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Management of transboundary water resources for water security; principles, approaches and State practice

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Increasing water scarcity and stress are leading many nations to securing supplies for present and future water uses. National objectives are more and more pointed towards water security and the close links with food security and other macro-economic and sectoral aspects. Water security is seen as an important aspect of national and regional security and international positions on water often have a political dimension that reflects broader national objectives. Available options for sharing transboundary resources are established on the basis of general legal principles such as equitable utilization and absence of appreciable harmful transboundary effects downstream and others such as established historical utilization. These principles and doctrines must be fully understood by the advisers serving on the negotiating teams of international water treaties and agreements. From these perspectives, the paper recognizes the importance of the structural and strategic uncertainty in international relations. Co-ordination or harmonization of national policy, as an integrated part of, and administrated under existing frameworks for, regional co-operation are proposed as realistic, efficient and practicable approaches, alternative to more intensive co-operation and complicated planning and coordinating mechanisms. The article also highlights the need for training of legal specialists in countries which contemplate negotiating or re-negotiating water treaties or agreements.

Water scarcity is the result of pressures stemming from population growth, environmental change, and a state of degradation and unequal distribution of and access to water resources (Appelgren, 1996). As competition for limited supplies increases, conflicts among water users at local, national and regional level intensify. Water scarcity and resultant conflicts are often the consequence of inadequate management capacity at national level. Management approaches, to be effective, need to address political and social aspects of water based on regional geo-political realities.

As domestic water resources are being exhausted, shared, transboundary water resources and water importation become realities in the management of water scarcity situations. Water imports do not necessarily mean physical water; the term "virtual water" was coined to account for the amounts of water saved by importing mainly food and other water demanding products and thus avoiding consumptive use of water in agriculture in a hypothetical food self-sufficiency situation.

Efficient management of transboundary resources is hampered by factors such as the variability and uncertainty of supplies. Moreover, individual countries have clear incentives to capture and use the resource before it goes beyond their hydraulic or political control, while in a situation of scarcity there are no immediately rewarding incentives to conserve supplies for users beyond the national borders. In regions without political conflict and well defined frameworks for co-operation, sights would be set wide, to address the ultimate purposes in a regional context securing economic development, food security, public health and the preservation of ecosystems. However, many countries still define strategic security and national borders as the basic means to secure access and control of water supplies. In this context, water management

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could be seen as a tool for aggression instead of a tool that would stimulate regional co-operation.

To secure long-term access to water, it would be in the interest of individual countries to adopt an attitude of regional responsibility and revise long-standing national political positions on water sovereignty. National decision-making is however an iterative process subject to uncertainty. Stable solutions, especially in developing and transition economies, can be achieved only by searching and finding what can be accepted as reasonable and equitable by the parties concerned. The alternative approach in situations of national conflict is to link water to economic policy and to search for agreeable solutions seeking assistance of independent mediators from third party countries.

National and regional water security

An effective approach to managing water scarcity needs to be balanced with the capacity of national economies and institutions, with due recognition given to long-established political positions of States. Developed economies have the economic potential to adapt to water scarcity. Developing economies are, however, generally constrained by high population growths and might not have the necessary capacity and economic diversity. Many of the current and potential water conflicts in the world take place between developing countries. The long time delays required to establish national management capacity in developing countries raises a question of urgency.

In the absence of a comprehensive international law on water, existing legal principles and frameworks for international water sharing devolve and draw from State practice, and deal with political realities along with accepted legal principles. International law has to meet a minimum level of generality while the challenge is to handle a wide variety of specific issues and conflicts between countries of different cultures, at different political and economic development levels and with varying institutional and manpower capacity. Countries establish strategic positions for negotiations; weaknesses and shortcomings in management capacity are often reinforced by taking rigid political stands. The weakness of developing countries often results in poor governance with centralized decision-making, delayed decision-making, or no decision-making at all. Some developing countries that have recently emerged from colonial to independent rule are still subject to the consequences of international agreements adopted by the old regimes. In such countries, national positions are often established under conditions of structural and strategic uncertainty.

Attempts have been made to group countries for water policy (UN-CSD, 1997) based on their capacity to cope measured on the basis of income, and in terms of water stress, based on the ratio of water used to water available.

This grouping results in four categories of countries.

- low income, low stress countries
- low income, high stress countries
- high income, low stress countries
- high income, high stress countries

The most vulnerable category is, of course, the low income high stress countries. As transboundary rivers often cross countries belonging to different categories, there is the case for improved basin efficiency and equity and the need for wider recognition of national issues and for bringing the capacity of the parties on parity to facilitate water-sharing negotiations.

With limited capacity to cope, water scarcity becomes a threat to both national and regional security and could contribute to economic failure in weak developing countries and regions. Decision-makers, in addressing social and economic impacts of water scarcity, need to carefully balance the requirements for national development on one hand and the benefits of regional co-operation and friendly relations and trade with neighbours, on the other.

Water and food security

As a result of increasing demands, the global food gap is widening while weak, food-deficit economies are facing increasing difficulties in buying food. At present, 2400 million people depend on irrigated agriculture for jobs, food and income. Over the next 30 years, an estimated 80% of the additional food supplies required to feed the world will depend on irrigation, and will, to a large extent, use transboundary water resources (FAO, 1996). Thus, national and regional water and food security are becoming closely related to water security and depend not only on water-sharing but, to a high degree, on international food trade. Without access to food through trade due to such reasons as weak economies or trade embargos, countries will resort to ensure food self-sufficiency. Even where it is known that national food self-sufficiency is not economically efficient, this policy leads to increasing and often in many cases conflicting national demands for transboundary water resources.

Co-ordination of national policies: a process in uncertainty

It has been proposed, as a means of resolving international water sharing issues, to assign monetary values, reflecting scarcity, to the disputed water (Anon., 1994). With this approach, optimal social allocation of water between and among states would be achieved and contentious water issues could be settled through modest compensations—economists have estimated the value in dispute over water in the Near East to less than US$110 million per year (*The Economist*, December 1995–January 1996). This and similar microeconomic constructs have proven to be simplistic and tend to disregard that, unlike oil, water is not always a commodity that can be traded freely. Water has no substitute for certain uses such as drinking, hygiene and industrial processes. Consequently, there are many market distortions and considerable uncertainty, while the financial and

human capacity to deal with the given situation may be limited. In an international perspective, in contrast to the national and local level, the value-in-use of water is based on positions of national sovereignty and long-term strategic interests, rather than on narrowly calculated economic benefits. Even the poorest nations are therefore not likely to be motivated to change long-standing positions for financial compensation and will remain reluctant to compromise with issues related to national water security. As evidenced from recent successful regional initiatives, such as the Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC), mentioned below, wider recognition at national political level of the regional aspects of water management as part of regional economic co-operation suggests a promising option for solving the problems of sharing transboundary water resources.

Management of transboundary water resources is founded on decisions of neighbouring governments, which are often unequal in power and influence. Co-ordination and co-operation meet with difficulties, such as disagreements on initial positions and future scenarios, priorities, appropriate implementation mechanisms, compounded by the lack of mutual trust. As a result, national positions are taken within a high degree of uncertainty. One option to reduce risks would be to accept water as a national issue, based on national concerns, and focus on international harmonization of national policies rather than prescriptions inspired by strict adherence to legal principles. Benefits from co-ordination and harmonization across the boundaries improve when the level of strategic uncertainty on issues such as preferences, trustworthiness, and data is low. Harmonization of domestic policies will not only address undesirable externalities but also reduces strategic uncertainty for the parties participating in international negotiations (Netanyahu, 1996). Conversely, approaches that overly emphasize co-ordination introduce new incentives to deviate from agreements and may therefore have an unstabilizing effect, especially when the level of mutual trust and confidence is low.

Treaty-making for co-operation: capacity-building in aid of treaty-making

The legal principles for the management, development and protection of water resources shared by two or more countries have been authoritatively laid down elsewhere and need not be repeated here. Success stories of treaty-making for co-operation between or among countries sharing water resources show that a key facilitating role is played by confidence and mutual trust among treaty negotiators, including, in particular, the advisers to the governments engaged in the negotiations. Confidence is present only when the concerned negotiators feel they are dealing with each other from a position of parity, among peers who can all master complex issues from their respective professional angle. This is particularly true of legal advisers, who must be fully conversant with the tenets of public international water resources law and with the domestic law and administration of water resources in their own respective countries. Arguably, peer confidence among the lawyers involved has been at play in forging lasting treaties and agreements among countries in all continents, not only between and among developed nations but also between and among developing ones.

In situations of disparity, when a transboundary water basin is common to countries in different stages of development, there lies an opportunity for the international donor community to redress the imbalance by building capacity in concerned countries in the specialized legal disciplines called for by complex negotiations over shared water. For example, the negotiations which resulted in the 1995 Agreement on the Co-operation for the Sustainable Development of the Mekong River Basin were based on build-up of confidence and mutual trust among a core group of government legal officials from Cambodia, Laos, Thailand and Vietnam. This is also the approach and thrust of on-going efforts by the international donor community to foster co-operation among the countries sharing the Nile Basin.

A solid knowledge of principles, doctrines and tenets of international water resources law and of one's own country's domestic legislation and administration of water resources are therefore an indispensable adjunct to successful, peer-style treaty negotiations. Where such knowledge and the confidence that comes with it are not evenly possessed by the negotiating teams, either negotiations fail or they yield unbalanced results. The international donor and technical assistance community has a key role to play in assisting the countries concerned to build up a core of legal specialists trained in, and conversant with, the legal disciplines called for by treaty-making for the management, development and protection of water resources shared by two or more countries.

Cases: management of international water courses

The cases presented and compared below aim at presenting the diversity of issues and difficulties in the management of transboundary water courses. They demonstrate the need for trade-offs between individual countries and between short and longer term economic and political gains and losses of nations, on one hand, and regional political security and environmental and inter-generational sustainability, on the other. To build an environment of mutual trust and confidence between countries and to bridge gaps in the skill of management and negotiating capacity at the country level represent the two major challenges.

The Nile Basin and Lake Victoria

Egypt, a relatively more developed, highly arid downstream state, depends fully on the Nile river (Figure 1) for its water and food security, and has used these waters since pre-historic times. More recently the country has installed reservoirs to regulate inflows to

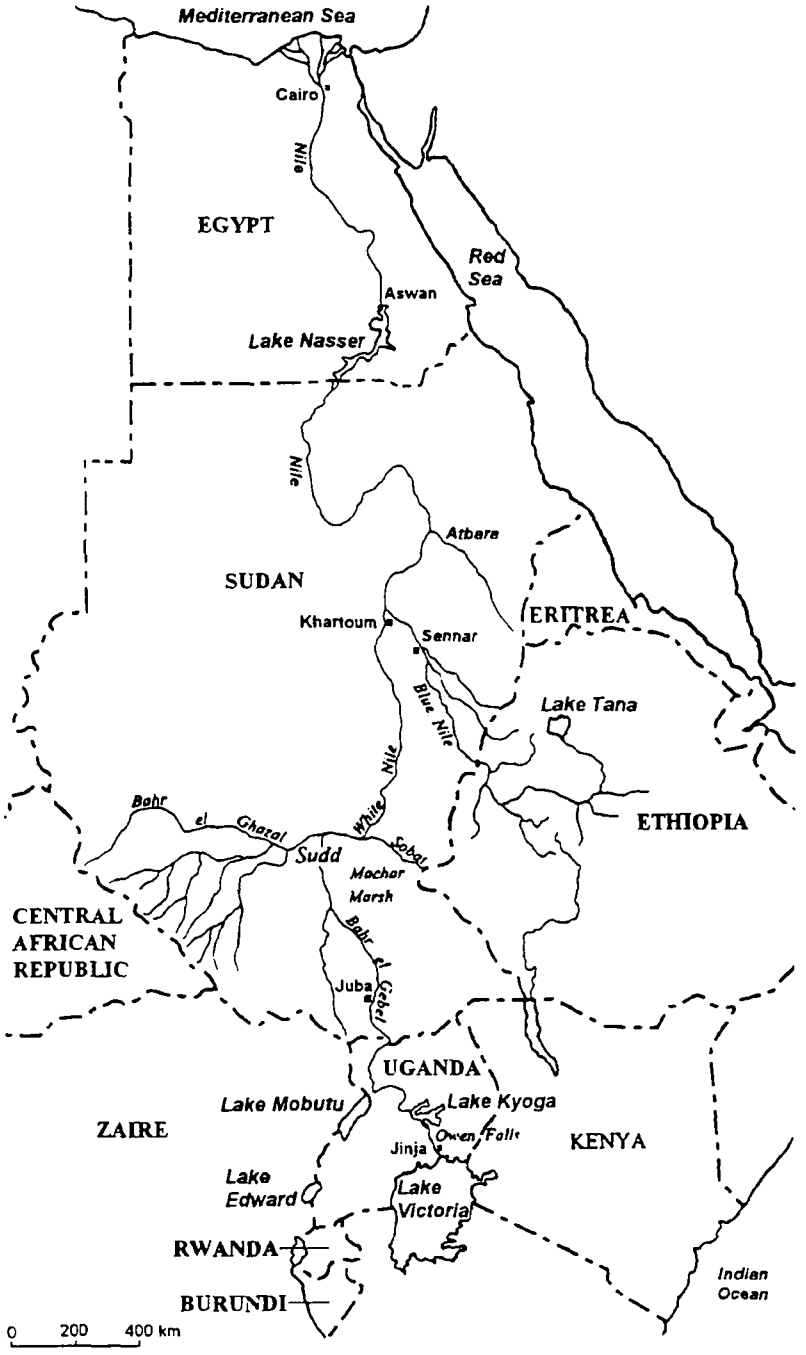

Figure 1 The Nile Basin. The Nile Basin is divided into the Blue Nile, the White Nile and the Atbara sub-basins. The Nile Basin, one of the major river basins in the world with an area of 2 900 000 km^2, is shared by nine sovereign countries. Note: This figure was considered appropriate at the time of its preparation and does not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or area, or concerning the delineation of frontiers or boundaries.

secure water supplies, and taken steps to increase cropping intensity, but is, with a growing population and socio-economic growth, increasingly water stressed. For this nearly rainless country, it can be shown that all the water of the Nile may, in an average year, produce food for only less than half the country's population, and the country therefore necessitates large food imports. The importation of food represents importation of the "virtual" water that the country would have required to produce the food itself.

Most of the factors cited as the basis for water use of international rivers in the Helsinki rules (ILA, 1966), such as total and irrigable land area, hydrology, past and present utilization, economic and social needs, among others, can be objectively measured and remain fairly invariant. The populations of the countries in the Nile basin, a basic parameter for planning and allocation of scarce international water resources, are however growing rapidly, although at a different rate, in the individual countries. Egypt, Sudan and Ethiopia,

on the Blue Nile, Sobat and Atbara, with over 80% of the Nile water resources, had a joint population of 117 million people in 1987. This population is projected to grow to 160–170 million by the year 2000. The present population of Egypt is 10% larger than that of Ethiopia; it is projected that by 2025, Ethiopia will have 25% more people than Egypt.

In spite of the population changes in the basin, Egypt pursues a *status quo* position of fixed or increased inflows, as provided in the bilateral 1959 Egypt–Sudan Nile treaty, while Ethiopia reportedly has plans to construct dams on Nile tributaries in its territory. These dams may be financed from international loans which might become available in anticipation of amendments under the water section in international law, especially in relation to historical rights.

The transboundary White Nile waters are gathered in five upstream sovereign states. Most of these countries became independent in the 1960s. Several of the upstream countries have severe food security problems compounded by poverty and have relatively less ability to buy food than Egypt. All countries claim that water resources development is the major option for socio-economic development and food security at national and sub-regional level. Some of the upstream food-short countries have large land resources in semi-arid regions which need to be used for long term food security. This would entail large consumptive uses and interbasin transfers, reducing the basin resources and depriving downstream countries of uses of the return flows in the Nile Basin. This could lead to escalation in competition and conflict over the transboundary waters.

Lake Victoria, a sub-basin in the Nile, represents an example of a multi-layered situation. In the perspective of the downstream countries, the lake is a reservoir of water for irrigation. In the closer perspective of the riparian countries, it is a source of food, transportation infrastructure, a sink for waste and as an emerging regional issue, an important regional supply of hydroelectricity. The scope for management is formidable and co-ordination needs to be well-focused on specific subjects involving countries whose interests can be common or conflicting. Costly technological and institutional approaches such as comprehensive integrated basin planning and large and widely mandated river basin organizations have generally failed and need to give way to decision-making based on pragmatic and issue-focused incremental planning.

Basin management at different levels was reflected in three institutional options put forward for Lake Victoria Co-operation (FAO, 1995):

- a multiple management function with a permanent secretariat;
- a multiple management function within the existing East African Co-operation Agreement;
- a management function with an existing subsector-oriented organization—The Lake Victoria Fisheries Organization.

Only the second alternative would be supported by an established regional authority and be free from sectoral bias. From the experience in other basins, the first alternative has in general proven to be costly and non-sustainable. In the real-world situation, however, the final choice will depend on strategic political positions and the resources available from countries and donors.

The Nile and the Euphrates–Tigris, a comparison

The Euphrates (Figure 2), in comparison with the Nile, shows a reverse situation, with a relatively strong upstream economy within the territory where a major share of the waters gather. Upstream diversion, pollution and salinization of the river resources is perceived negatively by the affected downstream States. In all basins, upstream countries have obvious advantages; however, upstream diversions and development have taken place only on the Euphrates, while in the case of the Nile, the downstream countries are the most established water users. In both basins, there is a need to co-operate for the protection of catchment areas. While there are no treaties on the Euphrates, the water sharing issues in the Nile are subject to existing bilateral treaties and agreements required under international law. For the Euphrates, bilateral and tripartite meetings have been carried out since the mid-1960s, resulting in a number of agreements on guaranteed international flows, but the dialogue has not been sustained in recent years. As in the case of the Nile, the water resources of the Euphrates and Tigris could be enhanced and made available to all riparian countries, if a situation of trust and collaboration were established.

Southern Africa—State practice and co-operation in the SADC region (Figure 3)

Most significant water resources in the SADC countries are shared. This situation highlights the regional ramifications of water scarcity, with many national and supranational issues and potential conflicts as well as clear-cut bilateral water-sharing issues associated with the management of the resources and major water transfers between river basins and countries.

The co-operation between Lesotho and South Africa under the Lesotho Highlands Water Project will, when implemented fully, supply the most industrialized region of South Africa with 30 cubic metres per second (m^3/s) and provide Lesotho with all the electricity it needs. The transferred water is sold to South Africa at an economic price established at 56% of the savings to South Africa, when compared with the next-cheapest supply.

Sharing of the water resources of the Lower Orange River between Namibia and South Africa represents a case of efficient co-ordination, initiated while both countries where parts of the Union of South Africa. The mutual trust and confidence between the two governments, also after Namibia's independence in 1990, allowed for harmonized national water policies and efficient allocation, balanced in time and in phase with the planned socio-economic development and the water demands in the two countries. The proposed arrangements could provide for South Africa to continue to utilize the scarce water resources for

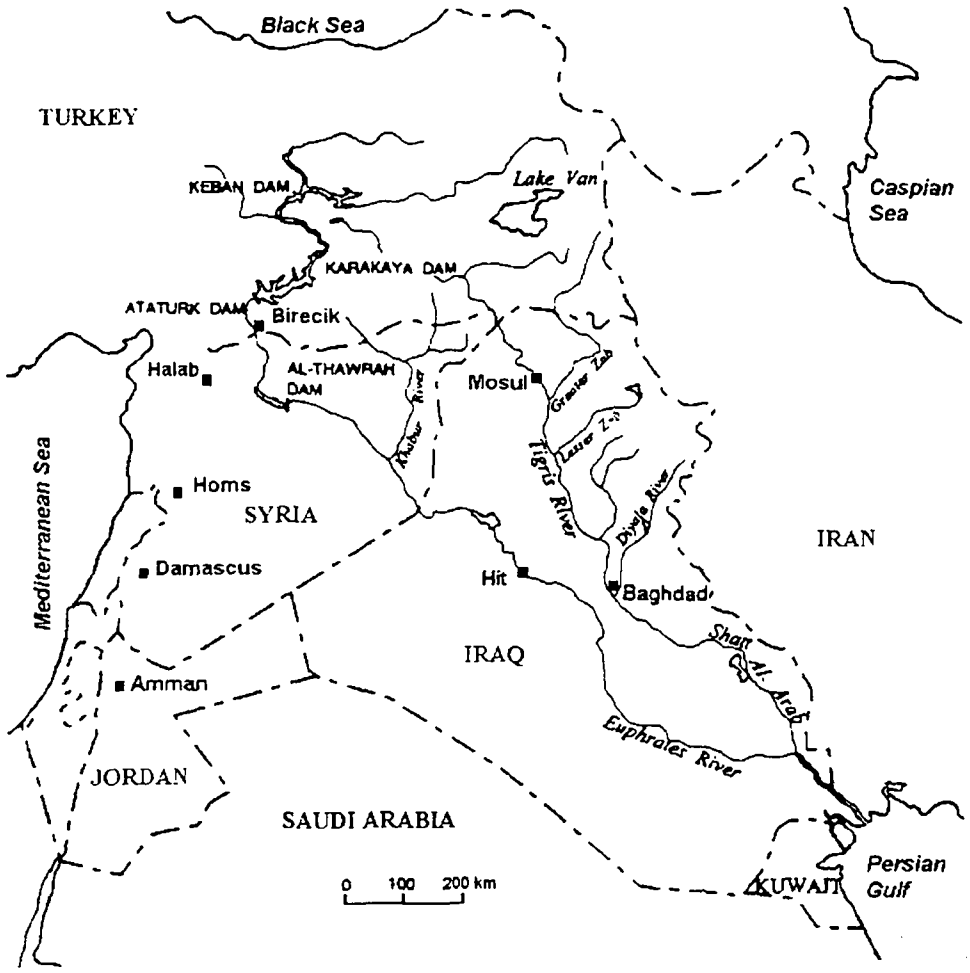

Figure 2 The Euphrates–Tigris Basin. The Euphrates and the Tigris flow within the same basin with the two watercourses joining before spilling into the Persian Gulf. The average flow of the Tigris, with a smaller catchment area, 258 000 km^2, is about 50 000 Mm^3 per annum, or close to double that of the Euphrates, 29 000 Mm^3, with a catchment of 444 000 km^2. A technically and economically viable solution to water scarcity in the Euphrates would be water transfers from the Tigris to the Euphrates. It can be expected, however, that the geo-political situation in the basin will for some time constrain such joint undertakings. Note: the figure is that considered appropriate at the time of its preparation and does not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or an area, or concerning the delineation of frontiers or boundaries.

mining uses for a few decades, after which the mineral resources will be depleted and Namibia will be able to use the resources for growing domestic demands for socio-economic development and to replace and complement the limited ground water resources.

Within the same SADC region, the Inkomati river (Figure 4) is shared between Mozambique, South Africa and Swaziland. Mozambique, a downstream country which depends on the upstream countries for more than half of its water supplies, is part of a tripartite agreement established during colonial rule, but has not, during more than a decade of civil war, been able to participate in the Inkomati co-operation. More recently, South Africa and Swaziland have reached an agreement and established a plan for joint bilateral development of the Komati sub-basin. The plan was initiated during the apartheid government in South Africa and provides for joint water resources development and sharing of high and low assurance water. The agreement recognizes the Helsinki Rules and the rights of Mozambique. A major share of the scarce water is allocated to South Africa and the agreement endorses the existing water transfers out of the basin for use in South Africa. With Mozambique coming back on the stage there may be need to again look at these arrangements in light of the larger context of the Inkomati Basin. In a general perspective of changing environments, there exists a body of opinions among international water jurists, that "unequal treaties", i.e. treaties which lack reciprocity or consideration, are invalid (Caponera, 1959); this proposes an option towards more flexibility and adaptation to change.

The Cunene River (Figure 5), shared between Angola and Namibia, originates in and has about 87% of its catchment area in Angola. With scarce and unreliable domestic water resources, the Cunene and other international perennial rivers are of critical importance to Namibia. Several interdependent dam reservoirs and hydropower installations in Angola, planned and built during colonial rule in the 1970s, remain either

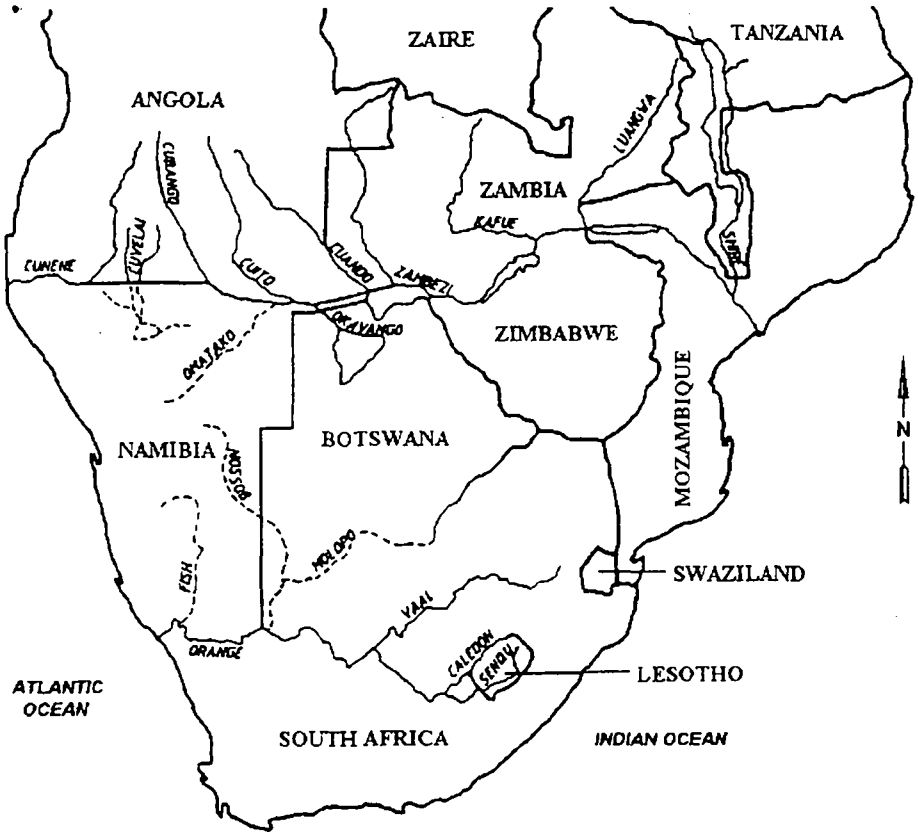

Figure 3 Water course systems in the Southern African Development Community (SADC). The recent changes including independence of Namibia in 1990, establishment of a democratic system in South Africa in 1994, and the process of peace in Angola and Mozambique have created the environment for collaboration in the SADC region. A protocol for cooperation and coordinated utilization of shared water systems, and the establishment of river basin institutions, was signed in 1995 by the eleven countries in the region. Note: the figure is that considered appropriate at the time of its preparation and does not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or an area, or concerning the delineation of frontiers or boundaries.

unfinished or with limited utilization. However, with growing demands for power and diversions in Namibia, related to a rapidly growing regional power market, a new hydro dam is being planned in the lower stretches of the river. Although a second water use agreement was reached in 1969, it was only in 1990, when Namibia gained independence from South Africa, that it was possible to arrive at a bilateral agreement with Angola for joint utilization and development of the Cunene (Heyns, 1996). Difficulties in understanding set rules in international agreements, as political environments changed and new and more comprehensive information became available, have caused problems and delays in reaching agreements and developing the shared water resources. Such delays in development are hardly affordable in the current situation of water scarcity.

The SADC region represents a variety of cases in a common situation of newly independent states and changing governments. It is of wider interest to follow the evolution of how the new governments in South Africa and Namibia and in States, such as Mozambique and Angola, that have experienced extended periods of civil war, will respond to the water sharing issues in the region. Also other SADC countries, in particular Botswana and Zimbabwe, are becoming increasingly water scarce and the region will depend not only on shared water resources and possible interbasin transfers but will need to co-operate on large joint water transfer projects. They may possibly agree on a common agricultural policy adapted to the water scarcity in many, but not all, of the countries in the region. The 1995 protocol for shared water systems within the SADC region forms a promising regional initiative for management, development and utilization of the shared basins, that covers provisions on utilization of shared resources and institutions for river basin management. Management of shared water resources, based on harmonization of national policy within the context of regional co-operation is also being considered in other regions, for example, in the isthmus of Central America under the auspices of the Regional Parliament, and could offer a model for a wider Nile co-operation.

Danube Basin: changing environment for regional co-operation

The Danube (Figure 6), is the largest river basin in Europe with close to 90 million people depending on

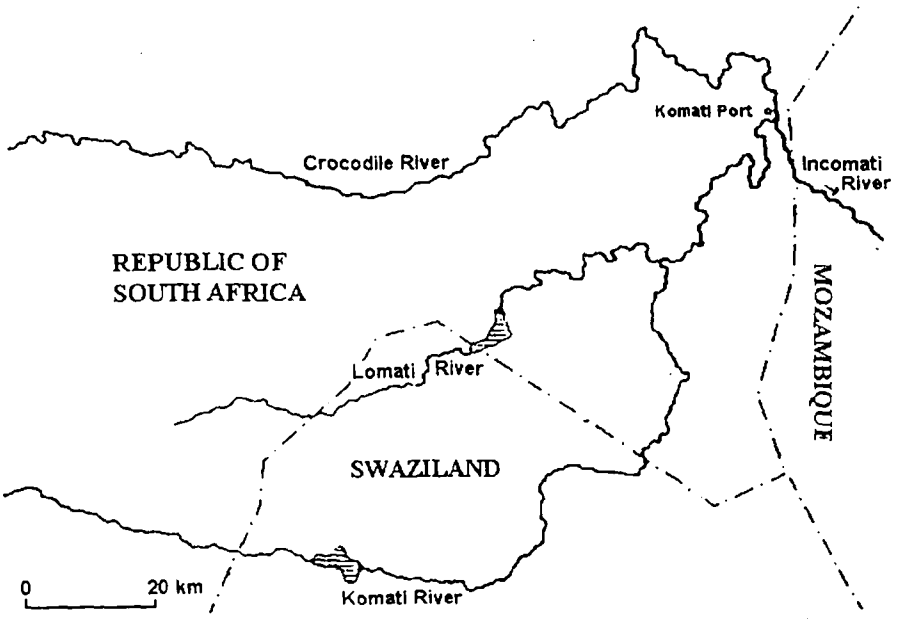

Figure 4 The Upper Inkomati Basin. The Inkomati Basin is shared between Mozambique, South Africa and Swaziland, and regulated under a tripartite agreement. The Komati sub-basin, on the other hand, is shared between South Africa and Swaziland under a more recent treaty and managed and developed jointly by the Komati Basin Water Authority. Note: the figure is that considered appropriate at the time of its preparation and does not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or an area, or concerning the delineation of frontiers or boundaries.

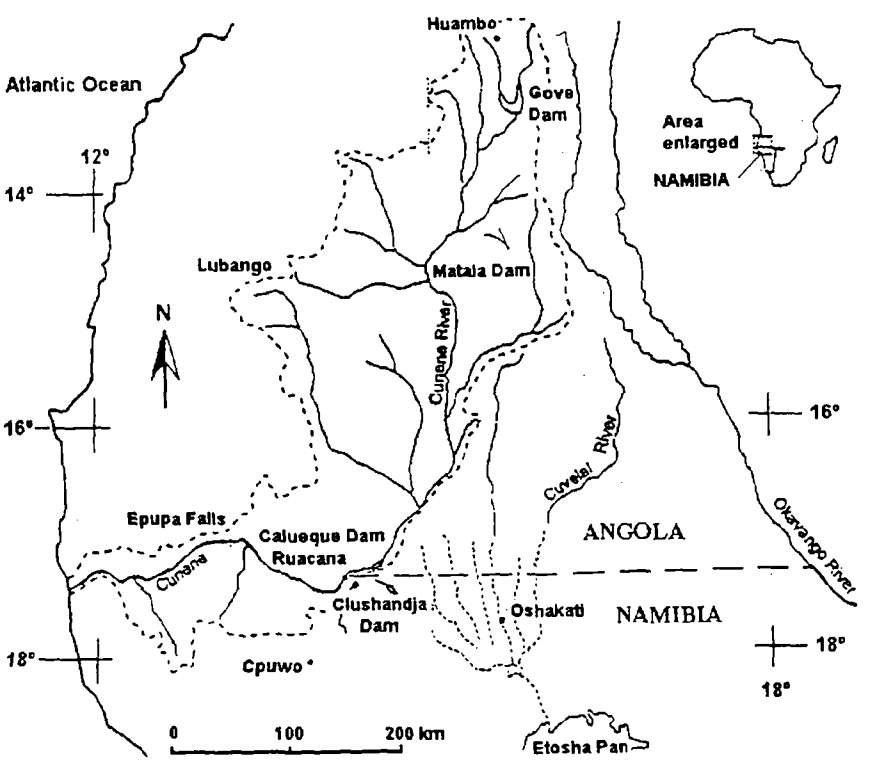

Figure 5 The Cunene Basin. The Cunene Basin covers about 107 000 km^2 of which 93 000 km^2 is in Angola and 14 000 km^2 in Namibia. The water resources development for water supply to northern Namibia and for hydropower, as the Matala Dam in 1952 and 1958, the Gove Dam in 1973, and the unfinished Calueque Dam, commenced in 1973, has been implemented within the framework of international agreements and institutional arrangements, which have evolved from the Berlin conference in 1885, agreements between the colonial power Portugal and South Africa in 1926, a water use agreement in 1969, and most recently the 1990 Agreement, shortly after the independence of Namibia. Note: the figure is that considered appropriate at the time of its preparation and does not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or an area, or concerning the delineation of frontiers or boundaries.

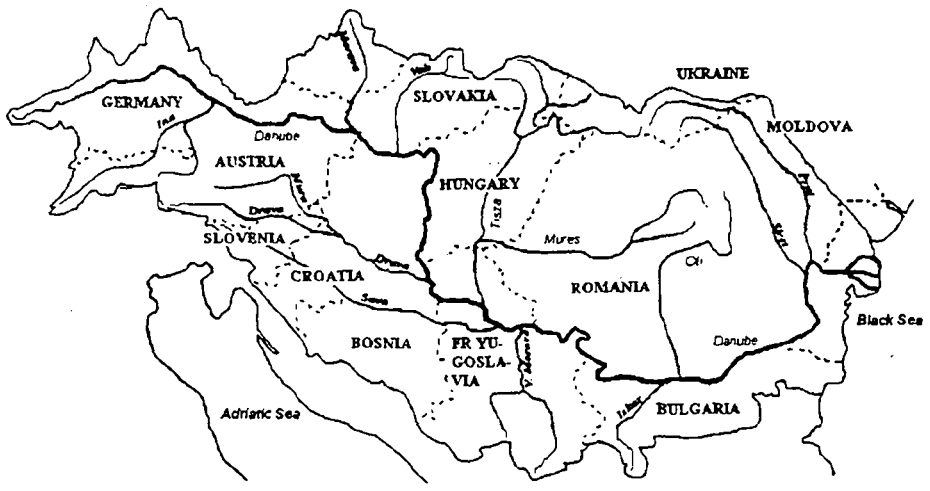

Figure 6 The Danube Basin. The Danube, the largest river basin in Europe with a catchment area of about 817 000 km^2, forms an important resource for different uses including drinking-water, transportation, irrigation, industry and energy, fisheries and waste disposal. The Danube has 10 riparian States the main course, while the basin is shared by 17 States. The management of the Danube dates back to the Treaty of Paris of 1856 and covers the post-World War II period with its East–West conflict, followed by the present transition of Eastern and Central Europe to open democratic systems and market economies. The river basin institutions, with an early focus on navigation, have changed in the last decade to address issues of increasing upstream and downstream interdependence, of the degrading environmental quality of the river. Note: the figure is that considered appropriate at the time of its preparation and does not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or an area, or concerning the delineation of frontiers or boundaries.

the shared water resource (Appelgren and Burchi, 1995). With competing water uses, including drinking water, transportation, irrigation, industry, energy, fisheries and waste disposal, the water resources are becoming increasingly scarce. The basin is shared between 17 States of which 10 are riparians to the main river course, representing upstream the industrialized and more wealthy countries, and downstream the economies in transition. The Danube co-operation dates back to the Treaty of Paris of 1856, with an early focus on free navigation, but had declined during the years of centrally planned economies. While the breaking up of the communist block, with the transition of Eastern and Central Europe to democratic rule and market economies, created a better climate for co-operation, this has been hampered by ethnic conflict and economic difficulties in some of the ex-socialist states, and by diverging upstream and downstream interests. As a result of the political transition in the region and the lack of co-ordination between the western and eastern countries in the past, earlier treaties have been challenged resulting in major conflicts, such as the Gabcikovo/Nagymaros scheme that has been bitterly disputed not only between Hungary and Slovakia but also between politicians, water engineers and environmentalists.

However, as the new economies emerge and expand, national positions may become more accommodating to the prospects of Danube and European co-operation. The earlier co-operation, focused on navigation, is being expanded to cover the more complicated issues of water management and environmental protection. Given the general lack of political clout of the river basin institutions, and the limited institutional and economic capacity of the downstream countries, it can be questioned whether these objectives can be realized. Promising progress can be seen in this more intensified co-operation, which can be attributed to the approach focused on harmonization of national policy planning and ultimately, the scope for integrating the Danube under the regional agenda of Europe. While the 1994 Danube River Protection Convention is limited in capacity to avoiding and resolving disputes similar to the Gabcikovo/Nagymaros case, it reflects a participatory approach that is well endorsed at national political level. The Convention is therefore a valuable reference as it reflects the consensus and just how far the diverse riparian States are prepared to go in relation to the different co-operation options. The possibility and limitations for a more intense co-operation in the future needs to be judged from the success and the impact of these features of the Danube Convention.

Lower Colorado: water conflict and international goodwill

The often quoted settlement reached between the U.S.A. and Mexico on the water conflict from increased salinity in the downstream, Mexican parts of the Colorado River is an example of a straightforward solution, which found a balance between the different interests of the parties and the gaps in national economic and institutional capacities. The U.S., as the stronger economy, was interested to promote regional co-operation and relations to maintain a favourable international image and to settle a long story of

contentious issues over the Colorado water resources. As a result the U.S.A., faced with domestic realities which limited the options to act at the level of the sources of salinity, assumed the costs for desalination of the Colorado water, before it enters Mexico—a high cost, uneconomic solution which trades financial contributions and economic costs for international goodwill. Mexico, on the other hand, would receive water of suitable quality to meet domestic and agricultural demands, however at some political or diplomatic cost.

Conclusions

While the traditional approaches to water management could work within the boundaries of well established jurisdictions, international water issues are not always well known and understood at the domestic level. Regional or basin-wide political systems are generally weaker and less well established as well as more distant from the societies than national and local mechanisms. A major challenge is therefore to bring management of transboundary water resources for regional development and stability onto the national political agenda of individual countries.

As scarcity develops and scarcity politics evolve, both regional and national food and water security are becoming critical issues that could trigger enhanced attention to management of shared water resources. Political development and increases and changes in water demand occur over time, and the challenge is to move the two processes forward in an efficient manner that will not lead to crisis and serious conflict.

Co-ordination of the individual country positions is efficient but often more theoretical than practical, as it is resource-demanding and requires well established mutual trust and confidence between governments—rarely available in real situations. Conversely, uncoordinated positions of individual countries based on scarcity politics, represent more stable responses of individual countries, given the actions of the other governments.

With the focus on bridging the capacity gaps between countries in a basin, treaty-making is critical for sustainable basin co-operation. Therefore, training support in aid of treaty-making is a high-priority, high-efficiency activity.

The following are some suggestions for practicable and implementable options towards successful management of transboundary water resources, drawing from the cases presented from such diverse regions as the Nile and Lake Victoria, Southern Africa, the Danube and North America:

- recognition of and adaptation to political directions with capacity to accommodate changes in political environments;
- establishment or strengthening of management institutions housed and integrated under existing regional co-operation frameworks;
- recognition of national policies with the objective of policy harmonization between States;
- establishment of management and legal capacity to bring the parties to parity for bilateral and basin-wide negotiations; and
- identification and implementation of priority goals that motivate national level decision-makers, with the focus on national and regional food and water security.

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