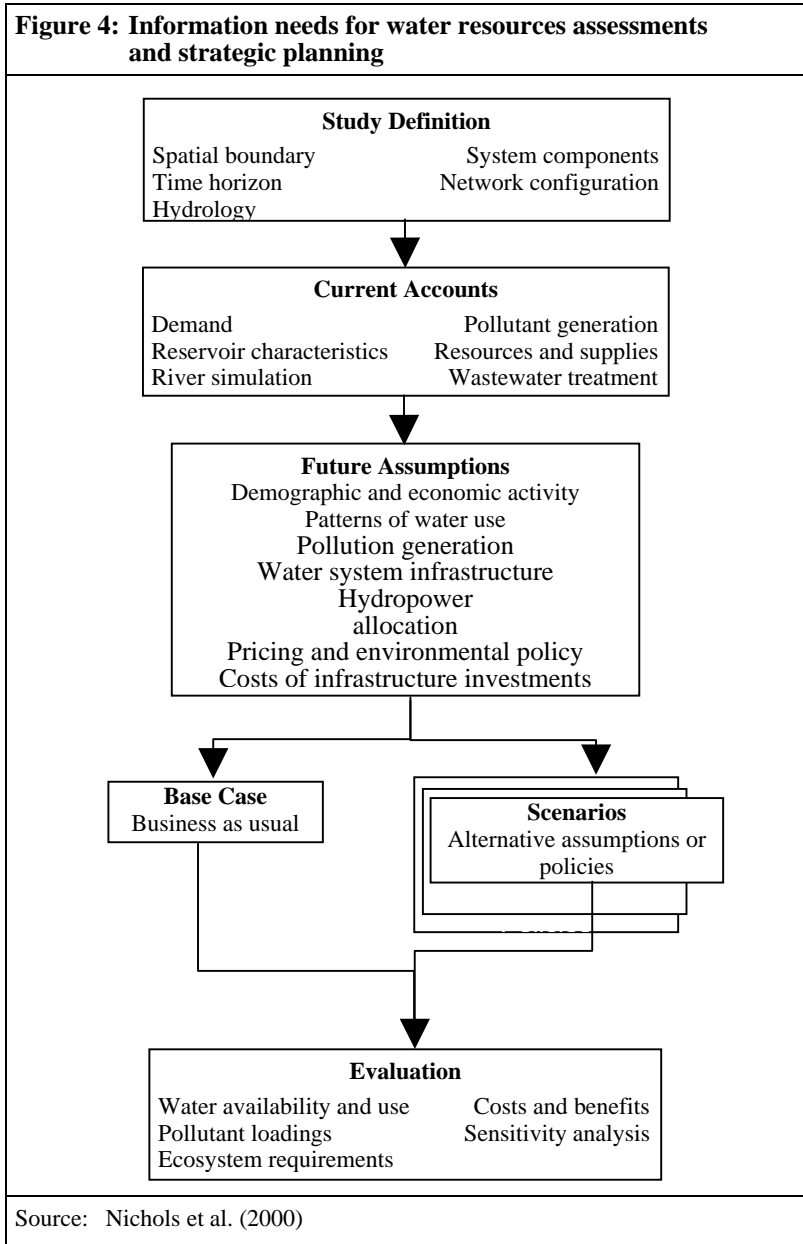
<p>Box 8: Decision-support systems (DSS) and river-basin / aquifer models</p>

<p>Decision-support systems have a modeling component. Models make it possible to describe a water system in simplified terms on the basis of what-would-happen-if scenarios - e. g. the effects of intersectoral water-allocation policies or effects of uncertainty and risk on possible water resources management strategies. Models developed to simulate the water yield and water balance (water management) of rivers or aquifers are generally available; but in most cases they require investment to acquire the databases needed for them. The typical elements of a water-management model include a representation of water flow system with its main channel and bypass flows, a representation of the precipitation-runoff relation of subbasins, dams and reservoirs, important transfers and diversions, and a representation of different water users (hydropower, shipping, irrigation, municipal and industrial water supply, minimum ecological runoffs). The most important output of such models is a time- and space-related description of the anticipated flows and water levels at important points in the system; this is used to assess the impacts of altered water allocation or regulation strategies. Progress in modelling techniques has made it possible for the negotiating parties to work out on a joint basis models for a river basin that are at once high-powered and economical. In view of the fact that the negotiating parties are themselves able to influence the approach used to model water uses, they tend to be more willing to accept the formulation and analysis of management-strategy scenarios. The process of model development and scenario formulation contributes to a shared understanding of the evidential value of the information used and thus also to its acceptance as a basis for negotiations.</p>

<p>Source: Global Water Partnership (2005)</p>

Lack of information on the dams' impacts long posed an obstacle to the OMVS' work. The insufficiency or total lack of time- and space-related data for many water-relevant areas has stood in the way of a systematic analysis of improved water availability, the environmental and health problems caused by the projects, and their direct and indirect impacts on the living conditions of the affected population.

The OMVS was reorganized in response to these problems, with new indicators defined and strategies worked out to compile the data required by the OMVS to continuously monitor the impacts of its water projects on water availability, health, the state of the environment, and socioeconomic development - and if need be to adjust its management strategy. The upshot was the creation of an environmental observatory and a network of all



relevant generators of information on certain issues, the aim being to build a central river-basin information system. Agreements have been concluded between the relevant organizations and the OMVS with a view to defining the role and the responsibilities of the individual organizations involved (collection, processing, and storage of data) and the OMVS (preparation, dissemination, and exchange of information).

Lessons learned: The OMVS is an example for cooperation with a strong international competence center in charge of organizing cooperation with national authorities. The OMVS is responsible for the operational regulation of jointly run infrastructure, and as such it also operates hydrological measuring networks. Inadequate monitoring of socioeconomic developments and the environment long stood in the way of any systematic analysis of the impacts of the dams on health and environment as well as on the living conditions of the local population. In order to enable the OMVS to continuously monitor the impacts of its water projects and to make appropriate adjustments to its management strategy, it was necessary to define a set of indicators to be monitored and to develop strategies that permitted the organization to compile the necessary data.

3.2 Nile³

On the Nile records on flow events have been kept for several thousand years now; the Nilometers along the river bear witness to this. Apart from an exchange of data among British experts during the colonial period, prior to 1960 no attempt was made by the ten Nile riparians (Egypt, Ethiopia, Burundi, Democratic Republic of the Congo, Eritrea, Kenya, Rwanda, Sudan, Tanzania and Uganda) to systematically share data. Agreement on a first joint project, the HYDROMET Project, was reached in 1967 between Egypt, Kenya, Sudan, Tanzania, and Uganda with the support of UNDP and the WMO. The project was motivated by rising water levels in Lake Victoria and the purpose of the project was to collect and analyze data on inflows into Lake Victoria and to prepare a study on the Nile's water balance. Political conflicts in the 1970s between the countries involved caused the project to be prematurely terminated, with Kenya and Tanzania withdrawing from it (the project was officially terminated only

3 See Nicol (2003a); Nicol (2003b); NBI (2001); Amer et al. (2004).

in 1992). Subsequently two projects were conducted under the auspices of the FAO: *Operation Water Resources Management and Information Systems for the Nile Basin Countries* and *Information Systems for Water Resources Planning and Monitoring in the Lake Victoria Region*. These projects included significant capacity-building elements in the upper-course Nile riparians.

The early 1990s saw the creation of the Technical Committee Nile (TEC-NONILE). One of its focuses was to build information-processing capacities, to introduce Geographic Information Systems (GIS) and satellite image analysis and to promote cooperation in information-sharing. The long-term aim was to prepare the information needed to arrive at an equitable allocation of the Nile's water resources; the short term aim was to develop national master plans with a view to integrating them into a larger Nile plan. Even though the project was not fully implemented, it did lay the groundwork for a more intensive cooperation in the Nile Basin Initiative launched in 1999.

The *Nile Basin Initiative* is a provisional institutional arrangement including all Nile riparians; it is rooted in a shared vision of sustainable development based on an equitable and reasonable allocation of the benefits of the Nile's water resources. To translate this vision into practice, a strategic program was developed that identified and prepared a number of joint projects. One of the program's components is the development of a decision-support system (DSS) for the Nile. The project's aim is to work out the infrastructure needed for efficient communication and to develop an information-management system and a planning model. At present a regional DSS unit is being set up; it is to work closely together with national DSS competence teams on the development of a set of joint instruments designed to cater for the needs of both national authorities and basinwide cooperation.

Lessons learned: The Nile is a good example of a case in which riparians withhold information for strategic reasons, with a view to avoid being drawn into negotiations on an equitable and reasonable allocation of water resources. However, efforts to organize a project-level exchange of information despite a lack of the political will needed for cooperation may be seen as a first step on the road to building the trust that was required for entering into the subsequent negotiations on cooperation in the Nile Basin Initiative.

3.3 Orange-Senqu⁴

The countries located in the Orange-Senqu Basin are Botswana, Lesotho, Namibia, and South Africa. In 2000 these countries founded the *Orange-Senqu River Commission*. One of the most important factors working in favor of the process was the cooperation that already existed at that time between the national water authorities. One milestone in the process was the Orange River Replanning Study (ORRS). The original planning for the Orange had already been carried out 20 years previously, even before the decision was made to develop the Lesotho Highlands Water Project (LHWP) for an intrabasin water transfer. In order to come to decisions on the further development of the Orange, it was necessary to conduct new analyses on potential water yield and future water demand. Even though the initial purpose of the ORRS was solely to clarify South Africa's own priorities, it became clear that no meaningful planning was possible without consideration of the needs of the other riparians. This meant that the study's hydrological base had to take account of the overall basin.

South Africa's invitation to Namibia and Lesotho to take part in the study caused some uneasiness, since the study was not to be conducted under a joint international forum. On the other side, South Africa had some reservations about divulging the ideas it had been developing; but in the end it determined that openness toward its neighbors would prove beneficial. Once the ORRS had been initiated, Namibia conducted some internal planning of its own on its water needs from the Orange and made the results available to South Africa. Lesotho embarked on a similar study. During the work on the ORRS South Africa proposed following it up with a joint study designed to focus the information from the country studies and to develop a consensual position. An Orange-Senqu agreement was signed that provides for the development of a database and a provisional integrated water resources management plan.

Data-sharing and joint hydrological analyses have now become everyday practice in the bilateral cooperation between these countries, and the data collected by South Africa are regularly shared with its neighbors. Namibia provides runoff data and information on present and anticipated water

4 See Conley / van Niekerk (2000); Turton (2003b); Meissner (2000); Mohamed (2003); Heyns (2003); Meissner / Turton (2003).

demand. Lesotho also provides runoff and precipitation data. South Africa has funded measuring weirs in Lesotho to calibrate the data. This information-sharing has led to a high level of conformity in assessments of the region's water yield. After many years of working separately, the hydrological services of Lesotho and South Africa have now pooled their resources in addressing the sensitive issue of the hydrological interpretations used to determine the royalties that South Africa is obliged to pay Lesotho for the transfer of water within the LHW Project. Even though the two parties have not yet accepted the results of the analysis, cooperation has been successful to the extent that it has served to reduce mistrust and disagreements. There is also close cooperation in the field of training, with South Africa conducting training sessions for neighboring countries in the use of various methods of analysis that are intended, among other things, to strengthen the skills that its partners need to engage in transboundary cooperation.

Lessons learned: The example of the Orange-Senqu shows that cooperation at the technical level can provide an important impulse toward overcoming mistrust. Furthermore, the example of the LHWP points to the conflict potential inherent in attempts to interpret hydrological data, in particular in cases where such information is used as the basis to allocate water resources and/or the benefits associated with them. Finally, the Orange-Senqu Basin, with its economically unequal riparians, is an example that clearly shows that weaker riparians are in need of support in the form of targeted interventions designed to empower them to cooperate on equal terms.

3.4 Incomati and Maputo⁵

South Africa, Mozambique, and Swaziland are riparians on the Incomati and Maputo. In 1991 they decided to conduct a joint study on the water yield, water requirements, and development potential of the Incomati River; the Maputo Basin was integrated into the study in 1999. The Joint Incomati Basin Study (JIBS) was completed in April 2001 and presented to the Tripartite Permanent Technical Committee (TPTC). Two computer

5 See Carmo Vaz / van der Zaag (2003); Carmo Vaz / Lopes Pereira (2000); Incomati-Maputo Resolution (2002); Kramer (2003).

models (i. e. Water Resources Yield Model, Water Resources Planning Model) were developed with the aid of external advisers and in cooperation with the South African Department of Water Affairs and Forestry. The models were used to analyze water availability and water supply for various users and to depict the impacts of different development scenarios.

For a longer period of time, it was however unclear to Mozambique and Swaziland whether their experts would have access to the model. Later, when South Africa finally did permit them access, the experts from Swaziland and Mozambique convinced themselves of the validity of the assumptions involved, but without taking advantage of the opportunity to calculate development scenarios of their own, even though this would have proven helpful to them in the trilateral negotiations. During the course of the talks the three riparians almost always met the requests of the other parties for information. But attempts to go beyond information-sharing and to use the opportunity provided by the Joint Basin Study to work out a joint picture of the present state and the future of the basin came too late and were not consistently pursued; the result was that it took far longer to work out the projected agreement on water resources allocation than was originally provided for. In 2002 the riparians signed the Incomati-Maputo Interim Agreement together with a comprehensive information-sharing protocol. The intention is to negotiate a final agreement at a later date after improved information is available.

Lessons learned: The negotiations on the Incomati-Maputo as well as the Joint Incomati Basin Study show how important it is for all riparians to have equal access to the data and model representations on which planning is based. Water management models designed to analyze development scenarios can be used as an instrument to support efforts to bring the negotiating parties closer together. The case demonstrates that it is important to conduct negotiations in a structured and systematic manner and in such a way that the negotiations start out with an exchange of information and subsequent efforts to work out a common understanding of water management potentials and future water needs. Only then is it possible to formulate joint management goals and to reach agreement on a formal and comprehensive treaty. The case of the Incomati also shows that attempts to abbreviate this process may in the end cost time and cause delays in reaping the benefits of cooperation.

3.5 Nubian Aquifer⁶

The Nubian Sandstone Aquifer System (NSAS) is a major groundwater resource of the eastern Sahara that is shared by Chad, Egypt, Libya, and Sudan. In the past four decades Egypt, Libya, and Sudan have undertaken separate attempts to develop the Nubian Sandstone Aquifer System and the arid land above it. Since the early 1970s the three countries have shown interest in exchanging their experiences and looking into related development potentials, and this has led to the establishment of the Joint Authority for the Nubian Sandstone Aquifer. Following a long period of inactivity, the countries concerned acquired the funds for a two-year research program. The program had three components: (1) training for staff of the four national institutions responsible for managing the NSAS; (2) creation of a database; and (3) development of a groundwater model.

The Nubian Aquifer Regional Information System (NARIS) was developed to store and make available data on the aquifer, including information on water levels, abstractions, stratigraphy, and hydraulic parameters. The database also has a bibliographic component containing earlier studies and research findings. The information system amounts to a standardized method of data acquisition for the four countries concerned, and it is used to prepare the input parameters required for the aquifer model. The aquifer model was developed to simulate scenarios on possible approaches to exploiting the NSAS. The model constitutes the technical basis for a mechanism of intercountry consultations on water abstraction.

One indirect result of the research program was the revitalization of the *Joint Authority for the Nubian Sandstone Aquifer*. It was recognized that the basis to ensure the continuity of regional cooperation in the management of the aquifer was a regular exchange of information. To this end two agreements were signed. The first covers the exchange of data, which were assembled and fed into the information system during the project. With the second agreement, the parties commit themselves to keep the information system up to date by means of continuous monitoring and upkeep and maintenance of the database. The data are stored on a server operated by the Centre for Environment and Development for the Arab Region and Europe (CEDARE) in Egypt. Access to NARIS is restricted to

6 See Salem / Pallas (2004); Burchi / Spreij (2003).

the water authorities of the countries involved. Any changes made to the data by one of the four water authorities can be controlled by the other parties.

Lessons learned: The Nubian Aquifer Regional Information System is a good example for shared, yet nonpublic information, that is accessible only to the parties to an agreement (in this case the national water authorities of the signatories). With a view to ensuring the database's acceptance for political-level management decisions and transboundary consultations, the revitalization of a joint commission of the parties to guide the database compilation has proven to be of great significance.

3.6 Niger⁷

Benin, Burkina Faso, Côte d' Ivoire, Guinea, Cameroon, Mali, Niger, Nigeria, and Chad are riparians of the Niger. The Niger River Commission was established in 1964; in 1980 it was transformed into the Niger Basin Authority (NBA). Although the NBA was set to implement an ambitious program of action for navigation, irrigation, and the environment, it proved unable to realize more than a small part of the program. In 1986 the council of ministers determined that the NBA was not operating satisfactorily and restricted the scope of its tasks to river basin planning. The member countries were to implement selected projects on their own responsibility; and instead of collecting data itself, the NBA was now to work with data made available to it by the member countries.

In 1987 UNDP and the FAO formulated a five-year program with three priority goals: (1) rehabilitation of the documentation and information center, expansion of the existing water management model, continued implementation of the Hydrological Forecasting System in the River Niger BasinProject (Hydroniger Project), and development of a hydrological database; (2) the NBA was to conduct a case study to demonstrate its competence as a coordinator for river-basin development planning; (3) the NBA was to conduct a water resource assessment. Ultimately only the first goal was realized.

7 See Burchi / Spreij (2003); Olomoda (2002); Rangley et al. (1994); World Bank / GEF (2004); Abe et al. (2004); Andersen et al. (2005).

The Hydroniger Project was designed to make real-time hydrological forecasts that would be used to issue flood warnings, inform on the navigability and to facilitate dam regulation in the member countries. The project was initiated in 1979, and by 1987 65 data collection platforms had been installed which simultaneously transmit data by satellite to the National Forecasting Centers and the NBA Regional Forecasting Centre. Even though over US\$ 15 million were invested in the system, the data collection network started to fall into deterioration by 1988. Demand by potential users for forecasts was low; in addition, the satellite technology used proved to be susceptible to breakdowns, and many stations were not in proper working order. At present the hydrological measuring network is being revitalized for US\$ 2.24 million in connection with the first phase of the HYCOS-NIGER Program. Furthermore, a study is being prepared to formulate requirements for improving the water management model for the Niger, because it is expected that the model can be used to develop strategies for transboundary water management and cooperation in the Basin. There are also plans to set up a monitoring unit at the NBA to gather and process information on the condition of water resources as well as on land uses that depend on them. It is intended that this unit be organized in a similar fashion like the environmental observatory for the Senegal Basin.

Lessons learned: Since the international basin organization was founded there have been several attempts to establish a comprehensive information base for planning purposes. Initially the Niger Basin Authority was to assume all tasks related to information transmission: operation of a hydrological measuring network, data generation, modeling and analysis. As far as the complexity and the scope of the task is concerned, the experience made by the NBA indicates that a division of labor between the member countries (responsible for collecting data in their own territories) and an international river commission (responsible for setting data collection standards, assembling the data and analyzing it at the river-basin level) would offer more prospects of success. The experience of the NBA also indicates that in planning and designing hydrological networks it is essential to bear two factors in mind: the actual information needs and a sustainable approach to funding.

3.7 Okavango⁸

Angola, Namibia, and Botswana are riparians of the Okavango. In 1994 they created the Permanent Okavango River Basin Water Commission (OKACOM). The parties to the agreement have committed themselves to implement an integrated management plan. OKACOM's first success consisted in the development of a project proposal to perform an environmental assessment for the Okavango Basin and to develop an integrated water resources management strategy. The aim was to collect comprehensive information on the environmental status of the Okavango Basin and at the same time to assess current water availability with a view to identifying further water-use potentials for each of the riparian countries. The initiated planning process is intended to prepare a reliable set of data that can be used as a basis to negotiate an agreement on the future use of water resources. As a first step, the Global Environment Facility (GEF) funded a transboundary diagnostic analysis (TDA). OKACOM set up the Okavango Basin Steering Committee (OBSC) to manage the project. A project director was appointed to coordinate the work of over 20 consultants from the three member countries. The TDA has since been successfully completed, and a draft project proposal on a strategic action plan has been submitted to the GEF; it contains proposals for detailed studies on development potentials as well as on the elaboration of an integrated management plan.

A good number of international organizations are engaged in the region, many of them with the aim of protecting the Okavanga Delta. This attention justifies referring to the Okavango Basin as - at least in part - "internationalized." The international organizations and their national partner NGOs have compiled comprehensive studies on the water balance of the Okavango and related wetlands, including for example the IUCN Review of the Southern Okavango Water Development Project (IUCN 1993). NGOs are organized in a forum, the aim being to develop formal participation mechanisms in OKACOM. The NGOs play an important role in generating and transmitting information. To cite an example, the Sharing Water Initiative has developed the Shared Okavango Database with a view

8 See Schultz (2003); Jansen / Madzwamuse (2003); IUCN (2003); Pinheiro et al. (2003); USAID (2004).

to promoting the dialogue on the management plan; the database has been made available to various interest groups, but also to OKACOM.

Lessons learned: The various initiatives in the Okavango Basin can be seen as an example of the influence that international and national NGOs may have on the issues involved in negotiating river-basin cooperation. Their lobbying work has set environmental concerns high on the agenda in the work leading up to the management plan. With a view to promoting dialogue on the management plan, NGOs have built a shared database which is accessible to various interest organizations, but also to OKACOM. In creating a publicly accessible database, NGOs have laid the groundwork for broader participation in the negotiation of a water management strategy.

3.8 Zambezi⁹

The Zambezi riparians are Botswana, Mozambique, Tanzania, Zambia, Zimbabwe, Angola, Malawi, and Namibia. One of the most important infrastructure projects is the Kariba Dam, which is located on the border between Zambia and Zimbabwe. The dam is operated by the Zambezi River Authority (ZRA). The ZRA is a binational organization, which also operates a hydrological measuring network with 12 telemetric stations which are used to control the dam's operation. Since 1994 the ZRA has also investigated environmental effects of its operations within its Environmental Monitoring Programme (EMP). An environmental policy and a water quality monitoring system has been developed in this connection.

At the overall basin level the governments of Botswana, Mozambique, Tanzania, Zambia, and Zimbabwe reached agreement in 1987 on the Action Plan for the Environmentally Sound Management of the Common Zambezi River System (ZACPLAN). The three other riparians, Angola, Malawi, and Namibia, joined the plan in the early 1990s. ZACPLAN was a framework program that provided for 19 so-called Zambezi Action Plan Projects (ZACPROs). These cover a range of activities ranging from a compilation of all existing and planned water projects and the creation of a monitoring system to the elaboration of an integrated management plan.

9 See Shela (2000); Chenje (2003); Nakayama (1998); Salewicz (2003); Nakayama (2003); Mwiinga (2000).

The initial plans to create an independent River Basin Coordinating Unit were not implemented. Some of the Zambezi riparians were unwilling to accept ZACPLAN because they feared it would have interfered in their own water resource planning. Due to the inadequacy of the organizational structure and a lack of funding, however, none of the projects has yet been realized. The only exception here is the Development of an Integrated Water Management Plan for the Zambezi River Basin Project (ZACPRO6). The first phase of ZACPRO6 (up to 1998) saw the creation of an information system (the Zambezi River Basin Information System and Database) and the preparation of seven sector studies on water use in the Zambezi Basin. Work is currently underway on an integrated development plan for the basin (ZACPRO6, Phase 2). The Zambezi Watercourse Commission (ZAMCOM), set up in 2004, is responsible for coordinating this project.

Lessons learned: The Zambezi River Authority is a bilateral organization responsible for running the infrastructure jointly owned and operated by two riparian countries. In this function the Authority is entrusted with comprehensive planning tasks, and it operates the required hydrological measuring networks in its own responsibility. Thus far, efforts to come up with a joint water resources planning for the entire basin have failed for lack of political will on the part of the countries involved, some of which feared that an externally initiated project which is not controlled by a political process would interfere in their own national planning. The example of the Zambezi shows that whilst comprehensive water allocation agreements will need information on the whole basin to be shared, information needed for the regulation of infrastructure in large transboundary basins can under certain conditions sufficiently be organized at the subbasin level.

3.9 Cross-basin cooperation in information sharing

The measuring networks used to collect relevant data for water resources management in Africa are in many cases inadequate and in poor condition (Rutashobya 2003). The process of decay has started at a time when demand for information on water resources is on the rise. With this in mind, the World Meteorological Organization (WMO) in 1993 initiated the Hydrological Cycle Observing System (HYCOS), the aim of which is to

strengthen the technical and institutional capacities of national hydrological services, enabling them to collect the hydrological data and to process the data with a view to the needs of water resources management (van Biljon et al. 2001). The core element of the program is rehabilitation of hydrological measuring networks. HYCOS consists of regional projects which, while funded from different sources, are advised by the WMO. Another objective of the HYCOS project is to promote regional data-sharing, and for this reason most projects cover one or more transboundary river basins. At present the following projects are in the process of implementation in Africa: SADC-HYCOS (including, among others, the Limpopo, the Zambezi, the Incomati, the Orange), Niger-HYCOS, and Volta-HYCOS. Projects in the development stage include IGAD-HYCOS (Horn of Africa), Lake Victoria-HYCOS, Lake Chad-HYCOS, and Senegal-HYCOS.

The so-called FRIEND Program (Flow Regimes from International Experimental and Network Data) which is part of the UNESCO International Hydrological Programme (IHP), is designed to promote data-sharing for hydrological studies (Gustard / Cole 2002). The aim is to develop enhanced methods for hydrological analysis (e. g. of precipitation-runoff models) and to establish these methods in hydrological services. There are regional projects underway for the Nile, the SADC region, and for West and Central Africa. One important success of the first phase of the South African FRIEND project was the creation of a joint hydrological database. The database contains time series of the daily flow rates and water levels for 680 basins. FRIEND has introduced a uniform database software in the countries involved and conducts training for it in these countries. In addition, the project has built a comprehensive geographic information system (GIS) containing basin boundaries, ground-level models, water systems, precipitation, evaporation, soils, geological information, and land uses. The development of this database is an important precondition for a systematic analysis of the hydrological data, and it demonstrates the will of the 11 countries involved to establish free data-sharing for hydrological research purposes.

In the field of transboundary groundwater resources, there are efforts underway, including international initiatives on the part of UNESCO's International Hydrological Programme (IHP), the International Association of Hydrogeologists (IAH), the FAO, and UNECE on Internationally Shared

Aquifer Resources Management (ISARM), to assemble data and information on transboundary groundwater resources (Appelgren 2004). The focus of these efforts is a compilation of Transboundary Aquifer Systems (TAS). Based on the TAS, and in coordination with other organizations, work is also underway to describe 35 transboundary groundwater systems in Africa. However, as far as most of these systems are concerned, few approaches to transboundary riparian cooperation have yet been developed. There is often also a lack of important information on the dimensions and the quality of these groundwater resources. In connection with regional cooperation (SADC) growing interest has been expressed in using expert-technical information networks as a means to strengthen cooperation on transboundary groundwater resources.

Increasingly, data gathered with the aid of remote-sensing techniques are being used for purposes of river-basin management. There are two areas in which remote sensing may play an important role: (1) more effective and faster mapping of hydrologically significant features over large areas (e. g. land cover) and (ii) direct derivation of hydrological parameters (e. g. soil moisture, precipitation, surface temperature) based on correlation of remote and in situ observations and the use of models. An example of an initiative with a view to optimizing these possibilities, is the so-called TIGER Initiative of the European Space Agency which was launched in 1992. The aim of the initiative is to promote the use of satellite technology in water resources management, especially in Africa, by making earth-observation data available as well as by providing training and technical support.

Lessons learned: In recent years two changes in data collection and access to data can be observed. First, many data needed for river-basin analyses have become available in the global (or regional) public domain. Second, more and more data are collected via remote sensing. There are a good number of international initiatives designed to promote the generation and exchange of information relevant to transboundary water resources management - although it should be noted that these initiatives are not necessarily organized in the framework of river-basin cooperation projects. Appropriate coordination and/or cofinancing can serve to foster synergies from initiatives in the public domain and transboundary water resources management.

4 Summary of the case studies

The studies on African river and lake basins show that formal information-sharing agreements are in many cases preceded by projects designed to improve the information basis and by informal contacts between water authorities endeavoring to share information for their planning purposes. In the regions covered by the present study we can, in essence, distinguish three reasons for initiatives on transboundary information transmission:

- Preparation of the groundwork needed for joint strategic planning (joint basin studies, basin management plans) as well as for agreements on water allocation;
- monitoring of the impacts of existing water infrastructure (especially dams) on health, the environment, and water uses with a view to adjusting regulation regimes;
- real-time information-sharing for purposes of operational infrastructure management and flood warnings.

The role played by basin organizations in this process is not a uniform one. On the other hand, the information-gathering and -processing capacities needed to address transboundary water resources management issues depend in large measure on the range of tasks assigned to these organizations (operational management of transboundary infrastructure and/or strategic water resources planning) as well as on the associated organizational form in which transboundary cooperation is cast.

The most important instruments used to organize information transmission in the river- and lake-basin cooperation ventures investigated here include:

- documentation centers / bibliographic information systems;
- basin information systems, including relevant guidelines and agreements on data harmonization and data provision;
- water-yield and water management models;
- hydrological / hydrogeological databases;
- operation of hydrological measuring networks;
- joint water resources assessments / basin studies designed to look into development potentials, without losing sight of IWRM principles.

Table 3: Information-transmission tasks directly assumed by international commission and/or associated international organizations

River Basin	Basin / Sub-basin	Countries	Organisation established under Agreement	with Secretariat	Major joint Infrastructure developed under Agreement	Joint organisation responsible for infrastructure	DSS Unit	Env. Monitoring Unit	Joint RB Model	Doc. Centre	IMS	hydroL/hydrogeo. Database	operation of hydrometric network	Joint Basin Study
Nubian Aquifer	Aquifer	Egypt, Libya, Sudan (1998), Chad (1999)	Joint Authority for the Study of the Nubian Sandstone Aquifer	X			X		X	X	X	X		(X)
Nile	Basin	Egypt, Ethiopia, Sudan, Uganda, Tanzania, Kenya	Nile Basin Initiative	X			(X)	(X)	(X)	X	(X)			(X)
	Eastern Nile Sub-basin	Egypt, Ethiopia	Agreement without Organisation											
	Lower Nile Sub-basin	Egypt, Sudan	Permanent Joint Technical Commission											
	Western Nile Sub-basin	Egypt, Uganda	Agreement without Organisation		Owens Dam (Hydropower, Regulation of Nile)									
Niger	Basin		Niger Basin Authority	X				(X)	(X)	X		X	X	(X)
Okavango	Basin	Botswana, Namibia, Angola	Okavango River Basin Water Commission						(X)					(X)
	Chobe-Linyanti Sub-basin	Botswana, Namibia	Joint Permanent Technical Commission						(X)					

Joint Basin Study	X			(X)					X
operation of hydrometric network	X				X				
hydrol./hydrogeo. Database	X			X	X				
IMS	X			X	X				
Doc. Centre	X				X				
Joint RB Model	X			(X)					X
Env. Monitoring Unit	X				X				
DSS Unit	X			X	X				
Joint organisation responsible for infrastructure	Agency for Management of the Diamant Dam (SOGED), Agency for the Management of Energy from the Manantali Dam (SOGEM)				Zambezi River Authority (ZRA)				
Major joint Infrastructure developed under Agreement	Manantali Dam (Hydroelectric Power, Irrigation), Djama Dam (Salt Intrusion)				Kariba Dam (Hydroelectric Power) Songwe River Stabilisation Project (Regulation)				
with Secretariat	X			(X)	X				
Organisation established under Agreement	Organisation pour la mise en valeur du fleuve Sénégal			Zambezi Watercourse Commission	Zambezi River Authority				
Agreement without Organisation					Agreement without Organisation				
Agreement without Organisation					Agreement without Organisation				
Countries	Senegal, Mauritania, Guinea				Zambia, Zimbabwe				
					Malawi, Tanzania				
					Malawi, Mozambique				
Basin / Sub-basin	Basin			Basin	Kariba / Zambezi Sub-basin				
					Songwe Sub-basin				
					Lower Shire Sub-basin				
River Basin	Senegal			Zambezi					
					Incomati / Maputo / Umbeluzi				

Joint Basin Study				(X)	X	X
operation of hydrometric network					X	X
hydrol./hydrogeo. Database					X	X
IMS						
Doc. Centre						
Joint RB Model				(X)	X	X
Env. Monitoring Unit						
DSS Unit					X	
Joint organisation responsible for infrastructure	Komati Basin Water Authority				Lesotho Highlands Development Authority, Trans-Caledon Tunnel Authority,	Joint Irrigation Authority
Major joint Infrastructure developed under Agreement	Komati River Basin Development Project (Driekoppies Dam & Mangua Dam)				Lesotho Highlands Project (Water Transfer, Hydroelectric Power)	Vioolsdrif and Noordoewer Joint Irrigation Scheme (Irrigation)
with Secretariat				(X)	X	
Organisation established under Agreement	Joint Water Commission	Joint Water Commission	Joint Water Commission	Orange-Senqu River Basin Commission,	Lesotho Highlands Water Commission	Permanent Water Commission
Countries	South Africa, Swaziland	South Africa, Mozambique,	Mozambique, Swaziland	Lesotho, South Africa, Namibia,	Lesotho, South Africa	Namibia, South Africa
Basin / Sub-basin	Komati Sub-basin	Komati Sub-basin	Umbeluzi Sub-basin	Basin	Lesotho Highlands Subbasin	Lower Orange Sub-basin
River Basin				Orange-Senqu		

Table 3 summarizes the way these instruments are used by the international commissions and/or the associated international organizations looked into in the present study. The work of most of these commissions is supported by development cooperation projects; Table 4 sums up some of the typical project components involved in providing support for information transmission.

5 Summary and recommendations for development cooperation

(i) Transboundary water resources management can be seen as a cyclical process involving the negotiation and implementation of international agreements. Basically four conflict strategies are available for the riparian parties to attempt to resolve transboundary management issues: negotiation, delegation, exit, and escalation. If cooperative transboundary water resources management is to be established, it is necessary that problems are transformed into negotiation problems. This requires that the parties must be in possession of the information they need to recognize potential Pareto improvements or so called win-win outcomes.

(ii) On their own, data are unable to effect any difference in water resources management: it is only as information that they may change behaviors. Since the only information relevant to a bargaining problem is information that has been understood, the crucial point is what information is both available and understood by the negotiating parties. Understanding should not be equated with acceptance of information. Acceptance is a deliberate decision by the parties. It is for this reason that two transmissions are required for negotiated solutions to transboundary water resources management problems: The negotiating parties must first realize the significance of certain data in the context of the negotiation problem, that is, they must transform these data into information. In order to be able to use this information in negotiation, this information must be transmitted into the parties' shared space, i. e. the parties must accept the information. Organizing the transmissions required is one of the core tasks of transboundary water resources management.

Table 4: Typical components of projects designed to support information transmission				
	IMS	RBM	DATA*	O&HC
1. Organizational development				
Provision of infrastructure (office, computers, communication)				X
Funding and training of personnel for regional competence team (e. g. DSS or planning unit)				X
Selection of national focal points and training of personnel involved				X
2. Technical tasks - river-basin model / information management system				
Analysis of information needs for strategic planning (e. g. transboundary diagnostic analysis)	X	X		
Development of water-yield and water-management models	X	X		
Development of a river basin / aquifer information system (e. g. database and GIS)	X	X		
Creation of a documentation center (document collection)				
3. Data-gathering and -sharing				
Analysis of data needs for decision support	X		X	
Development of standards for the collection, processing, analysis, and storage of data			X	
Supplementary support for collection and analysis of data when required (e. g. measuring-networks, laboratory)			X	
Development of rules for exchange of data and information	X			
4. Consolidation of application for planning and management problems				
Training and training programs at national and regional level				X
Efforts to harness DSS applications for problems at national / local level	X	X		
IMS = Information Management System, RBM = River Basin Model / DSS, DATA = Data basis, O&HC = Organizational and Human Capacity				

(iii) With a view to ensuring that all riparian countries have the facts they need to (a) negotiate an equitable and reasonable allocation of water resources and (b) to avoid any significant damage beyond their borders, international water law requires all countries to share water-related information. In other words, the UN convention sees the obligation to exchange information as directly instrumental as regards the fundamental right of the parties to acquire an equitable and reasonable share of the use of water-courses and also sets out an equally fundamental obligation not to cause any significant damage to other riparian countries.

(iv) Organization of the required transmissions of information is one of the core tasks of transboundary water resources management. Information needs for these various functions are many and varied. Data collected for one purpose, such as operational management, may be of use for other purposes such as planning. Often requirements differ, so that data collected for one purpose are not usable in another. It is generally necessary to distinguish between the information needed for strategic planning and intergovernmental negotiations and information needs for the operational management of water infrastructure with transboundary impacts. The important instruments of information transmission include information systems used to store data and keep them accessible and models used to simulate water yields and the impacts of different management strategies on water balances. Depending on spectrum of tasks involved (operational management of transboundary infrastructure systems and/or strategic water resources planning) and the associated form of organization selected for transboundary cooperation, the central information-transmission tasks may be divided up between national authorities and international river-basin organizations.

(v) In supporting transboundary water resources management, development cooperation should not lose sight of the interactions between the development of national institutions and the development of appropriate forms of intergovernmental cooperation. If they are to successfully negotiate transboundary water-management strategies, the parties must themselves realize the significance of certain data in the context of the negotiation problem; this implies that efforts to strengthen relevant national capacities have direct impacts on the parties' ability to engage in international cooperation. This is particularly important in constellations involving strong and weak states. Whether or not the development of joint but

independent analytical and planning capacities at the river-basin level will lead to duplications is a matter of the capacities already established in the riparian countries concerned. An alternative strategy is to support institutional cooperation between relevant national authorities under the auspices of international commissions; this could be flanked by targeted support for countries with limited planning and analytical capacities.

(vi) In supporting transboundary water resources management, development cooperation should not lose sight of the principle of subsidiarity. In particular when large basins are concerned, the high transaction costs involved call for a close definition of the object of cooperation and restriction to issues that are accessible to solution at the basin level. Many efforts concerned with transboundary water resources management in Africa are focused, explicitly or implicitly, on the issue of water allocation and the associated issue of allocation of water-use rights. What is therefore called for at the basin level is instruments designed to ensure that all actors are in possession of all of the facts they need to negotiate an equitable and reasonable share of the benefits derived from the use of water resources.

(vii) Development cooperation should not lose sight of the fact that responsibilities for data collection and analysis for transboundary water resources management are divided up among different levels of government. The fact that information acquisition may be aligned to the needs of water resources management should not be allowed to obscure the circumstance that as far as many transboundary waterbodies are concerned, the riparians themselves may lack sufficient data, or have no data at all. In view of the complexity and the scope of the task involved, experience would seem to indicate that a division of labor between the member countries responsible for collecting and analyzing data in their own territories and an international river-basin commission responsible for setting standards and responsible for coordinated basin wide analysis offers best prospects of success. The methods used to collect data in different countries are not always in line with international standards, and this often means that the information derived from these data cannot be directly compared with data from neighboring countries. River-basin organizations thus have an important role to play in efforts to standardize and harmonize data.

(viii) It follows from the principles of integrated water resources management and the requirements involved in negotiating an equitable share of the benefits of water use that strategies designed to acquire information

must have reference to both water yield (the hydrological and/or hydrogeological dimension) and water use and water demand (the socioeconomic dimension). In many cases this calls for a shift in emphasis from an information-acquisition strategy geared more to hydrological-technical considerations to one oriented more to the information needed for analysis of water uses and water-demand development (correlated with a switch from supply to demand management). Furthermore, it is essential to accord due consideration – in the sense of integrated water resources management – to the water needs of water-dependent ecosystems, and not to focus only on water needs for household consumption, industry, and irrigated agriculture.

(ix) In supporting transboundary water resources management, development cooperation should not lose sight of the transaction costs involved in information transmission. The widespread "what we need is more data" paradigm must give way to efforts to specify the information required to make management decisions. It is essential for any transboundary water resources management initiative to formulate a management information strategy and from that develop a management information system. The information strategy is the pattern or plan that aligns the information needs with the management requirements. It deals with information needs, the resources required for their collection and processing. The information system is the bundle of procedures that implement this strategy. Efforts should first be made to reach agreement on what types of information are needed and what level of detail this information must have if it is to be used to deal with the specific planning and management tasks concerned. Scoping in early phases of transboundary initiatives can help to minimize the costs of information acquisition. In this context it will be necessary to examine to what extent the set of management options to choose from may be expanded by improving the information base and whether or not the effort and expense this would involve is worthwhile.

(x) In supporting transboundary water resources management, development cooperation should look for synergies with other information-generating initiatives. In supporting cooperation projects, close coordination with other national or international initiatives is a good way to make optimal use of synergies. This goes (a) for the generation of data and basic information and (b) for analysis and research. Close integration of ongoing programs like the WMO's HYCOS project on improving hydrological

measuring networks, ESA's TIGER Initiative on promotion of the use of remote-sensing data, UNESCO's FRIEND analysis and modeling program into information-acquisition strategies and closer links to ISARM activities in compiling information on transboundary groundwater resources could prove directly beneficial to the work of basin commissions. Targeted cofinancing of relevant programs is a good way to harness synergy potentials. Efforts to strengthen the coordinating function of transboundary information-sharing agreements may play an important role for a good number of organizations that generate and collect data on integrated water resources planning; this would be the case e. g. in defining guidelines and standards for the collection and processing of data. Elaboration of and agreement on documentation standards and development of information systems would be a good way to ensure that information collected by a variety of individual projects remains accessible for further uses. International research projects also contribute to improving the information basis.

(xi) In supporting transboundary water resources management, development cooperation should not lose sight of the play of tensions between various requirements concerning the level of public accessibility of information. Two information asymmetries are relevant in the context of transboundary water resources management: on the one hand, asymmetries between riparian countries and on the other asymmetries between the negotiating parties and outsiders (e. g. the public, uninvolved government authorities, donor organizations, etc.). The principles of best IWRM practices are grounded on transparent mechanisms for the allocation, protection, and basic supply of scarce water resources, and these mechanisms are best ensured by clear-cut institutional arrangements designed to set the stage for planning and management at the lowest possible level and with the participation of all stakeholders. Participation requires public accessibility of information. Publication of information may prove beneficial to the political and civil society discourse on possible riparian cooperation. On the other hand, though, transboundary water resources management is for the most part a governmental task with political accountability. If, however, riparians withhold information for strategic reasons, creation of a shared information base (i. e. one that is not public but accessible only to the parties) may constitute an important trust-building measure for initiating transboundary negotiations.

(xii) If development cooperation should decide in favor of supporting an information management and decision-support component for transboundary cooperation, it should bear the following points in mind:

- An information and decision support system must be "owned" by the riparian countries concerned. One way to promote ownership is to involve official users in the conceptual development and to adapt the system to user needs by giving it an open, modular design.
- Such a system must be oriented to satisfy perceived actor information needs and be suited for use at both the regional and national level. It should be developed on the basis of an exact analysis of requirements at the regional, subregional, and national level. It must be ensured that there is cooperation at the regional level. Competence teams should be set up at the regional level, and - to ensure that the interplay between levels in fact works - teams with appropriate capacities should be created with the responsible national authorities.
- It is essential to ensure that both the database and the methods used for calculation are transparent and inspire confidence. This requires that all riparians concerned are involved "at eye level" in the specification and development of the models. There must also be consensus on assumptions, methods, and technical descriptions, and these must be accessible to all users and decision-makers.
- It is essential to ensure that the set of instruments will be maintained and developed over the long term. This means that due consideration must be given to the institutional, financial, and technical aspects.

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**How can international donors promote
transboundary water management?**

Erik Mostert

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How can international donors promote transboundary water management?

Erik Mostert

1 Introduction

Water and development

At the World Summit on Sustainable Development in Johannesburg in 2002, the Millennium Development Goals were confirmed. These goals call for:

- the eradication of extreme poverty and hunger,
- universal primary education,
- gender equality and the empowerment of women,
- the reduction in child mortality,
- improvement in maternal health,
- combat of HIV / AIDS, malaria and other diseases,
- environmental sustainability,
- the development of a global partnership.

Most Millennium Development Goals are related to water. Goals such as food security and environmental sustainability require that the water resources are protected effectively, that overexploitation is prevented and that appropriate water infrastructure is constructed and managed well. To a large extent, this is a governance issue. Skills and information need to be available, an appropriate legislative framework needs to be in place, decision-making processes should be fair, transparent and effective, and all stakeholders affected by or influencing water management should be involved.

Transboundary water management

The transboundary character of most water resources poses special problems. Worldwide more than 45 % of the land surface is located within international river basins and many groundwater aquifers are shared by

more than one country (Wolf 1999). Unilateral action by one country concerning these resources is often ineffective (e. g. fish ladders in an upstream country only), inefficient (e. g. hydropower development in a flat downstream country) or simply impossible (many developments on boundary stretches). Moreover, unilateral action can significantly harm the other countries and may result in serious international tension.

Many people fear that the wars of the 21st century will be over water. There are hardly any historical example of water wars (Wolf 1998), but conflicts falling short of a war have occurred frequently. For many international basins and aquifers no international agreement exists. For many other basins and aquifers, however, agreements do exist and effective institutions have been established that deliver benefits to all stakeholders.

Africa

In Africa the problems of development and water governance are especially acute. It is the poorest continent in the world. Many regions are water-stressed and many water resources are shared by more than one country. In the past there have been threats of water wars (the Nile), but there are also many examples of international cooperation.

Against this background the German Federal Ministry for Economic Cooperation and Development has set up the project "Transboundary river basin management in Africa" (Grenzüberschreitendes Wassermanagement in Afrika, BMZ-Forschungsprogramm 2004-2005). Within this project five topics are discussed:

1. The promotion of regional river regimes
2. Africa's international rivers: state of affairs and experiences with transboundary river basin management in Africa
3. Cooperation on international rivers from an economic point of view: the concept of benefit-sharing
4. Data bank "operational procedures of river basin organisations"
5. Information sharing and management

This paper

The present paper contains the results on topic 1. It focuses on the contributions that international donors can make to the development of transboundary water management. Chapter 2 introduces the issue of transboundary water management and present the empirical evidence that is available. Chapter 3 discusses the different strategies and instruments that international donors can use to promote transboundary water management. Chapter 4 presents the conclusions of the paper in the form of six recommendations for international donors.

2 Transboundary water management

This chapter introduces the issue of transboundary water management. It discusses the main driving forces, distinguishes several stages in transboundary water management and identifies the different types of stakeholders that play a role. Moreover, it discusses how in practice agreement is reached, the organisational frameworks that have been established and the experiences gained with public participation. The chapter contains two key messages:

1. At any stage of transboundary water management, **cooperation will occur if the major stakeholders perceive cooperation as a better option than non-cooperation.** Understanding transboundary water management therefore requires an understanding of the perceptions and motivations of the different stakeholders and the factors that influence these.
2. **The major stakeholders are not "states", but the different national government bodies and sectoral bureaucracies, regional and local governments, international governments and donors, the media, civil society, individual water users and influential individuals.** Understanding transboundary water management requires a "multi-scalar analysis" that maps the network of stakeholders and includes the regional and the local level.

2.1 Driving forces

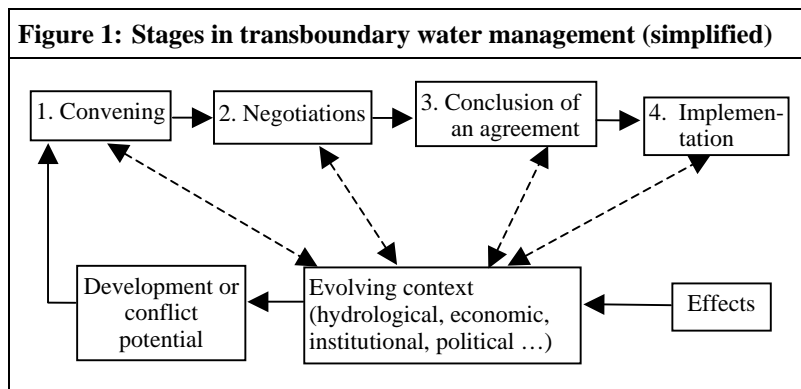
Transboundary water management can be equated with the development and implementation of international "agreements" (treaties, gentlemen's agreements, etc.). The main question is: what drives this process? In this context four types of benefits of transboundary water management have been mentioned (Sadoff / Grey 2002; see also Klaphake 2005):

- Transboundary water management can result in more intensive use of the river basin itself. Shipping routes may be improved, irrigation and hydropower may be developed, etc. ("Benefits from the river").
- The river basin itself may be better protected and overexploitation may be prevented ("Benefits to the river").
- Transboundary water management may reduce or prevent the costs associated with international conflicts ("Benefits because of the river").
- Transboundary water management can pave the way to much greater cooperation between states, even to economic integration among states ("Benefits beyond the river").

The first two benefits can be summarised in the phrase "sustainable development", and the last two as preventing or resolving international conflicts and promoting cooperation.¹ Both types of benefits are closely related. Development requires cooperation and the resolution of major outstanding conflicts. Conversely, the resolution of outstanding conflicts creates opportunities for development.

1 By "conflict" we mean any kind of unfriendly interaction, ranging from mild expression of discord to diplomatic and economic sanctions or even war – but especially the more seriously unfriendly interactions (Wolf et al. 2003). Water may be the object of a conflict, for instance when there is competition over scarce water resources, but it may also be an instrument in a conflict. This is for instance the case when an upstream state threatens to divert an international river in order to harm or pressurize a downstream state. Water can also act as a catalyst for conflict, for example when water shortage within a country creates internal political instability that in turn creates international instability (Libiszewski 1995).

"Cooperation" can be defined as the opposite of conflict, therefore as "friendly interaction".



Yet, these four benefits provide but an incomplete explanation of the development of transboundary water management. In the end, what drives transboundary water management are not "objective" benefits, but the subjective perceptions and motivations of the major stakeholders. If in their eyes cooperation is a better alternative than non-cooperation, transboundary water management will progress. If not, it will stall.

2.2 Stages

Transboundary water management can be analysed as a cyclical process consisting of different stages (Figure 1). It does not take place in a void, but in a continuously evolving hydrological, socio-economic, institutional, political and cultural context. This context can create a potential for development or for conflict. For instance, a boundary river with a steep gradient provides a potential for joint hydropower development, whereas water scarcity creates a potential for conflict.

The first and often most difficult stage in transboundary water management is convening. It consists of bringing the major stakeholders around the table (Gray 1989). The stakeholders need to find sufficient overlap in how they perceive the major issues. There should be a minimum level of mutual interdependence. The stakeholders need to be convinced that:

- (1) the present situation does not serve their interests optimally;

- (2) negotiations could result in a fair agreement that could serve their interests better (Fisher / Ury 1981);
- (3) the agreement will actually be complied with, also by the other parties to the agreement.

Especially when relations are good, one of the stakeholders involved could take on the role of convener. Often, however, a third-party convener will be useful. The convener could help the stakeholders in analysing their own interests, in identifying overlaps and interdependencies, and in overcoming barriers to negotiation, such as stereotyping the other parties, which hinders communication. Powerful convenors, whether third-party or stakeholder, can also use other means to persuade the (other) stakeholders to start negotiations. They could for instance promise or threaten to withhold, openly or more covertly, economic or political support.

The second stage in transboundary water management is the negotiations themselves (Gray 1989). If this has not yet been done at the convening stage, the agenda for the negotiations has to be decided upon and some ground rules need to be agreed upon, for instance on confidentiality of the negotiations and on possibilities to exit. Moreover, the relevant "facts" have to be established, such as the natural river discharge, present use and projected demand, and several options need to be developed and assessed (see section 2.5).

The third stage is the conclusion of an agreement. The chances for a mutually satisfactory agreement are best if the negotiations are "integrative" instead of "positional". Positional negotiations or "bargaining" occur when the stakeholders take fixed positions and then start defending these. This is likely to result in stalemates or in suboptimal compromises. Integrative negotiations, on the other hand, occur when the stakeholders think in terms of their underlying interests and are flexible with regard to the means for satisfying these. This offers far better possibilities for reaching a mutually satisfactory agreement (cf. the notion of "double-loop learning"; Argyris / Schön 1996). Integrative negotiations are promoted if during the negotiations more than two options are explored (Fisher / Ury 1981).

With respect to international rivers, upstream-downstream relations pose special problems. From a purely hydrological point of view, upstream

Box 1: Eight mechanisms for overcoming upstream-downstream problems (Golub 1996)

1: Issue linkage

Issue linkage occurs when an upstream-downstream issue is linked to another issue where the downstream state is in control and the upstream state is the asking party (LeMarquand 1977; Marty 2001; Meijerink 1999). This issue might be a water management issue (e. g. improving maritime access to the upstream state) or it might be an issue from a totally different policy sector. The former is more common since issue linkage is only possible if the countries involved can expect that the others will keep their part of a deal. This is more likely if the stakeholders for the different issues are the same (Golub 1996).

2: Diffuse reciprocity / good relations

Diffuse reciprocity refers to countries that accept less favourable agreements in order to keep good relations and to create a "reservoir of goodwill" (LeMarquand 1977) from which they can draw in the future. Diffuse reciprocity is a kind of issue linkage of unspecified issues over time.

3: Large geographical scope

Upstream-downstream problems can also be overcome by extending the scope of agreements to include rivers where the downstream country is upstream and the upstream country downstream. This is in fact a kind of "geographical issue linkage."

4: Side payments

Side payments or "financial compensation" are payments – directly or through increased subsidies or reduced contributions – in return for a concession (Golub 1996). Side payments will be most effective for compensating economic or financial losses. They will be less effective when deeply held values or basic human needs are involved and could be experienced as bribery (Hisschemöller et al. 1989; Zeiss 1991).

5: Slack cutting

Slack cutting occurs when sectoral government bodies use their privileged access to international fora for introducing a more ambitious national policy than would be possibly through the national channels (Golub 1996; Bernauer / Moser 1996). An upstream country may for instance agree to very strict emission reductions because in effect the environmental ministry representing this country wanted to introduce strict regulation nationally.

6: Intended non-compliance

Intended non-compliance refers to the fact that countries may be willing to accept ambitious international agreements if they expect that the agreements will not be enforced.

continued Box 1:*7: Unforeseen consequences*

At times upstream-downstream conflicts can be overcome simply because the upstream state did not see the consequences of the agreement. This can happen when negotiators are inexperienced or lack back-up, when last-minute changes are discussed under high pressure of reaching agreement, and when international courts give unexpectedly strict interpretations to agreements.

8: Exercise of power

While less powerful from a purely hydrological point of view, downstream countries may possess other sources of power – economic, political, military – that may compensate for this lack.

countries are less dependent on downstream countries than *vice versa* and may therefore be less interested in transboundary water management. However, a number of mechanisms can be used for reaching agreement (Box 1).

As a rule, agreements need to be ratified or approved by a higher authority: a minister, the cabinet or parliament. This might prove difficult if the negotiators have not interacted effectively with these higher authorities.

Problems may also occur after ratification or approval, when the agreement has to be implemented or complied with. Implementation or compliance is usually the responsibility of lower level governments and water users who have not been involved in international negotiations. To improve implementation, one could consider involving them, but there are limits to the number of participants in negotiations. Moreover, national governments are often against this kind of involvement. A very different option for improving implementation is to develop monitoring or reporting mechanisms. This is often coordinated by a river basin organisation (RBO) set up by the pertinent agreement.

When implemented, agreements result in certain environmental, social, economic, political and even cultural changes. These may be foreseen or not, but in any case they change the context of water management and may result in a new potential for development or conflict, in new negotiations and in new agreements.

Development or conflict potentials do not always result in negotiations, negotiations do not always result in an agreement, and agreements are not

always implemented. This can create serious conflicts. On the other hand, negotiations may also start after a conflict has developed (as witnessed by for instance peace negotiations).

In practice transboundary water management develops in several rounds. It often starts with technical cooperation on monitoring or research. This is less risky for the basin states concerned but still allows the development of a common factual basis and of trust (section 2.5). Often, a broad framework agreement is negotiated next. This agreement is then followed by a number of substantive agreements on, for instance, water allocation or distribution of costs. Figure 1 describes just one round.

2.3 The "agreement"

The "agreement" that figures so prominently in the previous section can take a number of forms: a treaty, a private law contract, a gentlemen's agreement, a tacit understanding, a shared cultural practice, etc. All these agreements can be analysed in terms of the "institutions" or "rules of the game" that they establish (Ostrom 1990; Young 1995):

- a) operational rules, which determine who can use the resource (use rules, e. g. concerning water abstraction) and who should provide or maintain the resource (provision rules, e. g. concerning financing of infrastructure);
- b) decision-making rules, which determine how the operational rules are to be decided upon (e. g. consultation and public participation requirements);
- c) constitutional rules, which determine who is entitled to take decisions (e. g. concerning the tasks and responsibilities of a river basin organisation).²

2 Although Ostrom's typology of management institutions can be applied to international river basins, the same does not necessarily hold true for the other elements of her theory. Ostrom's theory focuses on the management of relatively small common pool resources, such as irrigation systems, groundwater bodies and coastal fisheries. In international river basins, however, the number of stakeholders is far bigger. Complexity is often much bigger as well and relations can be more asymmetrical. Moreover, the role that government and courts can play is very different. There is no higher authority that can enforce agreements (except in the EU and when countries have

The institutions that are established depend on many factors, not in the least on the main management issues in the basin. In the case of water allocation, all eventualities should be considered, such as long drought periods. International water law and especially the principles of "reasonable and equitable utilisation" and of not causing "significant harm" to the other basin states may offer some guidance on the share of each basin state (UN 1997, Art. 5–7; Vinogradov et al. 2003). Apart from that, it is a matter of negotiation.

Integrated versus functional approach

A more general issue is the choice between an "integrated" or a "functional approach" to transboundary water management. An integrated approach aims at the integrated management of the whole basin and is transsectoral in character. It often involves the conclusion of a broad framework agreement that contains general principles and establishes a river basin organisation but requires further implementation agreements. In a functional approach, issues are addressed one-by-one as they emerge. Agreements often have a mono-sectoral character (for instance only hydropower or only water allocation) and often apply only to part of the basin, but they are very specific.

Several arguments have been raised in favour of a functional approach. A functional approach would be more politically feasible, specific agreements would be better implemented than broad framework agreements, and scientific-technical complexity and the number of stakeholders involved would be reduced, thus making it easier to reach agreement (Marty 2001; see also Alam 1998). On the other hand, several RBOs established by broad framework agreements have proven to promote further cooperation (e. g. the Meuse, *Scheldt* and *Rhine Commissions* and US-Mexican *International Boundary and Waters Commission*). Moreover, narrow "functional" agreements can create significant negative side effects. For instance, treaties promoting irrigation only may harm flood recession agriculture, fisheries and nature (see also the Rio Grande rectification project, discussed by Marty 2001).

accepted the jurisdiction of the International Court of Justice or established comparable procedures).

It is impossible and perhaps even dangerous to choose in general between an integrated and a functional approach. Both approaches have potential advantages as well as disadvantages. In each individual case, the applicability and importance of the different advantages and disadvantages need to be assessed and only then a well-informed choice can be made.

Legally binding agreements or not?

Another issue concerning agreements is whether they should be legally binding or not. Non-legally binding agreements can by definition not be enforced using legal means and may not be taken very seriously by the contracting parties. But on the other hand, legal enforcement is often problematic. Moreover, non-legally binding agreements may still be politically binding and may still be implemented.

A case in point is the Rhine Action Plan of 1987, developed in response to the 1986 Sandoz disaster. As this plan was not legally binding, it could be developed quickly, when public attention for environmental matters was high. Moreover, countries were willing to subscribe to ambitious goals because they were not legally binding. Still, the Rhine Action Plan was politically binding and most of its goals have been reached (Dieperink 1999; Victor et al. 1998; Bernauer / Moser 1996; Dieperink 1997). However, these experiences cannot be generalised, and in other basins the advantages of legally binding agreements may be more important.

2.4 Stakeholders

Traditionally, transboundary water management is seen as an issue between sovereign states. "States" are, however, abstractions. They are legal concepts and important symbols and provide a source of identity for many people, but in practice the main parties in transboundary water management are specific groups and individuals. These include groups and individuals that possess formal authority and other important resources for developing or implementing international agreements, such as money, political influence, information and expertise. They also include groups and individuals that may be affected by water management but are unable to exert any significant influence (Trottier 2003). Together, these two groups are the "stakeholders" in transboundary water management.

National, sub-, inter- and supranational government

International agreements are usually negotiated by national government bodies, but regional and local governments can play a key role in the background. Water-related problems are often experienced first at the local, grass-root level and may also be caused at this level. Especially in federal states it may be impossible to reach, ratify and implement international agreements without involving subnational governments in their preparation. In some countries, such as Belgium, subnational governments are entitled to conclude international agreements (Meijerink 1999).

Inter- and supranational organisations can play an important role as well. Prime examples are the many intergovernmental river and lake basin organisations. In addition there are boundary commissions, commissions for regional seas, and regional organisations, such as the EU and SADC. With few exceptions, these organisations lack decision-making powers, but they can create a platform for communication and negotiation.

Sectoral government

It is usually not correct to treat government at any level as a unified, single-minded entity. At the national level governments usually consist of different sectoral ministers, bureaucracies and specialists in parliament. They may adopt very different positions on international freshwater issues. For instance, the Ministry for Water management may favour the construction of a hydropower dam on a boundary river, but the Ministry of Environment may be against (Várkonyi 1990).

Water users

Furthermore, water users can play an important role. Especially in democracies, public opinion may influence the national position on international issues. Moreover, governments are usually not powerful enough to implement nationally any policy they want. They have to rely on a basic level of cooperation by the water users. Sometimes water users in one country can sue water users or governments in other countries, without involving their own government (Dieperink 1997; Bernauer / Moser 1996; Dieperink 1999). To increase their influence, interest groups may organise themselves at the international level.

International donors, international NGOs and developing countries

In so-called developing countries international donors and international NGOs often play an important role. A useful classification of stakeholders for many developing countries is the following (on the Senegal River: Adams 2000):

- the local population,
- national government bodies, such as irrigation services,
- international donors,
- international NGOs.

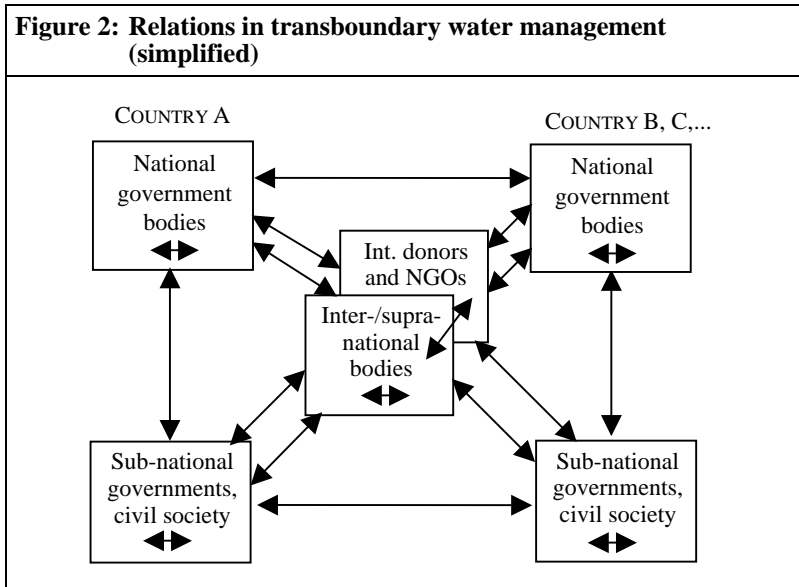
The prime concern of the local population is usually to safeguard their livelihood. National government bodies may focus on the interests of the country as a whole, the interests of the capital, the interests of the ruling elite or the specific sectoral interests that they represent, such as commercial farming or hydropower production. International RBOs are usually intergovernmental and often sectoral. Consequently, they focus on the same broad types of interests. When the interests of the local population and national government bodies differ, international donors may favour either. International NGOs usually support the local population or the local environment, which is not always the same.

The need for "multi-scalar analysis"

Concepts such as "local population", "water user" or "local government" can be as abstract as the concept "state." They may hide important distinctions, such as gender, ethnicity and profession (Trottier 2003). Which distinctions are important cannot be decided in advance. "Multi-scalar analysis" is needed that looks beyond the "states" and includes the regional and local levels in the analysis. Non-water issues may need to be considered as well, since water is just one aspect of the relations between groups and individuals involved. (This also applies to the relationships between the nation states.)

There is a moral side to multi-scalar analysis as well (e. g. Nicol 2003). Focusing exclusively on the interests and goals of the "states" means in practice focusing on the interests and goals of national governments. This may result in too little attention for the interests and needs of underprivileged stakeholders. For example, according to the policy of the govern-

ment of Senegal, the international cooperation on the Senegal River is a success. Large dams have been built and irrigated agricultural land has increased. However, reportedly (Adams 2000) this proved to be at the expense of flood-recession farming, fisheries, the environment and the health of the local population. The dams on the Salween River in Myanmar provide another example. These could be seen as an example of effective international cooperation if one ignores the fact that Myanmar is using forced labour to construct them (Moe 2000; US Department of Labor 2000).



Public participation

Apart from multi-scalar analysis, public participation may be called for. Public participation is generally believed to improve transparency and democracy, increase the quality of decisions and promote public acceptance. More information becomes available for decision-making, expertise and creativity among the water users can be used, and the chances of effective implementation are maximised. The chances of agreements that serve only some interests are minimised (Mostert 2003c; Budge 1996; Drafting Group 2002; Mostert 2003a; Webler / Renn 1995).

It can be difficult to organise public participation in large international and often multilingual river basins. There are practical issues to be addressed, and in addition there is often ideological or political resistance against public participation. Moreover, too much transparency may limit the possibilities for negotiators to freely explore possible solutions. In some cases the participating members of the public can be asked to respect the confidentiality of the negotiations or parts thereof. The international NGOs participating in the *International Rhine Commission* have done this (see also the section 2.6).

2.5 The role of information

Transboundary water management is the result of interactions between different stakeholders. At the same time it is a function of the perceptions of the stakeholders concerning the issues at stake (Craps 2003). Transboundary water management is often very political, but there is always a role for information exchange and joint research ("joint information search"; Gray 1989).

Information exchange and joint research serves several purposes:

- It helps to identify joint development potentials and can result in a common factual basis for reaching agreement.
- Early notification of unilateral initiatives can prevent the development of conflicts.
- Information exchange and joint research is also a good first step in developing cooperation: it can help to develop trust (Dieperink 1997; Savenije / van der Zaag 1998b; Nicol 2003).
- Good information increases the likelihood of agreements that are technically and economically feasible, deliver the promised benefits and produce no significant negative side-effects.

Joint research involving several stakeholders is likely to result in fewer technical controversies than research by one of the stakeholders only. Research is never completely value-free. It involves selection (which effects to predict? which alternatives to develop and assess? what to report and how?), interpretation and uncertainty. If research is not transparent or does not reflect the concerns of all major stakeholders, it is unlikely to serve as a basis for agreement and is very likely to become contested.

The information to be exchanged and the research to be conducted concern the state of the water resource as well as factors that could affect the resource (Grossmann 2005). Moreover, information about the concerns of the different stakeholders should be exchanged. If all stakeholders recognise each other's concerns, this will help in developing an agreement that is acceptable to all concerned.

2.6 Experiences

The previous sections of this chapter are partly based on literature on collaboration and negotiations (especially Gray 1989) and partly on case studies from Africa and other parts of the world (Mostert 2003b; Burchi / Spreij 2003; Wirkus / Böge 2005). Altogether, the experiences in more than 40 basins were taken into account. The most common transboundary issues in these basins were water scarcity and water allocation, followed by water pollution, shipping, hydropower development, flooding, fisheries and boundary issues. Nature protection and development was mentioned a few times as a topic for cooperation, but was an important issue in at least nine other cases.

Reaching agreement

In the 40 plus cases agreements were reached under different circumstances. In some cases an urgent problem had to be solved, such as water allocation in the Indus basin after the partition of India and Pakistan. In other cases the basin states wanted to develop the potential of their basin (Senegal and the Orange River). In some cases changing political circumstances offered new opportunities, such as the end of the Apartheid Regime in South Africa and in Central Europe the end of the Cold War.

Reaching agreement usually took between one and 100 years (the Alpine Rhine case: Marty 2001). The shortest periods usually relate to framework agreements that require further elaboration (Amazon) or to the modification of an existing ineffective regime (Senegal River). Such cases apart, the evidence suggests that the development of effective international cooperation takes at least ten years.

In several cases international relations were strained and parties are not willing to negotiate (for instance the Ganges–Brahmaputra, although bilat-

eral agreements exist). In some cases agreement was reached despite strained relations. Examples include the Indus River, the Senegal River and Lake Peipsi. In other cases international water issues were solved after relations had improved or as part of an effort to improve relations (the Rio Grande).

Reaching agreement may be difficult even when the issue is joined development of the resource with benefits for all countries involved. Reasons for this include complexities of project planning (Klaphake 2005), inequalities in expertise, internal conflicts of interests, strained international relations, lack of trust that the other parties will honour their side of an agreement and limited capacity to enforce compliance.

In many cases there was a conflict of interests between the upstream and the downstream states. In a few cases this conflict could be overcome through issue linkage (the Meuse and Scheldt, to some extent the Euphrates and the Colorado River). In at least one case side payments were offered to the polluting country (the Rhine). In some cases external donor funding may have played a role (the Niger River). In at least one case military strength may have contributed to the conclusion of an agreement (the Mahakali River between Nepal and India), but implementation of this agreement proved to be very difficult. No examples of the "slag cutting" or "unforeseen consequences" (Box 1) were found.

The most common and powerful factor influencing the conclusion of agreements was the wish to develop or maintain good international relations. When relations are good, countries are willing to compromise on some points that are more important for the other countries than for themselves, trusting that this will be reciprocated. Investing in good relations usually has long-term benefits for all countries concerned that outweigh the short-term benefits of less cooperative behaviour. Factual controversies are less likely, more learning can take place, negotiations may be shorter, there is less need for strict compliance procedures, and management can be more flexible.

Organisational frameworks

The agreements that were reached obviously depended on the issues that were addressed. However, they all involved the establishment of a RBO or were negotiated in the framework of such an organisation.³

The simplest organisational framework found is the *Permanent Indus Commission*. It consists of two commissioners only, one for Pakistan and one for India. The most complex framework is that of the OMVS (Senegal River), with a *Conference of the Heads of State*, the *Council of Ministers*, the *Office of the High Commissioner* (with several departments), three advisory bodies, *National Offices* and two separate companies for managing the dams in the river (SOGED and SOGEM). A relatively common framework in Europe consists of a general assembly with high-level civil servants, working groups on specific topics with governmental and non-governmental experts, irregular ministerial conferences, and an independent but relatively small secretariat. Examples include the Rhine, Danube, Meuse and Scheldt commissions.

The tasks and powers of the different organisations differ significantly, but three main types exist:

- Some RBOs deal with the *integrated development* of a river basin. These are to be found mostly in the so-called developing world. They often coordinate donor financing and are typically large. A prime example is the *Mekong Commission*.
- Other organisations deal with the *integrated protection* of river basins or other freshwater resources. They are to be found mostly in the developed world ("developed" referring both to the economy and to the water resources). Examples include the European commissions referred to above. They coordinate research and monitoring (but do not do this themselves) and organise intergovernmental discussions on the river concerned.
- The third type of organisation has *very specific tasks*, such as shipping, water allocation or the management of a particular hydropower dam. One example is the *Zambezi River Authority* (Zambia – Zim-

3 In this report the term "river basin organisation" refers to all types of river basin entities. Others authors reserve the term for river basin entities with more-or-less independent competencies and an own apparatus.

babwe), whose main task is the joint management of the Kariba Dam. These organisations may be quite small. Unlike the other two types, they may have significant regulatory powers and are then true "river basin authorities".

Financing

The costs of the RBO are usually borne by the member states on an equal basis or on the basis of surface area in the basin or another political agreement (Burchi / Spreij 2003). Tasks coordinated but not executed by the commission are usually financed by the country concerned. The costs of joint infrastructure projects are usually borne by the member states in proportion to the benefits they derive from these projects. In some basins a jointly operated fund exists to finance works (for instance the Rio de la Plata).

Both the member states and the commission itself can and sometimes do get financial support from international donors. In some river basins this is even the most important source of finances. It has been argued that donor financing is not the most sustainable financial solution for the long or even the medium term. Much more certain would be high political commitment, trust among parties, and stakeholder and civil society support (Development Policy Forum 1998).

River basin organisations could also raise their own funds through the sale of electricity, water or consultancy services and through other economic activities. This is in fact quite rare. It could lead to a conflict of interests if the RBO is also the regulator of these activities. Enforcement may then become problematic (the "poacher and gamekeeper problem") and the regulations themselves may become biased. Similar but smaller problems can occur if a RBO combines commercial functions with policy making and planning.

No conflict of interests needs to occur if RBOs only manage infrastructure or implement policies and regulations. An example is the *Zambezi River Authority* (although its official functions include policy as well). The ZRA charges for the water that it delivers to the two electricity companies of Zambia and Zimbabwe. However, it is important that a good policy and good regulations are in place to ensure that the operations of such organisations do not cause negative side-effects for the environment or for riparians.

Public participation

The tasks of many RBOs include information exchange, and many have public relations and communication departments. Many also publish reports and maintain websites. In most cases, however, citizens and NGOs do not have a right of access to information. Information exchange is often limited to exchange between the states party to the agreement. Participation in decision-making is even more limited. Many RBOs may invite observers to their meetings, but these are usually international organisations, international donors, and other government bodies.

The exceptions to the rule are the North American bodies and the Rhine and Danube commissions. They have very informative websites, publish many reports, mostly free of charge, and often organise consultations (Assetto / Mumme 2000; Milich / Varady 1999; Mostert 2000a; Chenoweth / Bird 2000). International NGOs often participate actively in the discussions in the plenary commission and the various subsidiary organs. National NGOs are frequently involved in the national preparations for the meetings of the commission and in the national implementation of its decisions.

In Africa public participation has been organised in the framework of the *Lake Victoria Environmental Management Project*, organised at national and regional levels and financed largely by Sida. Moreover, water users associations have been established in different places, among others in the Lake Chad Basin (*Kano River Irrigation Project* and the *Hadejia River Barrage Project*) and the Senegal basin (Meinzen-Dick 1997; Wirkus / Böge 2005)

Effectiveness

Information about the effectiveness of international agreements is limited and, as far as can be seen, the experiences are mixed. Most of the organisational structures that have been agreed upon have been established, sometimes with some delay. Many substantive provisions have been implemented: river bends have been cut off, dams have been built, water allocation rules are being observed, etc. There are, however, exceptions (e. g. Adams 2000; Hey 2000). Some agreements are violated and others are simply not implemented. This is especially true for broad framework agreements.

The ultimate test of transboundary water management is whether it delivers the benefits foreseen and whether any significant negative side effects occur. Evidence is scarce and had already been discussed (Rhine, Senegal River). A key question is: benefits for whom?

3 The roles of development cooperation

As argued in the previous chapter, transboundary water management is driven by the perceptions and motivations of the major stakeholders. In addition, however, international donors can play a positive role (Savenije / van der Zaag 1998a). This chapter tries to promote reflection on their role. It discusses in which basins and in which phases of transboundary water management donor involvement could be useful and which strategies can be used. Moreover, it discusses the instruments that can be used in the different strategies. Special attention is paid to the issue of donor coordination. But first, the available information sources are discussed.

3.1 Information sources

Basic information

Information on donor involvement is scarce. The most complete database on official development assistance and official aid is CRS / Aid of the OECD (www.oecd.org). CRS / Aid incorporates data from OECD's DAC (Development Assistance Committee) members and gives financial data up to the level of individual projects. It contains no information on the activities undertaken or on the national or transboundary character of the projects.

Much more detailed is the overview of the projects within Global Environment Facility's (GEF) *International Waters Focal Area* (www.iwlearn.net/projects). To date, 691.59 million US\$ have been spent in the Focal Area (GEF 2004). The overview contains links to websites, gives e-mail addresses of contact persons, and can be searched in different ways.

The European Union has funded the preparation of an EU Donor Atlas with details per (EU) donor, sector and recipient (Development Strategies 2004). The Donor Atlas is based largely on CRS/Aid. It shows that in the water and sanitation sector Germany is the biggest EU donor, followed by

the European Community, France and The Netherlands (301, 150, 141 and 120 million €/ year respectively). But like CRS, it gives little information about the types of activities that are supported.

In addition, many donors and implementing organisations have their own homepage, such as GTZ (www2.gtz.de/transwater/english/program.html), the European Union's Water Initiative (www.euwi.net), Sida (www.sida.se), USAID (www.usaid.gov) and Dutch Development Cooperation (www.minbuza.nl). With some effort, it is possible to find out in which basins these donors are active, but generally there is little or no information about individual projects.

Information specifically on the Limpopo, Orange River, Zambezi, Lake Victoria and Lake Chad can be found in Wirkus / Böge (2005).

Overseeing the different projects, it is clear that involvement in transboundary water management does not necessarily imply involvement at the international level. Many donor-sponsored activities take place at the national or even local level. This may reflect the role of national factors in transboundary water management (section 2.4), as well as the difficulties of addressing the international level directly. Sometimes no international organisations exist that could act as a counterpart or "beneficiary" (e. g. in the Nile basin: Jaspers, personal communication). Moreover, donor involvement at the international level may not be welcomed by all basin states.

Evaluations

Evaluations of donor involvement are very scarce. Often, individual projects are evaluated, but these evaluations are usually not publicly available. Systematic evaluations of programmes are even scarcer. Often evaluation is limited to the implementation aspects and the delivery of project outputs. The actual contribution to the development of transboundary water management is usually not assessed (Abrams et al. 2000).

The most informative evaluation is GEF's November 2004 evaluation of its *International Waters Focal Area* (GEF 2004). According to this study, the Focal Area has resulted in new legal regimes for a number of international resources. Most of the work, however, is not so spectacular and consists of "*assisting countries to jointly undertake a series of processes with progressive commitments to action and instilling a philosophy of*

adaptive management. Further, it seeks to simplify complex situations into manageable components for action" (GEF 2004, 2). The study furthermore draws conclusions specifically on the *Focal Area*, which, however, may also be relevant for other programmes, such as the need for clear programme documentation and for sufficient funding for site visits by supervisory staff.

Moreover, important information can be gained from the report of a special session "Facilitating transboundary water management" at the 3rd World Water Forum in March 2003 (GTZ 2003, Box 2). This information is quite normative and consists of a mix of concepts, issues to be addressed and principles to be applied. The "how-question" is not really addressed. For instance, one of the conclusions of the special session was "acceptance of international protocol and other policy frameworks by all riparian countries." But how can international donors promote this?

This paper specifically addresses the how-question and discusses issues such as: where and when to intervene? And which strategies and instruments to use? On top of the information sources mentioned above, it uses the following information:

- the theory of transboundary water management presented in the previous chapter,
- insights and experiences gained in preventing violent conflict (DAC 1997; 2001; Bigdon / Korf 2001; Paffenholz 2001),
- three interviews were held with experts involved in development cooperation (see list of interviewed persons),
- anecdotal evidence (as indicated below).

3.2 Where to intervene?

In section 2.1 the main driving forces of transboundary water management were discussed: sustainable development potential, conflict potential and the perceptions and motivations of the main stakeholders. These driving forces also constitute major reasons for donor involvement. The bigger the development or conflict potential, the sooner involvement is justified. This potential partly depends on objective factors, such as the presence of good

Box 2: Conclusions of the session "Facilitating transboundary water management" at the 3rd World Water Forum (Kyoto, 20 March 2003: GTZ 2003)

Vision and ownership

- Ownership to ensure sustainability to the process
- Ownership is reinforced by positive results and clear benefits from cooperation
- Consensus model for decision making
- Demand driven actions – riparian countries in the driver seat
- Joined vision as basis for cooperation
- Co-ownership with cooperating partners and stakeholders
- There are divers levels of visions

Institutional set up

- Legal framework: Water Act – national water resources management plans
- Harmonisation of policies – make legislation compatible between riparian states
- Accept and build on existing regional and international agreements
- Political process as an umbrella
- Technical process as the proof of success on the ground
- Role clarification

Capacity Building

- Build equal capacity within the countries
- Support for appropriate capacity building, skill and knowledge transfer
- Focus capacity building to areas where it is most needed

Cultural understanding

- Cooperating partners respect and understand the various cultural differences
- Understanding for cultural differences in respect of requirements by the cooperating partners

Finance

- Coordination of funds
- Coordination of financial support by donors – bi- and multilateral
- Direct benefits on the ground from financial inputs
- Basket funding as instrument

Time

- Realistic time-frame for cooperation
- Long term commitment

Framework

- Acceptance of international protocol and other policy frameworks by all riparian countries
- Building a legal framework
- A comprehensive frameworks must include all stakeholders
- Framework providing for sustainability in engagements

Partnerships

- Partnerships at all levels
- Active integration of people on the ground into the process of river basin development
- Active partnerships with all relevant stakeholders

Flexibility

- Flexibility in integrating partners on different levels

continued Box 2:	
<ul style="list-style-type: none">– Basin study as a "starter" - information of good quality exchanged between riparian states– Basins study developed in a gradual and progressive manner– Involvement of commission in the basin study	<ul style="list-style-type: none">– Flexibility to allow a bottom up approach– Flexibility in planning– Political will to enter the process and get involved

sites for dams or water stress. In the end, however, it depends on the perceptions of these objective factors by the main stakeholders and their motivations.

Additional reasons for donor involvement are the need for development, even when the potential is limited, and the capacity of the main stakeholders to forge and implement agreements. If this capacity is large, there is little need for donor involvement. Involvement is justified if this capacity is small and the pertinent donor can help to increase this capacity.

In a recent article, Wolf et al. (2003) have tried to identify basins with a high conflict potential. Using different data bases, they identified 1831 cooperative or conflictive international interactions related to water. They then tried to correlate these interactions with a number of other factors, such as per capita water availability, per capita GDP, climate and type of government (democratic or autocratic). None of these factors were correlated with conflicts. However, they did find some relation between the rate of change in river basins and conflicts. Conflicts were more common and more serious in basins that had recently been "internationalised" due to the brake up of old countries, and in basins where unilateral development took place (construction of dams) in the absence of a river basin organization or technical working group. Using rate of change as a criterion, they identified several basins at risk, including in Africa the Senegal, Lake Chad, Zambezi, Limpopo, Incomati, Orange, Okavango and Kuene basins.

3.3 When and how to intervene?

Donors could intervene in all stages of transboundary water management, but different strategies may be called for. Four different strategies can be distinguished (Bigdon / Korf 2001):

1. *Cooperation or "track I diplomacy"*

The cooperation strategy aims to support the conclusion of an international treaty or another formal agreement between the basin states. Typical instruments are mediation and facilitation.

2. *Collaboration or "track II diplomacy"*

The main concern in the collaboration strategy is not the conclusion of an international agreement *per se*, since many formal agreements are not implemented or do not deliver the expected benefits. Instead, the main concern is to resolve the underlying issues and achieve action on the ground. The collaboration strategy looks beyond the positions taken by the basin states to the underlying interests. It aims to support the basin states in developing a solution that satisfies the different interests involved and stands a good chance of actually being implemented. Instruments include the organisation of informal international dialogues, applied research and studies, and diverse forms of capacity building at the national level.

3. *Transformation or "track III diplomacy"*

Whereas the collaboration strategy tries to develop a solution within the existing social, political and economic structure, the transformation strategy targets this very structure, since it is often here where the root causes of international problems lie. For example, water scarcity may be a problem because the economy of the basin countries depends on very water-intensive crops. Donor involvement could then consist of promoting the introduction of less water-intensive crops. All attention in a transformation strategy goes to the national, regional and local level. Instruments include diverse forms of capacity building, financial assistance for e. g. technology and for developing reform strategies.

4. *Continuing support*

Even after basin states have agreed to cooperate, donor support may be necessary. This may include financing the operation of a river basin organization and support for development projects that have been agreed upon.

Table 1: When to intervene and which strategy to use?		
Donor characteristics Basin states characteristics	Donors <u>without</u> significant political and financial resources	Donors <u>with</u> significant political and financial resources
Unwillingness of one or more basin states to enter into discussions	– Transformation strategy	– Transformation strategy – Cooperation strategy (convening for informal discussions)
Willingness to enter into informal discussions	– Transformation strategy – Collaboration strategy	– Transformation strategy – Collaboration strategy – Cooperation strategy (convening for formal negotiations)
Willingness to enter into formal negotiations	– Transformation strategy – Collaboration strategy – Cooperation strategy	– Transformation strategy – Collaboration strategy – Cooperation strategy (including "power mediation")
After conclusion of an agreement	– Transformation strategy – Collaboration strategy – Continuing support	– Transformation strategy – Collaboration strategy – Continuing support

The different strategies are not mutually exclusive and may succeed each other. When international relations are polarised and basin states are unwilling to enter into discussions, the only option for most donors is to support transformation in one or more of the basin states. Some donors – those with significant political or financial resources – may also try to convene the parties and start informal discussions. Donors may also try to support informal technical cooperation, but if relations are much polarised, even cooperation at the technical level is problematic.

Once basin states are willing to have informal discussions, track II diplomacy becomes an option. Training courses may be held, informal meetings can be organised, etc. Influential donors may use their influence to pro-

mote the start of formal negotiations (track I diplomacy). Yet, track III diplomacy may continue as well.

Once formal negotiations have started, all donors may intervene directly in the negotiations as mediator or facilitator if requested by the basin states. Influential donors may use their influence to stimulate the conclusion of an agreement. Throughout the formal negotiations track II and track III diplomacy may continue.

After the conclusion of an agreement, donors may provide continuing support in the form of financial support for a RBO or loans for development projects. Moreover, track II and III diplomacy may continue (see Table 1).

Within each strategy different instruments can be used. Box 3 gives an overview. They are discussed in more detail in the following sections.

3.4 Exchange of expertise and capacity building

In all phases of transboundary water management expertise plays a role. Different types of expertise may be provided or exchanged, concerning the substantive issues at stake – hydrological, technical, economic, agronomical expertise, etc. – and concerning governance issues – conflict resolution, collaboration, legal and institutional design, etc. The expertise may be presented in an authoritative way – as a way of informing the stake-

Box 3: Overview of instruments for development cooperation	
<i>Exchange of expertise and capacity building</i>	– Arbitration
– (Feasibility) studies and research	– Peacekeeping
– Data exchange	<i>Capital</i>
– Long-term / short-term experts	– Grants or loans for infrastructure projects
– Education and training	– Debt relief (debt rescheduling, debt refinancing, debt reduction and / or debt service reduction)
– Twinning	<i>Financial support for...</i>
<i>Direct intervention</i>	– developing cooperative institutions
– Conciliation	– operations of a RBO
– Consultation	– data sharing and information management
– Pure mediation	
– Power mediation	

How can international donors promote transboundary water management?

holders what to do –, or in a facilitative way – as a way of enhancing learning by the stakeholders (Huxham 1996).

Instruments to improve expertise and management capacity include:

- (feasibility) studies and research,
- data exchange (Grossmann 2005),
- long-term / short-term experts,
- education and training,
- twinning (Box 4).

To be effective, exchange of expertise and capacity building ought to be part of a bigger strategy for water management, to prevent that *"the consultants came in, did their job and left, leaving little other than reports behind"* (Lamoree / Nilsson 2001 on the *Zambezi Action Plan*, quoted in Wirkus / Böge 2005). Another pitfall to prevent is to train *individuals* when the major challenge is *organisational* development.

3.5 Direct intervention

Track I entails and Track II diplomacy may entail direct intervention by international donors in transboundary water management. Donors may provide a communicative link between antagonistic parties, help in clarifying issues and developing solutions, facilitate the negotiation of agreements, use leverage or coercion; arbitrate at the request of parties in the conflict, or even send "peacekeeping forces" (Box 5).

Whether direct intervention has any chance of success and which form to choose depends on a number of factors:

- whether there is a development potential, a conflict potential or an actual conflict;
- whether the principal stakeholders have agreed to start (informal) talks or not;

Box 4: Twinning of river basin organisations

A form of capacity building that recently got a lot of attention is twinning. Twinning in a strict sense implies entering into and maintaining a structural relation between two organisations. These could be two international RBOs, but also two national water management agencies or two water ministries. Twinning in a broader sense includes networking activities involving more than two parties and occasional visits and other exchanges of experiences.

Twinning of RBOs received a lot of attention in the preparations for the 2nd World Water Forum in The Hague in 2000. At the Forum, eight organisations signed a Declaration of Intent, including four international organisations (*Lake Chad Basin Commission, the Zambezi Valley Development Authority, the International Commission for the Protection of the Danube River* and the *International Commission for the Protection of the Rhine*). Until now there is only one example of twinning in a strict sense involving two international RBOs: the *International Commission for the Protection of the Rhine* and the *Rio de la Plata Commission*. In addition, the OMVS (Senegal River) has a twinning agreement with the *Agence de l'Eau Seine Normandie*.

The first contact between the *International Commission for the Protection of the Rhine* (ICPR) and the *Rio de la Plata Commission* was made by the latter commission in 2001. On 17 March 2003, at the 3rd World Water Forum in Kyoto, a declaration of intent was signed. A draft Twinning agreement and work programme were ready in summer 2003, but could not yet be signed. The activities up to then had been financed through the Dutch programme "Partners for Water", but this programme was to end by 2004. The secretariat of the ICPR needed its resources to execute its tasks under the new European Water Framework Directive. Moreover, one member state feared that twinning would amount to nothing more than a "tea party".

In July 2003 these issues were solved. Switzerland had become interested in financing twinning activities and Germany expressed its willingness to finance concrete activities. The twinning agreement itself was signed in June 2004. The activities foreseen focus on flood and drought management, monitoring of water quality, harmonisation of transboundary water quality standards, institutional capacity building and public participation. On these issues documents will be exchanged, a number of workshops will be organised and a few secondments will be organised. A detailed work programme for the next 5 to 10 years is planned to be finalised in February 2005 in Buenos Aires.

Apart from this, in January 2004 the TWIN-basin project started, an associated programme of the *Global Water Partnership*, sponsored by the European Commission (6th Framework Programme) and coordinated by the *International Water Office* in Paris. Rather than a traditional twinning project, it is a network of, eventually, 150 RBOs, universities and other partners. Hundred and twenty scholarships of between 0.5 and 2 months will be disbursed to facilitate the mobility of executives between basins. The project will pay specific attention to transboundary basins. Partners include at this moment two international RBOs: the *Interstate Coordination Water Commission* (Aral Sea) and the OMVS (Senegal River).

Box 5: A taxonomy of third-party intervention

1. *Conciliation*, in which a trusted third-party provides an informal communicative link between the antagonists for the purposes of identifying the issues, lowering tension and encouraging direct interaction, usually in the form of negotiation.
2. *Consultation*, in which the third-party works to facilitate creative problem-solving through communication and analysis, making use of human relations skills and social-scientific understanding of conflict aetiology and dynamics.
3. *Pure Mediation*, in which the third-party works to facilitate a negotiated settlement on substantive issues through the use of reasoning, persuasion, effective control of information, and the suggestion of alternatives.
4. *Power Mediation*, which encompasses pure mediation but also moves beyond it to include the use of leverage or coercion on the part of the mediator in the form of promised rewards or threatened punishments, and may also involve the third-party as monitor and guarantor of the agreement.
5. *Arbitration*, wherein the third-party renders a binding judgment arrived at through consideration of the individual merits of the opposing positions and then imposes a settlement which is deemed to be fair and just.
6. *Peacekeeping*, in which the third-party provides military personnel in order to monitor a ceasefire or an agreement between antagonists, and may also engage in humanitarian activities designed to restore normalcy in concert with civilian personnel, who may also assist in the management of political decision-making processes such as elections.

Source: Fisher 2001, 11

- who initiated the intervention: all stakeholders, a few or only one stakeholder, or the intervening party?
- whether the intervening party only has informal influence or also financial resources and political influence.

Arbitration and peace-keeping are only an option under very specific circumstances, when serious conflicts have already developed. With respect to the other forms of direct intervention, the intervener may offer several services to the parties:

- *Helping the parties to analyse their positions and assess their interests*
The aim could be to prevent polarisation of positions in the negotiations ("positional bargaining") and promote the exploration of possible integrative solutions on the basis of the interests that underlie the different positions ("integrative bargaining"; Fisher / Ury 1981).

- *Organising and chairing meetings and arranging other practical matters in an expert and impartial way*
The facilitator (conciliator etc.) may offer physical space where the parties can meet in private and freely explore possible integrative solutions (Alam 1998). Moreover, in the case of large cultural differences he or she may act as a "cultural interpreter" and thus prevent communication problems (Cohen 1993).
- *Presenting ideas and proposal on behalf of one of the disputants to the other disputants*
Indirect communication may be called for when for reasons of national politics international talks are not possible, when the key players have bad interpersonal relations and when making concessions directly to the other parties would be seen as "loosing face" (Alam 1998; Cohen 1993).
- *Legitimizing procedures and outcomes*
Sometimes a facilitator may be better positioned to explain an agreement to domestic audiences than one of the parties to the agreement, especially when the agreement differs from positions taken previously in public.
- *Suggest, propose or develop solutions*
This only applies to mediation. Responsibility remains with the disputants themselves.

The best-known example of mediation (or "power mediation"; Fisher 2001) is the involvement of the World Bank in the Indus conflict between Pakistan and India (Alam 1998; Baxter 1967, see Box 6). Smaller donors, however, do not have the same leverage. If they are to succeed as facilitator, or even to be asked as facilitator, they have to rely completely on a reputation of impartiality and expertise.

3.6 Capital

The Indus example shows that "power mediation" is often accompanied by the transfer of capital or promises of transfer. Transfer of capital may take several forms:

- grants or loans for infrastructure projects,
- debt rescheduling,
- debt refinancing,

Box 6: World Bank involvement in the Indus conflict between India and Pakistan

In April 1948, after the partition of India and Pakistan, an international dispute arose as India, the upstream state, stopped water supply to Pakistani irrigation canals. This occurred in a general atmosphere of hostility, revolving around the disputed area of Kashmir. Yet, water was important too. India wanted to develop more irrigation areas and Pakistan wanted to do the same and in addition safeguard its present water uses.

The World Bank became involved in the conflict in 1949 when India applied for loans for irrigation development. Later, Pakistan applied for loans as well. The World Bank could not grant these loans because the use of disputed water was at stake. In 1951, the World Bank was officially asked by India and Pakistan to offer its "good offices."

The ensuing negotiations resulted in the *Indus River Basin Treaty* of 1960. Under this treaty, the water of the three Eastern Rivers (tributaries) was allocated to India and the water of the three Western Rivers to Pakistan. Since Pakistan used water from the Eastern Rivers for irrigation, extensive water transfer works were necessary on Pakistani territory from the Western to the Eastern Rivers. While perhaps not economically optimal, these works did allow Pakistan to develop additional irrigation and generate 3,000 MW of hydropower. The works were to be financed from two loans to Pakistan, from a financial contribution by India and from the *Indus Basin Development Fund*, to which Germany and other international donors made substantial contributions. Moreover, the Permanent Indus Commission was established, which was modelled after the *International Joint Commission* (United States – Canada).

It might be difficult to replicate the experiences in the Indus basin. The World Bank had special leverage because of its financing power. Moreover, the World Bank was still a relatively young institution and was interested to develop its reputation. In later years, the World Bank was prepared to offer its good offices in the Jordan Valley and the Ganges Basin, but it was not asked to. At the moment the World Bank, together with other donors, is trying to develop cooperation in the Nile basin, the main carrot being huge development projects when the basin states can agree on a shared vision (Jaspers, personal communication; World Bank 2004; Nicol 2003; Alaerts 2000).

— debt reduction and / or debt service reduction.

The three latter forms are also called debt relief.

By making grants, loans and debt relief conditional, the donors can to some extent influence the policy and management of the recipients. The World Bank, for instance, requires for projects on international waterways that all riparian states are notified and have voiced no objection. If there are objections, the World Bank staff assesses whether the project will cause "appreciable harm" to the interests of the other riparians. In appropriate cases, the World Bank may appoint one or more independent experts to examine the project (World Bank 2001a; 2004, 78; 2001b)

Grants and loans for infrastructure projects can promote international cooperation, but infrastructure projects can also cause international conflicts. Prior notification as required by international law (Vinogradov et al. 2003) and the World Bank may help to prevent conflicts. In addition, environmental and social impact assessment can be useful. The World Bank has a special policy on this (World Bank 1999a; b), but other donors often require these kinds of impact assessments as well, or conduct them themselves (e. g. International Dialogue Forum 1998).

3.7 Financial support

In addition to capital, international donors may also provide financial support for specific activities. These activities can include:

- developing cooperative institutions,
- operations of a river basin organization,
- data sharing and information management (Grossmann 2005),
- Water Cooperation Facility (Box 7).

The costs of developing cooperative institutions and the operational costs of a RBO are significant. Many international as well as national meetings are necessary, involving high travel and subsistence costs. Moreover, staff, office space and office equipment may be needed for the secretariat. Reports may have to be published, translation may have to be funded, an Internet site may have to be set up and maintained, and so on. (The financing of RBOs in general has been discussed in section 2.6.)

International donors have financed parts of the development and operational costs of many RBOs. This includes (Wirkus / Böge 2005):

Box 7: The *Water Cooperation Facility*

A relatively recent development in the field of transboundary water management is the development of a *Water Cooperation Facility*. The idea for an international facility was first launched at the Second World Water Forum in The Hague in 2000 by the president of the *World Water Council*. The role of the *Facility* would be to assist nations with current and potential transboundary water issues, to help bridge gaps between the concerned parties, and to develop and promote common interest for win-win solutions.

Early 2003 the idea was taken up again, and at the Third World Water Forum in Kyoto in March 2003, the Director General of UNESCO announced the creation of the *Water Cooperation Facility*. Following, ideas were developed on how it should be organised and funded, and most importantly, what it should do. A survey was held among RBOs, NGOs, national and international government bodies and academics on all continents about the desired services of such a *Facility* (Robertson 2004). The top seven of desired services (out of 24 in total) was as follows:

1. Designing, implementing and adapting institutional and legal frameworks
2. Capacity building
3. Basin-wide access to knowledge and tools
4. Convening parties
5. Performing joint research projects (modelling, data collection)
6. Creating joint development ventures
7. Research for the anticipation / prevention / resolution of water conflicts

Arbitration was the least popular service and mediation / facilitating the fourth least popular service. Traditional Track I diplomacy therefore does not seem to be in very high demand. This conclusion was confirmed at the *Water Cooperation Facility* Meeting in Delft on 25 and 26 November 2004.

The initiative has until now brought together a number of renowned experts. Presently, further steps are taken to develop the *Facility*, coordinated by UNESCO. The future will tell how it will develop and whether sufficient funds can be attracted.

- the development of the *Limpopo Watercourse Commission* (GTZ),
- *Lake Victoria Fisheries Organisation* (World Bank / GEF through the *Lake Victoria Fisheries Research Project* and FAO),
- *Lake Victoria Fisheries Research Project* (International Development Association and GEF, later Norway and Sweden),
- the development of the *Protocol for the Sustainable Development of Lake Victoria* (Sida).

Financial support for the development and operation of a RBO can benefit the persons involved in the form of employment, international travel and per diems that exceed the subsistence costs and complement meagre regular salaries. This can provide extra stimuli for transboundary cooperation. Yet, if they are the only reason for cooperation, the financial support will not be very effective.

3.8 Donor coordination

Whenever more than one donor is active in a specific basin, donor coordination becomes an issue. Donor coordination can significantly improve donor effectiveness:

- It results in an overview of ongoing initiatives.
- It allows donors to tackle bigger problems by pooling resources.
- It can prevent duplication of efforts and competition between donor projects.
- It can help to identify and fill in gaps.
- It can reduce the management burden for beneficiaries.

Despite these functions, donor coordination is often problematic (e. g. the *Zambezi Action Plan / Zambezi Commission Lake Victoria Environmental Management Project*; Wirkus / Böge 2005). Possible causes include the following:

- Everybody likes to coordinate and play a leading role, but nobody likes to be coordinated.
- Considerations other than donor effectiveness may prevail, such as international reputation or promoting export.
- Policies and priorities of the different donors may differ.
- Internal accounting procedures of donors may result in inflexibility.
- Donors may not be able to make long-term commitments.
- Information exchange procedures and platforms to discuss coordination issues may be lacking.
- Donors have limited human resources and may have other priorities than coordination.

These causes may not be relevant in all basins and for all donors. Sometimes, donors do coordinate their activities. A recent development in this respect is to give a larger role to the beneficiaries and base donor involvement on the needs expressed by them (e. g. European Commission 2005; European Council / European Commission 2000). One example is the EU Water Initiative. As part of this initiative, an African – EU strategic partnership on water affairs and sanitation has been established, involving on the African side the *African Ministers' Council on Water* (AMCOW). The strategy for the 2004–2005 work programme was agreed upon by AMCOW and EU-representatives on 13 December 2003 in Addis Abeba.

Involving the beneficiaries in project development can not only help to coordinate donor activities, but it can also improve ownership by the beneficiaries. Yet, it is no panacea. Beneficiaries do not necessarily cooperate better among themselves than donors do (see for example GEF 2004, footnote 28). If more than one beneficiary is involved, one option is to conclude an agreement between the different donors and the different beneficiaries. An example is the Partnership Agreement concerning Lake Victoria, concluded between the *East African Community* (Kenya, Tanzania and Uganda) and the donors Sweden, France, Norway and the World Bank (Wirkus / Böge 2005)

An essential first step towards better donor coordination is to improve information supply on the individual donor initiatives. Internet nowadays offers ample possibilities for this, but these are not yet fully used (see section 3.1).

4 Recommendations for development cooperation

This chapter contains the conclusions of the paper in the form of recommendations for development cooperation. Recommendations are always given from a specific perspective. The perspective used in this paper can be summarised in two points:

- Normatively: The main purpose of donor involvement in transboundary water management is to promote the development of effective, just and sustainable management institutions for transboundary basins and aquifers.

- Descriptively: The development of effective institutions is driven primarily by the perceptions and motivations of the major stakeholders in the basin (see chapter 2).

The recommendations given in this chapter do not tell international donors what to do. Instead, the recommendations suggest issues that need to be addressed and propose specific actions that can be taken. They are meant to promote reflection by the donors, who should decide for themselves, since they are responsible and also possess information that outsiders lack.

1. Nosce te ipsum

Nosce te ipsum, "know thyself", is the first step towards effective donor involvement. Donors may have motivations other than the promotion of effective transboundary water management. These should be recognised explicitly. Only then is it possible to see whether and how they can be accommodated without jeopardising the promotion of effective transboundary water management, or whether they should be given a lower priority.

Donors should also recognise their own possibilities and limitations, such as their financial resources, political influence, expertise and experiences. These factors influence in which basins and in which stages of transboundary water management they can make a contribution, and which strategies and instruments they can use (section 3.3).

"Know thyself" is important for all stages of transboundary water management, for all donors and for all forms of donor involvement. However, it deserves special attention when evaluating past donor involvement (recommendation 4) and deciding on new programmes (recommendation 5).

2. Donors should build on developments within the basin and promote ownership

Secondly, donors should always realise that they cannot organise transboundary water management from the outside. They can influence transboundary water management in several ways, but if their activities are to be effective, they should build on what is already available in the basin. To be effective, projects supported by donors should not be donor-driven, but should be owned by the countries themselves.

3. All stakeholders should be involved, not just "states"

"States" are legal constructs with a symbolic value. In practice, specific groups and individuals are involved in transboundary water management: individual politicians, sectoral government bureaucracies, regional and local governments, farmers, electricity companies, etc. Some may be involved in international negotiations, others may be needed to get international agreements ratified or implemented and still others may be affected by transboundary water management but lack the means to exert any influence. To improve the chances of effective and just agreements, all these stakeholders should be involved.

This being said, it is no easy task to involve all stakeholders in transboundary water management. International basins are huge, the costs of organising stakeholder participation are high, not all stakeholders are in a position to make optimal use of the opportunities that are offered, and social and political circumstances may not favour stakeholder involvement. But before any development project is approved, proper stakeholder analysis is needed to prevent that the project is "captured" by one national group (GEF 2004, 31). Moreover, in the framework of environmental and social impact assessment procedures the main categories of stakeholders should be consulted. Furthermore, large national and international NGOs could become involved more actively. Finally, stakeholder involvement can be facilitated by decentralising decision-making as much as possible (see section 2.6 and e. g. Assetto / Mumme 2000; Creighton 2000; Drafting Group 2002; IAP2 2004; Meinzen-Dick 1997; Mostert 2003a).

International donors can require different forms of public participation and involve different stakeholders in their own activities, provided there is sufficient willingness among the authorities in the basin. If this willingness is completely lacking, public participation cannot simply be imposed and donors may want to consider other basins to become involved in.

4. Evaluate!

Improving the effectiveness of donor involvement requires that past experiences are collected and evaluated. Evaluation should not be limited to the implementation of projects and the production of project outputs. In addition, the project outcomes in terms of promoting transboundary water management should be assessed. This is methodologically very difficult

but too important for not trying. A first step would be to collect and analyse the individual project evaluations. This can be complemented with questionnaires, interviews with the donor staff and beneficiaries and site visits. The costs would be significant but can be offset by increasing cost-effectiveness of donor involvement.

5. *Review!*

Ideally, donors should only be involved in those basins where the development needs and conflict potential are biggest and where the pertinent donor has the best possibilities to contribute to the development of effective institutions. In practice, donors are already involved in a number of basins and often have made long or medium-term commitments. It is, however, important to review regularly whether their activities are still the most appropriate. Different basins may benefit more from donor involvement or different strategies and instruments may need to be used.

6. *Publicise on the Internet and coordinate!*

Evaluations and reviews and details about ongoing and planned development projects should be published on the Internet. This will facilitate learning from other donors and coordination of donor activities. Moreover, detailed information on individual projects, ongoing and planned, should be published too. This would facilitate better donor coordination. A useful format for project information can be found on the IWLearn site (www.iwlearn.net/projects).

This IWLearn site now contains primarily information about GEF-projects. If agreed with IWLearn and GEF, other projects could be added. Alternatively, a new and bigger site could be developed in cooperation with IWLearn and GEF. Germany could propose in the framework of the *EU Water Initiative* or the Development Assistance Committee (DAC) of OECD that all donors publish their project details on this site.

An internet site may not be enough for improving donor coordination. It should also receive ample attention in the regular evaluations and reviews and be discussed amply among donors. However, an Internet site is an important first step. Individual donors would have no reason anymore for not contacting other donors.

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Recommendations on development cooperation in
transboundary water management

Waltina Scheumann / Susanne Neubert

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Recommendations on development cooperation in transboundary water management

Waltina Scheumann / Susanne Neubert

1 Present state of transboundary water management in Africa

While cooperation in transboundary river and lake basins is a necessity, it is not at all a matter of course. The reason: If it is not possible to satisfy the accumulated demand of all riparian countries sharing a river or lake system, the result may be water-use conflicts of many different kinds. These conflicts are concerned quite generally with water-quantity and water-quality issues.¹ Unlike domestic conflicts over water quantity and quality, which are generally accessible to resolution by a higher-level state authority or by informal means, i. e. by the users themselves, one particular feature of transboundary water-use conflicts is that they can be resolved only through negotiations between sovereign states. Developments in southern Africa show clearly the ways in which access to transboundary water resources depend on political and economic power. The unequal economic power of riparian countries and their unequally developed administrative capacities furthermore have an important influence on the ability of riparians to engage in cooperation.

Africa is a continent exceptionally well endowed with river basins and large inland lakes² that extend over the territories of several countries. We here find both crisis-prone hotspots and a good number of promising approaches to transboundary water management. Today there are international agreements in effect for 20 of Africa's 63 river basins, and in 16 river basins there are institutionalized forums that have the task of coordinating individual national initiatives.

1 The term "conflict" refers to disputes and differences of interests between riparians that may occur when accumulated demand cannot be satisfied. The task of conflict resolution may be approached by cooperative or by confrontational means; under certain - restrictive - conditions, though, the riparians concerned may opt to settle a conflict over water use by violent means.

2 In the present context the term "lake" will be used for all inland lakes.

Despite this limited number of formal coordination forums, transboundary water management has made considerable progress, especially in southern Africa: New organizations have been founded, older organizations re-structured and leaned own, and some such organizations have enlarged their regulatory scopes and fields of responsibility and redefined their functions. The reasons for this must be sought in the overall political constellation given at present, with the Republic of South Africa, the dominant regional power, pursuing a cooperative and pro-integration course. Furthermore, the Southern African Development Community (SADC) provides an overarching political framework conducive to such efforts aimed at transboundary cooperation. Another important success factor must be seen in the incrementalist, pragmatic approach that has been pursued in the development of transboundary water organizations; two features typical of the approach are confidence-building measures and the procedures governing of intergovernmental cooperation that have now been established.

Many promising developments may also be noted for older river-basin organizations like the *Organisation pour la mise en valeur du fleuve Sénégal* (OMVS), the Niger Basin Authority (NBA), and the Lake Chad Basin Commission (LCBC), and a new field of activity for development cooperation (DC) presently appears to be opening up on Lake Victoria. In addition, the founding of the African Ministers' Council on Water (AMCOW) has established a continent-wide cooperation context that has placed transboundary water cooperation on its agenda, and is receiving DC support for the purpose.

By comparison, cooperation along the region's roughly 38 transboundary aquifers is weakly developed, and examples of cooperation may be found only in North Africa, on the *Nubian Sandstone Aquifer System* and the *North West Sahara Aquifer System*. Even though many African countries have increasingly been tapping groundwater resources for agriculture and to supply household needs, very few forms of institutionalized cooperation have been established thus far.

The international donor community has played an important role in the foundation of nearly all river- and lake-basin organizations. It has contributed important financial and technical support for the building and development of such organizations, in taking stock of the current situation, in exchanging data, in developing options for and programs of action, in

supporting international and local NGOs and groups, and it is involved in the funding of infrastructure projects. Apart from international donor organizations, regional actors like the SADC Water Division, the Water Division of the Economic Community of West African States (ECOWAS), AMCOW, and the African Union (AU), via the New Partnership for Africa's Development (NEPAD), also play a role here, and they themselves have been receiving financial and technical support for the purpose.

Germany is engaged at several levels of transboundary water management in Africa: at the international level through the G8 and the EU Water Initiative; at the continental level (AMCOW, NEPAD); at the regional level (SADC), in river- and lake-basin organizations and, indirectly, at the bilateral level, making use of the instruments of financial cooperation (FC) and technical cooperation (TC) in the water sector (water supply and wastewater disposal, water-sector reforms, harmonization of water policies); in the agricultural sector (irrigation and drainage); and in the energy sector (hydropower plants).

In the framework of the BMZ research project, the present study took an in-depth look at five river and lake basins and the institutional forms used there for transboundary water management. An overview was prepared for each of 13 other such basins. However, it became clear during the term of the project that too little attention was being accorded to transboundary groundwater resources, which are equally important for the African continent. The findings and recommendations presented here therefore apply only for cooperation along surface waters.

2 Fields of action in transboundary water management

The five reports presented here have identified a number of general fields of action for transboundary water management. German development cooperation is already engaged in several of these fields, and it would make sense to deepen or to expand this engagement. The actual decision on whether or not to follow up on these issue-specific findings will of course depend on a number of other factors, including e. g. the means available, the comparative advantages that German DC has in certain fields, the activities of other donors, and political-strategic considerations bearing on existing DC priorities, etc. The present final report does not go into these internal DC criteria. The sole aim of the reports, including this

final report, is to identify, from an issue-related perspective, what support partner countries may need.

The fields of action are presented in a table below; some aspects are addressed again in more depth in the recommendations at the end of this report.

First field of action: Improved transboundary coordination of unilaterally planned projects designed to expand water supply

Looking at the river and lake basins that are the subject of the present reports (Orange-Senqu, Limpopo, Zambezi, Lake Victoria, and Lake Chad) as well as the 13 other reference waterbodies, we find that the riparian countries in river basins with a very high level of water-resource development plan to carry out further unilateral projects designed to increase national water supply. Neighboring countries are often not included in these plans. However, the projects need to be coordinated across borders with a view to avoiding negative impacts on both other countries and the waterbodies concerned. Most of these projects are concerned with dam construction and interbasin transfers (IBTs) conceived to cover the water needs of urban centers and irrigated agriculture and to generate electricity (hydropower plants). Table 1 provides an overview of the status quo and the projects planned.

Cooperative basin-level management approaches and strategies can serve to strike a balance between conflicting uses and in given cases to mitigate negative impacts on other riparians. It is often either impossible or too expensive (production costs) to satisfy the rising demand for water or water-related products (energy) within the borders of a single country. Joint transboundary planning is one possible way to minimize the production costs for infrastructure projects. Depending on the initial scenario and the given state of cooperation, joint planning approaches may be integrative and/or cross-sectoral in nature. In the earlier stages it is prudent to limit cooperation to certain aspects of water use that appear particularly relevant for the riparians concerned.

Table 1: Present state and intended uses in the river and lake basins considered in this report		
River / lake basin	State of development	In planning stage – for the most part unilateral
Orange-Senqu	37 large dams ^a and a good number of IBTs, mainly South Africa	Dam for irrigation on the Lower Orange (Namibia, South Africa); water supply for capital city (Botswana)
Zambezi	12 large dams	Use by Angola; irrigation and water supply (Botswana); water supply (Zimbabwe); irrigation (Malawi); IBTs (South Africa)
Limpopo	44 large dams + IBTs, mainly for South Africa	Plans by upstream riparians (dams, IBTs); reduced quantity /quality (Mozambique)
Lake Victoria	Intensive utilization (fishing-related conflicts, environmental problems)	Pipeline (water for Tanzania + Kenya)
Lake Chad	Intensive utilization (shrinkage of the lake and declining groundwater levels, species depletion, pollution, overfishing)	Irrigation and energy (Central African Republic); irrigation (Niger, Chad, Cameroon); IBT from Congo to Lake Chad (navigable canal)
a Dams with a storage capacity of over 12 million m ³ are classified as "large." Source: Compiled by the authors		

Second field of action: Greater consideration of water-quality and environmental issues

Even today, national planning as a rule accords too little attention to water-quality issues and other environmental problems associated with water use, with quantitative aspects continuing to dominate the picture. Another noteworthy aspect is that the focus tends to be on the development and management of surface waters, while hardly any consideration is given to the sizable potential offered by transboundary groundwater resources. Governance and management issues often tend to be sidelined for lack of

adequate awareness of the problems involved and sufficient information on the availability – in both quantitative and qualitative terms – of groundwater resources.

Third field of action: Support for efforts to develop disaster-prevention plans

Even today, there is a lack of comprehensive disaster-prevention plans for overall basin areas. Such plans need to be developed if both countries and individual river- and lake-basin organizations are to be able to respond more rapidly and effectively to unpredictable events and natural disasters (e. g. drought and flood events).

Fourth field of action: Improvement of information exchange and management

The hydrological, agronomic, social, economic, and economic information and data on international waterbodies that are essential for both the operational management of infrastructure and strategic water resource planning are often lacking, inaccessible, or not standardized. Yet information management has a crucial role to play for transboundary water management, for knowledge-sharing on resource availability is key to efforts to defuse use-related conflicts and to develop equitable and reasonable alternative uses.

Fifth field of action: Capacity-building for monitoring and public participation

The existing river- and lake-basin organizations are often unable to effectively carry out their mandates and tasks. To improve their effectiveness, they are in need of appropriate manpower capacities, effective feedback mechanisms to and from riparians, and agreements on procedural rules and other procedures suited to fostering transparency and public participation. There is also a need for capacity-building at the national level to boost the effectiveness of national administrations. This is especially important when there are in this regard major development disparities between the riparians concerned. Reporting on and monitoring of the implementation of intergovernmental agreements tend as a rule to be weakly developed. Another need often encountered is adequate formats for the reports and protocols that the relevant government units in riparian countries require to

acquire information on the activities of river- and lake-basin organizations and to monitor progress in implementation.

Sixth field of action: Financial support for river- and lake-basin organizations

The river- and lake-basin organization that already exist in Africa are often underfunded and heavily dependent on external financial support. Over the long term the riparian countries concerned should themselves fund the work of these organizations, and financial support through DC should be no more than transitional in nature. DC itself should therefore seek to promote the development of sustainable financial and manpower plans and insist that the countries involved meet their obligations.

3 Seven recommendations on the strategic orientation of development cooperation

3.1 An outline of the recommendations

Table 2 (below) presents, in outline form, the recommendations as well as some central propositions on the strategic orientation of DC in the field of transboundary water management. The backgrounds as well as more concrete information can be found in the explanatory section (3.2) that follows the table.

3.2 Explanatory remarks

3.2.1 Recommendation one: Create incentives for cooperation and support benefit-sharing agreements

In view of the fact that there is no automatism involved in the development of cooperation on transboundary lakes and rivers, economic – among other – incentives may play an important role in stimulating such cooperation. This is the idea on which the benefit-sharing concept favored by the World Bank is based. Following the line of argument pursued in Klaphake's report (2005), benefit-sharing may in general be said to be an approach well suited to promoting international water cooperation. The

Table 2: Recommendations on the strategic orientation of DC in the field of transboundary water management	
<p>Recommendation one: Create incentives for cooperation, e. g. through benefit-sharing agreements</p>	<p>When new projects are planned to expand water supply, specifically, to build dams and water pipelines – the classic fields of application for benefit-sharing – DC should continue to insist on adherence to the guidelines of the World Commission on Dams as well as on a comprehensive preliminary examination of the anticipated economic, social, and ecological impacts, or provide support for such efforts.</p> <p>In the preparatory phase of projects with possible transboundary impacts, DC should furthermore always conduct or provide support for a comprehensive assessment of the economic benefits of water cooperation.</p> <p>DC should participate in efforts to highlight the potential economic benefits involved in the joint pursuit of environmental goals. One factor of great importance here – and one that should be supported on a case-by-case basis – is participation of local groups, interest groups, and the public at large in transboundary water cooperation.</p>
	<p>DC should give special consideration to a multilevel approach: In some lake or river basins the focus could be more on building an institutional framework (e. g. in the SADC region); in others, though, it may prove necessary to start out by outlining the possible economic benefits of cooperation in order boost to the propensity of the governments concerned to cooperate (as e. g. in the case of cooperation among the Nile riparians).</p>
<p>Recommendation two: Strengthen information exchange and management</p>	<p>One of the first steps should be to use different analytical instruments to determine what kinds of information are needed for given management tasks and what level of differentiation this information should have. In collecting and recording data attention should be paid to possible synergies with other initiatives; this would e. g. serve to avoid duplications in data acquisition.</p>

Table 2 continued	
	<p>In view of the complexity and volume of the data that need to be collected and processed, this should involve division of labor, with the individual member countries responsible for collection data in their own area of responsibility and river-basin organizations responsible assembling the data and subjecting it to strategic analysis at the river-basin level.</p> <p>If DC provides contributions for a decision-support component, it should bear in mind that the instrument should be geared to the information needs of the actors involved and may prove useful at both the regional and the national level.</p> <p>Introduction of mechanisms that are transparent for both the actors involved and the general public should be given support in particular when the concern is the allocation, protection, and basic supply of – the scarce resource – water. In certain consultation phases, however, withholding information from the public may prove conducive to building confidence. DC should bear this fact in mind and subject it to a differentiated analysis.</p>
<p>Recommendation three: Support the establishment and the work of river- and lake-basin organizations</p>	<p>The establishment of river-lake-basin organizations is an important – though not the only – condition required for successful transboundary water management. DC can use a number of different instruments to promote the process involved in setting up cooperation forums. In view of the fact that transboundary water cooperation is a highly political enterprise, DC will be unable to do much to accelerate the process; what is called for is staying power.</p> <p>Regional and continental organizations like the SADC Water Division and AMCOW should continue to receive support, since they are in a position to provide important impulses for the creation and optimization of river- and lake-basin organizations. Further support could also be provided for the exchange of South-South information and experience by promoting the establishment of centers of competence.</p>

Table 2 continued	
	<p>In the bilateral funding of infrastructure projects, care should be taken in advance to determine whether and what cross-border impacts must be anticipated. If there is reason to fear substantial negative impacts, a risk analysis should be conducted. DC can also advise the organizations concerned on the use of procedural rules (prior notification, no objection).</p>
<p>Recommendation four: Promote the sustainable funding of river- and lake-basin organizations</p>	<p>Most organizations and their member countries are still far from the goal of being able to fund river- and lake-basin-organizations on their own.</p> <p>In principle it would be possible to use fees to cover administrative and personnel costs, assuming that a given organization is both the owner and operator of hydropower plants. DC should seek to ensure that this principle is applied in relevant cases. As regards irrigation projects, implementation of this principle would call for full cost coverage at the national level. Here we find clear-cut links to water- and agricultural-sector reforms at the national level.</p> <p>External funding in support of river- and lake-basin organizations may be justified for a given period of time, especially for weaker countries, assuming it is provided as start-up funding and is earmarked for specific tasks. But DC should make use of different instruments to ensure that member countries assume all costs for organizational work as soon as a certain level of institutionalization has been reached.</p>
<p>Recommendation five: Strengthen public participation in transboundary water management</p>	<p>There are a number of positive examples for participation of interest groups, stakeholders, associations, and NGOs in African river-basin organizations, and it would be important to learn from these examples. It is essential for DC to actively promote participation, since participation presupposes supra-regional coordination of and cooperation between groups and associations. DC can play an active role in developing participation strategies, including the organizational, legal, and financial aspects involved.</p>

Table 2 continued	
	<p>Public participation should be promoted pragmatically and with a view to the situations given on the ground. Among other things, participation is a question of capacities: The river- and lake-basin organizations concerned should envision creating a unit or office in charge of organizing the participation process on a continuous basis.</p> <p>DC should organize a workshop designed to discuss and make accessible participation-related experiences and best practices from developing countries and countries in transition as well as the experiences that have been made with participation along European and North American waterbodies.</p>
<p>Recommendation six: Strengthen donor coordination</p>	<p>Individual river and lake basins are receiving support from – in some cases – ten and more donors. German DC should focus more on creating donor coordination bodies designed to coordinate activities in individual basins. In order to create more transparency, German DC should work for publication of the both projects it supports and the relevant project data. Consideration of and decisions on provision of support to further basins and organizations should involve coordination with other donors.</p>
<p>Recommendation seven: Extend cooperation to include groundwater management</p>	<p>In many African countries groundwater resources are increasingly used for agriculture or water supply, usually without any consideration of the possible use rights of other riparian countries. Cooperative management approaches for groundwater resources should therefore be given more consideration, e. g. through regional standardization of monitoring networks and by the development and use of models.</p>
<p>Source: Compiled from the individual reports as well as from commentaries provided by all parties involved in the project.</p>	

concept's basic assumption is that the importance of such benefit-sharing agreements increases as a function of growing water scarcity, because shortage of water resources continuously raises the economic costs of noncooperation. However, this general assessment of the concept stands in contrast to its low level of dissemination in practice, above all on the African continent.

The difficulties involved in reaching agreements on allocating the benefits of win-win projects must be sought in part in the contrasting interests of the countries concerned. Other obstructive factors include claims to sovereignty focused on water rights, uncertainties over project impacts, insufficient administrative and economic capacities, or conflicting sectoral interests, e. g. cases in which all riparians concerned are interested in expanding irrigated agriculture. One reason why benefit-sharing agreements often fail in practice is that the economic benefits are not transparent (in advance) for individual countries – and it often proves difficult to render them visible.

Most of the benefit-sharing agreements concluded thus far have been concerned with the development of water infrastructure (project type: "joint dam construction"), as a rule for hydropower generation, but also for flood protection. Generally speaking hydropower has the greatest plausibility for benefit-sharing agreements, the reason being that the benefits of such projects are relatively simple to estimate and can usually be assessed on a consensual basis. For this reason there is good reason to assume that in the future benefit-sharing agreements will continue to be concentrated mainly on river development and exploitation of additional water resources. In South Africa in particular, transboundary water pipelines¹ are an important option on the water-supply side. Politically, it is far easier to allocate additional water resources than it is to reallocate existing water uses under conditions of absolute water scarcity.

In DC practice, the programmatic call for win-win solutions in water cooperation may therefore imply one-sided support for dam construction and transboundary water pipelines. In view of the fact that ecological, social, and economic impacts have in the past often been given too little consideration, DC should continue to work for adherence to the guidelines of the World Dam Commission; and as far as engagement in dam and pipeline projects is concerned, DC should continue to insist on a comprehensive preliminary assessment of the economic, social, and ecological impacts that may result from such projects.

1 The best-known project of this kind is the Lesotho Highlands Water Project, mainly because of its transboundary water-transfer function and the financial transfers that accompany it.

Most of the existing benefit-sharing agreements concluded thus far cover projects whose economic benefits for the countries involved are fairly easy to calculate (hydropower plants or dams). By comparison, the benefits stemming from projects designed to improve water quality, protect biodiversity, or to jointly manage groundwater resources are more difficult to assess, and accordingly they are very seldom calculated on a transboundary basis. This is the reason why there are very few examples of benefit-sharing agreements for this kind of project.

In advance of projects with possible transboundary impacts, DC should always insist that a comprehensive assessment of the economic benefits of cooperation be conducted, since estimates of this kind constitute an important precondition for such intergovernmental agreements. At present the low "visibility" of the positive effects of cooperation must be seen as an important obstacle to the further development of transboundary cooperation. While the relevant costs of cooperation for individual countries can often be directly estimated, this is frequently not the case when it comes to the benefits. Finally, DC should work to ensure that the potential economic benefits are highlighted for projects involving the joint pursuit of environmental-protection objectives (improvement of water quality, conservation of freshwater ecosystems, minimum runoffs).

Due to the social risks and the potential environmental impacts of transboundary benefit-sharing agreements, it is essential to ensure should that such agreements are embedded in a comprehensive development strategy. The lines of conflict over water use in Africa are drawn not only between states but also, within countries, between different sectors, forms of water use, and population groups. Since in the African context benefit-sharing is also concerned with allocation of the benefits within countries, participation of local groups, interest organizations, and the general public in transboundary water cooperation is a matter of considerable significance.

At present it is not possible to derive any general propositions on whether functional and bilateral approaches increase the probability of benefit-sharing mechanisms or whether multilateral and integrative management approaches are more likely to prove conducive to the adoption of such mechanisms. In the end, this depends in large measure on the concrete problem context and the object of cooperation. In developing water infrastructure, above all in dam construction, more bilateral and sectoral approaches have become established and proven to be functional. The com-

paratively low transaction costs involved are also a good reason to decide in favor of a narrow definition of the object of cooperation as well as for limitation to those riparians that are immediately affected by a given cooperation project. On the other hand, in certain problem constellations multilateral and comprehensive approaches to transboundary water management offer the possibility to negotiate larger packages.

Against this background, DC might be well advised to opt for a multilevel approach: In some river or lake basins the focus may be more on building the institutional framework (e. g. in the SADC region), in others, though, it will be necessary to start out by outlining the economic benefits of cooperation as a means of fostering the propensity of the governments concerned to cooperate (e. g. cooperation among the Nile riparians). Further development of regional water agreements may facilitate the establishment of benefit-sharing agreements by creating and clarifying the conditions needed for negotiations and reducing potentially obstructive asymmetries between the riparians concerned. Establishment and further development of river- and lake-basin organizations can also increase the likelihood of win-win projects by creating a stable and confidence-building institutional environment.

3.2.2 Recommendation two: Strengthen information exchange and management

The statements made in the following are based essentially on the report by Grossmann (2005). Organization and provision of information for joint use is one of the most important principles of transboundary water management and at the same time one of the core tasks of river- and lake-basin organizations. If water-related problems are to be solved cooperatively, it is necessary for all riparians to be familiar with all of the facts they need to (a) negotiate an equitable and reasonable share of the water resources concerned and (b) prevent any significant damage beyond their borders. Suitable information is also needed to identify win-win solutions. As a matter of principle, it is important to distinguish here between information needed for strategic planning, i. e. as a basis for intergovernmental negotiations, and information needed to manage water infrastructure.

In promoting transboundary water management, DC should not lose sight of the tensions between levels of publicness of different kinds of informa-

tion. When the issue at hand is the allocation, protection, and basic supply of scarce water resources, it is important to adopt transparent mechanisms to facilitate the participation of all stakeholders; this means that information must be largely public in nature (see Recommendation 5). On the other hand, transboundary water management is for the most part a task for which the state is politically responsible. If riparians hold back information for strategic reasons, a joint database – one available not to the public but only to the government authorities of the parties to an agreement – may serve as an important confidence-building measure for transboundary consultations.

Instead of issuing sweeping calls for more data, it would be important to start out by asking what types of information with what level of differentiation are required for specific management tasks. This, however, presupposes that the relevant actors are roughly familiar with the problems involved along the waterbody in question; these problems can be determined on the basis of what is known as a transboundary diagnostic analysis. Should additional basic information be needed on the status of water resources, it will be necessary to look into whether and to what extent there is a need to improve the information base as a means of more closely defining the options actually available – and whether the effort is worthwhile. In early phases of project initiatives, scoping, i. e. definition of the framework involved, can be used as a means to lower the costs of information acquisition.

Depending on the form of intergovernmental organization involved, there are different ways to divide up the central tasks of information provision between national authorities and international river- and lake-basin organizations. Whether or not the development of joint but independent analytical and planning capacities at the basin-organization level leads to duplications will depend on the capacities available in the riparian countries concerned. DC should for this reason bear in mind the interactions between the building of national institutions and the development of relevant forms of cooperation. As far as the complexity and the dimensions of this task is concerned, experience indicates that one promising approach is a division of labor between the member countries responsible for data collection in their sphere of responsibility and an international river-basin commission in charge of assembling and strategically analyzing the data at the river-basin level.

The important instruments of data provision include information systems and models that can be used to simulate water yields and the effects of different management strategies on water balances. If DC supports a decision-support component, it should ensure that the instrument is geared to actor information needs and will serve a useful purpose at both the regional and the national level. Furthermore, these systems should be anchored in appropriate administrative units of both the international river organization and the national authorities (ownership). There must also be consensus on the assumptions, methods, and technical descriptions to be used, and the systems must be accessible to all users and decision-makers.

In supporting transboundary water management, DC should seek to achieve synergies, e. g. by means of close coordination with other national and international initiatives. This applies for (a) generation of data and basic information and (b) analysis and research. Close integration of running programs² into information-acquisition strategies is one direct way to facilitate the work of river- and lake-basin organizations. Preparation and dissemination of documentation standards and requirements and information systems is one way to ensure that the information collected on and by individual projects remains accessible for other uses. International research programs – like e. g. the GLOWA program on Global Change, which is supported by the BMBF – may also provide contributions to optimizing databases and analyzing possible options for action.

3.2.3 Recommendation three: Support the establishment of coordination and cooperation forums

Following the arguments presented in the report by Mostert (2005), transboundary water management may be understood as a cyclic process that, in the ideal case, involves three phases. In a first phase the countries concerned decide whether they are interested into entering into negotiations in the first place; the interests involved may differ to such an extent that

2 To cite some examples, the WMO's HYCOS program on optimizing hydrological measuring networks, ESA's TIGER program on provision of earth-observation data, UNESCO's FRIEND analysis and model-development program, groundwater-related data provided by the International Groundwater Resources Assessment Centre (IGRAC), the UNESCO-IHP/IAH International Shared Aquifer Resources Management initiative (ISARM).

some countries may not anticipate any improvements from negotiations. In the second phase the countries concerned conduct negotiations on the establishment of river- or lake-basin organizations as well as on certain proposals (projects, programs of action, strategies). As a rule procedural rules will also be the subject of negotiations in this phase (conflict-settlement procedures, data-sharing, etc.). It is in the third phase that agreements are implemented (Mostert 2005; see also the report by Grossmann (2005).

River- and / or lake -basin organizations should be supported as platforms for negotiations; such organizations can serve to reduce the likelihood that conflicts over water use may escalate in that their work is based on binding procedural rules that govern the ways in which conflicts are dealt with. Such organizations play an important role in information provision and ensuring the acceptance of relevant information that may be of central importance for the development of and decisions on alternative resource uses. They can also monitor the implementation of agreements and function as a central liaison partners for an overall river basin. This all serves to bring about a type of support that is both regionally oriented and integrated and facilitates coordination between the donor organizations involved (KfW 2002).

The establishment of river- and lake-basin organizations is itself the result of negotiations in which sovereign states signal their willingness to cooperate. The different mandates and task areas involved may be seen as indicating different degrees of cooperation, but also different levels of willingness on the part of riparians to delegate rights to such organizations. In any case, river- and lake-basin organizations are an important – though not the only – condition required for successful transboundary water management. We can identify three organization types that reflect different stages of cooperation:

- negotiating bodies and coordinating committees,
- technical advisory committees or advisory commissions,
- river-basin organizations with highly differentiated organizational structures.

The experiences made by the GTZ in the river and lake basins in question indicate that it is essential to accord sufficient consideration to the factor of *time* in efforts to develop transboundary organizations. Depending on

the political constellations involved, it may take many years transboundary cooperation projects to materialize or for decisions to be reached on important and in some cases conflictual issues. In principle, donor organizations can and should seek to use their influence to accelerate such processes of negotiation and cooperation, but they can and should not seek to fundamentally alter these processes in terms of substantive considerations or the timeframes involved. What is called for here is long-term donor engagement.

Transboundary water management is above all a political undertaking, and not merely a technical matter. It is this that often makes the process of working out agreements a protracted and difficult matter. On the other hand, though, this state of affairs can be turned to come up with positive effects that go beyond the narrow field of "water management," e. g. in the fields of crisis prevention and regional security, in efforts to strengthen rule-of-law and participatory structures, and in promotion of economic and political integration.

Regional and continental organizations like the SADC Water Division and AMCOW should continue to receive support, because they may generate important impulses toward creating new river- and lake-basin organizations or optimizing the work of existing organizations. And the establishment of centers of competence can serve to further promote the ongoing South-South exchange of information and experience.

In quite general terms, DC can make use of various instruments to promote the willingness of riparians to engage in negotiations and continuous cooperation in river- and lake-basin organizations, taking care to ensure that these instruments are geared specifically to individual fields of action (Table 3).

However, Mostert (this volume) points out that no systematic evaluations have yet been performed on the impacts of these instruments: As a rule, individual projects are evaluated; hardly any systematic studies have been published. There is an urgent need to redress this situation.

Of all of these instruments, it is the financing of infrastructure projects that poses the greatest challenge. It is true that it is possible to reach agreement on some projects directly with river- and lake-basin organizations; the KfW e. g. is carrying out projects in the energy sector together with the

Table 3: Instruments used to promote cooperation	
<p><i>Exchange of expertise and capacity-building</i></p> <ul style="list-style-type: none"> • (Feasibility) studies and research • Data exchange • Long-term / short-term experts • Education and training • Twinning • Organizational development • Technical and advisory services 	<p><i>Capital</i></p> <ul style="list-style-type: none"> • Grants or loans for infrastructure projects • Debt relief (debt rescheduling, debt refinancing debt reduction and / or debt-service reduction) <p><i>Financial support for</i></p> <ul style="list-style-type: none"> • development of institutions of cooperation • operations of basin organizations • data-sharing and information management
<p>Source: Mostert 2005, 22 (modified by the authors)</p>	

Organisation pour la mise en valeur du fleuve Sénégal (OMVS) (contracting party and institution in charge of the project). But this is more the exception than the rule. Normally credit for infrastructure investments (dam construction, irrigation and drainage, urban water supply and waste-water disposal) are granted on a bilateral basis. Projects designed e. g. to expand irrigated agriculture in a country on the upper course of a river may hold considerable conflict potential. This may, though, also apply for projects that are designed to promote certain industries and may have impacts on downstream water quality. It is for this reason important to examine FC and TC projects to determine whether and – if the answer is yes – what transboundary impacts must be anticipated. If there is any reason to fear substantial negative impacts, it would be imperative to perform a risk analysis (KfW 2002).

In supporting water-related measures that are likely to have impacts on other riparians, DC should continue to insist that countries planning such measures abide by the principle of prior notification, and no engagement should be embarked upon unless the countries that could face negative impacts raise no objections. If objections are raised, the relevant implementing agency should start out by looking into whether a planned project may entail negative impacts; this should be done by independent experts. In such cases DC can provide legal advice to the organizations concerned and condition provision of DC funding on compliance with the rules named above. The principle of prior notification and the no-objection rule

should also be applied for projects eligible for German Hermes export-credit guarantees.

3.2.4 Recommendation four: Promote the sustainable funding of river- and lake-basin organizations

An early study (Berthelot 1989) of five African river- and lake-basin organizations pointed to the problem that despite their legal obligations to do so, member countries as a rule do not provide the funds needed to cover the operational costs of these organizations. This has meant that even without sufficient means, large, personnel-intensive organizations have been created, and this in turn has entailed high administrative and organizational costs. Funds earmarked for other projects have in some cases been misappropriated. The 1998 *Berlin Recommendations* also addressed the need for sustainable funding of river- and lake-basin organizations:

“In terms of their volume, commission projects and their structure and manpower levels should be in line with the funds available. External support should not be seen as a medium- or long-term means to meet the financial needs of commissions”. (BMZ 1999, 163)

Most of the organizations investigated are still far from reaching this goal. Even though the contract stipulations generally contain provisions on budget appropriations (see Box 1), the member countries generally tend to be remiss in their payments.

In principle, administrative and personnel costs could be funded through fees in cases in which the organizations concerned (e. g. the OMVS or the Zambezi River Authority/ ZRA) own and operate hydropower plants. The ZRA, for instance, has, since 1999, levied fees on the two national electricity companies for the water made available to them to generate power, and the authority is therefore largely independent of payments from national water authorities. DC should use its influence to ensure that this principle is applied on other, comparable cases. But experience also shows that this is far more difficult to achieve in the case of dams built to supply irrigation water, since this would necessarily presuppose that the principle of cost coverage had been implemented at the national level. Here we find a clear-cut linkage to national reforms in the agricultural and water sectors.

Box 1: Funding of organization work

As far as negotiating bodies and coordinating committees are concerned, the member countries are obliged to pay for their own delegations and in given cases for external advisers as well. The costs for meetings are borne by the host country. In some cases international donors provide financial support for national delegations to make up for the unequal negotiating capacities of the member countries.

No special funding agreements have been made for the technical advisory committees and advisory commissions investigated (e. g. the Okavango Commission and the Tripartite Permanent Technical Committee for the Maputo and the Incomati). To fulfill their sizable tasks, (recommendations on technical, legal, organizational, and other measures needed to promote the conclusion of comprehensive water-cooperation projects), these organizations are reliant on external funding and ad hoc national appropriations if these tasks are not part of the responsibilities of national water administrations.

As far as organizations with differentiated organizational structures are concerned (e. g. the OMVS), the member countries are responsible for covering payroll costs and the costs incurred in carrying out operational tasks. Comprehensive tasks such as strategic planning, regulation, project implementation, data collection, and monitoring require substantial amounts of funding, which the member countries are also expected to raise. Different keys are used to determine the shares to be paid by individual member countries: (a) all member countries pay the same share; (b) the shares to be paid by individual member countries is keyed to the benefits accruing to them; (c) in some cases payments are adapted to the economic capacities of the member countries (with weaker countries paying less).

Source: Compiled by the authors

In principle, it may be justifiable to provide financial support for river- and lake-basin organizations in the form of start-up funding for a given period of time and for the express purpose of tackling specific tasks. This would make it possible to provide financial support for weaker countries in negotiation processes; as an approach to initiating cooperation, financial support may also be justified as a means of paving the way for round-table talks; and the organizations concerned could also be provided financial support in working out agreements on organizational development and the building of management capacities.

However, DC should also take steps to ensure that as soon as the organizations concerned have reached a certain level of development and institutionalization, the member countries gradually start taking over the costs of

organization work. In view of the fact that the state of organizational development and the spectrum of tasks of such organizations have a crucial influence on the operational costs of these organizations, DC has, in essence, two possible points of departure in seeking to ensure that their financial basis is sustainable: It can seek to influence both organization designs and development and the ways in which given tasks are approached. DC can also use the instrument of organizational development to seek to ensure that the staff levels of commissions are in line with their tasks, and it can introduce financial control mechanisms that render the uses to which the funds are put transparent both for both paying countries and donors. The example of the Niger Basin Authority is of some interest in this respect; the NBA has created an administrative and finance department to which a finance and auditing unit reports.

3.2.5 Recommendation five: Strengthen public participation in transboundary water management

Compared with other issues, the question of "public participation" did not figure prominently in the terms of reference. It would, however, be worth looking into the issue in a separate study that distinguished between two different aspects:

1. international public participation in transboundary river- or lake-basin organizations, and
2. national public participation in cases in which a national catchment area is part of a transboundary river or lake basin.

We find that as a rule there is no provision for a formal participation of the public, of interest groups, or of stakeholders in international river- or lake-basin organizations; one exception here is the Zambezi River Commission. Some river- and lake-basin organizations do, however, involve certain segments of the public in certain programs or projects (see Box 2). These few examples show that approaches involving broader participation and transparency are indeed to be found on the African continent.

Promotion of transboundary water management must do justice to the fact that governments and state machinery can raise no claim to have all of the skills and competence that go into the making of water management. Precisely in regions with weak statehood and weak administrative capacities,

it will prove necessary to pay far more attention to involving nonstate actors in transboundary water management, and this is unlikely to have any negative impacts on the (re)emergence of effective state structures.

Promotion of public participation in transboundary organizations should be approached pragmatically and in ways adequate to the situation given. The reasons are obvious: The areas concerned are all very large river and lake basins with a good number of riparian countries. Government representative in the organizations concerned may not be well disposed toward any engagement of civil society – or willing to accept such engagement only in certain phases of negotiations and on certain issues. The representatives to be appointed to transboundary organizations are generally required to have some sort of legitimacy. Participation, though, calls above all for supraregional coordination of and cooperation among local groups, interest organizations, etc. Such efforts are as a rule in need of organizational and financial support.

The core aspect of any participation strategy is public access to information and data, and this means that the organizations concerned must make relevant information available. Some of the older organizations, like the OMVS and the NBA, have up-to-date information sheets or websites. A second aspect, and one that assumes relevance only beginning at a certain level of organizational development and for measures for which decisions are pending, is concerned with the intensity of participation: Are groups representing the public given a hearing on certain decisions, and do they have a right to become involved in the decision-making process? In any case there is a need for formal arrangements governing who is to participate and for what purposes and who is bear the costs of such participation.

Public participation, however, is also a question of capacities: In the river- and lake-basin organizations concerned, it would be essential to envision setting up an office or unit in charge of organizing the process of cooperation on a continuous basis. Another important factor is the need to develop, on a case-by-case basis, a number of different participation strategies: e. g. involvement of international NGOs when it comes to internationally significant, sensitive ecosystems; participation of the local population, whose interests are unlikely to be identical with those of NGOs; and creation of regional forums. DC can assume an active role in the development of participation strategies.

Box 2: Participation in transboundary river management

The OMVS' Environmental Observatory was set up as part of the *Programme d'Atténuation et de Suivi des Impacts sur l'Environnement*. The Environmental Observatory is a network of governmental and nongovernmental organizations designed to bring together organizations and individuals that provide environmental information. The Observatory has a central database designed to make data available and to publish them on a periodic basis.

Another example is the Okavango Liaison Group, which was founded in 1996 as an NGO coalition and has since gained the right to active participation in transboundary water management.

A similar process can also be observed in the Lesotho Highlands Development Authority (LHDA), where national and international NGOs are speaking up for the concerns of the affected population. This has been formalized in a memorandum of understanding between the LHDA and the interest groups involved that provides for cooperation in certain areas. As regards environmental issues, recently more and more nonstate stakeholders have been included in the ZRA's work on the basis of a so-called Stakeholder Working Group.

Stakeholder workshops have also been organized in the context of the Lake Victoria Environmental Management Project.

Source: Compiled by the authors

DC could e. g. organize a workshop designed to discuss and make accessible experiences and best practices from developing countries and countries in transition and the experiences that European and North American countries have made on their own rivers and lakes (see Box 3). Such workshops

Box 3: European experiences with participation

The established international river commissions in Europe, including the international commissions for the protection of the Rhine, the Elbe, the Danube, etc. grant **universal access to information** via their websites, while the commissions decide from case to case on who should have access to more special information and who should be consulted on what particular issues. As a rule the commissions grant **observer status** to NGOs and associations in certain commission bodies. These groups or organizations are required to meet certain conditions to attain observer status: They need to demonstrate that they have a general interest in water-related issues; the delegates who participate in commission meetings need to be elected by their memberships; and the groups or organizations concerned must themselves have the means they need to participate.

Source: Compiled by the authors

should also make use of the experiences made with the ESPOO Convention on Environmental Impact Assessment in a Transboundary Context and possibly as well with the UN/ECE Helsinki Convention, which also includes countries in transition.

3.2.6 Recommendation six: Strengthen donor coordination

In view of the fact that as a general rule a good number of donor organizations tend to be engaged in various fields of action in a given river or lake basin,³ coordination among donor organizations and between donor organizations and riparian countries is a matter of great importance.

Uncoordinated approaches can lead to activity overlaps, while other important fields are sidelined. On the other hand, coordination between donors and riparian countries is called for in order to adapt possible support to the needs of these countries. Another element associated with uncoordinated approaches has to do with donors who are engaged bilaterally in a river or lake basin, where in particular promotion of individual projects may entail transboundary impacts, and where a coordinated approach to capacity-building may generally be seen as reasonable. Coordination of capacity-building measures that include all riparians of a river or lake basin can serve to boost the effectiveness of river- and lake-basin organizations. German DC should for this reason step up its efforts to create bodies in charge of coordinating activities in one catchment area.⁴

To bring about more transparency, DC should undertake efforts to ensure that the both projects it supports and the relevant project documents are made publicly accessible. In a first step it could (like the World Bank) document its projects in detail on the Internet. This would be an important step, and one that would not be too costly.

German DC could consider together with other donors whether and which other river basins and/or riparians could (should) be provided support. One

3 To cite two examples: over ten donors are presently engaged on Lake Victoria; the number for Lake Chad is over 15.

4 With a view to coordinating its own policies, the BMZ formulates what is known as cooperation projects in which the GTZ and the KfW work together on the basis of a clearly defined division of tasks.

interesting river system is e. g. the *Maputo-Incomati*, where there are at present use conflicts between water-supply needs and the aim of protecting aquatic ecosystems. Efforts to find solutions to these conflicts are being supported by the EU and the Netherlands. The BMZ has commissioned the GTZ to examine the feasibility of an engagement in the *Congo-Oubangui-Sangha Basin*.

3.2.7 Recommendation seven: Extend cooperation to cover groundwater management

Transboundary lake-basin management on Lake Victoria and Lake Chad has already come in for consideration by German DC. On Lake Chad we find clear-cut linkages with groundwater utilization. Often, regions with marked seasonal rainfall fluctuations that tend to be low when averaged over a number of years, i. e. whose surface waters do not offer sufficient supply security, do have, regardless of season, extensive groundwater resources that could be tapped. According to a UNESCO compilation, there are 38 transboundary groundwater systems to be found in Africa. Many of these systems have not yet been properly explored and characterized, and there is thus very little information available on their present state, i. e. on quantitative and qualitative aspects of the groundwater availability there.

The only cooperation projects that can be cited as examples here are found in northern Africa (the *Nubian Sandstone Aquifer System*, NSAS, shared by Egypt, Libya, Sudan, and Chad, and the *North-West Sahara Aquifer System*, NWSAS, shared by Algeria, Libya, and Tunisia). Nevertheless, in many African countries such groundwater resources are being used increasingly for agriculture or water supply, for the most part without any consideration being given to the claims to use rights raised by other riparians. Groundwater resource management should therefore be accorded more attention; this could e. g. take on the form of efforts to standardize regional monitoring networks develop appropriate models.

Because of the semi-arid and arid climate and the complex geological conditions often found on the continent, the regional boundaries of groundwater management areas (catchment areas) seldom coincide with the boundaries of river and lake basins. The BMZ should for this reason initiate steps to examine the feasibility of an African transboundary groundwater systems project.

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