Proceedings of the International Workshop on **Institutional Capacity Development in Transboundary Basins** *Lessons learned from practical experience*

BMZ, Bonn
10-12 November 2008

Co-editors: Reza Ardakanian
Charlotte van der Schaaf

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Acknowledgements

The International Workshop on Institutional Capacity Development in Transboundary Basins was held from 10 to 12 November 2008, at the BMZ in Bonn, Germany. The workshop was jointly organized by the UN-Water Decade Programme on Capacity Development (UNW-DPC) and the International Hydrological Programme of UNESCO (UNESCO-IHP). The activity was coordinated by Dr Reza Ardakanian, Director of UNW-DPC, and Dr Charlotte van der Schaaf, Programme Officer of UNW-DPC, with support of the UNW-DPC team.

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TABLE OF CONTENTS

Foreword by the Director of UNW-DPC

UNW-DPC is a joint capacity development programme of the UN Agencies and Programmes cooperating within the interagency mechanism known as UN-Water. It is hosted by the United Nations University in Bonn. The aim of the programme is to support and strengthen the capacity development activities of the more than two dozen UN organizations and programmes within UN-Water. UNW-DPC is also a member of the UN-Water Task Force on Transboundary Waters.

Managing transboundary waters in a sustainable way requires effective and sustainable transboundary cooperation. Institutional and administrative structures need to be established that facilitate cooperation, guarantee enforcement of regulations and ensure public participation, to advance socio-economic development and ecological sustainability. It is therefore necessary to contribute to institutional capacity development and hence to contribute to building competent institutions capable of sustainable water management.

Because of the importance of this topic, the UN-Water Decade Programme on Capacity Development (UNW-DPC) and the UNESCO International Hydrological Programme (UNESCO-IHP), with kind support of UNECE, GEF and the German Federal Government, has organised this International Workshop on "Institutional Capacity Development in Transboundary Basins - Lessons learned from practical experiences", which has resulted in these workshop proceedings.

The workshop set out to collect and discuss success stories and examples of best practices that have led to the development of institutional capacity supporting effective transboundary water management. The ultimate aim being to provide future recommendations for required institutional arrangements and an assessment of needs for capacity development in this field.

As a significant outcome of this workshop, a number of recommendations were made by the participants on the way forward in developing institutional capacity for sustainable transboundary water cooperation and management and on possible follow-ups of this workshop. In this publication you will find papers describing the history of and the current institutional context of transboundary cooperation in transboundary waters around the world, as well as the outcomes of discussion groups on three main topics related to institutional arrangements for transboundary water cooperation, i.e. *cooperation mechanisms, policy and legal frameworks,* and *funding mechanisms*. We envisage this publication as serving those involved in transboundary water cooperation and management as a capacity development resource for use by international organizations, policy makers and water managers in their consideration of flexible and integrated strategies for transboundary water cooperation around the world.

On behalf of UNW-DPC, I would like to heartily thank all the workshop participants coming from transboundary waters in different regions worldwide (the Americas, Africa, Asia and Europe) and hope that this workshop has offered them an opportunity to exchange experiences and learn from one another. I also would like to thank the workshop co-organizer UNESCO-IHP, as well as the German Federal Government - especially Ms Karin Kortmann, Parliamentary State Secretary, Ministry for Economic Cooperation and Development and Dr Fritz Holzwarth, Deputy Director General for Water Management, Ministry for the Environment, Nature Conservation and Nuclear Safety - for their generous support, without which this workshop would not have been as successful.

Dr Reza Ardakanian

Director of the UN-Water Decade Programme on Capacity Development

BACKGROUND

The International Workshop on "Institutional Capacity Development in Transboundary Basins – lessons learned from experiences" was organized within the framework of the UN-Water Task Force on Transboundary Waters, of which UNW-DPC is a member. Improving and sustaining transboundary water cooperation is part of the overall dedication of the UN-Water Task Force members.

Transboundary water resources, be they rivers, aquifers or lakes, play a significant role for socio-economic development and ecological sustainability worldwide. Managing these waters in a sustainable way requires effective transboundary cooperation. Suitable institutional arrangements at the national and transboundary levels with strong enforcement capacity are a precondition for effective management of transboundary waters and cooperation among riparian countries.

Despite growing attention and support for this topic, institutional capacities of transboundary cooperative mechanisms are often weak compared to the challenges they face. Some of the main institutional challenges are unclear shared responsibilities within national authorities, lack of coordination among them, and weak capacity of staff to cooperate and coordinate with riparian partners and to develop and implement existing policies and regulations

Because of the importance of this topic, the UN-Water Decade Programme on Capacity Development (UNW-DPC) and the UNESCO International Hydrological Programme (UNESCO-IHP), with kind support of UNECE, GEF and the German Federal Government, organised an International Workshop on "Institutional Capacity Development in Transboundary Basins - Lessons learned from practical experiences", on 10-12 November 2008, held at BMZ, in Bonn, Germany.

OBJECTIVES

In this workshop UNW-DPC, in collaboration with UNESCO-IHP and with kind support of UNECE, GEF and the German Federal Government, brought together water professionals involved in transboundary water cooperation with the ultimate aim of providing recommendations for required institutional arrangements for transboundary water management, at the same time as providing an assessment of needs for capacity development in this field.

Institutional arrangements in this respect referred to the policies, procedures and processes in place to plan, legislate and manage development and rule of law, to measure change in progress and to provide oversight over (non-)state actors. The corresponding capacity development strategies focus on ensuring that the best possible institutional arrangements are in place for the particular situation.

The workshop focused on best practices that led to the development of workable institutional arrangements that tackled the above mentioned challenges, as well as developing the capacity required to do so. With this international workshop, the organizers sought to encourage regional follow-up events and help to establish communication between national and regional policy makers and water professionals in the basins.

OUTCOMES

As an outcome, UNW-DPC will establish a detailed compendium of institutional arrangements and capacity development strategies related to the presented case studies and an analysis of the outcomes as an initial step towards developing an institutional capacity development framework, which can be used as a guideline in other transboundary basins. Results of the workshop are also presented in the UNW-DPC World Water Development Report 3 side publication "Institutional Capacity Development in Transboundary Waters", which is presented at the 5th World Water Forum in Istanbul.

PARTICIPANTS

The workshop participants included water professionals and policy-makers from various transboundary waters in South-East and Central Asia, the Americas, Africa and Europe, including the invited speakers. Staff of (inter)national organisations dealing with capacity development in transboundary water cooperation also took part.

WORKSHOP ORGANISERS AND PARTNERS

Workshop Co-organiser

UNESCO-IHP

International Hydrological Programme

www.unesco.org/water/ihp/

Workshop Partners

UNECE

United Nations Economic

Commission for Europe

www.unece.org

GEF

Global Environmental Facility

www.gefweb.org

BMZ

German Federal Ministry for Economic

Cooperation and Development

www.bmz.de/en/

BMU

German Federal Ministry for the Environment,

Nature Conservation and Nuclear Safety

www.bmu.de/english/

Opening Session Speeches

Welcoming Address by Dr Reza Ardakanian, Director of the UN-Water Decade Programme on Capacity Development (UNW-DPC)

Parliamentary State Secretary Kortmann,
Director Dr Holzwarth,
Dr Szöllösi-Nagy,
Honourable guests,
Ladies and gentlemen,

I am very glad to address you today on behalf of the UN-Water Decade Programme on Capacity Development on the occasion of the opening of the International Workshop on "Institutional Capacity Development in Transboundary Basins - lessons learned from practical experiences" and welcome you here at the former Federal Chancellor's office in Bonn, which was the center of the German government politics and seat of the Federal Chancellor from 1976 until 1999. In December 2005 it became the seat of the Federal Ministry for Economic Cooperation and Development.

A little more than one year after the official opening of the UN-Water Decade Programme on Capacity Development - UNW-DPC - at the UN Campus in Bonn, I am very pleased to welcome you all for our second workshop activity here in Bonn in the premises of BMZ, one of the kind supporters of UNW-DPC since our start.

It was at this opening that the State Secretary of BMZ, Mr Stather, kindly offered me to share bread and salt with him as a welcome gift, a traditional German offering for people who have newly moved into an accommodation or office.

Today we are here to also discuss, not exactly the sharing of bread and salt, but at least to discuss about sharing of water and its benefits between people and countries. - Water, the essence of life. - Both, bread and salt are strongly linked in their production processes also to the availability of water. And it is the intelligent management of the water resources that will decide about the future ability of people, countries and societies to produce

enough bread and salt for their survival and development.

As we understand today, the sustainable management of water resources - also in the transboundary context - does not only depend on the individual knowledge of water managers. It is actually even more important to ensure that individual knowledge will be available and kept available for the respective institutions dealing with water.

As such it is the institutional capacity development - and with this the institutional ability to develop from the individual staff capacities into a lively competent institution, able to perform its duties. This institutional capacity development is creating one of the major obstacles to and challenges for development in the water sector.

UNW-DPC is supporting the improvement of capacity and competence for national and local stakeholders in water management and, hence, the delivery of UN-Water members towards the common goals; progress towards the achievement of all the water-related Millennium Development Goals and the implementation of IWRM at national and basin level.

Raising awareness and investing in education and capacity development are our priorities in addressing future water crises. These will also contribute to

improved cooperation and equitably sharing joint water resources for the benefit of the populations.

Especially in a transboundary setting it is important not only to address individual capacities or to develop knowledge of individual water managers. It is even more important to retain the individual knowledge in the respective transboundary institutions, to contribute to institutional capacity development and hence to contribute to building competent institutions capable of sustainable water management.

At the transboundary level, the formation of joint bodies with strong enforcement and organisational capacity, such as river and lake or basin commissions, helps to ensure cooperation between the governmental entities and leads to better management of shared water resources. For these joint bodies to be effective, their institutional and human capacities are crucial. Such joint bodies need to develop institutional and administrative structures that facilitate cooperation, guarantee enforcement of regulations and ensure public participation.

Therefore we have invited representatives from transboundary basins around the world to present their experiences and lessons learned to peers. Depending also on your interest, we would like to make best use of the outcomes and recommendations from this workshop in future follow-up activities, and - if interest is shown - also on the regional level.

One of the planned outcomes will be providing recommendations for required institutional arrangements for transboundary water management and an assessment of needs for further capacity development in this area.

I am very pleased and grateful to say that representatives from the following basins have confirmed their participation to this workshop to exchange their experiences and share with us their lessons learned: Niger, Senegal, Orange-Senqu, Nile, Okavango, North Western Sahara Aquifer System, Harirud, Mekong, the Rhine, Danube, Guarani Aquifer and the Great Lakes. I would like to thank them heartily for their keen interest and motivation to make this workshop a fruitful one.

I would also like to thank all the other participants from institutions and organisations working on the issue of transboundary water cooperation, for showing their interest to travel to Bonn to share with us their experiences.

At this point I would again like to thank the German Federal Government: the Federal Ministry of Education and Research - BMBF- and the Federal Ministry for Economic Cooperation and Development - BMZ - and especially Ms Kortmann who is here with us today at the opening – for their commitment to the UN goals in the water sector, their continuous basic funding of the activities of UNW-DPC, and for their support and the support from the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety – BMU for this particular workshop, and also for joining the organising committee of this workshop.

Additionally I am very grateful to UN-Water and the International Hydrological Programme of UNESCO for their assistance in organising this workshop. And to the UN Economic Commission for Europe - UNECE - and the Global Environment Facility - GEF - for their kind support of this workshop.

Ladies and gentlemen, I wish you an interesting exchange and successful workshop and look forward to working with you to develop recommendations for the institutional capacity development in the context of transboundary basin organisations.

Address by Karin Kortmann, Parliamentary State Secretary, German Federal Ministry for Economic Cooperation and Development

Dr Ardakanian,
Dr Szöllösi-Nagy,
Dr Holzwarth,
Workshop participants,

I am very pleased to welcome you all to the Federal Ministry for Economic Cooperation and Development today!

A little over a year ago, not far from here, I gave the opening speech at the 6th Petersberg Round Table on the topic of "Transboundary Water Management in Africa". Dr Ardakanian, that was where we met for the first time.

Bonn has been home to the offices of the UN Water Decade Programme for Capacity Building (UNW-DPC) since August 2007. We in the BMZ are happy to be able to support the work of this UN organisation.

And support is necessary!

Angel Gurría, OECD Secretary-General, reminded us of that a few weeks ago at the 13th World Water Congress in Montpellier, when he called on those in the water sector to also finally take leave of comfortable untruths: "There was an assumption that there would always be sufficient and cheap water to meet human needs within an environmentally sustainable scenario. Unfortunately, it is now clear that this is simply not true."

And so the challenge for us all is: We must secure a stable balance between demand for water and available supply! Because access to water is not just a fundamental human right and an important indicator per se for human progress. It also lends substance to other human rights and is a prerequisite for the achievement of more far-reaching goals of human development, in particular the Millennium Development Goals.

Therefore, whether you are a politician or a farmer, an entrepreneur or a consumer, few topics are likely to be of such lasting concern in the 21st century as water:

- We are dealing here with issues of personal responsibility and consumption; Technical and political management; Quality and quantity; Priorities and values; with issues of environmental protection, human rights and security!
- We need to decide: What should be regulated by the market and what by the state?
- But above all we must decide what can still be regulated at the local level and where do we need regional or international, i.e. transboundary involvement?

Your workshop today is dedicated to the management of transboundary waters. Plain figures clearly show how important your work is. About 40 per cent of the world's population lives in the catchment areas of more than 260 rivers, lakes and groundwater reserves that traverse national boundaries. They make up almost half the surface of the Earth and 60 per cent of the total volume of freshwater on the planet. Since 1820, according to FAO data, more than 400 treaties and agreements covering water have been concluded between nations. Half of that number has been signed in just the last 50 years!

Researchers from the University of Oregon have documented all water-related "interactions" between nations over the last 50 years. Their efforts reveal that water is both a subject for cooperation and a cause of conflict! On 1,228 occasions water issues have led to concrete cooperation between different countries; compared with 507 occasions that involved – for the most part purely verbal – conflicts. Based on the empirical findings we can say that, over the last 50 years, water was often a driving force for cooperation.

However, the past does not necessarily tell us something about the future, because the pressure on water resources is mounting constantly. We only have to think of over-exploitation or the pollution of water sources by a riparian state, which frequently (and that is something Europe has experienced often enough) results in a neighbouring country suffering massive disadvantages. Thus the potential for conflicts between countries is, for example, increased by large-scale irrigation projects, dams and effluent discharges in the upper reaches of a river or by over-exploitation of groundwater resources.

However, our continents have also enjoyed some positive experiences: for example, Europe has learnt a great deal about sustainable use and protecting river systems from the examples of the Rhine and the River Elbe. Despite considerable political differences in other areas of policy, India and Pakistan have managed to respect and uphold the Indus Water Treaty as a joint basis for action for almost 50 years.

Economic growth, population increase and climate change are threatening to draw a growing number of states and regions into a blind race for resources.

And so there can only be one answer:

Better governance and better management in the water sector! And with that also a rapid expansion of international cooperation in order to ensure sensible and reasonable joint use of transboundary water resources!

As the third biggest bilateral donor in the water sector, the Federal Republic of Germany has always seen promoting transboundary water cooperation as an important priority area of its development policy.

Let me therefore briefly outline the four levels of action within our development policy.

Four levels of action

First of all we are helping to promote the exchange of experience and establishment of rules and regulations at the international level through policy dialogue. For example, through the Petersberg Process that I mentioned earlier, a dialogue forum which we initiated in 1998 together with the World Bank and in which some of you have already taken part. Another example for intensifying international policy dialogue is Germany's lobbying to get international water cooperation onto the agenda of the G8 and other international forums and our willingness to take on direct responsibility within these processes. Thus Germany has taken on the lead role in the G8 for transboundary water resource management in Africa.

Secondly we are involved in efforts to set up exchange processes and strengthen institutions at the regional level. Examples of this are our support for the African Minister's Council on Water (AMCOW), the Southern African Development Community (SADC) and UNESCWA, the United Nations Economic and Social Commission for the Middle East and North African states (MENA).

Thirdly we are promoting the provision of institutional and technical support for watershed organisations, for example on the Nile or the Niger. This we are doing, for example, by seconding experts, or through an intensive exchange of experience, or also by supporting the development of strategies for the joint management of water resources.

The fourth and final level of our engagement is financial support to help make sustainable and efficient use of water resources, for example in agriculture or for power generation, and to protect them, e.g. through reafforestation programmes.

Five theses for successful development of institutional capacities and transboundary water management

Five statements can be elaborated based on the many years of experience chalked up in the field of German development policy; we feel that these po-

sitions are vitally important for the successful further development of institutional capacities for the management of transboundary basins.

1st statement: Transboundary water management needs the political will to engage in dialogue

The political leadership of riparian countries must have the fortitude and the will to engage in dialogue. Because questions relating to the distribution and use of water touch on sensitive policy issues and vital interests of state. By that I mean in particular the needs of industry and agriculture.

Skilful water management is one of the greatest cultural human achievements. For example, the "qanat" – sophisticated underground irrigation systems – ensured good agricultural yields for the people of Central Asia for hundreds of years despite unfavourable precipitation patterns in the region! Already today, some two thirds of total global water consumption is for agriculture and about 20 per cent for industry, leaving less and less for personal use.

Last but not least, the fate of the Aral Sea and its tributaries shows us that short-sighted policies focused on maximising agricultural yield and export revenues can fatally undermine the existence of a whole region within the space of one generation. That is why negotiating across national borders in order to establish rules and institutions for good water management is vital for survival!

This process is often difficult. Sometimes unpopular decisions can be necessary. That becomes particularly clear when you consider the question of costs, which are often left out of the equation. According to the WHO, a household should spend a maximum of 5% of its income on drinking water. However, for privatised utility companies, pro-poor water management is not a priority. For some poor people this can mean that when the price of water rises, the portion of rice gets smaller.

The human right to water does not forbid the privatisation of its provision. However, the state has a special responsibility here, and even when privatisation of the water sector is desirable and makes good sense, governments should never forget that human rights are not a marketable good. Thus, without political priorities and without the political will, we will not get any further in resolving these complex challenges. If that political will is missing at the national or regional level, then there is nothing international support can do to help. If, however, the political will is there, then an international framework can build on it and help forge practical cooperation arrangements.

Thus donor initiatives such as the G8 Africa Action Plan, the EU Water Initiative or the Petersberg Process can offer riparian countries incentives to cooperate and facilitate exchange on neutral ground. The international community also provided valuable stimuli in the case of the Nile Basin Initiative, which Germany is co-financing with a contribution of 7.5 million Euros over a period of 10 years. As a result, an intensive dialogue has been launched on transboundary water cooperation and its consequences for national water policies.

In view of the unmistakable distrust that often colours relations between riparian states, the fact that nowadays the people there no longer question the need for cooperation is an important success. However, it may well take a few more years of intensive effort by all concerned before we arrive at binding, workable agreements. And that means we need the corresponding political will to "stick at it".

The regional organisations offer an especially valuable international framework for strengthening policy in this field. They establish the international rules of play and make it possible to compensate for imbalances in terms of political weight. They thus increase the chance of win-win situations. In regional organisations you always have players with differing views and interests sitting together around the negotiating table. This often makes it easier to negotiate solutions that cover various riverbeds or even sectors.

SADC is an example of how regional organisations can be an important catalyst for water cooperation. In this case the governments of southern Africa agreed on the Protocol on Shared Watercourse Systems, which has formed the basis ever since for the establishment of a series of river basin commissions and concrete goals. Germany has been supporting these efforts at the regional, river basin and national levels for more than 6 years, with a contribution of 8.5 million Euros. In addition, Germany is responsible for donor coordination in this region.

Unfortunately, one important level is often neglected in the process of forming the necessary political will: the parliamentarians. That is all the more regrettable since it is usually the representatives of the people who have to ratify the international treaties. And who, as political allies, are able to make valuable contributions to the political debate at home and to consensus building. In the SADC region, therefore, plans are being made – with German support – to involve parliamentarians more closely in the process of international water cooperation.

My second statement is directed at politicians and experts alike. It is:

2nd statement: Transboundary water management needs patience

International water cooperation is not a topic with which it is possible to score political points over night or with which to suddenly start winning elections.

Forming opinions and decision-making is a complex process: negotiations and dialogue require time so that trust can grow between the negotiating partners and with it recognition of the advantages to be gained from cooperation and the will to implement the agreements reached. And you must be prepared if necessary to try again following a setback.

The (scientific) basis for cooperation must also be in place. For example the hydrological and hydrogeological data. And finally, many impacts take time to unfold. For example in the case of conflict prevention and adapting to the negative consequences of climate change.

Those of us working in German development cooperation are aware that transboundary water management is not a field where it is possible to make a splash with quick success stories. That is why our cooperation projects are planned to run for a long time, up to a decade. We have also embarked upon the difficult but necessary path of supporting the development of adaptation plans. Because it is often in a water-related context that people feel the effects of climate change. To put it bluntly, climate change either means too much water or too little water or water at the wrong time.

Most of the poor countries have so far done little to contribute to global warming. Yet they are the ones suffering the most from the drastic consequences of climate change. Too much water due to extreme precipitation, melting glaciers or rising ocean levels is threatening development achievements, thereby leading to

- Failed harvests and thus competition for scarce food
- The destruction of infrastructure and habitats
- Increasing poverty
- Environmental refugees

At the same time two out of five people living on this planet are already suffering from the effects of water shortages. Climate change will exacerbate these problems and thus lead to

- Loss of agricultural land and ecosystems
- Failed harvests and hunger
- Distribution conflicts
- Environmental refugees

That is why water resource management must adapt to these urgent challenges as a result of climate change.

We are supporting these efforts, for example as part of our cooperation in the SADC region and through our cooperation with the African Council of Water Ministers, where we are providing 9.5 million euros to support a 9-year programme of cooperation between river basin organisations.

3rd statement: Transboundary water management is an interaction of various levels

The key players here are: regional and watershed organisations and national authorities. In order for this interaction to work at all levels, we need to pay attention to the following

First of all the rules of interaction should be formulated clearly and sensibly. That means among other things that the division of labour and responsibilities must be precisely defined, and that the principle of subsidiarity must be taken into account.

Secondly national policy instruments and legislation must be harmonised with agreements relating to transboundary water management. That is why the BMZ is giving support to the Nile countries and the UNESCWA members in order to achieve the harmonisation of their water policies by first identifying shared challenges and national options. We also assisted a SADC working group in advising member states on amending national water legislation, strategies and guidelines in line with the regional water protocol.

Thirdly, in order that all members can play their part in the concerted international cooperation effort, institutional and human skills should be strengthened at all levels, if possible in parallel. We are also using this approach in the SADC region. Here we are not just working with the regional organisation; we are also supporting the capacity building efforts of the regional Limpopo and Orange-Senqu river basin organisations, for example with regard to recruiting staff from the region.

In statement 2, I emphasised that transboundary water management needs patience. Another statement that is equally true is:

4th statement: Particularly good chances of success in transboundary water management lie in combining capacity development and fast-track projects

That means making it clear very quickly that cooperation leads to concrete, tangible advantages for all concerned. If leading politicians from riparian countries and also national water experts can be convinced that everyone can benefit from cooperation, then the overall setting for the watershed institutions will be improved and this strengthens the will to further develop their capacities. Fast-track projects also offer the possibility to boost and put into practice cooperation between national authorities and a river basin institution. One example is the boats that Egypt is funding in Rwanda in order to fight the spread of water hyacinths. These plants lead to a rise in evaporation, so that the volume of water is already reduced in the upper reaches of the river, and they cause water to back up, which likewise has a negative impact on the water level further down river. Halting their spread therefore helps both countries.

That brings me to my final statement, which is really more of a truism:

5th statement: Transboundary water management needs sustainable financing

Our long-term goal must be that member states cover ongoing cooperation costs as soon as they are able to do so. At the very least, the funding for core tasks and key staff should not come from development cooperation donors, so that the organisations are able to stand on their own feet. A government's readiness to contribute funding from its own budget is, ultimately an indicator of ownership by national governments towards "their" river basin institutions. If this ownership is weak, then I must ask myself as Parliamentary State Secretary in the Development Ministry whether I can justify German support.

There are many different financing models. They range from equal membership contributions for all riparian countries, e.g. in the case of the Nile, to variable contributions, as in the case of the Niger or Lake Chad, and funding via customs duties, as is the case in the Kongo-Oubangoui-Sanga river basin organisation. However, I am convinced that it is possible, with your support and experience, to find the right model for every financing need!

Dr Ardakanian,
Ladies and Gentlemen,

Your work clearly shows us that water is a means for economic and political integration and thus a peace resource that can unite people and countries!

With the Millennium Declaration and the eight Millennium Goals the United Nations General Assembly has furnished us with the commandments for justice in globalisation. Particularly in the water sector the goals are expressed in very concrete terms; the proportion of people without access to clean water and basic sanitation is to be halved by 2015!

And I am sure that your deliberations over the next few days will form a very good basis for processing your positive experiences so that they can be used to help your colleagues from other river basin organisations proceed along the path towards more cooperation and thus to a better distribution of life's opportunities.

Thank you very much for your attention.

Address by Dr Fritz Holzwarth, Deputy Director General for Water Management, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

State Secretary Kortmann,
Dr Szöllösi-Nagy,
Dr Ardakanian,
Ladies and Gentlemen,

The timing of this workshop is very well chosen. We are two months away from the fifth World Water Forum in Istanbul and the overarching motto is "bridging divides". I think that transboundary water cooperation is an important element to bridge divides. I would like to underline what the State Secretary said before. There are two important elements in terms of the process, and capacity development is an important tool for transboundary water cooperation.

One element is that we need patience. This is important: that we are not able to look for fast solutions in transboundary basins. From this point of view it is important to recognise that capacity development in transboundary basins is a long term investment. Not only is the hardware is important, the software is also important. This is a major long-term investment from my point of view.

When you started your speech, Ms State Secretary, I was reminded of the 2001 Bonn Freshwater Conference. I was moderating a session with my colleague from the Ministry, and early in the morning we arrived at the point of formulating the final text on transboundary water cooperation for the conference declaration. The question was whether to use the term "international" or "transboundary" waters. Two delegations from riparian countries were discussing this. One delegation liked the term "international waters", the other said we could talk about "international waters" but not about "transboundary waters". It became clear that the challenge remains today that even these two countries sharing the same river basin have not yet achieved an advanced status of cooperation.

This is an important issue when talking about transboundary water cooperation. UNW-DPC is setting the right tone with this workshop. I feel that it should not be a one-off event; we should continue to cross-fertilize experiences from existing advanced basins to basins where cooperation is not so advanced yet. I think there is still a lot to be done, when looking at the 265 basins we have in the world.

The other element is that we have a lot of tools in place, like Integrated Water Resources Management. IWRM is a valid tool for transboundary water cooperation but it should be something which is driven by the political will to implement IWRM, to realise actual integration. We as water managers need to be self-critical in this respect. Water managers are often not too keen to make the things they are doing popular and understandable to the political level. They speak their own language and feel very comfortable in their, what I like to call, "water box". I think if we want to be successful, water managers all over the world have to leave their water box and think cross-sectorally.

Therefore institutional capacity development is from my point of view a strategic issue in a long-term perspective. It is also an innovative approach in two directions. On the one hand the issue is to generate institutional knowledge, to cooperate

cross-sectorally and to identify the best options for cooperation. There is no doubt that the one-size-fits-all approach is not the right approach for transboundary water cooperation, neither in river basins nor in lake basins nor in transboundary groundwater bodies. We need to find tailor-made solutions for these various basins and their specific contexts. On the other hand it is innovative in the sense that it includes involving the public and the stakeholders in transboundary water cooperation. Transboundary water cooperation is not only the responsibility of government institutions; the public and the stakeholders should be involved.

Water management ideally is adaptive to changing environments and changing conditions. But on top of the challenges we have been facing until now in this respect, we have to see how we are able to adapt to climate change. The answer is very simple in this case, and this should be a major message in this context: mitigation is energy and transport, adaptation is water and land use, and eighty per cent of adaptation is water. This is the challenge when it comes to adaptation in the context of transboundary basins, when it comes to finding a balance in water availability between upstream and downstream countries.

In addition to that, the water community is used to following an approach which has a long tradition; I call this approach supply side driven water policy. When there is new demand, it involves water managers looking for ways to satisfy that demand and increase the supply. I think we have to change the paradigm towards a demand management water policy: to see what the possibilities are to increase the availability through demand management and not through increasing the supply of water.

Last but not least it is important not to use the issue of climate change to conceal poor water management techniques in the countries. We have a lot of discussions in Europe on this matter, that climate change is producing water shortages. I think we should not allow this argument to be used in this context.

We have had interesting experiences in Europe concerning transboundary water cooperation. One very interesting experience is the cooperation in the Danube basin. Important in this example is that even during the Cold War period in Europe transboundary water cooperation existed at a low level, but also between countries belonging to two totally different political systems. It is an encouraging experience that there is a possibility to cooperate in transboundary waters beyond the issue of political systems.

From the perspective of the representative of the BMU I wish you a very successful workshop. I look forward to a series of such workshops to multiply experiences, to cross-fertilize the activities we are implementing all around the world and to make the work of UNW-DPC successful.

Keynote Presen-tation

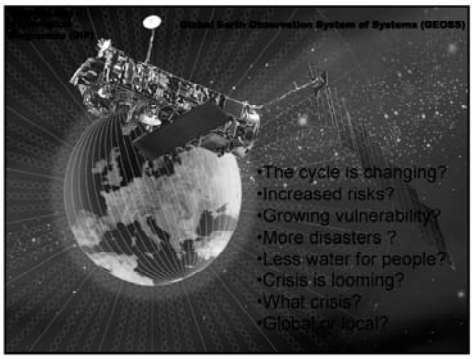
Presentation by Dr András Szöllösi-Nagy, Deputy Assistant Director-General for Natural Sciences, UNESCO

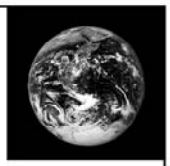
WAR OVER WATER
OR
TRANSBOUNDARY COOPERATION OVER WATER?

"The next war in the Middle East will be fought over water, not politics."
Boutros Boutros Ghali, former UN Secretary General in 1985

"The wars of the next century will be about water."
Ismail Serageldin, former vice president of the World Bank in 1999

"Fierce competition for fresh water may well become a source of conflict and wars in the future."
Kofi Annan, former U.N. Secretary-General in 2001





First message:

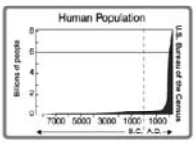
Humans are changing the global water system in a globally-significant way

without…..

adequate knowledge of the system and thus its response to change

Global change drivers

- Population growth, movement and age structures
- Geo-political changes and realignments
- Trade and subsidies
- Technological changes
- Climate change

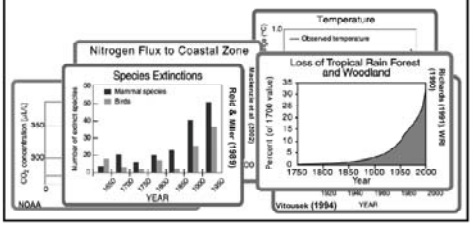


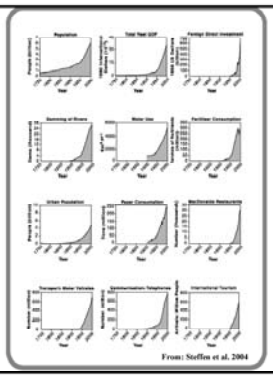
GLOBAL CHANGE

Global change impacts

- Global change is more than global climate variability/change
- It has natural PLUS human/social dimensions
- A constellation of changes, many global in domain

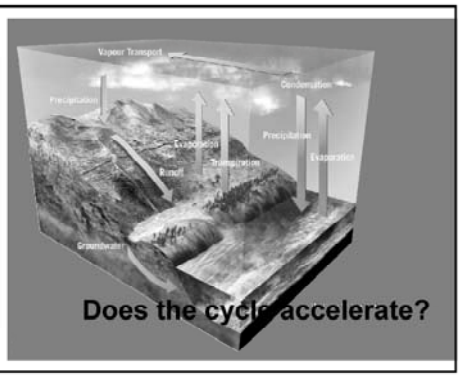
For example, we see large changes in:





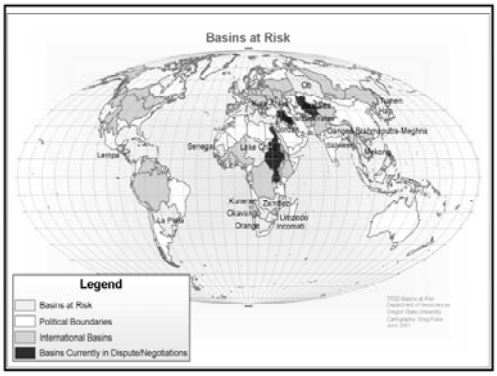
The Global Water System

- Water ***Cycling*** Deeply Embedded in Earth System
- Interconnections are Strong
- Change to One Part Reverberates Throughout



GLOBAL FRESHWATER RESOURCES

Relation between water availability and population

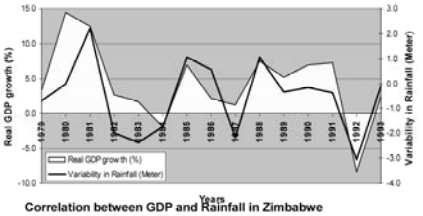


Second message:

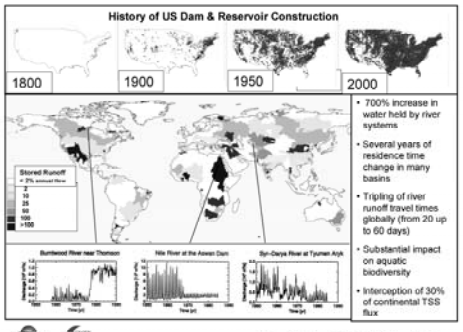
LOOMING WATER CRISES

Rainfall affects growth..

the case of Zimbabwe

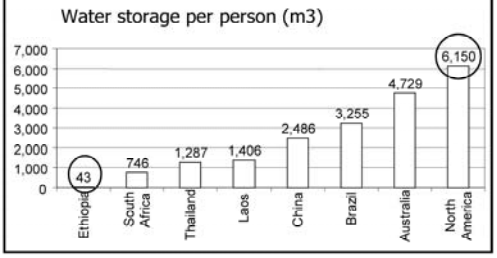


Correlation between GDP and Rainfall in Zimbabwe



From: Vörösmarty et al. 2004, *Eos-AGU Trans.*

Infrastructure gap: Water storage

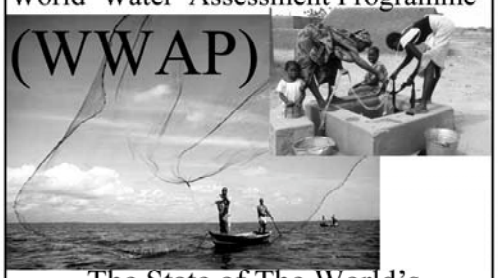


A new consensus is emerging in international thinking about water resources

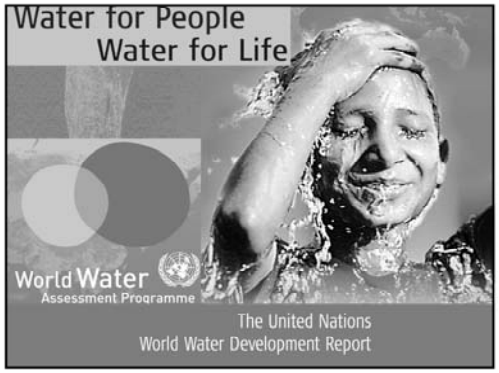
Water Resources are recognized as a UNESCO Principal Priority

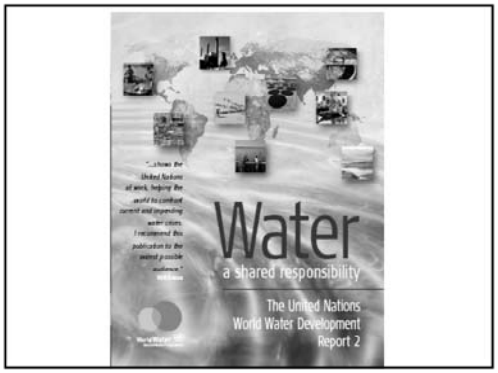
World Water Assessment Programme

(WWAP)



The State of The World's Freshwater Resources





From **Potential Conflict**

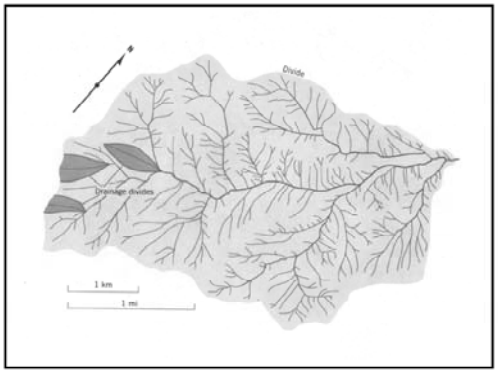
to **Co-operation Potential**

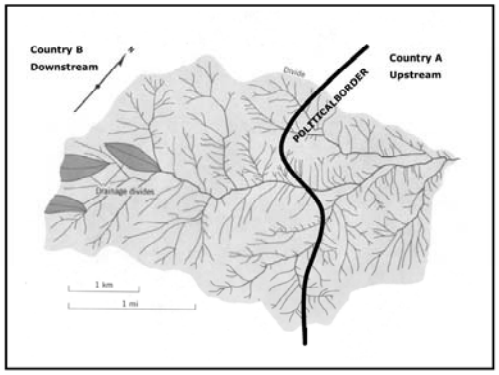
P C → C P

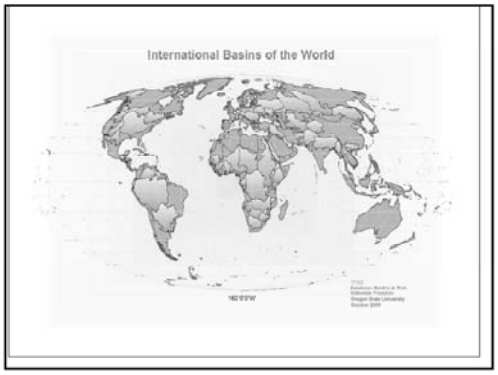
Water for Peace

a contribution to

World Water Assessment Programme







ILA 1966:

An international drainage basin is a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.

UN 1997:

Watercourse means a system of surface waters and groundwater constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus

States' surface within 263 (?) transboundary basins

145 States include territory within transboundary basins

21 States lie entirely within a transboundary basin

12 States have more than 95% of their territory within one or more transboundary basin(s)

Number of States sharing transboundary basins

-1/3 of the total 263 are shared by 2 or more States

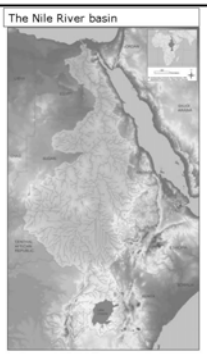
-19 are shared by 5 or more States (Danube shared by 18 States)

-5 are shared by 9-11 States

-13 are shared by 5-8 States

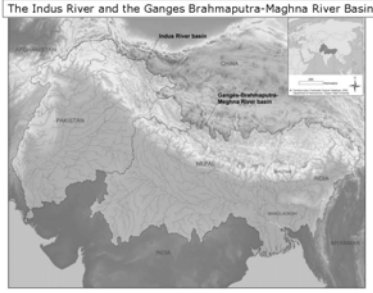
WAR OVER WATER?

The Nile River basin



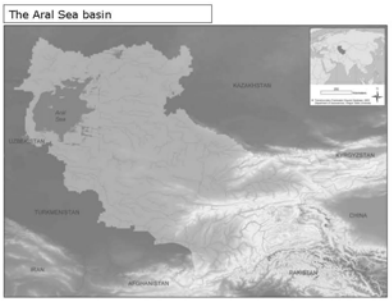
The Jordan River basin

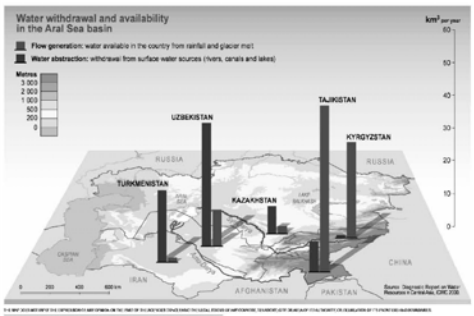
The Indus River and the Ganges Brahmaputra-Maghna River Basin



The Tigris Euphrates basin

The Aral Sea basin





UN Convention on the Law of Non-Navigational Uses of Transboundary Watercourses 1997

- **Consistent with state practice**
- **Comprises earlier efforts of codification**
- **Adopted equitable utilization as leading principles of international water law, with a list of factors to be used for determination of equitability of share**
- **Adopted the principle of "no significant harm"**
- **Ratification process en route**

Needed: 35
Obtained: 16

(Not yet in force after 27 years of negotiation)

Status

Voting

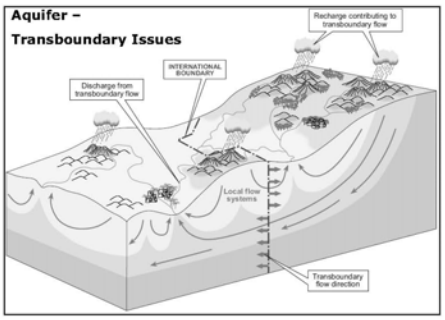
- In favour: 104
- Against: 3 [Burundi, China, Turkey]
- Abstained: 27
- Absent: 33

Ratification

Needed: 35
Obtained: 16

Not yet in force
After 27 years of negotiation

Aquifer –
Transboundary Issues



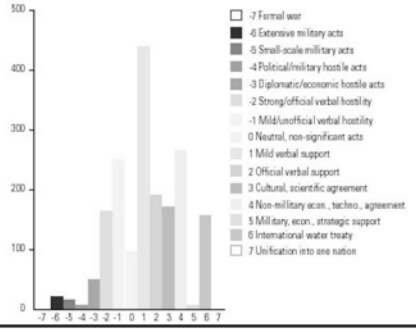
WAR OVER WATER?

ONE war over water:

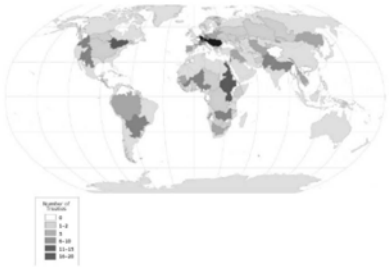
Umma and Lagash in Sumer

(4500 years ago)

Events related to transboundary waters



Number of treaties per basin



Water Conflict and Cooperation Indicators

"The likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change."

What are indicators?

- **Uncoordinated development: a major project in the absence of a treaty or commission**
- **"Internationalized basins"**
- **General animosity**

"But the water problems of our world need not be only a cause of tension;
they can also be a catalyst for cooperation

....If we work together, a secure
and sustainable water future can be ours."

Kofi Annan, February 2002

-

From Potential Conflict

to Co-operation Potential

P C → C P

One of UNESCO's contributions to the
World Water Assessment Programme

PCCP's spirit in the media

1- Concerned that some issues continue not to receive sustained media attention or slip off the radar screen, the United Nations Department of Public Information (DPI) unveils every year since 2004 a list of "Ten Stories the World Should Hear More About".

2- Articles in newspapers.

P C → C P

DISSEMINATION OF RESULTS

PCCP web site:

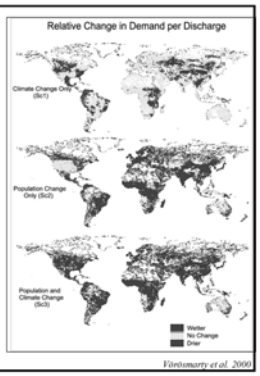
www.unesco.org/water/wwap/pccp/

In English, French and Spanish.

P C → C P

Water Stress Changes to 2025

- 80% of future stress from **population & development**, not **climate change**!
- Correct Priorities? (E.g. 85% US global change research funding to climate and carbon)

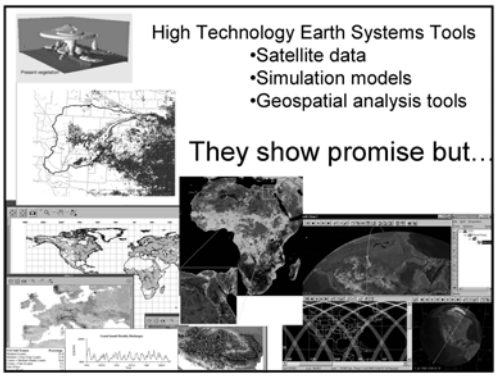


UNH

Vörösmarty et al. 2000

"There is no sustainable development without adequate information about the state of the Earth and its environment"

Statement at WSSD



High Technology Earth Systems Tools
- Satellite data
- Simulation models
- Geospatial analysis tools

They show promise but…

The data issue: a major source of risk and vulnerability in river basins

- The case of Africa
- Interconnectedness through data
- Local data networks:
  - The ethical choice vs.
  - The global needs to mimimize bias
- GEOSS: space and in situ observations
- Will data secrecy be gone?
- Will it be replaced by sharing?
- What is the way out of trouble?

History and Mandate

Julian Huxley
1946 - 1948

The Preamble to the Constitution of UNESCO declares that '**since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed**'.

Constitution of the United Nations Educational, Scientific and Cultural Organization

Adopted in London on 16 November 1945

...the wide diffusion of culture, and the education of humanity for justice and liberty and peace are indispensable to the dignity of man ...

...peace must be therefore be founded, if it is not to fail, upon the intellectual and moral solidarity of mankind.

"In consequence whereof they do hereby create the United Nations Educational, Scientific and Cultural Organization for the purpose of advancing, through the educational and scientific and cultural relations of the peoples of the world, the objectives of international peace and of the common welfare of mankind for which the United Nations Organization was established and which its Charter proclaims".

The challenge we all have

How to put water in the minds of people?

"Anybody who can solve the problems of water will be worthy of two Nobel Prizes, one for peace and one for science"

(President J. F. Kennedy)

Intro-duction of Speakers

Speakers

NIGER BASIN AUTHORITY (ABN)

Mr Bana has an MSc degree from the University of Arizona, USA, and 28 years of professional experience in natural resources management, desertification control, transboundary water resources management and integrated water resources management (IWRM). He is currently Technical Director of the Niger Basin Authority.

NIGER BASIN AUTHORITY (ABN)

Ms Condé has an MSc degree in Economics, with specialisation in Planning and Development, and has 18 years of professional experience, of which 15 years were with the Central Bank of Guinea, where her last post was that of Inspector of Banks and Finances. For the last three years she has been Director of Administration and Finances with the Niger Basin Authority.

OFFICE DE MISE EN VALEUR DE LA FLEUVE DE SÉNÉGAL (OMVS)

Mr N'Diaye is a soil engineer with professional experience in transboundary water management, natural resources and environmental management (NRM) and integrated water resources management (IWRM). He worked as an expert for the UNDP programme for West Africa concerning the support of national environmental and desertification action plans and Mr N'Diaye was responsible for the GTZ programme "Natural Resources Management and the Environment" in Senegal. He has been director of the Environmental Observatory of the OMVS since November 2000.

LAKE VICTORIA BASIN COMMISSION (LVBC)

Dr Okurut has a PhD from Wageningen University, the Netherlands and has 16 years of experience in Environmental Resources management and the development sector. As the lead person in the process of growth of an EAC Lake Victoria Development Programme Unit into an autonomous institution of EAC -the LVBC-, he gained practical experience in technical and legal institutional transformations in the management of transboundary water bodies, and in negotiations and conflict prevention and resolution among competing local, national and regional multi-stakeholder interest groups. As a Chief Executive of the LVBC he coordinates and facilitates the development agenda of the Lake Victoria Basin.

NILE BASIN INITIATIVE (NBI)

Ms Wondimu is a Water Resources Development Specialist, who has worked over 20 years for the water sector in Ethiopia, mostly on different water resources management and development related tasks. Since 2002 she has been Senior Program Officer and Shared Vision Program (SVP) Coordinator at the Nile Basin Initiative Secretariat (NBI), where she is responsible for supervising and coordinating the Shared Vision Program (SVP) portfolio which consists of eight basin wide projects focusing e.g. on transboundary environmental actions, capacity building, stakeholder involvement and socioeconomic development/benefit sharing.

THE PERMANENT OKAVANGO RIVER BASIN WATER COMMISSION (OKACOM)

Dr Chonguica, who is from Mozambique, has a PhD in Physical Geography from the Institute of Earth Sciences of the University of Uppsala in Sweden. His area of specialization was Fluvial Geomorphology. He obtained his Masters degree from the Technical University of Dresden, Germany. In 1997/98 he was IUCN Country Representative for Mozambique, and from 1999 – 2007 he was Regional Programmes Coordinator for IUCN-Southern Africa. He was appointed Executive Secretary for the Permanent Okavango River Basin Water Commission in December 2007.

OBSERVATOIRE DU SAHARA ET DU SAHEL (OSS)

Mr Diallo is a water resources management engineer with extensive experience in Integrated Water Resources Management (IWRM) and transboundary water management. Among others he was Interim Secretary & Regional Coordinator of the IWRM process in West Africa (ECOWAS) and coordinator of the Niger Shared Vision process (2002-2005). As coordinator of the Water Programme of the Sahara and Sahel Observatory (OSS) he is currently responsible for the implementation and management of projects on several groundwater aquifers in the region, including the North Western Sahara Aquifer System and the Lullemeden Aquifer System.

HARIRUD JOINT COMMISSION (JC)

Dr Nairiz has a PhD in civil engineering from Southampton University, U.K. and has extensive experience in civil engineering as project manager of several irrigation and water supply projects and as chairman of the board and managing director of Toossab Consulting Engineers Co. Toossab has been involved in more than 320 water-related projects in Iran, the Middle East and Central Asian countries.

VIETNAM NATIONAL MEKONG COMMITTEE IN THE MEKONG RIVER COMMISSION (VNMC)

Dr Trung has a PhD in Water Resources and Hydrology, from the Institute of Meteorology Hydrology and Environment (Ha Noi, Vietnam) and has extensive experience on international river basin cooperation and in transboundary impact and development scenario analyses. As Acting Secretary General of the Vietnam National Mekong Committee he is currently responsible for water resources planning and management, international river basin cooperation and management, institution strengthening and capacity building.

GUARANI AQUIFER SYSTEM PROJECT (SAP-GUARANI)

Mr Amore is an environmental engineer, with focus on groundwater, and has worked for NGOs and different governmental levels in Latin America on water and groundwater management. In Brazil he has been Coordinator of the Paraiba do Sul Watershed Project and the Guarani Project since its preparation phase in the Water Resources Secretariat and the Brazilian Water Resources Agency. Mr Amore is currently the General Secretary of Environmental Protection and Sustainable Development of the Guarani Aquifer System Project, based in Montevideo, Uruguay.

GREAT LAKES INTERNATIONAL JOINT COMMISSION (IJC)

Dr Clamen is a registered professional engineer with extensive experience in international water resource studies, environmental assessments and policy development, consultative processes and programme management. As Secretary of the Canadian Section of the IJC he is responsible for the day-to-day operations of the Canadian Secretariat, acts as senior financial officer and manages the assigned resources. Dr. Clamen provides policy advice on all Treaty matters and consults with a broad range of government and non-government stakeholders on behalf of the Commission.

UNECE WATER CONVENTION

Ms Jekel heads the Division „Cooperation in International River Basins, Freshwater Management Conventions, International Freshwater Protection Law“. She represents Germany in six international river basin commissions and several bilateral commissions and is currently Chair of the Meeting of the Parties of the UNECE Water Convention. Since 1994 she has been with the Federal Environment Ministry, where she has worked for several years in the Water Law Division, e.g. transposing the EC Water Framework Directive into national law.

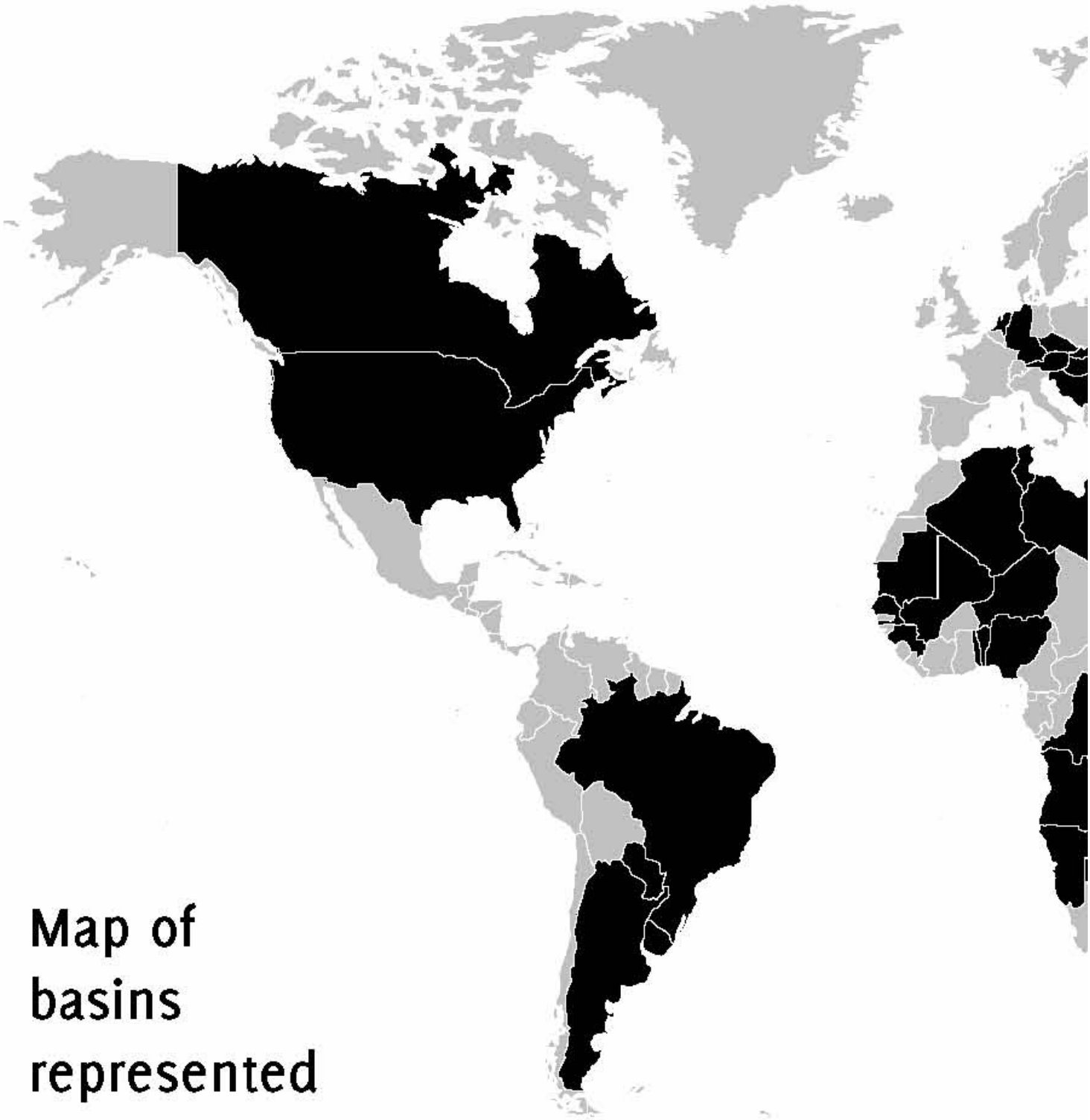
GERMAN FEDERAL MINISTRY FOR THE ENVIRONMENT, NATURE CONSERVATION AND NUCLEAR SAFETY (BMU)

Dr Holzwarth, has a PhD in Economics from the College of Economics, Pforzheim, Germany, and has been actively involved in transboundary cooperation in international river basins during his whole career. Together with the World Bank he was one of the initiators of the “Petersberg Process on Transboundary Water Management”, a global initiative. In his position as Deputy Director General for Water Management in the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety he has been actively involved in developing EU Directives such as the Water Framework Directives, the Marine Strategy Directive and other water related regulations.

INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE DANUBE RIVER BASIN (ICPDR)

Mr Weller is an environmental planner by training and studied general Environmental Science at the University of Waterloo, Canada. As the Executive Secretary of the ICPDR he is responsible for the management of the ICPDR, which is the forum for the 14 major Danube countries and the European Commission to implement their commitments made to improve water quality and water management in the Danube Basin. In his previous position as Programme Director of the Danube Carpathian Programme of WWF International Mr Weller was the driving force behind the “Lower Danube Green Corridor”. Previously he served as director of Great Lakes United.

Case Studies



Map of basins represented

La Connaissance et l'Information, bases de la coopération transfrontalière: l'expérience du Système Aquifère du Sahara Septentrional (SASS)

By Ousmane S. Diallo, Coordinateur du Programme EAU de l'OSS, Observatoire du Sahara et du Sahel (OSS) et les équipes des Programmes Eau et Environnement de l'OSS

CONTEXTE DU SASS - DES RESERVES CONSIDERABLES MAIS PEU DISPONIBLES ET FORTEMENT VULNERABLES

Le système Aquifère du Sahara Septentrional, partagé par l'Algérie, la Libye et la Tunisie, renferme des réserves d'eaux considérables mais constitue en fait une ressource peu renouvelable et partiellement exploitable.

Constituée de deux principales couches aquifères profondes, ce système recouvre une étendue de plus d'un million de km^2 dont 700 000 km^2 en Algérie, 250 000 km^2 en Libye et 80 000 km^2 en Tunisie et présente une ressource théorique estimée à 30 000 milliards de m^3 dont 10 milliards seulement sont exploitables, et avec une capacité de recharge totale d'un milliard de m^3 par an.

Cette ressource constitue un potentiel essentiel pour le développement économique et social mais ses possibilités d'exploitation se trouvent limitées par des facteurs naturels et anthropiques :

Contraintes naturelles de son exploitation

- Une grande partie de la nappe est en région aride, inaccessible ou peu propice à l'implantation d'activités humaines.
- La configuration géologique de la nappe implique des profondeurs de captages (jusqu'à 2500 m) qui rendent son exploitation très coûteuse et parfois inadaptée à l'agriculture (température pouvant atteindre 60°C).

Une surexploitation de la ressource depuis les années 80

- Les prélèvements annuels ont doublé depuis les années 80, période où l'équilibre entre prélèvement et recharge a été dépassé.
- Les pratiques agricoles constituent l'usage principal de l'eau (70% à 90 % des prélèvements selon les zones) avec une multiplication par 4 des surfaces irriguées sur l'ensemble de la zone (de 50 000 ha en 1970 à 200 000 ha en 2000).
- La croissance démographique attendue représente également une pression supplémen-taire pour les besoins en eau potable : de 1 mil-lion d'habitants en 1970 à 4 millions en 2000 et une perspective de 8 millions en 2025.
- En outre cette zone peut constituer une zone de replis des populations périphériques en fonction des impacts à plus ou moins court terme du changement climatique sur les autres ressources.

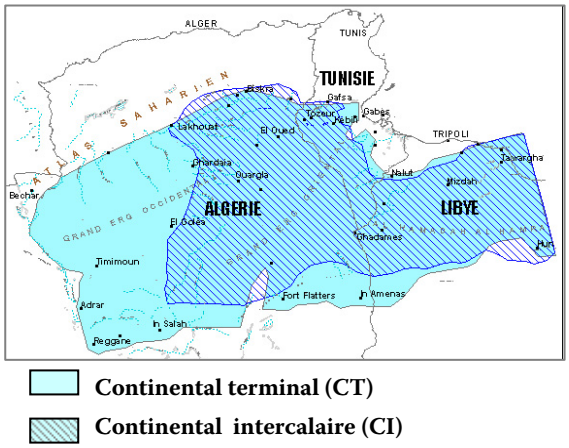


Figure 1. Les deux nappes du SASS

Une grande vulnérabilité environnementale

- Les contraintes environnementales pour l'usage agricole et les effets anthropiques augmentent les risques et les effets dégradants pour la ressource et son environnement.

- La faible accessibilité des zones sahariennes concentre les zones de prélèvements et augmente les impacts localisés sur et autour des zones de prélèvements.

- En outre, la surexploitation de la nappe depuis les années 80 se traduit par des conséquences sur la dégradation de l'environnement qui engendre en retour une dégradation de la qualité de la ressource en eau.

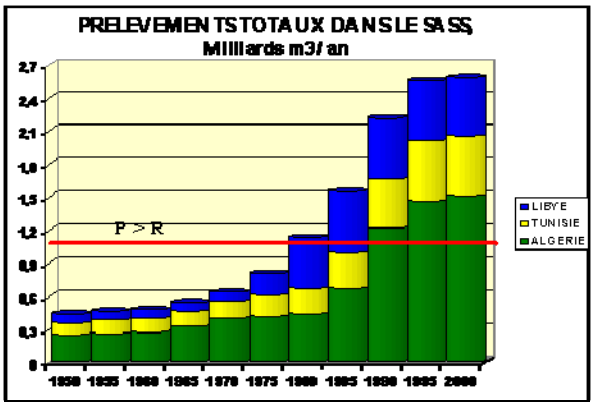


Figure 2. Accroissement des volumes prélevés par les trois pays entre 1950 et 2000

Dans ces conditions, comment exploiter au mieux cette ressource, de façon raisonnée et concertée entre les trois pays bénéficiaires, pour accompagner le développement économique et social, tout en préservant l'état de la ressource, le potentiel environnemental des zones humides et des paysages oasiens environnants et en luttant contre la dégradation des terres agricoles ? Tel est le défi majeur dans la gestion et le développement durable des ressources en eau du SASS.

La gestion raisonnée et concertée des ressources en eau du SASS

La mission de l'OSS a consisté à l'animation d'un dispositif de concertation entre les trois pays concernés pour une gestion raisonnée et durable de la ressource, au travers de trois axes :

- une meilleure connaissance hydrogéologique de la ressource, et de son fonctionnement dynamique,

- le développement de modèles hydrodynamiques permettant de simuler l'évolution quantitative et qualitative de la ressource en fonction des hypothèses de prélèvements ou d'autres impacts à intégrer,

- la coordination et l'animation du dispositif de concertation entre les ministères impliqués des trois pays pour apporter des éléments d'aide à la décision et des propositions dans la formulation et la mise en œuvre des politiques de développement économique et social ayant un impact direct ou indirect sur la ressource en eau, et les potentiels environnementaux qui lui sont associés (oasis, zones humides….).

Pour ce faire, une approche commune et progressive, basée sur les principes de la GIRE adaptés au contexte de la région et aux spécificités des ressources en eau souterraines a été développée. Cette approche a été mise en œuvre en plusieurs étapes et à deux niveaux.

a. Approche technique

Le premier niveau porte sur une approche technique ayant pour objectif une meilleure connaissance de la ressource et une prise de con-science de sa vulnérabilité par les parties prenantes.

Les travaux réalisés de 1999 à 2002, ont permis de mettre en place un système d'information à l'échelle de la ressource et partagé par les trois pays concernés. Le système d'exploitation des données a permis de mieux connaître la ressource, de mettre en exergue les zones nécessitant des études complémentaires, d'identifier les risques et de con-struire des modèles utilisés pour simuler l'impact des scénarii d'évolution des prélèvements sur la ressource.

D'autres résultats des travaux se mesurent en terme de gouvernance : le travail sur les données de l'ensemble du périmètre SASS a permis de faire bénéficier les trois pays d'une vision globale sur les ressources en du SASS et des données des autres pays concernés. **Cette phase a été essentielle pour**

l'installation d'une relation de confiance et de partage d'information qui constitue la pierre angulaire des enjeux du SASS.

Les travaux réalisés de 2003 à 2007 ont permis de consolider les acquis techniques, notamment sur les zones à risques, de confronter les résultats hydrauliques à une première approche socio-économique mettant en avant les inefficiences de l'irrigation, et enfin d'identifier les menaces environnementales pesant sur les zones humides, les oasis, la qualité des sols et la nature même des paysages.

Le système d'information et de connaissance, les modèles et les cartographies associées constituent un véritable outil de compréhension des enjeux et de leur localisation : ils génèrent ainsi des informations et des simulations à l'échelle globale du SASS qui sont nécessaires à la prise de décision par chacun des trois pays.

L'ensemble des premiers résultats techniques obtenus a permis une double prise de conscience du risque avéré et de la vulnérabilité de la ressource, et de la nécessité d'une concertation entre les trois pays concernés, pour sa gestion durable.

b. Approche institutionnelle et politique

Cette prise de conscience, grâce à cet outil partagé, amène les pays à intégrer ces constats dans leurs orientations pour le développement économique social et environnemental de ces régions agricoles à potentiel touristique.

La mise en œuvre d'une politique d'utilisation rationnelle de l'eau pour l'irrigation et le recours à des solutions alternatives (eau non conventionnelle ou même virtuelle) demande une connaissance fine des consommations d'eau réelles, selon les pratiques d'irrigation, les modes de cultures et les types de plantes. Les premières approches socio-économiques ont mis en lumière la nécessité de réaliser un travail complémentaire, détaillé et de terrain afin de mieux apprécier l'incidence entre mode de culture et eau consommée pour améliorer la productivité de l'eau, l'efficience de l'irrigation et la gestion durable de la ressource.

La prise en compte des résultats techniques s'est traduite par la nécessité et l'urgence de préserver la ressource et une volonté politique commune d'agir, au travers d'un dispositif de concertation formel.

Au-delà de la mise en place d'une structure permanente de concertation, les attentes des autorités nationales en charge de la ressource en eau sont de pouvoir disposer de données précises sur la ressource, en quantité et en qualité, sur les besoins des différents usages, en particulier l'usage principal agricole, et sur les niveaux et modes de consommation de la ressource selon les pratiques agricoles.

Les ateliers régionaux, tenus à Rome en décembre 2002, puis à Tripoli, Alger et Tunis respectivement en février, mars et avril 2005 ont approuvé la mise en place d'une structure, dénommée « **mécanisme de concertation** », dont l'objectif est de **promouvoir et favoriser la gestion rationnelle et concertée des ressources en eau du SASS.**

L'engagement pour la mise en œuvre effective de cette structure a été formalisé par un accord entre les ministères des trois pays en février 2006.

En juin 2007, la structure définitive du mécanisme de concertation a été officiellement approuvée et totalement appropriée par les trois pays.

Les capacités mises en place pour la coopération transfrontalière

Dès la conception du premier projet sur le SASS (avec l'accompagnement de l'OSS), les trois pays, l'OSS et les partenaires de coopération, ont eu comme premier souci celui de la poursuite de leur coopération au-delà du projet. En effet, conscients de la nécessité d'une coopération technique et solidaire forte en vue d'une gestion efficiente tenant compte des divers risques potentiels, les réflexions sur une structure technique permanente de gestion du SASS ont été initiées en 1999. C'est pourquoi, dès l'origine, le projet SASS visait deux objectifs :

- l'un, d'ordre technique, destiné à produire tous les éléments techniques fiables (données, simulations,…), à mettre en place des outils de dialogue et rendre plus visibles les risques ;
- l'autre, d'ordre institutionnel et politique, visant à pérenniser la concertation, d'abord au niveau technique, et son appropriation au niveau politique par la mise en place d'une structure perma-

nente pour l'harmonisation de la planification du développement.

a. Capacités techniques

Le projet SASS s'est fixé comme objectif d'élaborer une base de données commune qui permet l'intégration et la mise en cohérence de toutes les informations recensées, mais également le recueil, l'intégration et la mise à jour de données nouvelles.

L'élaboration du Système d'Information (SI) a comporté le diagnostic de l'existant, la conception et la réalisation d'une base de données commune, avec l'objectif de rendre accessible le SI simultanément au siège du projet et dans chaque administration responsable de l'eau dans les trois pays.

On dispose maintenant d'un outil de gestion de très bonne qualité pour chacun des trois pays et fonctionnel dans chaque administration.

En parallèle, un serveur cartographique spécifique au SASS a été élaboré, en vue d'assurer une représentation géo-référencée de l'information disponible. Ce serveur est disponible sur Internet à l'adresse URL suivante: http://www.geosass.oss.org.tn/geosass.

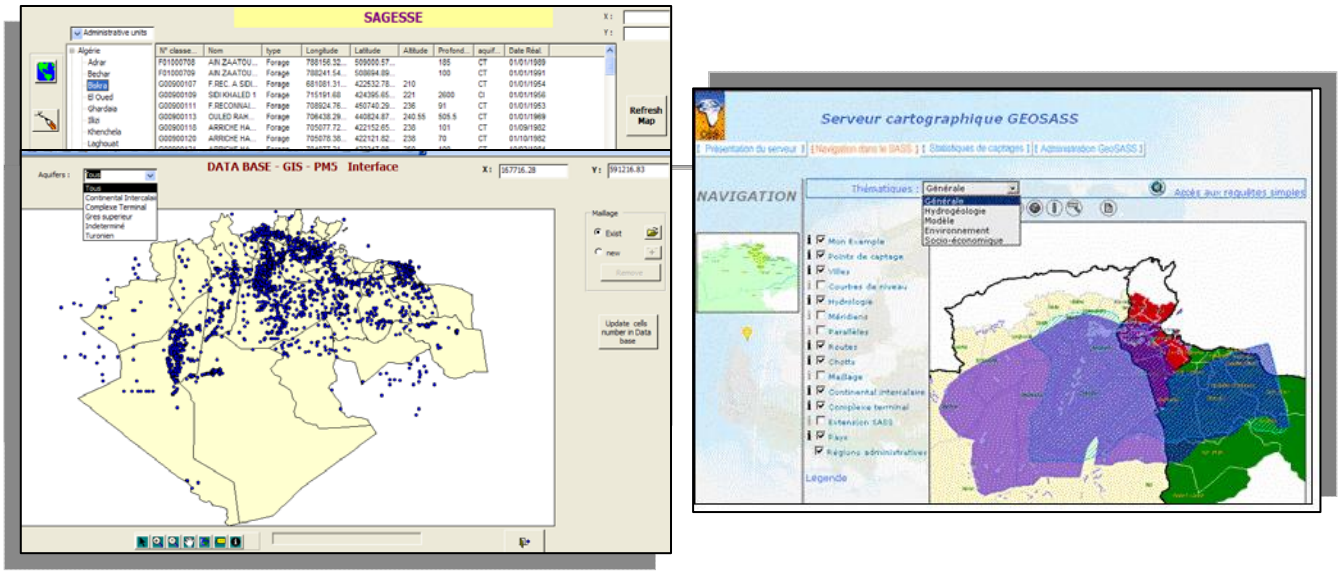


Figure 3. Système de connaissance et d'information du SASS : Base de Données, SIG et Serveur cartographique GEOSASS

b. Capacités institutionnelles et politiques

Parallèlement aux travaux scientifiques ayant permis à la communauté des chercheurs, des experts, et aux administrations des trois pays du SASS d'échanger et de construire ensemble un savoir commun sur lequel une gestion concertée peut désormais s'édifier, les formes et le mécanisme de cette gestion commune ont été progressivement définis, pour aboutir à la création formelle du Mécanisme et de son secrétariat installé auprès de l'OSS en juin 2008.

La composition de la structure est définie, ainsi que l'organisation fonctionnelle, les missions qu'elle devra assurer et les ressources qui lui sont affectées. Son mode de financement est partagé de façon égalitaire par les trois pays qui contribuent chacun au budget de fonctionnement de la structure.

La configuration de la structure adoptée traduit le fort engagement politique des trois pays pour la mise en œuvre des décisions et recommandations pour un développement durable.

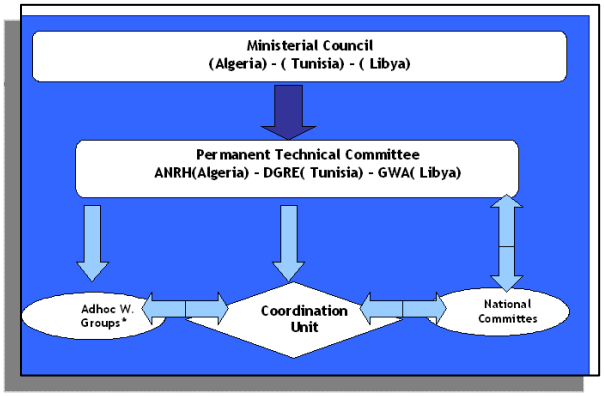


Figure 4. Schéma du Mécanisme de concertation du SASS

Les missions essentielles de l'Unité de coordination consistent à:

- appuyer les pays dans la mise en œuvre des principales activités techniques destinées à faciliter la concertation : collecte des données par le biais des réseaux communs, mise à jour de la base de données communes ainsi que de l'actualisation des modèles ;
- dynamiser le processus institutionnel par l'identification des problèmes hydrauliques transfrontaliers, la formulation de propositions de solutions ainsi que la formalisation des consensus ou accords ;
- assurer d'une part, la diffusion de l'information et l'organisation de débats au niveau décideurs concernant les programmes et options de développement à travers les bassins, d'autre part, favoriser la gestion participative par un véritable travail de communication.

Il veillera également, et son rôle est fondamental à ce titre, à la mise en cohérence des politiques nationales des trois pays au regard de la gestion durable de la ressource, et à l'intégration des recommandations dans les politiques nationales, et locales, pour une gestion concertée de la ressource entre les différents usages.

LEÇONS ET CONCLUSION

Sur la base de l'expérience du SASS, les leçons et enseignements que l'on tire sont résumés ci-dessous.

- La connaissance et l'information sont indispensables pour la gestion des ressources en eau ; elles le sont davantage d'autant plus qu'il s'agit de ressources en eau souterraines, transfrontalières dans un contexte climatique aride, où ces ressources se révèlent stratégiques.
- En matière de coopération transfrontalière de ressources en eau partagées, la GIRE est une approche qui peut donner de bons résultats ; toutefois, il est essentiel de commencer par une coopération technique à travers des études communes et le développement d'outils communs de suivi et de gestion.
- L'amélioration des connaissances et le développement d'un système d'information communs passent par l'implication des concernés en prenant en compte leurs préoccupations avec les informations qu'ils comprennent.
- Il n'est pas envisageable d'obtenir des avancées significatives en l'absence d'intérêts forts et un engagement politique.
- Les résultats et impacts doivent être à la hauteur des attentes des politiques ; il faut également gagner leur volonté d'entreprendre les changements nécessaires.
- Tenir compte du contexte: les principes généraux s'appliquent mais il est indispensable de les adapter au contexte spécifique sur les plans techniques, institutionnel et politique.

La construction de la coopération entre l'Algérie, la Libye et la Tunisie pour la gestion concertée des ressources en eau du SASS s'est réalisée au fil du temps. Tout d'abord, la pratique du partenariat au cours du projet SASS a progressivement forgé la confiance mutuelle entre les équipes techniques, la conviction que l'action commune augmente l'efficacité des solutions et la certitude que l'échange d'informations, qui fonde toute solidarité, est deve-

nu au cours du projet une activité non seulement possible mais nécessaire. A cet égard, la volonté et la détermination des institutions nationales en charge de l'eau des trois pays pour communiquer et partager les données et informations ont été exemplaires. Une fois le modèle du SASS et la base de données opérationnelle dans chacun des trois pays, une forme de concertation efficace a d'abord consisté à assurer l'entretien, le développement et l'actualisation permanente de ces deux outils dans le cadre d'une structure technique.

Tout cela a nécessité de gros efforts en matière de développement de capacités tant sur le plan technique qu'institutionnel.

Aujourd'hui, les travaux menés sur SASS et les résultats qui en découlent constituent un véritable cadre d'échange technique, scientifique dans un cadre de concertation favorisant la mise en œuvre, par les trois pays concernés, des stratégies et mécanismes de gestion commune des ressources en eau.

Les travaux sur le SASS se poursuivent et visent à la fois à améliorer toujours les outils techniques, en utilisant la télédétection pour une cartographie précise des zones irriguées, et en poursuivant les investigations sur les aspects socio-économiques et environnementaux. Ces éléments constitueront un pas de plus vers la réalisation de l'objectif global de l'approche préconisée par l'OSS qui vise le développement d'une « **conscience de bassin** » vers un développement durable des zones arides et semi-arides du circum-Sahara.

On soulignera enfin l'exemplarité de ce processus, qui n'aurait pu atteindre de tels résultats sans l'adhésion pleine et entière de l'Algérie, de la Libye et de la Tunisie, conscients désormais de partager un destin commun à travers le développement durable de la zone du SASS. La démarche préconisée et les résultats obtenus confortent ainsi l'OSS dans son approche de partenariat et don rôle de facilitation entre les pays membres ; ces résultats ont servi à constituer un patrimoine d'expérience que l'OSS a à cœur d'utiliser sur d'autres bassins aquifères transfrontaliers.

Governance and Institutional Arrangements in the Great Lakes Basin

Murray Clamen, Great Lakes International Joint Commission (IJC)

INTRODUCTION

The Great Lakes of North America -– Superior, Michigan, Huron, Erie and Ontario – are an important part of our physical and cultural heritage providing water for consumption, transportation, power, recreation and a host of other beneficial uses. The Lakes are surrounded by two sovereign nations (Canada and the United States), a Canadian province, eight American states and thousands of local, regional and special-purpose governing bodies with jurisdiction for management of some aspect of the basin or the lakes. The sheer magnitude of the Great Lakes system is difficult to appreciate, even for those who live within the Basin, and although the lakes are part of a single system, each is unique. A map of the Great Lakes Basin is shown in Figure 1.

Figure 1. The Great Lakes – St. Lawrence River Basin

The current web of governance and institutional arrangements described in this paper are numerous and complex and reflect decades of experience addressing both water quality and water quantity management issues in a concept termed the ecosystem approach. The adoption of an ecosystem approach to management is the result of a growing understanding of the many interrelated and interdependent factors that govern the ecological health of the Lakes. This rich experience is potentially transferable to other basins worldwide.

A GREAT LAKES PRIMER

Formed 10,000 years ago by the retreat of the last glacier, the Great Lakes is the largest body of fresh water in the world. Considered one of the great waterways stretching a third of the way across the continent, no other major body of fresh water contributes so much to the health and well-being of so many people. Sometimes referred to as North America's inland sea, the Lakes comprise five immense bodies of water, including Lake Superior, the world's largest in area. The natural outlets from Lakes Michigan and Huron (treated as one lake insofar as their hydraulic characteristics are concerned) are not regulated by any artificial devices while the levels of Lakes Superior and Ontario are regulated within the limits of their controls and the capacities of their outlet channels. This regulation was approved and is monitored by the IJC as described below Table 1 summarizes some of the major features of this remarkable system.

The first Europeans who started to settle the area in the 1600s found a relatively stable ecosystem that had been only moderately disturbed by the hunting and agricultural activities of the native peoples. The earliest activities were to improve transportation in the Connecting Channels by constructing canals. As settlement increased and exploitation intensified, profound ecological changes were brought about by logging, farming and commercial fishing. Industrialization, the current major economy of the Basin, followed closely behind agrarian settlement which, together with growing urbanization, degraded the Basin's rivers and the Lakes themselves. This and related utilization and development of the resources

of the Great Lakes interfered and impacted profoundly on the natural regime.

Today, the Lakes face an increasing threat from a variety of sources including, but not limited to, existing and new chemical contaminants and their effects; excess nutrients from point and non-point sources; exotic species and changes to the biological community; population increases; shoreline development and suburban sprawl; as well as the potential effects of diversions, withdrawals and climate change. There is a growing sense of urgency by many members of the public for a renewed sense of shared purpose and greater institutional capacity to coordinate and integrate roles, responsibilities and decision making to provide greater accountability among all governments.

	Superior	Michigan	Huron	Erie	Ontario	Totals
Elevation (metres)	183	176	176	173	74	
Length (kilometres)	563	494	332	388	311	
Breadth (kilometers)	257	190	245	92	85	
Average Depth (metres)	147	85	59	19	86	
Max. Depth (metres)	406	282	229	64	244	
Volume (km^3)	12,100	4,920	3,540	484	1,640	22,684
Water Area (km^2)	82,100	57,800	59,600	25,700	18,960	244,160
Land Area (km^2)	127,700	118,000	134,100	78,000	64,030	521,830
Total Area (km^2)	209,800	175,800	193,700	103,700	82,990	765,990
Shore Length (kilometres)	4,385	2,633	6,157	1,402	1,146	17,017
Retention Time (years)*	191	99	22	2.6	6	
Population: U.S. (1990)** Canada (1991)	425,548 181,573	10,057,026 -	1,502,687 1,191,467	10,017,530 1,664,639	2,704,284 5,446,611	24,707,075 8,484,290
Totals	**607,121**	**10,057,026**	**2,694,154**	**11,682,169**	**8,150,895**	**33,191,365**
Outlet	St. Marys River	Straits of Mackinac	St. Clair River	Niagara River/ Welland Canal	St. Lawrence River	

Table 1. Physical Features and Population

Sources:

Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data, Coordinated Great Lakes Physical Data. May, 1992

* Extension Bulletins E-1866-70, Michigan Sea Grant College Program, Cooperative Extension Service, Michigan State University, E. Lansing, Michigan, 1985

** 1990-1991 population census data were collected on different watershed boundaries and are not directly comparable to previous years.

EVOLUTION OF GREAT LAKES WATER QUANTITY AND WATER QUALITY MANAGEMENT

During the first years of the 20th century, the governments of the United States and Great Britain were dealing with numerous issues concerning the use of waters that flowed across the borders or served as a boundary. In 1903 the International Waterways Commission was established to address existing boundary waters disputes in the Great Lakes. It had limited success but did recommend the establishment of principles to govern the use and diversion of boundary waters and the creation of a permanent body with wider powers. Negotiations toward a treaty began in 1907 and were concluded successfully in January 1909 with the signing of the Boundary Waters Treaty. Although Canada had not yet acquired an international personality, the government was involved in these negotiations and today, as a fully independent country, has succeeded to Great Britain's rights and obligations under the treaty.

The Boundary Waters Treaty of 1909

With the signing of the treaty, long-standing disputes on the St Mary and Milk Rivers in the west (use of water for irrigation) and in the Great Lakes (use of Niagara River flows for power and scenic purposes) were settled, important principles with respect to navigation and pollution were set out, mechanisms to address transboundary and environmental issues were established, and a permanent body called the International Joint Commission (IJC) was created. In setting out limitations on the freedom with which each country could act, the treaty pioneered restrictions on transboundary pollution long before environmental issues became a matter of public concern. It also provided a forum for those whose interests were affected to be heard significantly in advance of the time when public participation became a prerequisite for resource planning. The treaty has been amended only once, namely in regard to the Niagara River Treaty of 1950 (described later).

The International Joint Commission

From its inception, the IJC's fundamental role has been to prevent and resolve transboundary and environmental disputes between the U.S. and Canada through processes that seek the common interest of both countries. What has developed over time is an institution that many believe does not exist elsewhere. It not only offers the two countries a flexible set of mechanisms to help manage their relationship in the transboundary region, but also provides them with the assurance that it will reflect the shared system of principles and values recognized in the treaty.

The treaty provides for six commissioners, three from each country. The U.S. commissioners are appointed by the President and confirmed by the Senate. The Governor General-in-Council appoints the three Canadian commissioners. The commissioners serve in their personal and professional capacities and do not receive instructions from their governments. With Secretariat offices to support the commissioners in Washington, DC and Ottawa, Canada (as well as a binational Great Lakes Regional Office in Windsor, Canada), the IJC acts as a unitary body and operates by consensus. The Commission has two primary responsibilities under the treaty, and it has been called upon to exercise both in very significant ways in the Great Lakes Basin.

First, as a quasi-judicial body the IJC considers applications for works in boundary waters and rivers that flow across the boundary. The IJC retains jurisdiction over the projects it approves so that it can oversee their operation and adapt the terms of its approval to changing circumstances. Under this role, in the Great Lakes Basin, the IJC has issued Orders for structures at the outlet of Lakes Superior and Ontario as well as remedial works in the Niagara River (the outlet for Lake Erie), and appointed permanent Boards of Control to oversee construction, monitor operations and make recommendations when appropriate. These binational boards, and their expert technical support teams that report regularly to the IJC, are important institutional features of Great Lakes water quantity management. They give governments and the public confidence that sensitive water level and outflow decisions are made in accordance with the treaty.

Currently, the orders for control works at the outlets of Lake Ontario and Lake Superior are being reviewed by the IJC to see if changed circumstances warrant any formal adjustments. The discharge from Lake Superior is controlled by a gated dam ("Compensating Works") at the head of the St. Marys Rapids which was built to permit power diversions around the rapids. The structure at the outlet of Lake Ontario is the Moses-Saunders Power Dam which is jointly owned by the New York Power Authority and Ontario Power Generation. There is also the Great Lakes/St. Lawrence Seaway – which is not administered by the IJC but was built as a binational partnership between the U.S. and Canada, and continues to operate as such. Administration of the system is shared by two entities, the Saint Lawrence Seaway Development Corp. in the U.S., a federal agency within the U.S. Department of Transportation, and the St. Lawrence Seaway Management Corporation in Canada, a not-for-profit corporation.

Secondly, at the request of governments, the IJC investigates and reports on issues of concern along the boundary (the so called "Reference" function). These reports are advisory and not binding on the governments, however the IJC process - appointing a binational board of experts to conduct joint, impartial, scientific studies and advise commissioners on their findings, combined with the requirement to give the public opportunities to comment – increases the likelihood that IJC reports will be favourably received and acted upon by governments. Under this role, in the Great Lakes Basin, the IJC has conducted many water quantity studies (water levels and flows, water use and diversions), as well as important water pollution and water quality reports over several decades and which ultimately led to the signing of the first Great Lakes Water Quality Agreement of 1972. In this historic Agreement governments established new governance mechanisms, including standing IJC advisory Boards, and gave the IJC additional responsibilities to monitor progress and coordinate activities. These and other institutional aspects of the Agreement are described in detail below.

CURRENT JOINT MANAGEMENT OF THE LAKES

Concern about protection and use of the Great Lakes has, over time, led to the signing of agreements and the creation of institutions that foster joint management. The following represents some of the more significant agreements and institutions.

The Niagara Treaty of 1950

In 1950 governments agreed to amend Article V of the Boundary Waters Treaty through a separate Niagara Treaty which is still in force and provides for the amount of water that is to flow over Niagara Falls for scenic purposes and for diversions for power purposes. It also confirms that waters which are being diverted into the Great Lakes from the Hudson Bay drainage system through the Long Lac-Ogoki works will continue to be governed by a 1940 exchange of notes between governments that allows Canada the use of those waters for power at Niagara. The responsibility to oversee the Niagara Treaty rests not with the IJC but by a separate institutional arrangement, namely the International Niagara Committee, established by governments for that purpose.

United States – Canada Convention on Great Lakes Fisheries of 1955

The binational Great Lakes Fishery Commission (GLFC) was established in 1955 by the Canadian/U.S. Convention on Great Lakes Fisheries primarily to control the expanding sea lamprey that was decimating the Great Lakes fishery. Since then, the GLFC has expanded its activities to include work to rehabilitate the fisheries of the lakes and to coordinate government efforts to stock and restore fish populations. The GLFC is made up of eight Commissioners (four appointed from each of the United States and Canada) and one U.S. Alternate Commissioner. U.S. Commissioners are appointed by the President for six-year terms. Canadian Commissioners are appointed by the Privy Council and serve at the Council's pleasure. The GLFC executes its management responsibilities with a Secretariat staff located in Ann Arbor, Michigan. The Secretariat serves as the primary interface between the GLFC and those with whom the GLFC interacts, directs program and business management

efforts, and provides decision support on a wide range of issues.

The Great Lakes Water Quality Agreements of 1972, 1978 and 1987

First signed in 1972 by Canada and the U.S. following numerous studies and recommendations by the IJC, the Great Lakes Water Quality Agreement is the binational blueprint for protecting and restoring the Great Lakes. The Agreement is a lengthy document made up of a Preamble, followed by 15 Articles and 17 detailed and technical Annexes that reaffirms the governments' obligations under the Boundary Waters Treaty not to pollute boundary waters, and has been the basis for a great deal of work and many IJC reports and recommendations since the 1970s.

The 1972 Agreement gave priority to addressing point-source pollution from factories and sewage plants, and as a result, such pollution was dramatically reduced. A new Agreement, signed in 1978, adopted the "ecosystem approach" and called for the virtual elimination of the input of persistent toxic chemicals, and the levels of those chemicals in birds and fish have declined substantially. The Agreement was last revised in 1987, when the U.S. and Canada agreed to focus efforts on the restoration of water quality in 43 of the most contaminated local areas in the basin (known as Areas of Concern). This innovative revision, outlined in Annex 2, called for governments at all levels to develop and implement Remedial Action Plans (RAPs) and Lakewide Management Plans (LaMPs) to restore identified impaired beneficial uses, and a three and four stage process respectively, that the IJC monitors and reports on.

The Agreement recognizes that control procedures, research and monitoring would continue to be conducted by the two countries within their respective legislative and administrative structures. In Canada, this means the federal government and the province of Ontario must cooperate to help achieve the goals of the Agreement. This has led to the creation of the Canada/Ontario Agreement (COA) which has been renegotiated over the years. In Ontario, Conservation Authorities (local, watershed management agencies that deliver services and programs that protect and manage water and other natural resources in partnership with government, landowners and other organizations) are empowered to regulate development and activities in river or stream valleys, Great Lakes and large inland lakes shorelines, hazardous lands and wetlands. In the U.S., many federal laws affect the lakes, however regulatory authority has also been delegated to state governments. This means cooperation is also essential in the U.S. to accomplish Agreement goals which has led to the creation of the U.S. Policy Committee. Governments also established a Binational Executive Committee (BEC) to coordinate their federal efforts under the Agreement which has, among other things and partly in response to IJC recommendations, produced their Binational Toxics Strategy, their Binational Program to Restore and Protect the Lake Superior Basin and their biennial State of the Lakes Ecosystem Conferences (SOLEC).

To help fulfill its responsibilities under the Agreement, the IJC has the assistance of a Great Lakes Water Quality Board, Great Lakes Science Advisory Board and Great Lakes Regional Office, which were established pursuant to the Agreement, of the Council of Great Lakes Research Managers (which the IJC itself established in 1984), and of several IJC task forces and committees which have made recommendations that have been adopted by governments, for example on indicators to assess Agreement progress (e.g. drinkability, swimability, fishability). Because responsibilities assigned to the IJC are so wide and varied, it is not possible to discharge all of them simultaneously. The IJC is required to report to governments at least biennially and the IJC does this through biennial as well as special reports, all of which are made public, and which cover most aspects of the Agreement over time in accordance with priorities established in advance each two year cycle. Another feature of IJC work are public biennial meetings convened to hear presentations from its institutions, presentations by government representatives, and the views of individual citizens and groups. Currently, the 1987 Agreement is being reviewed by governments to see if changed circumstances warrant any revisions and the IJC is playing an important role in that process as well as providing recommendations for change.

The Great Lakes Charter of 1985 and Annex 2001

This Charter is a relatively recent development in the governance of the basin. It was signed in 1985 by the governors of the eight Great Lakes States (Council of Great Lakes Governors) and by the premiers of Ontario and Quebec, primarily in response to concerns over diverting water from the Great Lakes to other regions of the U.S. that potentially faced shortages. While not legally binding, it focuses the states and provinces on a number of resource issues and fosters cooperation among them. It commits the signatories to protect, conserve and manage the waters of the Great Lakes, and to develop and maintain a common data and information base. In June 2001 the premiers and governors issued a supplementary agreement to the Charter known as Annex 2001 intended to strategically address the potential water diversion issue. In December 2005, following lengthy negotiations, the governors of the eight Great Lakes states reached agreement on a U.S. Compact and also reached a good faith Agreement with Ontario and Quebec. During 2007 and 2008, each of the state legislatures ratified the Compact, (and Ontario and Quebec passed resolutions of support). In September 2008 the U.S. Congress gave its consent to the Compact and U.S. President Bush has now signed the joint Congressional resolution.

Related key developments to help protect the waters of the Great Lakes worthy of note include: in Canada, amendments in December 2002 to the *International Boundary Waters Treaty Act* (Bill C-6) and related *Regulations* to prohibit removals from Canadian waters of the Great Lakes; in the U.S., the *Water Resources Development Act of 1986* prohibits diversions unless approved by all eight states, and amendments in 2000 further encourage development of a standard for decision making; in 1999 the province of Ontario enacted a *Water Taking and Transfer Regulation* which generally prohibits transfers out of Ontario's part of the Great Lakes basin, and since 1999 the province of Quebec has generally prohibited transferring water outside Quebec that has been taken in Quebec. Discussion of the legal and policy considerations for the protection of the waters of the Great Lakes, as well as important related issues, are covered in IJC Reports to governments in 2000 and 2004, in response to a 1999 Reference. IJC recommendations contained therein provided a blueprint for such protection of Great Lakes waters.

Other Organizations

Given the demonstrated importance of the Great Lakes to the health and well being of all basin residents, it should come as no surprise that many non-government and academic organizations work on behalf of the lakes such as Great Lakes United (www.glu.org), Pollution Probe (www.pollutionprobe.org), the Sierra Club (www.sierraclub.ca), Alliance for the Great Lakes (www.greatlakes.org), the Nature Conservancy (www.nature.org), Canadian Wildlife Federation (www.cwf-fcf.org), Nature Quebec (www.naturequebec.org) and Save the River (www.savetheriver.org) to name just a few.

Other important institutions include, but are not limited to, the Great Lakes Commission (www.glc.org), a binational agency established by joint legislative action of the Great Lakes states in 1955 and granted congressional consent in 1968; the Great Lakes-St. Lawrence Cities Initiative (www.glslcities.org), a binational coalition of mayors and other local officials that works actively with federal, state, and provincial governments to advance the protection and restoration of the Great Lakes and the St. Lawrence River; and the Council of Great Lakes Industries (www.cgli.org), a non-profit organization representing the common interests of U.S. and Canadian industrial organizations from the manufacturing, utilities, transportation, communications, financial services and trade sectors that have investments in the Great Lakes Basin.

FUTURE CHALLENGES

Over the past 150 years, the Great Lakes have faced many serious environmental challenges and the accomplishments achieved to date in both the water quality and water quantity arena are impressive. Government agencies, non-governmental organizations and the public in both countries have put tremendous effort into restoring and protecting the lakes. Governments at all levels, businesses, industry and agricultural have also committed significant amounts of resources and people. The IJC itself has played a significant role with binational studies, recommendations, oversight of water level regulation and by fulfilling its mandate under the Great

Lakes Water Quality Agreement. The Boundary Waters Treaty still remains the primary international legal instrument governing the use of the waters of the Basin.

Yet issues continue to evolve and new challenges will be faced in the future:

- The Great Lakes Water Quality Agreement has not been revised for over (1987) 20 years and there is a broad call, including from the IJC, for renewal and revisions by governments so the Agreement can better reflect today's pressing issues such as the impacts of climate change, aquatic invasive species and urbanization, all of which affect biodiversity;

- Use of Great Lakes waters by nearly every interest has increased in extent and variety, including impacts of water level regulation on the ecosystem. (In response to this and other issues, such as climate change, IJC Orders of Approval in the Great Lakes are being reviewed by the IJC to see if changes can be made consistent with the Boundary Waters Treaty);

- The institutional structure is confusing, overly cumbersome and has the effect of blurring accountability. More effective coordination amongst the various institutions is being called for;

- There is a demand for an increased role for cities and smaller municipalities in Great Lakes management;

- First Nations and aboriginal peoples have governance authority and unique constitutional rights and want to be included with respect to Great Lakes agreements;

- Despite considerable investment to date, there is a need for increased financial commitment to the Great Lakes from senior levels of government including increased investment in the science, research, monitoring and reporting on Great Lakes issues; and

- Finally, there is a need for an even greater Great Lakes presence on the governments' policy agenda.

As noted in a 2007 report by the Office of the Environmental Commissioner of Ontario:

"Collectively, these comments and concerns point to an emerging vision for the Great Lakes (in Ontario), one that is based on the recognition of the multiple, cumulative and changing stresses on the Lakes, that is based on government commitment, accountability and sufficient financial resources, that promotes citizen engagement and education, and ultimately that is based on everyone – individuals, businesses, municipalities, senior governments and First Nations – doing their part to protect an awesome global asset for which we have responsibility, the Great Lakes."

Transboundary River Basin Management – The OKACOM initiative

By Dr Stefan de Wet (OBSC Co-Chairperson/Namibia), Ms. Laura Namene (OSBCE Member/Namibia), Ms. Portia Segomelo (OBSC Co-Chairperson/Botswana), Ms. Tracy Molefi (OBSC Member/Botswana), Mr. Isidro Pinheiro (OBSC Co-Chairperson/Angola), Dr Ebenizario Chonguica (Executive Secretary/OKACOM).

BACKGROUND

The Okavango River Basin, shared by Angola, Botswana and Namibia, encompasses one of the world's largest inland wetland ecosystems. Being the only perennial river in Africa that flows eastward without reaching the ocean, is also very unique in its *quasi*-pristine status and biodiversity richness.

The Permanent Okavango River Basin Water Commission (OKACOM) was established in 1994 by Angola, Botswana and Namibia. The objective of the Commission is to act as the technical advisor to the contracting parties on matters of common interest relating to the conservation, development and utilization of water resources in the Okavango River Basin (OKACOM, 1994). This entails promoting coordinated and sustainable water resources management of the basin, while addressing the legitimate social and economic needs of the riparian states.

The Commission is guided by a shared vision amongst the riparian States that envisages anticipating and reducing unintended, unacceptable and often unnecessary impacts to the resources of the Okavango basin system. The vision is supported by operational principles of:

1. Equitable allocation,
2. Sustainable utilization,
3. Sound environmental management, and
4. Sharing of benefits (OKACOM, 1994).

The Commission's mandate requires it to investigate the pre-requisites and set-up conditions to:

1. Determine the long term safe yield of water available from the river,
2. Estimate reasonable water demand scenarios from consumers,
3. Prepare criteria for conservation, equitable allocation and sustainable utilization of water,
4. Undertake investigations related to water infrastructure,
5. Formulate recommended pollution prevention measures,
6. Develop measures for alleviation of short-term difficulties, such as temporary droughts and floods, and
7. Generate visible impacts on poverty alleviation for the riparian communities emanating from applied resources management options (OKACOM, 1994).

RIPARIAN COUNTRIES

Angola, as the upstream water-rich riparian country, has for over three decades been involved in one of the most destructive civil wars that has destroyed infrastructure, human life and prevented basic development in most parts of the country, particularly in that part of the country that falls within the Okavango basin. With the current peace dividend, development options outside the heavily concentrated oil and diamond industries are now being considered.

Botswana accounts for the lower end of the basin system where a magnificent delta system holds one of the most biodiversity-rich wetland ecosystems with significant social, economic and ecological

value. Its protection and conservation is paramount both nationally and internationally but is dependent on upstream conditions to maintain desired flows for wetlands ecosystem integrity. Despite the high tourism value represented by the Delta, the country still holds alternative economic options with the diamond and beef industries supporting the country's excellent governance credentials.

Namibia has one of the driest hydro-climatic conditions in the region, making it highly dependent on groundwater, existing ephemeral river systems and perennial rivers on its border. Alternative water sources such as recycled water and desalination are also being used. In future, the country will rely more on using some water from the perennial river systems for its socio-economic development in central areas.

In terms of contribution to the average annual inflows to the Okavango basin system, there are substantial differences between the three countries, with Angola contributing by far the most. The values are summarized in table 1:

Country	Average annual river inflows (Mm^3)	% Annual inflow	% Basin area contributing to annual inflows	% Basin area not contributing
Angola	9320.5	94.5	38.7	0.9
Botswana	256.4	2.6	3.8	36.7
Namibia	286.1	2.9	4.1	15.8
Total	**9,863.0**	**100.0**	**46.6**	**53.4**

Table 1. Contribution of basin countries to annual inflow in the Okavango Basin

Source: Ashton P. 2003

INSTITUTIONAL STRUCTURES *(ORGANIZATIONAL AND INTERACTIVE PROCEDURES)*

The organizational structure of OKACOM (Figure 1) is defined as per the terms of the OKACOM Agreement on the Organizational Structure for the Commission, entered into by the three countries in 2007. According to Article 4 of this agreement, the organizational structure is designed to ensure the effective fulfilment of its functions (Agreement on the organizational structure of OKACOM, 2007). The main OKACM organs, therefore, consist of:

- The Commission,
- The Okavango Basin Steering Committee, and
- The Secretariat.

The Commission is the principal organ of OKACOM, responsible for defining and guiding the development policy and the overall supervision of the activities of OKACOM. The Commission is chaired on an annual rotational basis and the appointed Commission Chairperson is the Chairperson of the National Commission of the Contracting Party holding the Chair. The commission is composed of two categories of members: permanent members and non-permanent members (OKACOM, 2007):

- Permanent members are officials nominated as Commissioners by the Contracting Parties in accordance with the provisions of the 1994 Windhoek Agreement;

- Non-permanent members are any officials nominated by the Chair of the Contracting Parties, who are not Commissioners in terms of the 1994 agreement, and are officials of the respective National Commissions under OKACOM.

The Okavango Basin Steering Committee (OBSC) is the technical advisory body to the Commission. It provides technical leadership to permanent or temporary subsidiary committees – known as task forces – that are established according to the nature and specificity of the matter. It is also composed of permanent and non-permanent members, and is chaired by an OBSC member from the Contracting Party holding the Chair and appointed by the Chair Contracting Party who should notify other Contracting parties of such appointment (OKACOM, 2007).

The Secretariat is the organ responsible for providing administrative, financial and general secretarial services to OKACOM. It is headed by an Executive Secretary appointed by the Commission, under the terms and conditions established in the rules of procedures thereof. The staffing and personnel composition of the Secretariat are established as may be decided and approved by the commission to enable it to effectively fulfil its functions (OKACOM, 2007). In line with the sustainability model for the Secretariat, provisions are made for it to be supplied with national seconded staff, with the associated costs fully covered by the riparian country of origin. On the basis of required technical skills, provided seconded staff may assist the Secretariat in the coordination of regional project implementation, data collection and documentation, and updating of integrated management plans of the basin among other technical professional requirements.

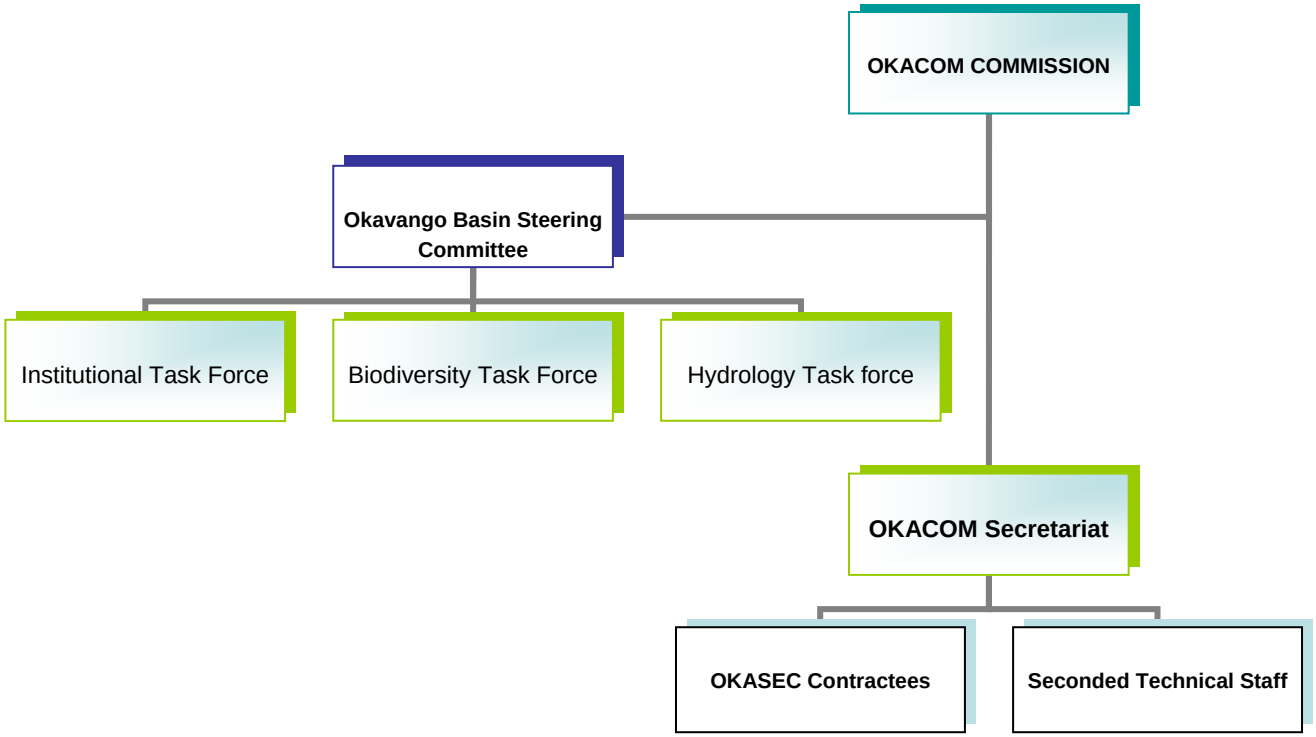


Figure 1. OKACOM organizational structure

MANDATE, RESPONSIBILITIES AND IMPLEMENTATION POWER OF JOINT BODIES/INSTITUTIONS

The key mandates and operations procedures of the main OKACOM organs are defined by the provisions of the OKACOM agreement on the organizational structure. These are detailed below.

The Commission

Mandate and functions - the key functions of the Commission as defined in Article 7 of the Agreement on Organizational Structure include:

1.To define and approve guidelines to achieve the main objectives of OKACOM,

2.To approve the annual and multi-annual work plans, financial plans and budgets thereof,

3.To approve accountability mechanisms and documents,

4.To submit technical, economic, financial and legal information required for the preparation of the Master Plan for the integrated use of water resources of the basin, for consideration and approval by the Contracting Parties,

5.To submit, for consideration and approval by the Contracting Parties, the Agreement on Shared Water Resources of the basin,

6.To approve the rules of procedures of OKACOM internal bodies,

7.To appoint and dismiss members of OKACOM internal bodies and project managers,

8.To adopt the terms of reference for experts and consultants to be recruited within the scope of OKACOM and as required for project implementation,

9.To approve experts' and consultants' contracts within the scope of OKACOM and as required for project implementation,

10.To approve the technical and administrative structures of OKACOM and the rules of procedures thereof,

11.To establish "ad hoc" working groups or specific temporary or permanent committees,

12.To propose to the Contracting Parties the acquisition or disposal, on any ground whatsoever, of fixed assets, of income-generating assets or other property of historical or artistic value,

13.To decide on any amendment or revision of agreement or conventions pertaining or applicable to the Basin,

14.To provide overall guidance in the governance of the internal organs of OKACOM, and

15.To decide on any matter submitted by any OKACM body or any matter that comes to its knowledge (OKACOM, 2007).

Responsibilities - as defined in the organizational structure, major responsibilities of the Commission Chairperson in coordination with the Secretariat include:

1. Convene and chair the meetings of the Commission and also guide the respective agenda items,

2. Prepare the agenda for meetings, invite members of the Commission to the same and ensure the presence of the required number of members,

3. In coordination with the Secretariat, guide the preparation of the meetings of the Commission, ensuring that all the information provided to the members arrives on time and is thoroughly researched and duly presented,

4. Facilitate the circulation of the documentation by the Secretariat to the permanent members of the Commission, at least four weeks before the date of the meetings,

5. Coordinate the activities of the Commission in between meetings,

6. Facilitate, when necessary or when the Commission so deliberates, the convening of joint meetings with the OBSC,

7. Represent the Commission when duly mandated to the effect, unless when another mode of representation is mandated by the Contracting Parties, and

8. Appoint a member of the Commission of the respective State as a replacement in case of absence or impediment (OKACOM, 2007).

Operations - as defined in article 9 of the organizational structure, the operations of the commission are ruled as follows:

1. The Commission operations are guided by its own approved rules and procedures,
2. It convenes ordinary meetings once a year and extraordinary meetings at any time at the request of any of the contracting parties,
3. The decisions of the Commission are by consensus,
4. The decisions are only valid when all Contracting Parties are duly represented,
5. Any Contracting Party may request an extraordinary meeting to be held,
6. The requesting Contracting Party may host the extraordinary meeting,
7. The holding of an extraordinary meeting of the Commission does not end the tenure of the Chairpersonship in favour of the Contracting Party hosting the meeting (OKACOM, 2007).

The Okavango Basin Steering Committee (OBSC)

Mandate and functions - as per provisions of the organizational structure agreement article 12, the key functions of the OBSC in coordination with the Secretariat include:

1. To prepare and submit, for approval by the Commission, the technical, economic and financial terms of the programme and projects aiming at the conservation, development and general use of the water resources of the Basin,
2. To prepare and submit background information for the development of an agreement on shared water resources of the Basin for the approval of the Commission,
3. To prepare and submit the technical, economic, financing and legal background information for the preparation of the Master Plan for the integrated use of the water resources of the Basin for the approval by the Commission,
4. To prepare and submit the annual and multi-annual work plans of the Commission, and the respective implementation reports for the approval of the Commission,
5. To prepare and submit OKACOM programme and projects implementation reports for the approval of the Commission,
6. To monitor, oversee and advise on water resources related projects and programmes implemented within the basin,
7. To implement projects and other activities on the basis of the terms and conditions as approved by the Commission,
8. To develop the terms of reference for experts and consultants, to be recruited for the implementation of the projects and other tasks, within the scope of the Commission,
9. To propose the recruitment of experts and consultants for the implementation of OKACOM projects,
10. To propose OKACOM's technical, administrative, organizational structure and operational rules and regulations thereof,
11. To propose staff rules and regulations,
12. To propose the establishment of ad hoc working groups or committees,
13. To submit experts' and consultants' work-plans for approval by the Commission,
14. To advise on the amendment and review of agreements related to the Basin,
15. To advise on situations relating to the execution of programmes and projects, taking into account the implementation of the decisions made by the Commission,
16. To provide technical advice to the Commission on emerging issues regarding conservation, development and the use of water resources of common interest to the Contracting Parties,
17. To advise on the acquisition or disposal, under any title, of fixed assets, of income-generating assets or other property of historical or artistic value,

18. To prevent and resolve any conflicts under the terms and conditions established by the Commission,

19. To develop a capacity building programme for OKACOM, and

20. To advise on any other matters concerning the Basin (OKACOM, 2007).

Roles and responsibilities - Under article 13 of the agreement on organizational structure, the roles attributed to the OBSC Chairperson include:

8. Convene and chair the meetings of the OBSC, as well as guide the respective agenda items,

9. Prepare the agenda, invite the members of the OBSC and ensure the presence of the required number of members,

10. In coordination with the Secretariat, organize OBSC meetings and ensue the timely dissemination of documents and information for use at meetings,

11. Facilitate the circulation of the documentation by the Secretariat to members of the OBSC, at least four weeks before the date of the meeting,

12. Coordinate the activities of the OBSC,

13. Represent the OBSC,

14. Appoint another member of the OBSC of the respective State as a replacement in case of absence or impediment, and

15. Develop and conduct other activities as mandated by the OBSC or the Commission (OKACOM, 2007).

Operations - as per article 14 of the organizational structure agreement, the operation of OBSC are conducted as follows:

1. The OBSC meets every six months,

2. The OBSC's extraordinary meetings can take place when convened upon the Chairperson's own motion, or when requested by one of the Contracting Parties,

3. All decisions of the OBSC are taken on the basis of consensus,

4. The decisions of the OBSC are valid only when all Contracting Parties are duly represented,

5. The OBSC is governed by its own rules of procedure as approved by the Commission,

6. The rules establish:

    a. The number of members of each State Basin in the OBSC,

    b. The Quorum,

    c. The mode of nomination of Chairperson,

    d. The procedures for the preparation of the agenda and the invitations for the meetings, the activity programme and the submission of proposed recommendations to the Commission,

    e. Conditions guiding the submission for notification of the nominated members of the OBSC, and

    f. Any other conditions guiding the operations of the OBSC (OKACOM, 2007).

The Secretariat

Mandate and functions - as per article 16 of the organizational structure, major functions of the Secretariat include:

16. To provide administrative and archiving services, under the guidance, coordination and supervision of the Commission,

17. To procure equipment and services for its daily operations on the terms approved by the Commission,

18. To facilitate the implementation of projects and the execution of any other activities in the Basin under the guidance, coordination and supervision of the Commission and in close cooperation with OBSC,

19. To prepare and submit its annual work plan and budget for approval by the Commission,

20. To liaise with stakeholders and share information on OKACOM activities, under the guidance, coordination and supervision of the Commission,

21. To establish and maintain a database to support the information provided by the Commission relating to transboundary issues of the Basin,
22. To manage OKACOM funds in an efficient and transparent way as per financial procedures approved by OKACOM,
23. To establish an archive of all OKACOM's documentation including, but not limited to, correspondence and minutes of meetings,
24. To ensure the timely circulation of documentation to the permanent members of the Commission and the OBSC, at least four weeks prior to the meetings,
25. To ensure that the official languages of the Contracting Parties have equal status and are equally used,
26. To undertake any other activities under the terms and conditions established by the Commission, and
27. To receive assets and funds on behalf of OKACOM (OKACOM, 2007).

It should, however, be noted that in the context of the gradual but incremental process of consolidation and operationalization of the Secretariat, two distinct functional phases are envisaged.

During the first phase of the OKACOM action plan (first three-year plan), the main functions of the Secretariat concentrate on support to OKACOM in the management of the river basin resources through the implementation of the 1994 agreement. In programmatic terms the Secretariat is specifically responsible for ensuring:

- Effective administration of OKACOM operations,
- Efficient implementation of OKACOM decisions, and
- Developing and implementing functional and expedient information sharing and communications systems and procedures (OKACOM, 2005).

During the second phase (from the fourth year onward), the above functions will be expanded to include:

- Planning and coordination,
- Fund raising,
- Capacity building, and
- Conflict prevention.

Should it be found advantageous, some of the functions of the second phase can be anticipated into the first phase.

CURRENT STATUS OF INSTITUTIONAL ARRANGEMENTS AND ONGOING JOINT FIELD PROJECTS

It became apparent that the increasingly complex challenges of managing water resources required solid institutional foundation for handling day-to-day matters, and therefore OKACOM is presently concentrating on the consolidation and operationalization of its institutional arrangements and governance procedures. In this respect, from the October 2004 deliberations, a proposal was agreed upon to strengthen the Commission by setting up a Permanent Secretariat (OKACOM, 2005).

Since December 2007 the Permanent Secretariat for OKACOM has been established as a legal entity based in Maun, Botswana, with a clear mandate to operate under the terms of its defined structural and functional attributes. Being a recently established organ, a special secretariat institutional development process is being implemented. This is being done under the proposed Three Year Plan for the Consolidation and Operations of the Secretariat (OKACOM, 2007).

Thus two parallel processes are currently taking place: i) strengthening OKACOM internal institutional arrangements; ii) implementation of field projects on the ground.

OKACOM internal institutional arrangements

Three Year Plan for the Consolidation and Operations of the Secretariat (funded by SIDA)

Goal

OKACOM and member countries supported in integrated management of the Okavango River Basin through the implementation of the 1994 agreement

Immediate objectives

Objective 1: OKACOM decisions are well informed, based on:

- well prepared analysis of alternatives and relative costs and benefits and
- implemented in a timely and effective manner

Objective 2: Information relevant to sustainable, equitable and effective management of the Okavango River Basin is defined ensuring that:

all relevant actors are aware of the sources and

- these sources continue to match present and future needs

Objective 3: Participation of stakeholders in the integrated governance of the Okavango River Basin is increased by:

- enhancing communication
- Improving capacity of OKACOM
- Enhancing stakeholders' participation in the management of the Okavango River Basin.

Objective 1: OKACOM decisions	**Objective 2: Information strategy**	**Objective 3: Participation**
1.1. Effective administration/highly functional and well organized OKACOM organs established	**2.1.**Present information sources and partners effectively identified and mapped	**3.1.**Specific stakeholder categories analysis and information/communication needs defined
1.2. Coordinated action plan for implementation of OKACOM decisions	**2.2.**Present and future information needs effectively analyzed and listed	**3.2.**Appropriate messages, media and platforms identified and linked
1.3. Progress reporting on implementation process	**2.3.**Information responsibility criteria developed and implemented	**3.3.**Field tested communications strategy linking outcomes 1, 2 and 3 developed with mechanisms for adaptive management
1.4. Analytical systems in place/Issues and option papers developed on key topics	**2.4.**Information access strategy developed	**3.4.**Communication outreach personnel of OKACOM stakeholders trained in facilitating communication – capacity building
	2.5. Plan of action for implementation of information duties assigned to the Secretariat	

Table 2. Expected outcomes per immediate objective

Implementation arrangements

This initiative is being fully coordinated and implemented within the internal organs of OKACOM. The Secretariat is the key driver of the day-to-day implementation arrangements under the guidance and supervision of the OBSC and ultimate strategic direction and decision-making by the Commission.

The task forces are part and parcel of the implementation arrangements and proper linkages are established with all other relevant projects taking place in the basin (detailed below) including the Basin Wide Forum[1] through NCUs.

Financing model

A special approach to secure long term financial sustainability of the operations of the Secretariat is envisaged. The three year plan for the Secretariat estimates annual operational costs to be US$ 600,000 to US$ 800,000 during phase 1. This amount is expected to increase to approximately US$ 1,100,000 per annum during phase 2.

During phase 1 the operational costs are fully covered by the main international cooperating partner (SIDA) with the exception of salaries for national seconded staff. Riparian States, however, are financially responsible for covering all costs associated with national delegates' travel and accommodation to all OKACOM related official meetings.

Contributions from ICPs are expected to phase out over a ten year period, which will result in a national contribution shift from the current annual US$ 100,000 to US$ 400,000 (OKACOM, 2007). A graphic representation of the funding model and associated ICP phase out approach is as illustrated in figure 2 overleaf.

[1] *The Basin Wide Forum is a transboundary committee comprised of 10 local community representatives from each of the riparian states. At a country level, the members are called Country Forum Members, and they meet twice a year at national level and at least once a year at basin level. The primary aim of the meetings is to share experiences and generate a 'bird's eye view' of the socio-economic and hydro-environmental landscape of the basin in order to help formulate knowledge-based community livelihoods and environmental action plans.*

Field projects

Besides the above, OKACOM is also engaged in the implementation of specific thematic projects on the ground. The major interventions taking place at present include:

- The Environmental Protection and Sustainable Management of the Okavango Basin Project/ (EPSMO) - funded by GEF/UNDP;
- The Okavango Integrated River Basin Management project (IRBM) - funded by USAID; and
- The Every River has its People project (ERP) - SIDA funded.

A summary of the key objectives and expected results of the above initiatives can be found in Table 3 below.

a) EPSMO Project

This project constitutes one of the first major initiatives of OKACOM. It is aimed at executing a Transboundary Diagnostic Assessment (TDA) of the entire Okavango River Basin and formulating a strategic action plan for the system. It entails providing comprehensive scientific information and analysis of the state of the resources and environment in the whole basin, as well as an assessment of the prevailing situation to show potential options for future development scenarios and associated implications for the basin.

This project was directly commissioned by the Commission, and will generate the backbone of future OKACOM overall programmatic interventions in the basin. It is being implemented through FAO and it has a stand-alone project management unit, a project steering committee and a tri-partite board.

In all EPSMO project implementation, OKACOM organs are duly represented at appropriate levels. The project has established organisational links with NCUs and the Secretariat that will inherit the final products of the project for the formulation and implementation of the OKACOM strategic plan for the basin. All the project activity planning and implementation are systematically coordinated and supervised by OBSC for final approval by the Commission.

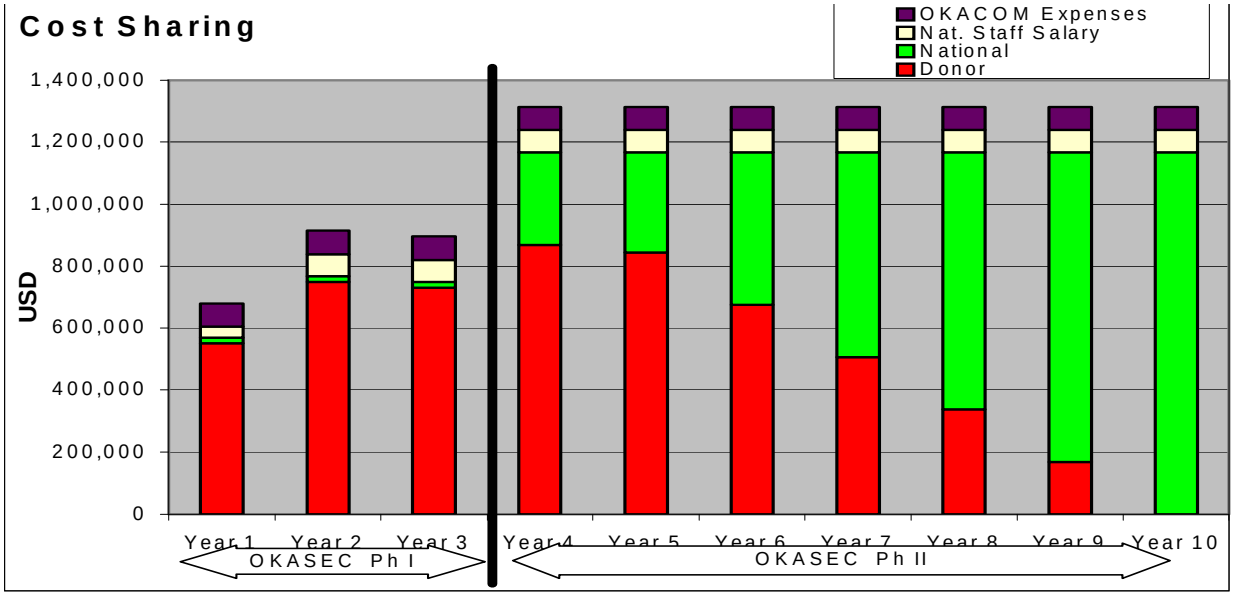


Figure 2. OKACOM funding model for long term sustainability (OKACOM, 2007)

A. Strengthened Mechanisms for Joint Management	B. Transboundary Diagnostic Analysis	C. Strategic Action - Plan Formulation
A1) Riparian countries expertise strengthened A2) Basin wide mechanisms for stakeholder participation established A3) Policy, legal, institutional and human resources initiatives launched	B1) Water resources assessment B2) Socio-economic analysis B3) Environmental systems limits defined B4) Environmental assets described B5) Water resources alternatives assessed B6) Water resources models used for options B7) Environment, economic criteria for planning	C1) Technical and policy implications evaluated C2) Joint management plan developed C3) Commitments to SAP defined C4) SAP endorsed by riparian governments C5) SAP financed ready for implementation

Table 3. Major outcomes of the EPSMO project

b) OKAVANGO Integrated River Basin Management (IRBM)

Funded by USAID and implemented through ARD Inc., the project was formulated before the decision to establish the Secretariat. It played an instrumental role in supporting OKACOM in the process of establishing the Permanent Secretariat by providing Interim Secretarial Services (ISS) to OKACOM. Its major aim gravitates around participatory natural resources planning and management. Working in three major pillars, the scope of work focuses on

- Strengthening OKACOM and members states
- Policy, legal, planning and management
- Community participation and enterprise

c) Every River has its People (ERP)

This SIDA-funded project focuses on strengthening the enabling environment for effective participation of communities in the management of the Okavango River Basin. The Basin Wide Forum, comprised of community members representing each of the riparian countries, presents key issues periodically to OKACOM. The main implementing agents are civil society organizations within the three riparian states led by the Kalahari Conservation Society in Botswana, the Namibia Nature Foundation in Namibia and ACADIR in Angola. ERP's elements include socio-ecological surveys, analysis of information, development of educational material and capacity building for improved participation in planning and decision-making.

THE TRANSITION PROCESS – WHAT HAS CHANGED

It is interesting to observe that by the time Angola and Namibia entered into a bilateral arrangement to re-activate the joint management agreement of the Cunene (previously initiated by the colonial powers Portugal and South Africa 1994) that subsequently led to the establishment of the Permanent Okavango River Basin Water Commission in September 1994, Angola was just re-engaging in the second phase of one of the most destructive civil wars in Southern Africa (Porto & Clover, 2003).

After the failed peace process between UNITA and MPLA in 1992, basically the whole of southern Angola – and the Okavango basin in particular – was fundamentally a war zone. Most of the stronghold military bases of UNITA were located within the basin, and places like Cuito Cuanavale at the heart of the basin are known for the most ferocious battles ever experienced in the sub-continent. One could therefore question the extent to which the three riparian states could think of a transboundary river basin management arrangement in a river system converted into a military theatre of operations. The reality is that, in spite of the conflict, OKACOM was established and commitment to jointly manage the system was agreed upon. It was not until April 2004 that the two confrontational forces in Angola agreed to put an end to the longest high-intensity military conflict in Southern Africa (Porto & Clover, 2003).

From that standpoint, it can be inferred that the peace dividend in Angola is one of the fundamental defining moments of change in the historical and practical trajectory of the OKACOM agreement. Other important drivers to the agreement may include the high expectations of both Namibia and Botswana to generate national economic, social and ecological benefits from the very few perennial river basin systems adjacent to their borders.

In Namibia, the development of the so-called Eastern National Water Carrier in the context of the National Water Master Plan, is an indication of the above (Pinheiro, Gabaake & Heyns, 2003). In 1997, Botswana acceded to the Ramsar Convention and the Okavango Delta was listed as a Ramsar site of international importance. This vast water body, in a predominantly dryland, has created a unique wetland environment justifying its status as the largest Ramsar site on the planet (at the time). Options for using the area are centred on low-volume/high-value tourism, which is proving a solid economic opportunity.

Perhaps it is these underlying geopolitical, historical, socio-economic and environmental imperatives that have created the motivation for the OKACOM riparian states to be very determined and committed to cooperation and the setting up of a joint management system to respond to the associated challenges. However, it is important to note that consolidation of agreements is fundamentally dependent on perceived mutual benefits, and it is clear that the countries stand to gain more from working together than apart.

Ten to 15 years ago the military conflict imposed impossible conditions for the assessment of the status of land and water resources of the basin, a pre-condition for developing planning and management scenarios. Today, however, hydrological gauging stations are being rehabilitated and upgraded in Angola. Under the tense geopolitical landscape governed by civil war that prevailed in the late 1990's, the sense of trust at the negotiating table between the contracting Parties to the OKACOM agreement could be easily shaken, whereas today the riparian states are building transborder communication bridges that transcend individual government officials. Government officers, researchers, academics, and the various segments of civil society are joining forces to develop a common shared vision and action plan for the joint management of the Okavango River Basin. The TDA process is bringing together researchers from the three States to develop a holistic appraisal of the status of basin resources. To ensure that the TDA process is catchment-based, the tri-country researchers and policy makers have agreed to adopt the 'environmental flows' assessment methodology (King, J. et al, 2003) to avoid risks of generating country-specific discrete assessments that may not connect to each other. Tri-country, multi-disciplinary teams are being put together and cross-country scientific expeditions in the context of the TDA process are being implemented.

WISHES FOR THE FUTURE – WHAT CAN AND SHOULD BE IMPROVED

Most trans-national initiatives are driven by provisions stipulated in bilateral, regional or international agreements that still lack the appropriate institutional infrastructure to effectively operationalize the very good intentions behind them. These initiatives are further hampered by the difficulties surrounding the ongoing debate on policy integration and coordination. Eventually this constitutes the central theme of the current workshop: to effectively investigate and invest in the foundations for capacity development of the critical institutional pillars that can secure the realization of the "dream" of River Basin Organizations (RBO) – transboundary management of rivers.

Most of the emerging RBO initiatives in Southern Africa are driven by the manifested political will, under the umbrella of SADC (as captured in the Regional Integration and Protocol on Shared Water Course Systems), and the technical passion of involved technocrats - but without any reference model to follow. Building the institutional arrangements is a learning curve that needs to be guided by well defined and tested scientific and empirical paradigms to guarantee success. It constitutes a required step beyond the concepts currently being verbosely advocated, such as Integrated Water Resources Management, Ecosystems Approaches, etc., that still need to be practically demonstrated on the ground as optimal options for the management of our natural capital.

With regard to transboundary rivers management, the challenge still remains to tackle the profoundly-built notion of state sovereignty that determines planning and management around state sovereign entities or in sector "silos", creating significant barriers for the much preached concept of trans-disciplinary, trans-sectoral and socially inclusive models of planning and decision making.

CONCLUDING REMARKS

The substantial strides taken so far by OKACOM and other Southern Africa RBO initiatives need to be sustained. Associated lessons learnt must be adequately studied and documented. Southern Africa encompasses an important source of knowledge and experience in setting up, developing and managing RBOs, contributing to the worldwide pool of knowledge on transboundary management for river basins.

Put in perspective, it can be argued that the establishment of OKACOM through the 1994 agreement was a strong and bold political statement of willingness to cooperate and respond to the challenges imposed by the complexity of transboundary management of river systems. Despite the visible practical constraints imposed across the geopolitical landscape by protracted conflict affecting the region, as well as the complexity of managing endorheic and ephemeral river systems (Seely, M. et al, 2003) the contracting parties have manifested a solid determination to move on with the agreement because ultimately, this is the sole optimal solution to the potential or emerging water crises in such systems.

Mekong River Commission and its first test in a transboundary impact incident - Ialy Dam

By Dr Le Duc Trung, Acting Secretary General, Viet Nam National Mekong Committee

Abstract

Mekong river is the most important river in the South-East Asia, nurturing about 70 million people. Riparian have long realized its vital importance to their livelihood that led to the initiative of Mekong cooperation started from 1957. Soon after getting out of political turbulence in the region, the commitments of riparian Government to the Mekong cooperation have brought to a new height culminated by the signing of the "The Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin" on 5 April 1995 in Chiang Rai, Thailand. It also led to the establishment of a new set-up – the Mekong River Commission (MRC), which are mandated to promote sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin. The regional cooperation body have been since then making every effort to build up its institutional set-up and capacity to deal with concerned issues, especially those of transboundary or basin-wide nature.

Experiences regarding an incidental release from Ialy dam (Central Highland of Viet Nam) to the Cambodian downstream and its costly damages are shared in this presentation. The painful case has been widely regarded as the most typical and thus the first test to the regional awareness in general and to the MRC effectiveness in particular. A series of institutional arrangements/set-up have been made both by MRC and bilateral channels (between Viet Nam and Cambodia) to not only mitigate the damages but to ensure that such an incident would not be able to happen again.

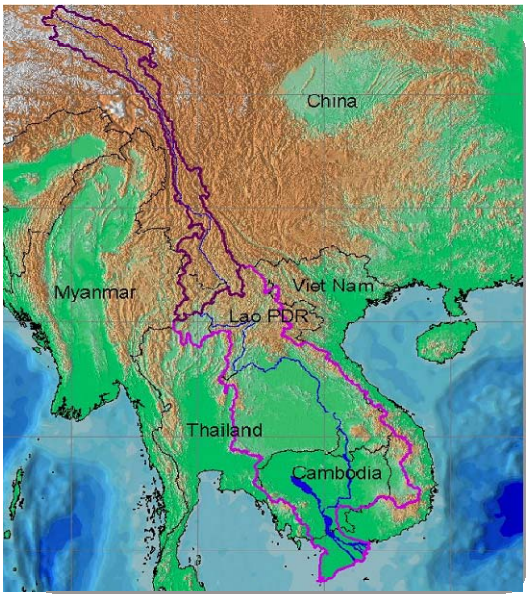


Figure 1. The Mekong River Basin

Mekong Basin introduction

The Mekong ranks twelfth in the world in terms of length (4,800 km) and eighth in terms of average annual runoff (475 billion cubic meters). Starting at an elevation of over 5,000 meters in the Tanghla Sha Mountains on the Tibetan plateau – starting point of a total catchment of some 795,000 km^2 - the Mekong River rushes southward through deep gorges and down steep inclines in the Chinese portion of the river. After the river leaves China, it forms the border between Burma and Laos for 270 km. By the time the Mekong River has reached the "Golden Triangle," where Laos, Thailand and Burma meet and the "lower Mekong Basin" starts,

the elevation has dropped to only 500 meters. The Mekong River then turns eastward into Laos, makes an abrupt turn southward near the ancient Lao city of Luang Prabang, and then forms the Thai-Lao border for another 900 km. Near the Lao town of Pakse, the river turns away from Thailand, courses a short distance through Laos and then enters Cambodia. The Mekong then meanders through the heart of Cambodia, passes by the Cambodian capital of Phnom Phen, and breaks into two distributaries, the Mekong River and the Bassac River. After entering Vietnam, the Bassac and Mekong Rivers fan out into eight distributaries that empty into the South China Sea.

The Mekong Basin is widely perceived as divisible into two parts: (i) the Upper Basin in Tibet and China, where the river is referred to as the Lancang Jiang, and (ii) the Lower Mekong Basin downstream of Yunnan, a distinction that is broadly consistent with wider geographical and geomorphologic differences (as shown in the above map).

Description	China	Myanmar	Lao PDR	Thailand	Cambodia	Viet Nam	Total Mekong River Basin
Area (km^2)	165,000	24,000	202,000	184,000	155,000	65,000	795,000
Catchment as % of MRB	21	3	25	23	20	8	100
Flow as % of MRB	16	2	35	18	18	11	100

Table 1. Mekong Basin Countries

The flow in the Mekong River and its tributaries is closely related to the rainfall pattern associated with the region's tropical monsoon climate. Below graph presents average year hydrographs for key stations along the Mekong River. The flows begin to increase at the onset of the wet season in April, usually reaching a peak in August or September, and then decreasing rapidly until December. The flows recede slowly during the annual dry period from December to April, usually reaching their lowest levels during March or April. The Great Lake of Cambodia, also know as Tonle Sap, regulates water flow into the Mekong delta downstream of Phnom Penh by storing portions of the peak flow from July to September and releasing it from October to April. During the wet season, the water level in the Mekong rises faster than in the Tonle Sap. Excess water enters the Great Lake through the Tonle Sap River, storing some 70 billion cubic meters in this natural reservoir. The surface of Tonle Sap expands five-fold during the wet season, from 2,000 to 10,000 square kilometres. As the Mekong water level recedes, the Tonle Sap River reverses direction and releases water into the Mekong River – including both stored Mekong flood water and the yield of its own catchment area.

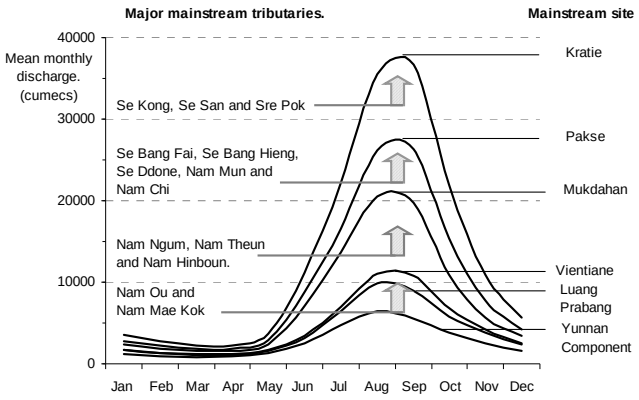


Figure 2. Major main stream tributaries

An enormous volume of water flows through the Mekong Basin in the wet season, resulting in extensive flooding, both along the mainstream and the tributaries. The flood waters support an incredibly productive eco-system throughout the length of the

Mekong River and its tributaries, including Tonle Sap's unique eco-system based upon the annual expansion and contraction of the lake. The flood waters also result in substantial damage to crops and structures. In contrast, during the dry season a dramatic reduction of flow often leads to drought, resulting in water shortages for both domestic and agricultural use, and limiting navigation on the Mekong. Most seriously affected during the dry season is the coastal plain of the Mekong delta, located mainly in Vietnam, where the low flow also results in an intrusion of salt water into the delta (up to some 2 million hectares).

Mekong River Commission

The history of the Mekong cooperation dates back some 50 years. At a then regional cooperation session (ECAFE) in March, 1957 representatives from the governments of Cambodia, Laos, South Vietnam and Thailand issued a declaration expressing their desire to establish a joint institution for the development of the lower Mekong Basin. China and Myanmar did not join in for various reasons. The mandate of the Mekong Committee was limited to the planning aspects of water resource development, and helping mobilize technical and financial resources to support water resource development in the Mekong Basin. In spite of the war in the region, the organization pressed ahead with the master plans and construction of several medium-sized tributary projects in Thailand and Laos. In 1970, the Mekong Committee unveiled the "Indicative Basin Plan" with aims to providing a framework for basin development up to the end of the century, including a proposed mainstream reservoir cascade of which Pa Mong project was then one of the world's largest dam and reservoir projects.

The 1975 Joint Declaration was a milestone in the evolution of the constitutional framework of the Mekong cooperation, representing an expansion of the Mekong regime's authority from that of simply controlling planning as dictated in 1957, to actually regulating the implementation of water resource projects. However, the lack of formal ratification of the 1975 Joint Declaration leaving its status in doubt became a source of great controversy in later stages. The cooperation was briefly discontinued due to the global Cold War and the political tension in the region soon after the end of the Indo-China war. By 1978, however, the time was ripe for a resurrection of the Mekong cooperation. With assistance from the Economic and Social Commission for Asia and the Pacific (ESCAP) - ECAFE's successor - representatives from the governments of Laos, Thailand, and Viet Nam signed the 1978 Interim Mekong Committee (IMC) Declaration with aim to "promote" water resource projects. Cambodia did not join the IMC due to the isolationist policies of the Khmer Rouge. In 1987, the IMC formulated a "Revised Indicative Basin Plan" which reviewed the long-term perspective of the basin's development potential, proposed an investment plan up to the year 2000, and recommended a concurrent program of studies and investigations. The 1987 Plan maintained the concept of a cascade of dams along the mainstream of the lower Mekong River, although these were downsized in order to reduce resettlement requirements and meet relevant environment concerns.

In the 1990s, at the request of Cambodia to resume their membership in the cooperation, Thailand argued that the 1975 Joint Declaration was not binding, while the other three claimed that embedded principles should be respected. Whilst Thai negotiators attempted to escape the obligations in the Joint Declaration and the Vietnamese, Cambodian and Laos tried to salvage as many of these 1975 Joint Declaration principles as possible, a new process of negotiating a new cooperation framework was initiated. The negotiating process was completed by the official signing of the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin on 5 April 1995, in Chiang Rai, Thailand. The Agreement set a new mandate for the organisation "to cooperate in all fields of sustainable development, utilisation, management and conservation of the water and related resources of the Mekong River Basin".

The Mekong River Commission (MRC) was established also in 1995 by the Agreement with members consisting of the governments of Cambodia, Lao PDR, Thailand and Viet Nam. The two upper states of the Mekong River Basin, the People's Republic of China and the Union of Myanmar are dialogue partners to the MRC.

The MRC consists of three permanent bodies: The Council with members of ministerial level, the Joint Committee with members at no less than Department Director General level and the Secretariat, which is now located in Vientiane, Lao PDR. The MRC Secretariat is the operational arm of the MRC, providing technical and administrative services to the JC and the Council. The agency is under the direction of a Chief Executive Officer (CEO) who is responsible for the day-to-day operations of the inter-governmental organization. The MRC is funded by contributions from the four member countries and from aid donors. Formal consultation with the donor community is carried out through an annual Donor Consultative Group meeting.

Since the 1995 Agreement, the Mekong River Commission (MRC) has launched a process to ensure "reasonable and equitable use" of the Mekong River System, through a participatory process with National Mekong Committees in each country to develop procedures for water utilisation. The MRC is supporting a joint basin wide planning process with the four countries, called the Basin Development Plan (BDP), which applies the principles of Integrated Water Resources Management and Sustainable Development. The MRC is also involved in fisheries management, promotion of safe navigation, irrigated agriculture, watershed management, environment monitoring, flood and drought management and facilitating hydropower development.

The 1995 Agreement provides a coherent statement of intent of the four riparian countries that they wish to cooperate in managing the water and related natural resources of the basin to mutual advantage and within sustainable limits, and a clear framework for the MRC to work within. The Agreement introduces a set of rules of procedure by which to utilize the Mekong's waters in a reasonable and equitable manner in each country, the basis for determining an acceptable set of flow conditions in the shared mainstream, a set of rules for monitoring water utilization and a rolling planning process (the BDP) to determine a programme of joint actions by which to fulfil the goals of the Agreement and associated investment opportunities. The Agreement also provides a wide range of guidance on how the MRC will act in implementing the Agreement, in which the four member countries commit inter alia to active consultation and/or prior agreement before engaging in certain types of development. Conversely, other development activities within each country, as being subject to notification, remain solely within the remit of that country, providing of course that these activities do not cause harm to others.

Pursuant to a vision for "an economically prosperous, socially just and environmentally sound Mekong River Basin" by promoting and coordinating sustainable management and development of water and related resources, the Mekong River Commission has defined in its Strategic Plan 2006-2010 an overarching Strategic Goal (to support Member States for more effective use of the Mekong's water and related resources to alleviate poverty while protecting the environment) and four following specific Strategic Goals: (i) Goal 1: To promote and support coordinated, sustainable and pro-poor development; (ii) Goal 2: To enhance effective regional cooperation; (iii) Goal 3: To strengthen basin wide environmental monitoring and impact assessment; and (iv) Goal 4: To strengthen the Integrated Water Resources Management capacity and knowledge base of the MRC bodies, NMCs, line agencies, and other stakeholders.

To date, the following rules/procedures have been prepared and considered:

1. Procedures for Data and Information Exchange and Sharing (approved 2001);

2. Procedures for Notification, Prior Consultation and Agreement (approved 2003);

3. Procedures for Water Use Monitoring (approved 2003);

4. Procedures for Maintenance of Flows on the Mainstream (approved 2006);

5. Procedures for Water Quality (pending for approval);

6. Guidelines for Transboundary Environmental Impact Assessment (under preparation)

Since then, numerous projects which might have transboundary impacts or be of great regional concern have been notified to the MRC. The most debated projects in terms of their basin-wide impacts may be the mainstream hydropower projects (under construction in Yunnan, China and being proposed and prepared in Northern parts of Lao PDR), and suggested water diversion and interbasin diversion by Thailand. However, the "hottest" project which first came under the regional concern and of course coincidently became the first test of the 1995 Mekong Agreement and the above-mentioned rules/procedures was the Ialy Hydropower project in the Central Highland part of Viet Nam.

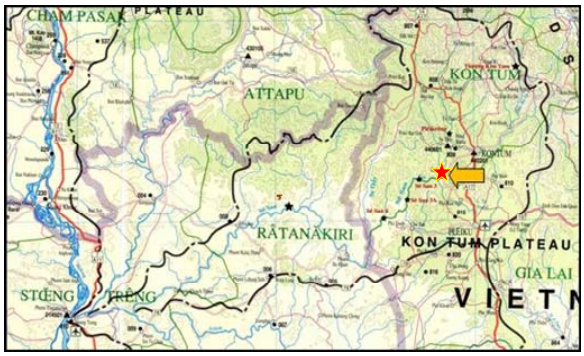


Figure 3. Location of the Ialy dam

Ialy Hydropower Project incident

The Sesan River is one of the main tributaries of the Mekong river system on the left bank. Originating in northern part of the Gia Lai – Kon Tum Plateau, the river is constituted by two tributaries, namely Krong Poco and Dak Bla. After joining, the river mainstream runs East North – West South and receives contribution of another tributary – Sa Thay river before crossing the Viet Nam – Cambodia border (see the map). The Sesan River joins the Mekong mainstream at Stung Treng town in Cambodia. The river has long been well known for its vast hydropower potentials. The table below shows the cascade designed for the sub-basin, of which four projects have been partially or fully operated. The Ialy project was the first of the system to be put into operation in 2000. The project with the largest capacity of electricity generation of the whole system has since been a key in the Viet Nam power grid network.

On February, 2000, due to the careless release of the Ialy dam during the middle of the dry season after a nine-month break of normal flow for reservoir filling, a devastating surge was raiding downstream along the narrow valleys. It unfortunately caused a sudden increase in water level without proper notification, which in turn accounted for the loss of life of reportedly some Cambodian children and serious damage to the property of people living along the Sesan River from 16-19 February 2000. The incident sent a shock wave around the region, especially to the people and community concerned about environmental impacts, and the transboundary impacts in particular. Some NGOs have jumped in to report exaggerations about the scale of the damage, such as crop loss, water quality degradation, increased diseases, declined fish capture and other economic sectors etc.

In fact, immediately after receiving report of the incident, the Viet Nam National Mekong Committee contacted its counterpart on the Cambodian side and the MRC Secretariat to find appropriate measures and solution to mitigate damages. A joint team was sent to the dam and damaged locations for a fact finding and damage investigation. A series of immediate measures were agreed to ensure the painful incident would be able to happen again. Large-scale assistance from Viet Nam to the Cambodian people who suffered was also arranged. In late 2000, a Joint Working Group on Sesan Flow Regulation was established which aimed to: (i) ensure a proper dam operation and flow regulation on the Sesan river; (ii) maintain an effective notification mechanism on the flow regulation (not only between governmental agencies, but also between two adjacent provinces and related people communities); (iii) jointly carry out required transboundary environment impact assessment studies; and (iv) strengthen the trust and cooperation spirit between the two sides in water resources management of the sub-basin. The Sesan-related concerns and issue were also incorporated into the agendas of the Joint Commission between Viet Nam and Cambodia, since its 5th session in Ho Chi Minh City (December 2002). Since then, the operation of the Ialy dam has been strictly monitored and properly observed the agreed procedures (gradual release to enable people to visually observe the change; environmental flow during dry season; notification to pro-

vincial authorities 15 days in advance, bi-annual meetings between the two sides to review the implementation etc.). Additionally, since the official introduction of the MRC rules/procedures for water utilization, Viet Nam adopted a very strict implementation of those rules and principles of regional cooperation, i.e. sending notifications of all hydropower projects in the Central Highlands (not only the Sesan basin) to the MRC; providing related EIA studies of those projects; maintaining all level of contacts of bilateral channels; issuing Prime Minister's Instruction to related ministries/agencies on transboundary impact concerns; adding a re-regulatory reservoir downstream of Ialy to absorb the possible hydrological changes from the dam operation; and suggesting joint ventures for hydropower development on Cambodia side (studies for two projects started early this year).

Conclusions

Mekong cooperation, even though experiencing a not very long but turbulent history, has been in a pioneering position by introducing an advanced set of institutional set-up aiming to effectively deal with transboundary impacts and to facilitate the joint development in the basin of possibly the most important river in South-East Asia. The incomplete institutional set-up (including rules/procedures/technical guidelines and relevant documents and appropriate structures from policy-making, working levels to involved communities and people) has since helped the member countries, their line agencies and provincial authorities in meeting emerging requirements on environmental impacts; resolving the relevant differences and further building trust and cooperation across the border.

The Ialy incident has been widely regarded as the first test of the MRC cooperation framework on the transboundary impact, especially relating to the most sensitive kind of basin development – hydropower. The incident, however, was appropriately tackled thanks to the high commitment and cooperation spirit of the two governments, the mediation and technical support from the MRC Secretariat, the increased awareness, trust and long friendship between both sides of the border. The Ialy dam now fortunately became an excellent example in the Mekong Basin - a key project that was infamous for its transboundary impact concerns becoming a site-to-visit of demonstrated care for relevant aspects and practical exercises.

The lessons learnt from the Ialy incident were: (i) whilst commitment of the top level was quite high, awareness at working level needs to be constantly increased; (i) the regional institutional mechanism cannot replace but needs to be combined with those of bilateral channels; (iii) in a holistic approach, related activities, such as joint investment, monitoring, study and data/information exchange should be all paid attention to; and (iv) capacity building activities.

Transboundary River Management - A Platform for Friendship Enhancement between Iran and Turkmenistan

By S. Nairizi, M. Hosseini, G. Hajmesgari and F. Sheibani

Introduction

Harirud River originates from the Hindu Kush Mountains in Afghanistan and forms the Iran-Afghanistan border from Hassanabad Village to Zoulfiqar neck and then continues its course on the Iran-Turkmenistan common border up to Sarakhs city and enters the Kara Kum plain in Turkmenistan.

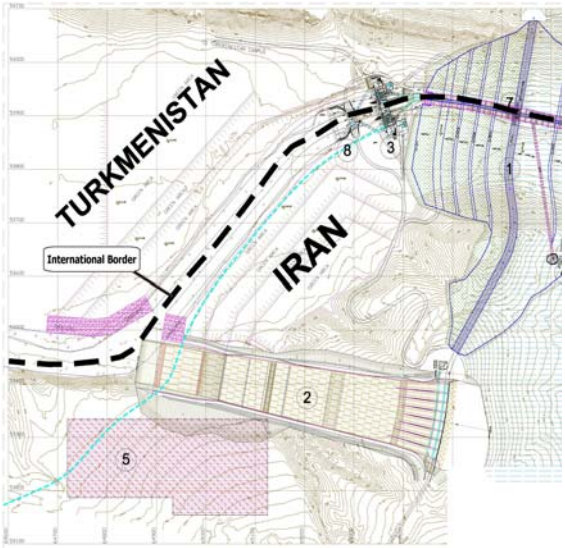
Some important specifications of the river are as follows:

- Total length: 900 km
- Catchment area up to the dam's axis: 54000 km^2
- River flow regime: seasonal
- Mean annual discharge: 1000 MCM

Dam location and access roads:
Doosti dam is located in the north-east of Iran, 75 km south east of Sarakhs city and 180 km north east of Mashhad. Access to the dam site is by the Mashhad-Sarakhs road and along a water supply pipeline service road which connects Mozdooran town with Pol-e-Khatoon.

Figure 1. Harirud river basin and location of theDoosti Dam

Picture 1. Doosti Dam



1. Dam body
2. Spillway
3. Power plant and gate chambers
4. Intake towers
5. Temporary building
6. Bottom outlet intake
7. Bottom outlet emergency valve chambers
8. Outlets service house

Figure 2. Doosti Dam general plan

Doosti Dam specifications

- Purpose: Irrigation & urban water supply
- Dam type: earth fill dam with silty-clay core
- Height: 78m
- Crest length: 655m
- Dam body volume: 5.8 MCM
- Reservoir volume: 1250 MCM
- Annual water regulation: 683.4 MCM
- Spillway type: gated (8x15m)
- Spillway design discharge: 3920 m3/Sec
- Bottom outlet discharge: 105 m3/ Sec

HISTORICAL BACKGROUND

The first agreement concerning the use of transboundary rivers between Iran and Russia, including Harirud, was signed in the year 1921, when it was agreed to share these water resources with equal rights. This agreement was amended five years later with respect to Harirud, emphasising the construction of a common dam reservoir at a point upstream of a historical bridge, Pol-e-Khatoon, to meet the increasing demand on water in the two countries. The proposal of the Soviet Union to construct the dam was not responded to by Iran and the negotiations were stopped for 30 years. It was in the year 1958 that both countries agreed to conduct a feasibility study for dam construction on this river. There was again a considerable delay for 16 years in the realization of this agreement, despite of several meetings between officials and experts from the two countries. Neither country appeared to have a tangible interest in controlling the river flow.

It was finally in the year 1974 that both countries agreed upon a serious plan to embark on a feasibility study which was implemented by Solkhoz prom Export, a Russian consultant. The results of this study were submitted to the Khorasan Water Authority (KWA) in the year 1979, and were subsequently approved by the Iranian government in the year 1983, with some amendments for further consideration on a new dam site at the upper Pol-e-Khatoon location. There was another eight-year delay and frustrating negotiations for project implementation until the collapse of Soviet Union in the year 1991, as a result of which the new state of Turkmenistan emerged.

In October 1991 a protocol was signed in Tehran by the president of Turkmenistan and the Iranian Foreign Minister, covering many aspects of cultural, economical and scientific collaboration between the two countries, through which the construction of the common dam on the Harirud river was again emphasised.

The negotiations were soon reconvened between the two countries and resulted in a new contract between KWA as client from Iran and Turkmen

Giprovodkhooz (TG) a consultant from Turkmenistan to conduct the feasibility study on the new site in the same year.

Several protocols exchanged at ministerial levels between the two countries, supported by technical discussion at lower levels, and some addenda to the contract minimized the problems associated with such collaboration. Yet to speed up the construction of the dam, a protocol was exchanged between two ministers, in January 1996, to construct the diversion system before finalizing the whole project. The important decision at this stage was to construct the diversion gallery exactly on the border line.

The enthusiasm among all top officials in both countries, particularly the two presidents Mr. Rafsanjani of Iran and Mr. Niazov of Turkmenistan made the process so fast that within a few months, at last and, after 75 years of negotiations, expectation and hopes, in May 1996 the construction of the diversion system of Doosti dam began on the occasion of the opening of the railway to Central Asia, when presidents and top officials from more than 40 countries were present in Sarakhs to celebrate this event. This part of the project was financed by Iran.

It was in February 1997 that the Iranian Minister of Energy and the Turkmen Vice-president exchanged a protocol in Tehran concerning the construction of the dam body and its related structures. The political will and technical support within two countries was the main driving force to move the project so fast, as if they were trying to make up for the delay.

In September 1999 a protocol was signed in Ashgabad by two deputy ministers to approve the feasibility study and was submitted to their respective governments for endorsement. Another protocol was signed the following day to plan for the design and implementation of the dam and its related structures. This protocol was the foundation of the whole project implementation. The following month an agreement was exchanged between representatives of the two governments concerning the operation of the dam and water allocation to the countries in equal shares but taking the water demand pattern of each country into account.

The contents of this agreement included the following:

- Building work should start from the year 2000 and end in 2005.
- Required funds for dam construction should be contributed equally by both countries.
- Previously compiled border provisions were approved.
- The dam operation and safety procedures and environmental protection measures were agreed upon.
- Regulated water and energy provided by the constructed dam were considered equally shared.
- The common border line was to be remained unchanged after the dam construction.
- The main contractor would be Iranian, and Turkmen contractors would participate in dam construction as sub-contractors, to execute up to 50% of the work.

A comprehensive agreement was provided upon all previous agreements to be signed by the two presidents, which was in May 2000 endorsed by the Iranian parliament. A similar process was also conducted in Turkmenistan, resulting in a treaty between the two countries for immediate implementation of the project. In this treaty all financial and technical aspects of the project construction, as well as its operation, water allocation and environmental issues were covered.

In November 2000 a protocol was exchanged at ministerial level to execute the treaty. The main item in this protocol was the establishment of the Joint Management Committee (JMC), with its responsibilities and functions, constituted by three members from each country.

The main tasks of the JMC were categorized in the five following sections, consisting of an introduction and 43 articles:

- General conditions
- The management authorities and responsibilities

- Technical supervision
- Management structures
- Administrative costs of the Management

The organization chart of the project management and execution was proposed as below:

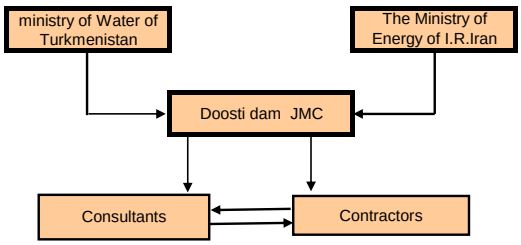


Figure 3. Project management

The JMC officially started their assigned tasks on 18 November 2000. The appointed Iranian members were the Khorasan water authority Managing Director, the project's executive manager and the financial manager, with Turkmen members nominated to equivalent positions in their country.

The priority function of JMC was to provide bid documents and assign constructors to complete the project. An Iranian civil contractor was selected through a bidding procedure in February 2001, and a contractor from Turkmenistan was nominated as its partner. This selection was approved by both Ministries in January 2001. The details of the construction procedure was published in the February 2001 protocol which was signed by the deputy Minister of Energy from Iran and the Minister of Water and Agriculture from Turkmenistan. The detailed design and supervision of the project was executed by Toossab (TA), an Iranian consultant, assisted by TG.

Another important event was the reservoir impounding ceremony which was performed in the presence of the foreign ministers of both countries and invited international guests in 2002.

Several protocols and agreements were exchanged between the two countries at Ministerial level, backed up by high-ranking officials and experts to solve the problems which normally arise in the course of such collaboration. But it was the intention of both countries' Presidents and Ministers to carry the project to finalisation with high efficiency and with the strong commitments of the JMC and collaboration of the consultants and contractors. This is the reason the project was finished 14 months earlier than scheduled, and inaugurated by president Khatami from Iran and President Safar Morad Niazov from Turkmenistan in the presence of several ambassadors from neighbouring countries in April 2005. We have to acknowledge the hard work and determination of the regional managers, technical staff, consultants and contractors who made this historical event possible.

METHOD OF COOPERATION

Cooperation between the two parties took place at four levels

A) High Government officials

Numerous meetings were held at high government official level to endorse the agreements at lower level officials. Several protocols were signed and exchanged between the two presidents and relevant ministers in the two countries.

B) Common management

While JMC was leading the project execution, 58 protocols were concluded at this level aiming to monitor job assignment between the contractors, make decisions on design changes, tender document preparation management, bidding execution, and project control procedures.

The basis of negotiations and decision making processes at all meetings was equal rights for each party and respect for the other party's interests, a win-win approach and flexibility in accepting new ideas.

C) Consultants

Numerous meetings were required at this level, as the technical standards and regulations in the two countries differed.

The consultants were required to make decisions in the light of proposed new technologies, technical capabilities and implementation levels of each party and project technical specification.

D) Civil Contractors

Considering the execution capabilities of two contractors from two countries and the type of jobs assigned to them, meetings were necessary at this level, particularly as they had to share their activities and even their equipments in a very close coexistence.

The activities related to the dam body, construction of dam shells, riprap emplacement and coarse material excavations were implemented by the Turkmen contractor; construction of the dam's silt-clay core, filters and drains, riprap preparation, rock excavation, concrete works and grouting were implemented by the Iranian contractor.

CONCLUSION

The development of Harirud's water resources has a distinct history. From 1921–1991, 70 years of tedious meetings and negotiations between politicians and technical officials produced no tangible results, mainly due to:

•Giving priority to political consideration

•Disregarding the development requirements in remote regions.

•Centralized decision making process

•Unfair negotiations

On the other hand , during the period 1991-2005, political change brought a fresh attitude to the region and resulted in the construction of the Doosti Dam on the Harirud river. But the success was not easily achieved; there were challenges at the project management and implementation level which had to be met:

- **Language barrier:** communication at meetings and concluding any agreement was a serious problem throughout the whole period of project planning and implementation. This was mainly due to the misconceptions conveyed by interpreters of both languages. This problem was gradually overcome as the interpreters became accustomed to the required technical language.

- **Differences in project execution systems:** the mechanism of project planning and execution and required support systems were quite different in the two countries. The system in Turkmenistan was totally public oriented, where all staff of the client, the consultant and contractors were government employees under the Ministry of Water and Agriculture. In Iran clients, consultants and contractors were independent companies, while consultants and contractors were private enterprises. The coordination between these parties with different interests and authorities where tough tasks to deal with.

- **Differences in technological status:** there were quite distinct differences in technological capabilities between the two parties. The dam construction technology in Iran is quite advanced because of numerous dam projects which have been studied and implemented during the last 30 years by Iranian engineers, whereas it appeared that in the former Soviet Union most dam construction knowhow and experiences in Central Asian countries had been in Russian hands.

- **Problems involved in collaboration between the two contractors:** the presence of two contractors with different technical capacities created many problems during the work execution, particularly where on some work fronts they were working together. But the collaboration was achieved through a long process of acceptance and persuasion.

- **Problems associated with the common border:** we cannot ignore the fact that there were many political and physical obstacle involved at the execution stage, due to the location of the dam site on the common border between the two countries.

To overcome the challenges the following measures were taken:

- **Designation of a common zone:** having considered the security regulations of both countries and conducted several meetings between top border officials, a common zone without any regular restrictions was set up for project execution.

- **Establishment of the JMC;** to facilitate the process of decision making, the JMC comprising three members from each country was set up which is still in existence.

- **Project base currency:** for the financial management, USD was considered as the base currency. The tender documents were provided in this currency throughout the project execution. Now the project is in operation the two parties are trying to divide the work between them to avoid any exchange of payments.

- **Non-conformity of standards:** the non-conformity of standards in the two countries was augmented by the relevant international standards.

- **Standards and technical regulations:** rules and regulations were acknowledged in their final contracts based on the contractors' countries of origin. The contractors were allowed to exchange equipment and construction materials according to their internal agreements.

- **Selection of the contractors:** contractors were selected for their capacity and experiences, regardless of their nationalities. The Iranian contractor was nominated as the leader, and the Turkmen civil contractor as the subcontractor. In the case of hydro mechanical works, which it was agreed would be financed by Turkmenistan, JMC accepted the Turkmen financial procedure.

- **Assigning the civil works between the contractors:** the civil works were assigned to the two contractors based on their technical capabilities and their equipment, having considered a 50% share for each one. Wherever any contractor failed to perform a part of its work, the other contractor took over the job with its consent. The cost of this extra work was either compensated by another work or paid by project management to keep the financial balance between the two countries.

- **Changes in project specification:** there were several changes in the project features and detail specification, some of them being quite major. The changes were proposed by both sides with different technical, economical and operational objectives. The success of negotiations about any changes depended on the apprehension of one party about the other's intentions. Here building mutual trust was the key element of success.

- **Lack of proper supervision:** the totally public approach to implementation of the project in Turkmenistan did not involve the extensive supervision of the work execution customary for consultants in Iran. Here the Iranian consultant undertook the quality control services on behalf of both countries. Hence checking the invoices submitted by all contractors was executed by the Iranian consultant as a part of overall supervision.

- **Project time schedule:** it was the two governments' desire to finish the project in a shorter period than designated in the contract. This was achieved by cutting the execution time schedule by 14 months, itself a very clear indication of successful collaboration between the two countries at all levels from top officials to the engineers involved.

- **Dam operation and maintenance:** the guidelines and procedures for the dam operation and maintenance were provided by the Iranian consultant and later on amended by Turkmen intervention.

The Guarani Aquifer Project: From knowledge to governance

By Luiz Amore, General Secretary SAP-Guarani Project

INTRODUCTION

The transboundary Guarani Aquifer System (SAG) is an important groundwater reservoir that occurs in an area of approximately 1.1 million km^2 in territories of Argentina, Brazil, Paraguay and Uruguay. Water is stored in pores of sandstone, which holds great volumes moving at an extremely slow speed. The reservoir is protected by a thick layer of non permeable basaltic rock that is up to 1.5 km thick. Recharge and discharge areas are located in the outcrops, bordering the geological basin. On the east border for instance, the discharge forms some rivers of the Pantanal wetland.

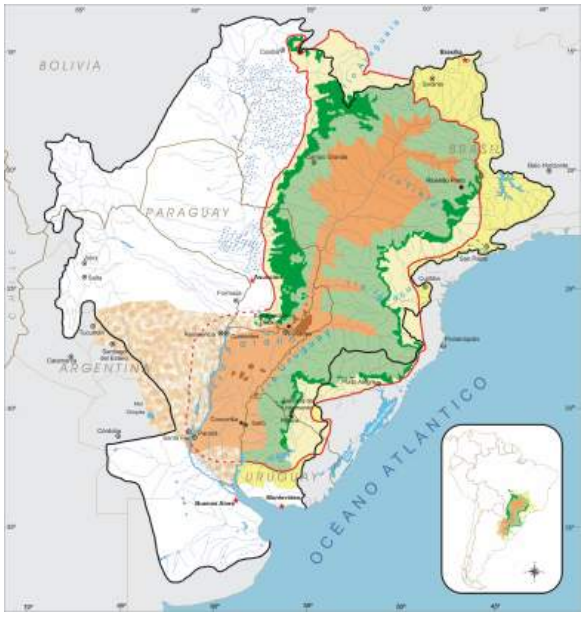


Figure 1. Map of the Guarani Aquifer System

The water is in general of good quality and accessible through deep wells, used mainly for urban water supply and tourism. Depending on the geothermal gradient, water can reach temperatures of up to 85ºC. The aquifer has a great potential for use, however it should be managed appropriately in order to be protected. An effective protection needs to consider the local dimensions of use and management, especially in those areas where potential pollutants and exploitation problems can show more adverse effects.

THE SAP GUARANI PROJECT

The beneficiary countries agreed to execute the Environmental Protection and Sustainable Development of the Guarani Aquifer System Project (SAP) from March 2003 to January 2009. A significant part of the funding (US$13M) was provided by the Global Environment Facility (GEF), with the support of the World Bank, as implementation agency, and the Organization of the American States (OAS), as regional executive agency. The four countries provided active institutional participation as counterparts. The German Geological Survey and the International Atomic Energy Agency supported some specific studies.

Based on a participatory process and knowledge development, the project supported the countries in the elaboration of a Strategic Action Program (SAP), which was approved by the Project Steering Committee. The Project Steering Committee, consisting of the ministries of water resources management, environment and foreign affairs of each country, also agreed on an institutional structure to support the cooperation process and to hereby ensure further protection of the aquifer.

The SAP consists of ten main parts with a set of detailed actions to improve transboundary groundwater management in the four countries, and sub national levels, since in Argentina and Brazil (federal countries) the provinces and states are responsible for groundwater management. These actions include proposals from each country, based on the outcomes of participatory national and regional meetings, which were organized at national and transboundary level.

In all cases, since transnational actions are hydrogeologically limited, emphasis should be given to the involvement of the municipal levels and the par-

ticipation of local civil society to improve knowledge of the source and its particularities and to be able to develop adequate groundwater management schemes.

The cooperation structure which was established to improve national and subnational aquifer management, mainly focused on technical and management tools to be maintained by the countries, including:

- an integrative basic map;
- a hydrogeological data base;
- a geographic information system (SISAG);
- a monitoring network; and
- an aquifer numeric model of the whole SAG area, with detailed scales (in the hotspots).

Specific managerial structures to improve technical knowledge diffusion, capacity building and training on the particularities of aquifers, was also considered by the project. According to the appropriate groundwater management scale, local committees were established in the hotspots and encouraged, in selected areas, to support the groundwater management system and the responsible administrative institutions in their actions.

Besides the management support tools, a group of materials, elaborated through participatory processes, have been provided to the countries, such as drilling manuals, and printed information on special funds created to support scientific investigation and public participation and education are also made available.

Two other control systems where developed in the process, the project management system in which all execution information is made available and the quality control system, for which the national institutions were involved in the evaluation process of project products. This has proved to be a very powerful tool to internalize the project.

The cooperation process among the countries was a catalytic element to develop groundwater managerial tools locally. In Concordia-Salto, the cross-border area between Argentina and Uruguay, a minimum distance between deep thermal wells was agreed on to avoid interference (10 km and 2 km respectively); in Ribeirao Preto, Brazil, a zoning act was approved by the Sao Paulo State Water Resources Council; in Santana do Livramento, Brazil, and Rivera, Uruguay, areas to concentrate exploitation wells far from sanitation contamination have been discussed; and in Itapua, Paraguay, the local committee support the watershed management institution to deal with conflicts related to deforestation and the locally grown soy bean crop to avoid future contamination problems.

The cooperation process was also a catalytic element to allow the development of high complexity numeric models to support local resource management in each pilot country.

With the conclusion of the present project execution phase, substantial changes can be observed in the general knowledge of the public and in the incorporation of ground water into the national water policies and political agendas. In the project execution period, the Paraguayan water law was approved and a specific act was approved in Uruguay where water is now considered as a public good, as in the other countries. Unlike at the start of the project, the population in the region has been given information on the aquifer resources mainly thanks to the participation of civil society organizations, supported by the Citizenship Fund, and the involvement of environmental journalist associations.

CONCLUSION

All project commitments have been achieved and the project has provided the countries with specifically designed technical and managerial tools. The countries are able to maintain the cooperation process to benefit groundwater management and protection of the Guarani Aquifer. The cooperation objectives, from the perspective of countries and international agencies, were achieved. However, there remains a lot to do to keep the tools functioning and up to date; the local administration responsible for groundwater resources should be further strengthened to consolidate national and subnational policies on water resources. Moreover, local institutions need to be integrated at the state and national levels to ensure adequate ground water management. The products of the project were only a first contribution to groundwater management in the region; and the managerial tools and institutional cooperation system created during the project period need to be maintained and positive experiences should be replicated.

Institutional Capacity Development in Transboundary Basins – The Case of Lake Victoria

By Tom Ukurut, Executive Secretary Lake Victoria Basin Commission

ABSTRACT

Lake Victoria is the largest freshwater lake in Africa; it is the meeting point for the three riparian countries of Kenya, Uganda and Tanzania. Its catchment area however extends to republics of Rwanda and Burundi. The lake is an important shared natural resource of the region and it is a critical factor in defining the East African Community (EAC). The management of Lake Victoria resources, which are abundant, is challenging and complex because of the different competing interests of multi-stakeholders at various levels.

The management of Lake Victoria has transitioned over many years from chiefdom control into national and regional mechanisms. The current management system is a regional institutional mechanism of the EAC and specifically under the auspices of the Lake Victoria Basin Commission (LVBC). The legal provisions for this mechanism are provided for in the Treaty for the Establishment of East African Community (1999) and more specifically in the Protocol for Sustainable Development of Lake Victoria Basin (2004). The Sectoral Council of Ministers is the apex policy body of the Commission while the Secretariat is its executive implementing arm. Participation of other non-state actors is provided for in the Protocol.

The thematic areas for management and development are defined in the Shared Vision and Strategy Framework for the Management and Development of the Lake Victoria Basin (2004), a document developed with strong multi-stakeholder participation. The recurrent budget of the LVBC Secretariat is funded through Partner States' contributions while the major projects are funded through grants and credits from partners (East African Development Strategy, 2006-2010).

BACKGROUND TO LAKE VICTORIA BASIN

Lake Victoria (LV), with a surface area of about 68,870 square km, is Africa's largest and the world's second largest freshwater lake. It lies at an altitude of 1134m above sea level and is relatively shallow with a maximum depth of about 80m, and an average depth of about 40m. Direct rainfall into the lake is its main source of water accounting for 82%, while 18% comes in through rivers. Evaporation accounts for 76% of water loss and 24% loss are through River Nile outflow at Jinja, Uganda. The lake's water residence time is 23 years, while its flushing time is 123 years. The catchment area is 180,950 square kilometres with Tanzania occupying 44%, Kenya 22%, Uganda 16%, Rwanda 11% and Burundi 7% (Fig 1).

The lake is one of the most important shared natural resources for EAC Partner States; it is a major source of water and fisheries in the region (Shared Vision for LV, 2004). The vegetation cover around the lake basin is comprised of savannah and wetlands. Its biodiversity and ecosystem provide a wide range of species of aquatic life, plant and forest cover.

Figure 1. Map of Lake Victoria and its Catchment

The population within the Lake Victoria Basin was approximately 35 million as of 2005 (RTDA, 2007), most of whom depend on the natural resources in the basin for their livelihoods. Activities such as agriculture and livestock production, hydropower generation, forestry, fisheries, wildlife and tourism, and mining constitute major sources of income and employment for the population within the basin. The East African Community recognized the vast potential for economic development that exists within the lake basin and the challenges associated with the national approaches to exploiting the resources. It consequently designated the lake and its basin in 1997 as a Regional Economic Growth Zone (REGZ) and which is to be exploited in a coordinated manner for the benefit of its people (EAC 1st Strategy, 1997).

KEY CHALLENGES OF THE LAKE VICTORIA BASIN

Environmental

Domestic and industrial wastewaters, solid wastes, sediments from soil erosion in the catchment areas, agricultural wastes and atmospheric deposition are the major nutrients sources of the lake. Largely this has contributed to the resurgence of the water hyacinth and blue green algae. Most recently, the lake has faced the challenge of declining water levels. The threats facing the lake have caused considerable hardship for the populations depending on it for their livelihood, and also have reduced biodiversity of the lake's fauna, most notably the phytoplankton and fish, especially the commercially exploited Nile Perch.

Management

The rich natural resources base of the entire Lake Basin is a main attraction to many stakeholders with diverse interests especially in the Lake fishery. As a result, there are several uncoordinated and duplicated programmes and projects that are implemented by individuals, associations and Non-Governmental Organizations (NGOs) but which do not effectively contribute towards the attainment of the Shared Vision of Lake Victoria Basin (LVBC, 2008). Most often, there are conflicts in natural resource uses among various communities within the country and across the borders. Moreover, interactions and synergy build up among the actors has been minimal and with the NGO each seemed to work on its niche.

Socio-economic

Poverty level especially among the rural communities living in the basin is relatively high with most relying heavily on subsistence production. Mortality rates are high, tuberculosis and water-borne diseases like malaria, typhoid and bilharzias are quite common. Overall, Partner States face a challenge of meeting the Millennium Development Goals (MDS).

This state of affairs was not healthy and therefore necessitated the need for establishment of a well-defined institutional framework that would in the long term coordinate and supervise the wide range of actors in the Lake Victoria Basin.

STRUCTURE AND MANDATE OF THE LVBC

Lake Victoria Basin Commission (LVBC) is an apex institution of the EAC responsible for coordinating matters relating to management and sustainable development of the Lake Victoria Basin. The Commission was established by Treaty (Treaty for Establishment of the East African Community, 1999) and more specifically by the Protocol for Sustainable Development of Lake Victoria Basin (LVB Protocol, 2004). Prior to the Commission becoming effective in July 2005 and starting its operations in Kisumu Kenya, the coordination initiatives of Lake Victoria affairs that commenced in 2001 were under the Lake Victoria Development Programme Unit (LVDP) within the EAC Secretariat in Arusha Tanzania.

The broad mandate of the Commission is provided for under Article 33(2) of the Protocol for Sustainable Development of Lake Victoria Basin namely to: promote equitable economic growth; promote measures aimed at eradicating poverty; promote sustainable utilization and management of natural resources; promote the protection of environment with the Lake Victoria Basin; and promote compliance on safety of navigation. This mandate is spread over the fourteen areas of cooperation specified in the Protocol. This

mandate is to facilitate the realisation of Shared Vision of Lake Victoria Basin (2004), which is to have: *"A prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefits".* This Vision and its five defining policy areas are now the recommended Planning Tool and a development guideline for sustainable development and management initiatives by all actors within the Lake and the Basin including government agencies. The EAC Council of Ministers in 2004 recommended that Partner States, civil society organizations, development partners and other stakeholders adopt this framework as an operational development guideline in the sustainable management and development of the Lake Victoria Basin.

The current institutional structure of LVBC is illustrated in Figure 2. This structure is derived from Articles 34 - 42 of the Protocol for Sustainable Development of Lake Victoria Basin and specifically comprises: the Sectoral Council, Coordination Committee, Sectoral Committees and the Secretariat. The composition and functions of each of the above categories are articulated in the respective Articles of the Protocol and the Treaty. The LVBC Secretariat in carrying out its mandate works with the Civil Society and Private Sector institutions.

The Sectoral Council for Lake Victoria Commission is the top policy organ for the Commission and is composed of Ministers from the sectors of Water, Environment, Fishery and Maritime Transport from the five EAC Partner States. Further, from each country, there is a lead ministry that is designated as the focal point for LVBC. This ministry acts as the main entry or link for LVBC into each country.

PROJECTS COORDINATED AND IMPLEMENTED UNDER THE LVBC

There are several projects and programs that are currently under implementation within the framework of LVBC, i.e. under its supervision or coordination while others are under different partners who are with LVBC responsible for the final output. Most of them were developed based on the thematic areas of the Shared Vision.

Projects and programmes under coordination and implementation by LVBC

1. Lake Victoria Environmental Management Project (LVEMP)
2. Mt Elgon Regional Ecosystem Conservation Programme (MERECP)
3. Maritime Transport, Safety and Security in Lake Victoria
4. Implementation of Fisheries Management Plan (IFMP)
5. Projects under the Partnership Agreement that include: Strengthening the capacity of the LVBC; Harmonization of Regional Policies, Laws, Regulations and Standards; Implementation of some aspects of the Toxic Chemicals/Oil Products Spill Contingency Plan for Lake Victoria and strengthening the LVBC Resource Centre.

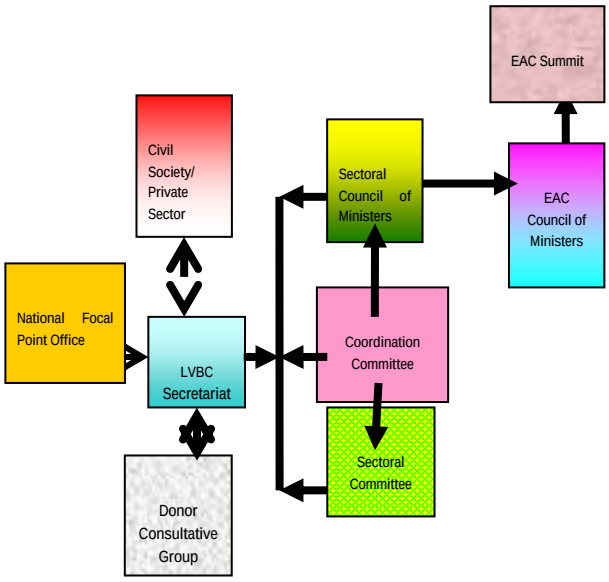


Figure 2. The Institutional Structure of LVBC

Source: Lake Victoria Basin Commission Operational Strategy

Programmes and projects under implementation by other partners

1. The three Transboundary River Projects (led by Nile Equatorial Lakes Subsidiary Action Program (NELSAP-NBI), including the Kagera, Mara and Sio-Malaba-Malakis Transboundary Water Resources Projects
2. Lake Victoria Region Water and Sanitation Initiative (LVWATSAN) led by UNHABITAT
3. Lake Victoria Catchment Environmental Education Program (LVCEEP) led by WWF-RO Nairobi
4. Agro-forestry and Improved Farming and Marketing Project (AIFM) led by the Swedish Cooperative Centre and Vi Agro-forestry

The numerous projects are related to the extent of the Basin and its many challenges that require concerted efforts for a long time to resolve. Ongoing projects have contributed to an improved understanding of the challenges facing the Basin as well as to the resolution of some of these.

MECHANISMS FOR OPERATIONALISATION OF INSTITUTIONAL ARRANGEMENTS FOR THE LAKE VICTORIA BASIN COMMISSION – LESSONS TO SHARE

Operations of the Lake Victoria Basin Commission are guided by the East African Development Strategy which is based on five year plan. The current EAC Development Strategy runs for the period 2006-2010. The Development Strategy outlines the strategic intervention areas for all the organs and institutions of the Community and specific targets for achievement within its time frame. Based on this, each organ and institution is expected to develop an operational strategy which provides guidelines on the implementation of the specific strategic interventions set for each institutions/organ of the Community.

It is on this basis that the LVBC developed its Operational Strategy which addresses all the strategic intervention areas as outlined in the EAC Development Strategy 2006 -2008.

On the basis of the Operational Strategy a number of successes have been recorded:

1. The Operational Strategy has translated the strategic intervention areas into programme clusters. Each of the projects/programmes of the Commission can now be linked to the area where it is contributing to the EAC Development Strategy;
2. Through the cluster programme, the Commission is able to prioritize its interventions and is able to assess which area requires resource mobilization;
3. Through the programme approach adopted in the Operational Strategy, Partner States Governments, Development Partners and other key stakeholders are now able to identify specific areas for support; and
4. Monitoring and evaluation of different interventions and how they contribute to the shared vision of the people of East Africa can now be undertaken more easily and effectively.

The use of a programme approach in the sustainable management of the basin is the way forward. The approach provides a clear framework of how transboundary resources within a basin can be managed in an integrated manner and also brings in the aspect of synergy building within programmes/projects operating within a given basin. Through a programmatic approach, the coordination and performance monitoring of different actors in a basin become more effective.

AREAS FOR CAPACITY BUILDING

The main challenge faced in the operationalisation of the current institutional arrangement set up for the Commission is that of human resource (LVBC Operational Strategy, 2007). The operational strategy has nine programme areas with specific competences. Though the Commission now has an institutional framework for coordinating and implementing the strategy, it currently focuses on five programme areas only due to limited human resource capacity.

The legal framework that the Commission operates on is the Protocol for Sustainable Management of the Lake Victoria Basin. This protocol needs to be upgraded into Acts with strong laws and regulations to ensure compliance with the provisions of the Acts. Currently, only the Lake Victoria Transport Acts have been upgraded from the provisions of the Protocol. There is a need to strengthen the legal unit of the Commission so most of the provisions of the protocol are translated into Acts that are enforceable.

Once these two challenges are addressed, the institutional capacity of the Commission in transboundary basins management will be greatly enhanced in the region. The long term impacts of a strengthened institutional capacity of the LVBC shall be the fast tracking of development of the Lake Victoria Basin into a regional economic growth zone (Constraints and Potentials of investment in LVB, 2002).

BIBLIOGRAPHY

1. EAC 3rd Development Strategy (2006-2010)
2. EAC (1997) The 1st Development Strategy
3. EAC (1999); *The Treaty for the Establishment of the East African Community.* East African Community Secretariat Publications No I, Arusha
4. EAC (2002); Potentials and Constraints of Developing Lake Victoria Basin into an economic growth zone.
5. EAC (2004); *The Protocol for Sustainable Development of Lake Victoria Basin.* East African Community Secretariat Publications No V.
6. EAC (2005); The Vision and Strategy Framework for Management and Development of Lake Victoria Basin;
7. EAC (2007); The Report of the Regional Transboundary Diagnostic Analysis
8. LVBC (2008); Mapping of CSOs in Lake Victoria Basin Report;
9. Namisi, P.W. (2002); Socio-economic Implications of the Fish Export Trade on the Fishers and Fisheries of Lake Victoria in Uganda.
10. Okungu et al (2005); Water Quality Monitoring in Lake Victoria

Workshop Reports

Sessions Report

The UN-Water Decade Programme on Capacity Development (UNW-DPC) and the UNESCO International Hydrological Programme (UNESCO-IHP), with kind support of UNECE, GEF and the German Federal Government, organized an International Workshop on "Institutional Capacity Development in Transboundary Basins - Lessons learned from practical experiences", held on 10-12 November 2008, at BMZ, in Bonn, Germany. Almost 45 participants, including water managers, decision-makers and policy makers from various basins around the world, and international organizations working in transboundary water cooperation and management, met to share their experiences and discuss necessary institutional arrangements for transboundary water cooperation, institutional capacity development issues and specific capacity development activities needed.

TRANSBOUNDARY WATER MANAGEMENT AND COOPERATION

The workshop was structured in three sessions of presentations and discussion groups. In each session three to four speakers explained what institutional arrangements were successfully put in place in their particular basins, and to what extent the required capacities were available and how these were developed and/or strengthened. Also, lessons learned and further needs for institutional capacity development in the particular basins were presented. The presentations functioned as an input for discussion in the subsequent discussion groups, during which participants discussed both institutional capacity requirements and necessary capacity development activities based on the cases presented and additional examples from their own experiences setting up necessary *legal and policy frameworks*, *cooperation mechanisms* and *funding mechanisms*. After the discussion, the information collected and issues debated were analyzed and synthesized, and where then presented in the plenary during the last day by rapporteurs from each group.

The opening session set the stage with a speech by Dr Reza Ardakanian representing UNW-DPC, and two opening addresses by Ms Karin Kortmann, Parliamentary State Secretary of the Federal Ministry for Economic Cooperation and Development (BMZ), and Dr Fritz Holzwarth, Deputy Director General for Water Management of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Ms Kortmann underlined the importance her ministry attached to supporting UNW-DPC in its work, since access to water was a prerequisite for the achievement of the Millennium Development Goals, and capacity development was vital to ensure sustainable access to water for all. She furthermore outlined five theses that were fundamental for the successful development of institutional capacities and transboundary water management. These included the political will to engage in dialogue, clear rules of interaction and a clear definition of division of labour and responsibilities, harmonization of national policy instruments and legislation, and the strengthening of institutional and human skills at all levels. Last but not least, she emphasized that trans-

boundary water management and cooperation needed sustainable financing.

Dr Fritz Holzwarth discussed the importance of capacity development as a tool for transboundary water management and cooperation. He underlined the fact that transboundary water cooperation required patience and that capacity development was a long term investment as a type of 'software' to make such cooperation work. Dr Holzwarth further stressed that adaptation to climate change was basically a water and land use issue, and that 80 per cent of adaptation strategy was water related. However, climate change should not be used as an excuse for poor water management.

The workshop continued with a keynote speech from Dr András Szöllösi-Nagy, secretary of the UNESCO International Hydrological Programme (UNESCO-IHP), who presented global change drivers and impacts on transboundary water management and cooperation. He also raised awareness about current looming water crises and explained that water resources were recognized as a principal priority for UNESCO. Through its PCCP program, UNESCO aimed to foster co-operation between stakeholders in the management of shared water resources, while helping to ensure that potential conflicts do not turn into real ones, through the development of tools for the anticipation, prevention and resolution of water conflicts. Furthermore he stressed that poor data availability would be a major source of risk and vulnerability in the basins and more attention should be given to this issue.

Ms Heide Jekel, Chairperson of the Meeting of the Parties to the UNECE Water Convention, then gave a presentation on the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes and discussed experiences implementing the Convention as well as its strengths. Almost all transboundary waters in the region were covered by transboundary water agreements based on or influenced by the Convention (e.g. Rhine, Meuse, Scheldt, Danube, Bug, Chu-Talas, Dniester) and even non-Parties participated in the work under the Convention. Furthermore, the Convention worked in "water-stressed" regions such as Central Asia and dealt with emerging issues, such as climate change.

Session 1: Cooperation and joint decision-making - between regional bodies, national authorities and other stakeholders

This session mainly focused on existing institutional arrangements for cooperation and joint decision-making between different levels and experiences about how to set up and strengthen such arrangements. The cases presented, including the NWSAS consultation mechanism, the OKACOM initiative and the Rhine Commission, showed that each institutional arrangement has to be adapted to the specific context of the basins, in terms of the environmental, political and economical situation, and that joint decision-making has its specific drivers.

Session 2: Cooperation and joint decision-making – developing goals on water management

This session discussed the drivers and contexts in

which riparian states start cooperation and joint decision-making on water management in the transboundary water basins, and which structures and activities are put in place to strengthen these arrangements and ensure their sustainability.

The institutional framework of cooperation and necessary capacity development strategies of the Great Lakes were presented, transboundary negotiations and arrangements after a flood accident in the Mekong river were discussed, the case of the building of the Harirud dam and joint management of the river was presented, as well as how cooperation between all 19 riparian states to ensure water quality is strengthened in the case of the Danube.

Session 3: Strengthening of joint bodies - organisation, monitoring and data sharing

This session dealt with institutional and organisational capacity development of the joint bodies responsible for transboundary water management and cooperation, in their dealing with organizational issues, data sharing and monitoring arrangements. Experiences from the Nile Basin Initiative (NBI), the Niger Basin Authority (ABN), the *Organisation pour la Mise en Valeur du fleuve Senegal* (OMVS) and the SAP-Guarani Aquifer project were shared and discussed with the other participants.

After each session of presentations the participants further discussed issues concerning required institutional capacity and further capacity development needs in three main discussion groups. The discussion groups covered three separate themes: *cooperation mechanisms*, *political and legal frameworks* and *funding mechanisms*. The following outcomes are based on the discussions in the working groups and the general debate in the plenary.

Discussion Groups

1. Cooperation mechanisms

The following text is based on the discussions in the group on *cooperation mechanisms* and the general debate in the plenary.

DRIVERS FOR TRANSBOUNDARY WATER COOPERATION

The participants discussed different drivers for cooperation in their particular basins, and it appeared that there exists a variety of different drivers, often very much depending on the particular socio-political, economic and environmental context.

- Serious consequences in case of non-cooperation (e.g. political, environmental);
- Willingness of governments to cooperate;
- History of cooperation in other fields;
- Clear guidance on procedures;
- Interactions with the public;
- Amendments of rules;
- Donor support for countries to cooperate;
- Trigger events, such as the collapse of the Iron Curtain;
- Pre-accession strategy (EU);
- People gain from participating in expert meetings, form of capacity development ("learning by joining");
- Involvement of people/governments;
- Responsibility for the region;
- Creation of a win-win situation;
- Expectation of benefits (e.g. economic);
- Common interest (e.g. pollution);
- Basic awareness;
- A need to maintain good relations with neighbors;
- Emerging socio-economic development;
- Importance and relative paucity of water.

LEVELS OF COOPERATION

Three levels of cooperation exist, i.e. regional, national and international, and at each level different actors are relevant. At the national level state and civil society are the most relevant actors, at the regional level one finds different organizations working in the same domain, which means that it is important to reach a degree of coherence. At the international level bilateral and multilateral donors are the main players, together with scientific and technical bodies. The participants felt that a top-down and a bottom-up process are needed simultaneously. In these processes the local level should have priority and be supported throughout.

INSTITUTIONAL STRUCTURES

Various institutional structures for transboundary water cooperation exist, of which the main mechanisms are the following:

- Meetings of heads of state;
- Ministerial council or working group meetings;
- Inter-ministerial coordination committees;
- Technical advisory committees;
- Consultative committees consisting of donors and technical partners;
- River basin organizations;

These structures are mainly coordinated by particular units, including secretariats, management committees or task forces.

Stakeholder participation can be assured through various institutional arrangements, including the following: neutral informal platforms; parliamentary congresses; public- private partnerships; partners' consultative groups; regional and national committees of water users, Decision Support Systems (DSS), observer status, Memoranda of Understanding (MOUs).

The participants agreed that one has to distinguish between different levels of representation and integration of stakeholders, and that their organization and representation are based on their relevant capabilities and needs. Moreover, often stakeholder are not properly defined; in each case it should therefore be specified who these 'stakeholders' are (e.g. ministries, water users, public-private, etc.)

Basin commissions

The *strengths* of these commissions are that they have regular meetings, very often a more or less clear mandate and the actual authority to make decisions. Some *weaknesses* of this mechanism are that these structures are dominated by governments, there is often a lack of meetings (at regular intervals), or meetings are held without the authorization to make decisions, and that there is a lack of data (sharing).

Required institutional capacity

These bodies need a clear mandate and the authorization to make decisions and concessions, and adequate governance, i.e. a need for harmonization of decision making processes.

It is also deemed necessary to involve different ministries such as finance, planning and foreign affairs at the national and international level and not just include the ministries of water and/or environment.

Input into the negotiations should be provided by thematic sub-committees, supported by regional consultation groups. Knowledge and information sharing, through scientific expert groups and advisory panels, is equally important.

For these mechanisms to function effectively negotiation skills are required, as well as the availability of experts on certain specific related issues; the dissemination of technical knowledge in the institutional process was also deemed important.

Necessary capacity development

- Partnerships with financing agencies and/or the private sector;
- Building upon existing national structures instead of creating new institutions;
- Harmonization of monitoring agencies: common shared standards for data and information, i.e. standardized rules and regulations;
- Twinning agreements with other basin organizations.

These capacity development activities need to be integrated into the institutional structure.

Coordination unit

Basin commissions are served by a coordination unit, e.g. in the form of a secretariat, providing mainly administrative, financial and general secretarial services.

The *strengths* of these units are that they are mostly permanent and flexible, with a high level of commitment, show continuity and can be financially independent and neutral.

Common *weaknesses* are, however, that they can become too independent and that secretariat staff need to be exchanged regularly, because after a certain amount of time staff identify too much with the issues they are working on. These units normally do not have financial sustainability; often the political system can become a problem for their functioning, because secretariats are state-dependent, and if states are weak these units are also weak, or not neutral. The question asked during the group discussions was whether secretariats should or can be completely neutral, as they are established and financed by state governments and therefore are actually an instrument of these governments. Their role therefore needs to be clearly defined before their establishment.

The participants agreed that too much pressure from or dependence on donors or governments is negative for the functioning of such a coordination unit.

Required institutional capacity

These units need technical competence, managerial competence, clear mandates and political independence. Additionally they need interdisciplinary skills, expertise and approaches, which are normally not part of educational curricula (i.e. human resource capacity, individual capacity).

Necessary capacity development activities

Change of university curricula (e.g. with UNESCO support);

- Specific centers for education on water management and all related issues;
- Forums for sharing such knowledge and expertise;
- In-house and on-the-job training;
- Team work approaches.

Stakeholder participation

Participants argued that stakeholder participation should always be considered as a *strength* in the cooperation process. Stakeholder participation is expected to ensure a broader view and better results. Moreover, the larger the number of stakeholders, the more democratic are the decisions being made and the more ownership is felt by water users. This will eventually lead to a better acceptance of decisions made by the joint bodies.

However, participants reported that their experiences so far had been mixed, especially if there were too many NGOs involved. The stakeholder participation process also often appeared to be time consuming and costly. Plus, one weakness of this approach was that the larger the organizational unit, the more difficult it was to ensure real participation. Therefore the question was raised as to whether the river basin level is too large a unit for stakeholder participation. What was clear to all participants was that compulsory participation cannot work and was an indicator of weak capacity.

An additional difficulty can be the weakness of the participatory process itself, rather than of participation as such. As a cooperative mechanism, stakeholder participation is very complex and often in need of improvement. However, there are hidden costs of not involving stakeholders. This means that high costs need to be considered in the planning process, but should not be used as an argument against participation.

All participants agreed that capacities of stakeholders are crucial for the cooperation process and can be very varied.

Institutional capacity required

- Stakeholders need organizational capacities and knowledge/information provision at all times;
- Transparency within institutions, dissemination of information and communication skills;
- Knowledge of and experience with transboundary legal issues;

Necessary capacity development

It was agreed upon by all participants that capacity development and education are necessary to actually turn awareness into action and tangible results.

- The media could act as facilitator or contribute to awareness raising;
- Capacity development requires using the “right” language; the necessity needs to be understood by local populations; one should use “their” language to customize messages

Shared vision and objectives

The strength of a shared vision is that it can ensure the rational use of fair sharing of basin resources. Shared visions (should) encompass a clear definition of objectives and of the limits of the cooperation, a vision on river basin development shared by all donors and stakeholders and a shared environmental management plan. A shared vision was seen as a prerequisite for cooperation, since the main objectives of cooperation can be derived from a shared vision.

Institutional capacity required

- Leadership (e.g. president or prime minister with a certain interest in cooperation on water) and diplomacy.
- Alternatively a strong public movement, which means that the pressure for cooperation moves bottom-up.

Necessary capacity development

- Shared vision planning, e.g. with a software tool, as used in the Great Lakes region.
- A monitoring system to monitor whether the shared vision is actually achieved. All participants agreed that monitoring in the end is a cross-cutting issue, not only for shared vision.

Political mechanisms

Political mechanisms are the very basis for starting and maintaining the process of transboundary water management. However, a weakness of such political mechanisms (e.g. meetings of heads of states, ministerial councils) is that these are often under funded and it is difficult to achieve full attendance at high-level meetings. Moreover, it has to be ensured that the topics discussed during these meetings are relevant to the electorate and "important" issues to be decided are on the agenda.

Institutional capacity required

- An interface between the technical and the political 'communities', a common language to enable clear and effective communication (needs to be learned);
- Politicians need to see the advantages of these transboundary institutions.

Necessary capacity development

- Workshops and training for high-level technical experts to 'translate' their messages for politicians;
- Awareness-raising activities.

GENERAL CAPACITY DEVELOPMENT NEEDS

- Integration of an ecosystem approach into IWRM (needs to consider land, biodiversity, and climate change issues);
- Data and information harmonization within the committee;
- Specific capacity development measures regarding cooperation between countries without RBOs;
- Facilitation of networking within the scientific community;
- More funding to enhance the institutional memory, as most river basin commissions are small, consist of few and highly specialized staff members and fluctuation is high;
- Internship programmes and staff exchange between commissions on an individual basis;
- Applied research and applicable results; the gap between research and management needs leads to the underutilization of scientific data, therefore reaching out to universities essential;
- An assessment of existing knowledge in the region, support of existing initiatives, international expertise, training and knowledge (such as the CWP in the Mekong basin) ;
- Awareness-raising activities to achieve more visibility of secretariat actions to ensure public acceptance;
- Infrastructure for data collection (harmonization is only the second step); hardware is often a problem (especially in the Nile Basin).

ADDITIONAL RECOMMENDATIONS

- Inclusion of more topics in the water negotiations, which will lead to non-water cooperation: “enlarging the pie”.
- UN interagency cooperation (bringing people and institutions together)
- UNU and other UN agencies already promote twinning exercises between commissions; these measures and basin exchange activities should be extended;
- More targeted discussion e.g. with groundwater experts;
- Web-based information systems, also to continue the dialogue, share best practices, e.g. through Wiki or similar.

2. Policy and legal frameworks

The following text is based on the discussions in the discussion group on *policy and legal frameworks* and the general debate in the plenary.

DRIVERS FOR INSTITUTIONAL FRAMEWORK DEVELOPMENT

Different basins appear to have institutional structures that have different mandates and more or less legislative power to decide on water use and management issues within the basins. Some of the differences were discussed by the groups. However, it was clear that three main drivers exist for the development of legislation and policies for transboundary water cooperation and management.

- Crises (political, environmental, etc.);
- Bottom-up: member states;
- Top-down: transnational institutional frameworks.

Regional water framework

The participants agreed that in any case regional frameworks and conventions provide an important cover of legitimacy for institutional change at the national level

The main example of a regional water framework presented at the workshop was the EU Water Framework Directive (WFD). The Water Framework Directive:

- covers surface water and groundwater quality;
- overrides sovereignty;
- requires basin-scale management;
- is legally enforceable;
- requires particular levels of public and stakeholder participation (article 12).

Advantages of the WFD are that the directive integrates surface and groundwater into the planning and that the framework encourages and demands certain types of stakeholder involvement. The decisions as to what to undertake are made nationally and are thereafter enforceable by law. However, the implementation of the decisions on the regional level is not enforceable; this could only be done through an international court of justice. A disadvantage of the WFD is that there is little funding available for stakeholder involvement.

All countries within the EU agree on the general principle of water management as described in the Water Convention; however it is more difficult to have it applied in the national context.

Institutional capacity requirements

- An international court of justice to enforce the directive and convention;
- Harmonisation of national laws and policies between member countries.

Capacity development activities

- Improve institutional capacity support to the ratification of UN conventions by member states;
- Make agreements flexible/adaptable at a later stage.

MODELS OF COMPLIANCE

Two main compliance models for cooperation were discussed. On the one hand the cooperation model can be more or less top-down, in the form of a commission that overrides national sovereignty and/or has the responsibility to decide on the go-ahead of development projects such as infrastructure development. On the other hand, the process can be more bottom-up, in the sense that a commission can basically allow the exchange of ideas, but that decisions are left to member states or basic peer pressure, which is an informal determinant of compliance.

The following texts briefly describe which models of compliance exist in the different basins that were represented at the workshop and which were discussed in the group.

Senegal

The OMVS is a basin organization and has a permanent water commission (PWC) and high commissioner. The establishment of a permanent water commission (PWC), as exists in the case of Senegal (OMVS), can be a main driver for policy and legal framework development. The *strength* of this kind of commission is that decisions on what projects/programmes should be undertaken are taken by the commission and these decisions override national decisions. Moreover, all costs are shared by countries based on the benefits they receive and within the commission both national and regional committees are linked.

Two conventions are in place, signed among stakeholders, i.e. the international water convention and a funding modalities convention. These conventions overrule national legislation but should not go against international conventions that have been agreed on.

Each river development project needs to be submitted to national authorities, which submit the proposal to the permanent water commission. The permanent water commission has experts that analyze all projects, and authorize or abandon them. The described system of decision-making accounts for all private and public entities; they need to request the permanent water commission first before action is undertaken.

In this decision-making process the interests of all need are taken into account. The commission brings all stakeholders together and takes decisions on the water use of the different users. These decisions are scientifically based, e.g. on data, availability, modeling or simulation. More in-depth studies on the connection between groundwater and surface are needed.

Required institutional capacity

- Legal instrument to decide on national contributions/payments;
- Capacity to consult stakeholders and maintain representativeness.

EU

Within Europe decisions on water use and management are taken on the regional level through the EU Water Framework Directive (WFD); these decisions need to be implemented by every country. However, an enforcement mechanism does not exist. The EU WFD is only enforceable through an international court of justice. Talking about the EU water convention, All members in principle agree with the EU Water Convention, but in reality the actual application in the national context is difficult.

Niger

The permanent commission has existed for a long time but did not have means, financial and human, to function. Due to issues such as a sinking water level in the river, the executive secretariat was reorganized in 2000 to obtain more authority and to develop a shared vision. A regional master plan was established based on several studies, which was the first step to revive the secretariat. In order to share water on a fair basis, and to ensure rational use, a water charter has just been approved.

This charter should be used as country mitigation tool, adopted by highest authorities at national level. The charter is similar to the EU WFD. The charter applies within and between countries; the charter is based on national legislation, linked to legal frameworks and water resource policies from each coun-

try. The next step is to harmonise environmental "codes" in the different nation states.

Guarani Aquifer

No previous agreements were available and currently there is no management body in place yet. A general secretariat is in place, and national and local structures are put into place for the development of the project. An agreement between municipalities on water extraction has been signed, but not yet between countries.

Great Lakes

The Great Lakes main legislation framework includes a boundary waters treaty and the Great lakes water quality agreement. The International Joint Commission's (IJC) mandate covers the responsibility to approve projects on water utilization. The IJC also conducts and provides studies and references on emerging issues. If problems emerge, the IJC gives the countries advice based on studies. Thirdly, the IJC plays a large role in conflict arbitration between the countries.

Rhine

The Rhine has its own legislation; the main challenge was to harmonize the different national legislations. International activities are a collection of national activities, which are directed bottom-up by the member states. The funding of activities is territoriality-based. This model has developed over time and was not superimposed. For instance the flood protection legacy: first a few countries agreed and harmonized their laws, then more countries followed. The main idea behind this is that if there is not acceptance at the national level, it cannot be imposed on the transboundary level.

Nile

The Nile basin does not have a legal and policy framework yet. Decision-making is based on agreed minutes of ministerial meetings, which means that the decision-making process is a flexible mechanism. There is a set of principles that all countries have agreed on and signed, i.e. on negotiation within the cooperative framework and on the strengthening of regional cooperation. In the Nile basin cooperation only functions when the process starts at the national level. Water policies development, e.g. on quality monitoring mechanisms, first take place at the national level. The NBI has started to work with each country separately on revising, adapting and harmonizing their water resource policies. If capacity building has started from the national level, the next step is to engage the politicians, involved in ratification of policies and frameworks. The SADC protocol probably could not work in the case of the Nile basin, because of the existing situation, legal issues, the regional history, policies, etc.

Danube

The Danube does not have a permanent water commission and legal powers to decide. The ICPDR is a consultative mechanism, a forum for sharing common understanding and information. The Danube river protection convention is there to inform others and to make sure certain developments are not harmful to other countries, but it remains a national decision whether or not decisions are implemented.

NWSAS Aquifer

Also the NWSAS has a consultation mechanism. In 2007 a final agreement on structure, responsibilities and mandate was signed between the riparian states. In 2008 a coordination unit was put in place, which is currently the main executive body.

Harirud

A Joint Commission is in place which mainly deals with technical issues and its dimensions. Recommendations are given to the national ministerial level and decision-making takes place at this level. All decisions of the JC are based on agreed minutes, based on consensus; there only exists a legal framework in the form of a treaty. Large development projects (dams etc.) have to be reported to the riparian countries for their approval.

STEPPING STONES

The participants discussed some of the main capacity development stepping stones they experienced in their particular basins to develop legal and policy frameworks for transboundary water cooperation.

- **Technical cooperation**
  - TECCONILE: Nile
  - Technical agreements, development of common models (NWSAS)
  - Operational level cooperation, like projects on data collection (SAP-Guarani)
- **Non-legal agreements**
  - Agreed minutes of ministers, supported by technical advisory board (Nile)
- **Exchange meetings between stakeholders**
- **Common joint projects (SAP-Guarani, Nile)**
- **Awareness-raising and public participation**
  - Public and media awareness-raising (Danube)
  - Public and media awareness-raising about groundwater (Guarani, NWSAS)
- **Development of funding mechanisms**
  - Legal instruments for cost-benefit setting of financial responsibilities (Nile)
- **Shifting of responsibility to member states**
  - From donors
  - From transnational body (Nile)

The following texts illustrate the different paths towards the development of legal and policy frameworks, as experienced by the basins represented at the workshop.

Danube

The activities to develop a policy and a legal framework in the beginning were donor-driven. When the convention was signed formally the national governments were responsible, but still continued donor support was ensured. After funding was halted, the ICPDR was able to continue the process by its own means.

Many activities were funded by external donors; foremost they funded travel costs of staff and stakeholders to attend meetings and workshops and hereby to interact. Currently travel costs are covered by the countries themselves.

In terms of technical support, the ICPDR received support from consultants for the development and establishment of a transboundary monitoring framework. Especially the Rhine commission provided support in terms of consultancies and technical support for the national laboratories that are responsible for checking the water quality. The ICPDR also received external assistance to develop and establish early warning systems.

Finally the ICPDR developed a transnational diagnostic analysis. The secretariat brought people together, who went through a problem assessment phase and finally developed a strategic action plan on the basis of the assessment. This action plan was taken over by the EU Water Framework in 2000; funding continued and led to the acceptance of the EUWF by most countries.

In terms of personnel support several training courses were organised by the secretariat, e.g. chairpersons received training on how to run meetings.

Last but not least the donors put a lot of emphasis on public information. The ICPDR received considerable resources for communication purposes, such as publications and the building and funding of a NGO network. ICPDR benefited greatly from this approach, both to publish its own materials and to celebrate its successes and share these with their stakeholders in the basin.

During the last five years ICPDR has been developing an ‘exit strategy’ to become independent from external funding, and a plan was developed for when external support is no longer available. Currently most activities are kept going by the secretariat with funding from the member states.

Niger

The executive secretariat of the Niger Basin Authority (ABN) has always existed, but was not active. The main revival of the basin commission came with the shared vision process. It was decided to put into place a water charter for the Niger. Donors were requested to fund this charter and they influenced decision makers and got other donors interested in the basin. The World Bank eventually financed the shared vision process. The ABN was inspired by what happened in other basins and took the first step to revive the process.

Missions to the field, studies, and legislation were already available on the national level. The secretariat collected all that information and grouped available structures to put in this new body, the ABN. This means that there were already existing elements at different stages of the process.

Consultants, funded by the donors involved, came to conduct initial base studies, based on data available in the basin and provided by the riparian countries and the ABN secretariat.

Nile

First dialogue forums were organised between water engineers and policy makers. This has resulted in a now regular exchange of technicians between countries is now very regular.

Then technical responsibilities were handed over to the national level structures, such as ministries. The next step is to hand over confidence building activities to national governments.

Also the Shared Vision Projects support the development of policy frameworks. Members of each government are active in different Task Forces (TF), e.g. on water management. There exists one regional and several national TFs. These TFs have investigated water resources rules, plans and strategies in the different countries; these were then commonly revisited by all countries. These meetings were funded by donors.

Last but not least the Nile basins discourse, which was funded by UNDP, is a mechanism to solve minor problems on the ground. It is currently used to receive feedback on the functioning of the NBI from the stakeholders involved. It has become a kind of feedback mechanism, to give a voice to the population.

The Nile Basin Initiative experience has shown that national capacity needs to be built. Regional conventions can support the development of national standards and capacities. It is therefore important to find a balance between regional and national capacities and develop both simultaneously.

Guarani Aquifer

So far no legal and policy frameworks exist for the use and development of the Guarani aquifer yet, Awareness-raising activities about the aquifer, its existence, the water use and its value for the countries, were very important to ensure involvement of both government and the public in the start of the policy development process. A citizenship fund was established that provided some financing for these activities, NGOs were involved and kept informed by the SAP-Guarani secretariat, and supported awareness-raising activities and the whole process.

The secretariat also had discussions with the media covering water and environmental issues. They organised meetings to inform them about groundwater-related issues, in addition to surface water and the environment in general. These awareness-raising processes are currently being maintained by the countries. They have also developed a huge knowledge base and these processes are being used to disseminate this information.

In future drafting of agreements for national governments needs to be discussed and agreed upon.

NWSAS Aquifer

Also the NWSAS does not have a legal framework in place yet. Improvement of the awareness of the actual basin and the fact that countries share the aquifer was an important first step in the process. The OSS, FAO and UNESCO talked to each country, and organised regional and national workshops to put in mind the absolute necessity to share information and data on the aquifer.

Also an assessment of the status of national policies and legislation took place. Moreover studies were conducted to find out how water from the aquifer is managed and used, to be able to understand what

needs to be done and developed at the regional level.

Through the execution of different trainings, data on the aquifer were collected, common management tools were designed, GIS tools were used and modelling facilities were established. This was all achieved in close cooperation with national water authorities at the national level, the agricultural departments, various universities and others. National mechanisms were established for this purpose.

The next step in the process will be the joint development of the aquifer and the establishment of common policy and legal frameworks.

REQUIRED INSTITUTIONAL CAPACITIES

General

- Permanent secretariats in place;
- Awareness at the political level;
- Capacity of member states to deal with transnational institutional requirements;
- National capacity needs to be developed to ensure effective regional cooperation. If national capacities are weak, regional cooperation cannot be realized. It is a parallel process; if countries are not talking the same language, meetings will not bring the expected results.

Legislation

- Harmonization of national legislation systems and frameworks on water and also land use, cross-checking against existing legal systems within each state;
- Developing rights (land and water rights) to use groundwater;
- Ability to alter/adapt existing treaties to take in new developments, such as environmental assessments and groundwater issues;
- Capacity to develop legal instruments/tools for deciding on who pays for what, agreed upon by all stakeholders. The cost/benefit ratio of each development opportunity should be defined. There is a need for a model for benefit and costs balancing and sharing.
- International court enforcement (EU);
- Integration of secondary legislation at national level. In some cases there is a framework needed to develop these national capacities. A regional convention can facilitate this, as it becomes an “international obligation” for the countries, which in turn can become an incentive for national governments to make it happen.
- In other cases first a commitment of all countries is needed, legal and policy frameworks can be built in stages.

Policies

- Joint standards on what data are collected and actually shared,
- Knowledge of the concept of demand management;
- Capacity to organize and share knowledge and data: knowledge management tools, a consensus on the data for knowledge transfer. Decisions should be taken on the basis of data and knowledge.
- Capacity to harmonize policies between countries
- Capacity to ensure stakeholder participation/involvement in processes
- Capacity to ensure stakeholder representativity and consultation
- Capacity to develop scientific information for taking decisions: education for human beings to learn and grow. Investment in different kinds of education, i.e. law, information management, engineering, etc.

REQUIRED CAPACITY DEVELOPMENT

- Coherent capacity development activities - a unified UN response is needed to the needs of the basins;
- Support poorly resourced basins to allow exchange visits from other basins
- Support twinning of basins;
- Support development of public participation capacities;
- Awareness-raising, technical exchange, facilitate political meetings, improve meeting moderation skills;
- Support for riparian state dialogues;
- Orientate existing programmes to meet the needs of the basins;
- Deal with historical water rights;
- Develop a science-policy interface;
- Support learning between ministries;
- Training for staff of secretariats on legislation formulation and adaptive agreement drafting.
- Support for direct exchange between basins by the UN;

  a. Group like this coming together every couple of years for new exchange;

  b. Direct twinning between basins;

  c. Targeted sets of discussions more than general discussions, e.g. on groundwater or other emerging issues;

  d. Packaging existing resources and information, and disseminate this information via platforms for sharing of experiences (internet platform to share information and networking, etc.).

3. Funding mechanisms

The following text is based on the discussions in the discussion group on *funding mechanisms* and the general debate in the plenary.

NECESSITY FUNDING MECHANISMS

Funding is necessary for different functions and responsibilities within transboundary water management and cooperation. First of all funding is needed for the basic operation of joint bodies/institutions, basically the running of the coordination unit. Funding is also necessary to organize training sessions for experts in the different countries on using management tools and for updated data collection to feed the information systems. Investments are also needed for data monitoring infrastructure and use (field networks) and investments into water use (i.e. irrigation schemes, reservoirs, hydropower etc.); such investments could eventually generate funds that can be reinvested into joint bodies/ institutions. Compensation mechanisms also provide funding to react to water pollution, loss of income of livelihoods because of change of land use, and other issues. Funding is also needed for coordination issues, policy responses and research issues to ensure sustainability of the mechanisms in place. Last but not least funding is necessary for public awareness raising, information and knowledge transfers and general communication to inform the general public within the basins about current issues and decisions made.

MAIN SOURCES

Funding may be achieved through the following main sources of funding:

- Donors' support
- National contributions by the governments;
- Payment of staff salaries by national governments;
- Funding of commission meetings ;

However, participants mentioned that additional funds could be mobilized through other mechanisms which are not so common yet. Funds can for instance be generated by hydropower plants, which can consequently be reinvested into the joint commissions; one could say in this case that "infrastructure pays out". Water users could also contribute to the functioning of the structures by contribution in kind. Lastly, a reduction of costs after initial investments (i.e. end of a project funding from donors) would also indirectly make extra funds available.

All participants agreed that transboundary cooperation needs money on top of the budget for national water management issues, and that national governments should ensure that these additional funds are made available. Moreover, continuous national contributions will make the joint body sustainable. It was also agreed that it is important to be aware of donors´ own agendas, since donors may not have the same interests as the cooperating riparian countries.

FUNDING MECHANISMS/ ARRANGEMENTS

The following are the main mechanisms applied in the different basins represented at the workshop. It has to be considered that mechanisms may shift over time, meaning that funding can start by donor funding and slowly shift towards state contributions, etc.

- **External Donors support**
  - Nile basin,
  - NBA/ABN countries pay back to the WB through the ABN,
  - Guarani Aquifer (Phase I) (GEF),
  - IGAD (AfDB),
  - VBA (AfDB).

National/country contributions
- NWSAS,
- Nile,
- NBA/ABN,
- Guarani Aquifer (under discussion for Phase II),
- ICPR,
- IGAD,
- Lake Chad Basin Commission (LCBC) 1st phase,
- OMVS.

- **Users**
  - NBA/ABN.
- **Private sector**
  - NBA/ABN, ICPR.
- **Regional economic organizations (REC)**
  - NBA/ABN,
  - NL-B-D (Netherlands, Belgium and Germany) Interregional Programme (funded by EU),
  - Volta Basin Authority - Economic Community of West African States (ECOWAS).

External Donors support

These funds can be made available through

- trust funds (different level of control by donors);
- grants (may be subject to specific conditions); and
- loans (development banks, commercial banks).

The advantage of donor funding is that it is substantial and reliable; it shows the confidence of donors and at the same time increases their credibility. However, the disadvantage is that often it results in a lack of ownership by the riparian countries. Moreover, normally it takes a long time to acquire donor funds, certain donor conditions must be complied with, and there is a high corruption risk.

Required institutional capacity

- Financial management skills (train high level decision makers and bring new expertise);
- Dialogue and negotiation skills with donors (in order to address donors' conditions);
- Donor and multi-donor coordination (make sure there is no overlap and no missing activities);
- Economic valuation of water in relation to targets shall be discussed between the donor and the countries;
- Transparency and accountability (steering committees);
- Linking spending with visible results (how the money was used and what results were achieved);
- Technical skills to deal with financial management;
- Donor conditions and riparian interests need clear target setting.

Capacity development activities

- Training for financing management skills development for programme implementation (adapted to regions or language, could involve Regional Economic Commissions-REC);
- Capacity development of donors to improve and harmonize funding mechanisms (including information for financial managers about real project implementation in the field);
- Improving the capacity of basin organizations for preparing project proposals and submitting requests for funding to donors;
- Training for multidonor dialogue and management;
- New school of water economy – creating and developing curricula on water and finance;
- Training to develop clear guidelines for finance management;
- Conclusive meetings and contracts;
- Harmonization of donor systems.

National/country contributions

One of the issues that plays a role in defining national or country contributions is how to define and how to calculate country contributions (e.g. by surface area, by population) or whether to agree on equal contributions. Another issue is whether the national contribution should be paid in cash (com-

mon institution) or in kind (national institution budget).

According to the participants of the workshop, one of the advantages of national contributions as a financing mechanism is the relative high cost efficiency and the fact that funding is more or less sustainable. National contributions also enlarge the sense of ownership of the countries, increase confidence of member countries in the cooperation and the funding is predictable.

One of the weaknesses of this approach is that national contributions could mean a substantial cut in the national budget (devaluation) and often countries pay small amounts only. National contributions very much depend on variability in political and/or social support and often the basin organizations are confronted with a lack of national fulfillment of financial commitments.

Required institutional capacity

- Financial management skills;
- Rules of procedure (assist politicians in defining and developing them)
- Awareness raising;
- Financial committees empowered by countries with a mandate;
- Sanctions.

Capacity development activities

- Awareness-raising activities to achieve more visibility of secretariat actions to ensure public acceptance;
- Training to develop financing management skills for programme implementation (continuous financing);
- Training to develop multidonor dialogues and to improve management skills;
- Training to develop negotiation skills;
- Creating and developing education curricula on water and finance (new school of water economy);
- Communication training for basin organizations concerning the organization of media campaigns to sensitize the public about funding and to move towards transparency and accountability;
- Capacity development for socio-economic and ecological viability;
- Interdisciplinary and holistic training towards real capacity development;
- Training on environment policy development and writing.

Private sector

The involvement of the private sector may add another dimension of funding to the existing mechanisms. However, its main drawback is that with the funding often comes the condition that the corporate interests need to be satisfied. These funds could be used to put in place facilities for water supply and sewage systems, or as investments to improve water infrastructure. Public/private partnerships could be developed or funds could result from corporate social responsibility programmes.

Capacity development activities

Staff of common units of basin organizations would need training to develop their capacity to set and manage trust funds, and to provide tools and means to learn how to set-up and develop trust funds.

Regional economic commissions (REC)

Although in many cases the geography of the basin does not necessarily coincide with that of the regional economic organizations, funding by RECs can be an important source for transboundary water cooperation. This kind of funding positively supports regional cooperation and integration. However, some countries might not like the idea that through this funding others might have a say in "their" water.

User/beneficiaries contributions

This type of funding mechanism induces sustainability, it ensures local level involvement which can lead to a strong sense of ownership, and it does not need to cost much. However, the mobilization of these contributions requires a lot of time and effort.

ADDITIONAL RECOMMENDATIONS

- More donor money should flow into groundwater authorities;
- Target/goal setting mechanisms are needed which may have an impact on the allocation of resources;
- Concentration on funding for institutional development (e.g. actions plans for specific projects);
- National funding is needed increasingly for the operation of secretariats to ensure that the member countries develop a sense of ownership for their secretariats and pay for everyday operation;
- Sustainable resources are necessary; the ABN therefore has approved a water charter which includes the user-payer principle. Charging the small water users would help to fund the management institution. Country contributions could on the long run be replaced by user contributions to make funding more sustainable;
- Continuous funding/investments to be ensured (long-term vs. short-term financing);
- A partnership and equity approach is important to set priorities;
- Direct taxing appears to be difficult to realize;
- Direct taxing of water use by the transboundary joint commission and not by the country;
- The most reliable and sustainable source of funding is the one generated by the stakeholders who benefit from the service provided by the commission (as a basis for national and international contributions);
- Increase financial efficiency to attract donor funds (possibility for developing an efficiency index);
- Financial consideration of water, water valuation as a commodity;
- Distinguish between the type of funding: operation and maintenance investments are different financing categories;
- Funding of institutional operation: self-sufficiency development of own perennial mechanisms as donors will not fund operational costs forever;
- Investment funds: partnerships (private of private-public) are easy to establish because of the potential yield that these investments may bring;
- Sub-basin entities can ensure that users, enterprises and farmers work together.

Main recommendations and the way forward

The final session of the workshop was directed towards summarizing results and discussing future action. The workshop participants mentioned several issues as essential for achieving the required institutional capacity for transboundary water cooperation and management.

REQUIRED INSTITUTIONAL CAPACITY

Raising awareness at all levels, including the political and stakeholder level, on issues such as groundwater management, the effectiveness of certain mechanisms such as the polluter-pays mechanism, political awareness and the enhancement of public-private partnerships appeared to be a prerequisite for successful transboundary water cooperation. Also sustainable funding modalities, knowledge management approaches, shared visions and adaptable agreements were mentioned as important requirements.

It was confirmed that there was also a need to harmonize national policies, procedures and legislation on both water *and* land use, to integrate national sectoral legislation in regional legislation, and to directly integrate groundwater issues in newly established agreements, policies and regulations.

The establishment and strengthening of links with Regional Economic Commissions and other regional commissions, i.e. to raise their awareness of transboundary water issues, was also mentioned as an essential issue for sustainable cooperation.

CAPACITY DEVELOPMENT ACTIVITIES

Recommendations for required capacity development activities included specific activities such as support for direct basin exchanges for staff of basin commission secretariats or other institutional structures. Participants also recommended the strengthening of existing twinning agreements between basins and external support for a “kick start” for new cooperation/-twinning between basins.

Training appeared to be another important tool for capacity development. Training in this perspective covered skill development at all levels, e.g. on the formulation of adaptable agreements and legislation for transboundary water management, but also skills for benefit-sharing negotiations and group moderation. Another issue concerned specific training for the management of trust funds.

Interdisciplinary training programmes for staff of ministries and secretariats were considered to be necessary for adaptive water management. Furthermore, a shift of the policy paradigm, e.g. supply versus demand management was seen as a necessary development for sustainable management of transboundary waters. In this respect it was mentioned that one should identify and collaborate with existing centers of excellence in the region to adapt programmes towards the specificities and special needs concerning transboundary water cooperation, such as curricula development and the development of cost-benefit sharing (economic) models.

Career professionalization should, however, not just include training, but also systems should be put in place to enable staff to operate effectively. Human capacity development hence plays an important role concerning the internalization of the various issues.

Another important precondition mentioned was public (stakeholder) participation and the development of public participation capacities. To engage the public more in the topic of transboundary water cooperation and share lessons learned and experiences with other basins, it was considered that successes and best practices should be made more visible, e.g. in the form of prizes, workshops and knowledge management. Also frequent dialogue forums, both horizontal and vertical (within and between states, ministries and cooperation partners), are useful approaches for getting all stakeholders on board.

One specific important point mentioned was the need for more coherence in capacity development: the participants felt that a unified UN response to the needs of the different basins was needed to make support most effective and efficient.

THE WAY FORWARD

Finally, suggestions were made by the participants concerning potential follow-up activities to ensure further exchange of experiences and lessons learned between joint bodies, and between joint bodies and national ministries.

Potential follow-up activities suggested were support for direct basin exchange between and within continents, as well as support for twinning agreements between basins. Twinning of basins could eventually lead to partnerships for joint studies and support the development of academic programmes for specialists.

Regional follow-up workshops that focus on specific issues, such as adaptable legal and policy frameworks or funding issues, were also thought to be useful follow-up activities of this workshop.

A further recommendation was to organize similar international workshops on a regular basis to track progress in the invited basins, to provide further opportunities for exchange of experiences and to deepen the discussions on certain selected topics, and also to promote similar workshops at the regional level.

Knowledge management appeared to be another important issue. It was therefore suggested that a study could be conducted on mechanisms for transboundary cooperation, discussing both strengths and weaknesses. Moreover, an assessment and provision of an inventory on existing water management organisations with a focus on which capacity development mechanisms have been applied in the past, based on a geographical approach, was proposed a useful reference tool.

Linked to this was the proposal to develop a comprehensive river basins organisation typology, to use this typology to differentiate between various institutional capacity mechanisms and needs, and identify which types were applicable under which specific conditions.

Moreover, many participants agreed that it would be beneficial to organise workshops for staff of joint bodies and ministries to deepen the discussion on relevant issues such as cost-benefit sharing, financial sustainability of river basin organisations as well as environmental sustainability, as these themes are becoming more important for transboundary water cooperation; staff of the secretariats and commissions often have insufficient knowledge about these issues to be able to operationalise these approaches. Additionally, a short-term course on multidisciplinary approaches and techniques for staff of transboundary water basin secretariats was proposed as a useful follow-up.

The participants also saw a need to strengthen discussions on groundwater management. A number of regional workshops for regional economic commissions with the aim of adequately addressing groundwater within transboundary IWRM was perceived as a necessary activity.

Last but not least, support from UN organisations and programmes to science-policy interactions was considered to be important. This support could be realised through the establishment of a network of organizations, managers and scientists working on and in transboundary basins and aquifers.

Annexes

Monday, 10 November 2008

WORKSHOP PROGRAMME

	Registration and coffee
9:00 – 10:30	**Opening session**
	Welcome Address: ▪ *Dr Reza Ardakanian*, Director, UN-Water Decade Programme on Capacity Development (UNW-DPC)
	Opening Addresses: ▪ *Ms Karin Kortmann*, Parliamentary State Secretary, Federal Ministry for Economic Cooperation and Development (BMZ) ▪ *Dr Fritz Holzwarth*, Deputy Director General of Water Management, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
10:00 – 10:30	Keynote speech ▪ *Dr András Szöllösi-Nagy*, Secretary of the International Hydrological Programme of UNESCO and co-chair of the Political Processes Committee of WWF5
10:30 – 11:00	Coffee break
11:00 – 12:15	**Introductions**
11:00 – 11:20	**"The 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes"** – Heide Jekel, Chairperson to the Meeting of the Parties to the UNECE Water Convention
11:20 – 11:35	Introduction to the workshop objectives and programme
11:35 – 12:15	Round of introductions and participants' expectations of the workshop
12:15 – 13:30	Lunch break
13:30 – 18:00	**Session 1: Cooperation and joint decision making - between regional bodies, national authorities and other stakeholders** *Moderator: Dr Reza Ardakanian, UNW-DPC*

13:30 – 15:00 *Presentations*

"Information and Knowledge as a Basis to Establish Transboundary Cooperation:
the experience of the North Western Sahara Aquifer System (NWSAS)" - Ousmane Diallo, Coordinator of the OSS Water Programme, l'Observatoire du Sahara et du Sahel (OSS)

"Trans-boundary River Basin Management – the OKACOM initiative"- Ebénizario Chonguiça, Executive Secretary, Permanent Okavango River Basin Water Commission (OKACOM)

"From the Most Romantic Sewer in Europe to a Living River – the Rhine case" Fritz Holzwarth, Deputy Director General of Water Management, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

15:00 – 15:30 Coffee break

15:30 – 17:30 ***Group Discussions*** *(moderated)*

Three parallel working groups will be formed on the following three aspects of the session topics and will discuss capacity development issues concerning:

1. Legal and policy frameworks
2. Cooperation mechanisms
3. Funding mechanisms

The participants will be requested to discuss, in moderated working groups, the lessons learned from the presentations and from their own experiences. Participants may choose their preferred working group. All three working groups will be held in each of the three sessions.

17:35 – 18:00 Group Photo

18:30 – 21.30 ***Dinner***

Tuesday, 11 November

09:00 – 13:00 **Session 2: Cooperation and joint decision making – developing goals on water management**

Moderator: Dr András Szöllösi-Nagy, UNESCO-IHP

09:00 – 11:00 ***Presentations***

"Governance and Institutional Arrangements in the Great Lakes Basin" – Murray Clamen, Secretary, Canadian Section of the International Joint Commission (IJC)

"Mekong River Commission and its First Test in a Transboundary Impact Incident – the Yali Dam" - Le Duc Trung, Acting Secretary General, Viet Nam National Mekong Committee (VNMC)

"Doosti Dam on the shared river of Harirud: A bridge of friendship between Iran and Turkmenistan" - Saed Nairizi, Director, Toossab Eng. Consulting, on behalf of the Harirud Joint Commission

"The Danube River Basin – the most international river basin in the world" – Philip Weller, Executive Secretary, International Commission for the Protection of the Danube River (ICPDR)

11:00 – 11:30 Coffee break

11:30 - 13:00 ***Group Discussions*** *(moderated)*

Three parallel working groups will be formed on the following three aspects of the session topics and will discuss capacity development issues concerning:

1. Legal and policy frameworks
2. Cooperation mechanisms
3. Funding mechanisms

13:00 – 14:00 Lunch break

14:00 – 18:00 **Session 3: Strengthening of joint bodies - organisation, monitoring and data sharing**

Moderator: Dr Reza Ardakanian, UNW-DPC

14:00 – 16:00 ***Presentations***

"Nile Basin Initiative Current Context and its Evolution Towards Institutional Strengthening" - Hamere Wondimu, Senior Programme Officer and Shared Vision Program Coordinator, Nile Basin Initiative (NBI) Secretariat

"Perspectives de Développement du Bassin du Niger "- Nialen Condé, Directrice de l'Administration et des Finances, and Idé Bana, Directeur Technique, Autorité du Bassin du Niger (ABN)

"Aménagement et Gestion Solidaire d'un Bassin Transfrontalier : description et leçons tirées des 35 années d'expérience de l'OMVS" - Tamsir N'Diaye, Directeur de L'Observatoire d'Environnement, Office de Mise en Valeur du Fleuve Senegal (OMVS)

"Guarani Aquifer Project: from knowledge to governance" – Luiz Amore, General Secretary of the Guarani Aquifer Project, Organization of American States (OAS)

16:00 – 16:30 Coffee break

16:30 – 18:00 ***Group Discussions*** *(moderated):*

Three parallel working groups will be formed on the following three aspects of the session topics and will discuss capacity development issues concerning:

1. Legal and policy frameworks
2. Cooperation mechanisms
3. Funding mechanisms

19:00 Dinner

Wednesday 12 November

09:00 – 12:30	**Closing session: Plenary** Moderator: Dr Matt Hare, UNW-DPC
09:00 – 10:30	**Presentation of the outcomes of the working groups followed by plenary discussion** Report of the rapporteurs (3 times 15 minutes). *It will be the task of the rapporteurs to extract conclusions from each of the working groups and present these to the plenary.*
10:30 – 11:00	Coffee break
11:00 – 11:45	**Workshop conclusions and main recommendations** Write-up and final discussion of the main recommendations
11:45 – 12:30	***The way ahead:*** *Follow-up activities to disseminate and possibly adapt the lessons learned and recommendations* - Short workshop evaluation - Suggestions for potential follow-up activities **Closing words** *Dr Reza Ardakanian*, Director UNW-DPC
12:30 – 14:00	Lunch

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