



Management of International Waters: Opportunities and Constraints

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ABSTRACT *Global water demands are likely to increase steadily in the foreseeable future due to increases in population growth in the developing world and changes in per capita demand as a result of changing lifestyles in nearly all parts of the world. Since all exclusively national sources of water that could be used economically have already been developed, or are in the process of development, there would be tremendous pressure to develop international water bodies, which are often the only new sources of water that could be used cost-effectively. These international water sources have not been developed in the past, primarily because of absence of agreements on water allocations between the countries concerned. Thus, the potential for conflicts in the 21st century between the countries on various international water bodies is likely to be much higher than at present. International organizations can play an important role as mediators in conflicts on international water bodies. However, except for Eugene Black, President of the World Bank, who played a critical role in the 1950s on the formulation of the Indus Water Treaty between India and Pakistan, their contributions have been somewhat marginal. These organizations have become increasingly risk-averse during the past three decades, and their leaderships have given the potentially thorny issue of development of international rivers a wide berth. In 1970, the United Nations decided to take up the case of the law of the non-navigable uses of international watercourses. Some 27 years later, the UN General Assembly approved, on 8 July 1997, a convention on this subject. The convention, though a useful step, is very broad, general and vague, and thus is likely to be of only limited help to the negotiators on the various international watercourses. Even when the convention is ratified, agreements on the development and management of international water bodies are likely to be achieved only through protracted negotiations between the countries concerned, as has been the case in the past.*

Introduction

Historically, global water demands have increased steadily with population growth and the subsequent increases in various types of human activities. With a steadily increasing world population, and mankind's eternal quest for higher and higher standards of living, there is no doubt that the demands on our natural resources, both non-renewable and renewable, will continue to increase well into the foreseeable future. Water, a renewable resource, will be no exception to this general trend.

Even when the global population stabilizes, the demands for certain resources

such as water are likely to continue to increase because of higher per capita demands from more and more people in the developing world who seek to attain a better standard of living, and also as a result of changing lifestyles, both in developed and developing countries. These trends are now clearly visible in countries such as India, where already some 100 million people have reached a middle-class standard of living. This rapidly emerging class is slowly flexing its new-found political and economic muscles and, in the area of water, unlike earlier generations, they are not likely to remain satisfied with the *status quo* of a few hours of intermittent supply of dubious quality every day. The availability of adequate quantity and appropriate quality of water to an increasingly urban population in the developing world is likely to be an important political and social issue in the coming decades in most countries.

Three other factors should also be noted. These are water requirements for agricultural production and energy generation, and increasing water contamination due to accelerated human activities. Efficient irrigated agriculture is essential for ensuring reliable food production in the 21st century. At present nearly 55% of all rice and wheat produced in the world comes from irrigated areas and some 2.4 billion people currently depend on irrigated agriculture for food, income and employment. Current estimates indicate that 80% of the additional food supplies required to feed the future world population will depend on irrigation (IIMI, 1992). Reliable availability of adequate quantity and quality of water for increasing agricultural production will continue to be an important factor well into the 21st century.

While water requirements for increasing total global agricultural production have received considerable attention in recent years (for example at the World Food Summit in Rome in 1996) water needs for energy production have been basically neglected thus far. High development and economic growth rates can only be achieved, especially in the developing world, if adequate energy is available. No large-scale electricity generation is possible without large quantities of water. In addition to hydropower generation, construction and operation of new thermal and nuclear plants would require significant additional quantities of cooling water, a fact that has basically escaped both water and energy planners to date.

A good example of the implications of massive increases in electricity generation for national and international water resources is the Asian developing countries. These countries had a total generating capacity of 250 000 MW in 1990, nearly 70% of which was thermally generated (mainly coal), with the balance of 30% being accounted for mostly by hydropower. It is estimated that another 240 000 MW will be needed by the year 2000 to fulfil their current development plans. This almost doubling of electricity requirements within a very short period of only one decade means that the water needs of a rapidly expanding energy sector can no longer be ignored, especially as similar growth rates are expected to continue during the early part of the 21st century (Biswas & Hashimoto, 1996). Similarly in Turkey, electricity demand is now growing by 7–8% annually. It should also be noted that for England and Wales, some 36% of all water abstracted at present is accounted for by the energy-generation industry alone. The corresponding figure for France is much higher, and for Mexico it is 69%. Thus, the future global water requirements for the energy sector need to be considered carefully.

Another important issue is increasing water contamination, especially in the

developing world, which means that many sources of water must now receive expensive treatment before they could be used beneficially. While much rhetoric can be noted in terms of water pollution control and ecosystem conservation, in reality appropriate remedial actions on the ground are basically missing. Inadequate treatment of domestic and industrial wastewater (for example, in Mexico, only about 6% of the total wastewater produced is properly treated), and complete neglect of non-point sources, mean that water quality management urgently needs more than the lip-service it is receiving at present.

The above issues, as well as other associated factors, mean that sustainable water management in the coming decades will face a challenge, the like of which no previous generation has had to face. In spite of the gravity of the situation, unfortunately we currently do not have even reasonably reliable assessments of the global situation in terms of water quantity and quality and associated factors. It is indeed a damning indictment of international programmes such as UNESCO's International Hydrological Programme that after spending hundreds of millions of dollars over the decades, they have been unable to produce even such fundamental information. Similarly, the United Nations system and the Stockholm Environment Institute (United Nations, 1997) recently published *Comprehensive Assessments of the Freshwater Resources of the World*. While this report makes some useful points, it is most remarkable for the absence of any serious assessments of the global water quantity and quality conditions. In addition, no major country has prepared realistic estimates of future water demand and availability situations based on expected patterns of development, social and environmental requirements, economic considerations, changes in management techniques, involvement of the private sector, and other related issues. All these will be important considerations in the 21st century.

Importance of International Waters

The foregoing factors and other related issues, when considered together, indicate that water requirements in the arid and semi-arid areas will continue to increase steadily in the foreseeable future for a variety of reasons (Biswas, 1994, 1997):

- All easily available exclusively national sources of water have already been developed or are in the process of development, which means that the real costs of new projects per cubic metre of new water available will continue to increase. An analysis of domestic water supply projects supported by the World Bank (1992) indicates that the cost per cubic metre of water for the next generation of projects is often 2–3 times higher than from the present generation.
- Water needs for ecosystem and habitat preservation will increasingly be considered as a 'legitimate' use in the future, probably within a decade, thus putting additional pressure on water available for existing 'traditional' uses.
- For environmental and social reasons, the next generation of water projects will take significantly longer to develop than currently anticipated by the planners, which will further intensify the anticipated water shortages in the foreseeable future.
- Water planning and management practices are likely to improve only incrementally during the near to medium terms; radical changes in such practices needed to resolve the water crisis appear to be highly unlikely.

All these factors will most probably contribute to tremendous sociopolitical pressure to develop new sources of water. Since exclusively national and new sources of water which could be efficiently developed techno-economically are generally no longer available, there would be tremendous pressure in many countries to develop international water bodies, that is those rivers, lakes and aquifers that are shared by two or more countries. This is because international bodies are often the only sources of water that could be developed economically. These water bodies were not considered for development in the past because of the absence of any agreements between the co-basin countries on their utilization. The political risks and complexities were considered to be too high for their unilateral development by only one country. However, as water shortages in individual nations become more and more severe, and if and when they create serious internal political and social tensions and unrest, some countries may decide that it is worth the external political risk to develop such resources, even though it could imply a 'beggar thy neighbour' attitude.

During the past two decades, there has been an increasing number of examples where countries have built dams and barrages on the main stems of international rivers (some times even very close to the borders between the countries) and/or on major tributaries, which affects the flow regime in the downstream countries. Furthermore, the number of studies that have already been completed, or are under preparation, on the development of the major tributaries of international rivers, especially when they are under exclusive national jurisdiction, is increasing all the time. All such developments on major tributaries would clearly have perceptible impacts on the main international river. A good recent example of this was on the Mekong River. On 5 April 1995, the plenipotentiaries from Cambodia, Lao PDR, Thailand and Vietnam signed an agreement on cooperation for the sustainable development of the lower Mekong River basin at Chiang Rai, Thailand. Following the signing ceremony, the VIPs embarked on a boat tour of the Mekong River. The boat, however, got stuck in the river because, unknown to the participants, China was filling up a major new reservoir upstream. China is not a member of the newly constituted Mekong River Commission. Currently several dams are under construction and/or are under active consideration upstream in the Chinese territory. China is the most upstream country in the Mekong River system.

International funding agencies have generally in the past declined to provide loans for the development of international waters, until and unless the countries concerned have signed a mutually acceptable agreement. Without external financial assistance, developing countries have often been unable to construct capital-intensive water development projects on international rivers, even if they had so wished unilaterally. An analysis of the latest trends indicated that this situation appears to be changing for the following reasons:

- Many of the countries concerned are now capable of raising the necessary investment funds from internal national sources.
- Private sector funds, both international and national, can now be harnessed for such developments.
- International funding agencies appear to have been taking a somewhat more liberal approach recently to support such development activities. For example, while they are still continuing to decline to finance construction of structures such as dams and hydropower plants, they have begun to support associated

activities like agricultural development, even though these would use water from the project.

- In many cases international financing supports only a limited part of the total project cost. Absence of international funds thus could mean only an extension of the time needed for the construction of the project; it may not necessarily stop the project.

Herein will lie one of the principal challenges to the water profession in the 21st century: how to develop and manage the various international water sources sustainably and efficiently in full agreement and with cooperation between the co-basin countries so that the result could be a 'win-win' situation for all the parties concerned. The development considerations would no longer be confined to the techno-economical factors alone, as is generally the case for the exclusively national sources. Other factors would have to be considered. These would include binational or multinational political considerations, the power of the country in which the water development would take place compared with the other co-basin countries, the importance of maintaining good relations between the countries concerned, and the general international and media interest in the project. These and other similar associated issues are likely to add complexity to the water management processes in the future by several orders of magnitude. Hydropolitics is thus likely to become an increasingly important global issue in the coming years for the management of international river and lake basins and aquifers (Biswas *et al.*, 1997, 1999).

Magnitude and Distribution of International Waters

In the context of the present paper, the various issues associated with international waters will be discussed only in the context of freshwater. Coastal and ocean waters will not be considered since these sources need to be analysed and discussed in a different context, and within wholly different frameworks.

In the area of freshwater, three types of water sources need to be considered. These are rivers, lakes and groundwaters, even though often these sources are interconnected. While we now have considerable experience with the management of international rivers, and to a lesser extent international lakes, similar knowledge on groundwater issues is conspicuous by its absence. Because of space and time constraints, the focus of this paper is exclusively on the management of international rivers and lakes.

The global magnitude and the distribution of the problem of international rivers and lakes were basically unknown until Wolf *et al.*'s work is published in this issue. The literature is replete with unscientific and hypothetical 'facts and figures'. The information base is basically non-existent for international aquifers.

It has generally been assumed during the past two decades that there are 214 international river and lake basins in the world. This number originated from a report completed in 1976, but published in 1978, by the now defunct Centre for Natural Resources, Energy and Transport (CNRET) of the Department of Economic and Social Affairs of the United Nations. This number itself was an upward revision of an earlier (1958) estimate of 166 international river and lake basins by CNRET.

While the CNRET study was a useful contribution in 1976, its shortcomings are clearly evident more than two decades later. The study defined a river basin

Table 1. Distribution of international river and lake basins by continent

Continent	Number
Africa	57
Asia	40
Europe	48
North and Central America	33
South America	36
Total	214

Source: CNRET (1978).

as an "area within which waters of natural origin (rain, groundwater flow, melting of snow and ice) feed a given river". It considered only those international river basins which were 'separate' (that is, not tributary basins), and were connected "directly with the final recipient of the water (oceans, closed island seas and lakes)".

The distribution of international river and lake basins by continents, according to the CNRET study, was as given in Table 1.

The study further indicated that nearly 47% of the area of the world (excluding Antarctica) falls within international basins. It ranged from a high of nearly 60% of the area in Africa and South America to a low of about 40% in North and Central America. Viewed in a different fashion, the report indicated that there are 44 countries where at least 80% of the total areas are within international basins. Of these 44 countries, 20 are in Africa, 7 in Asia, 13 in Europe and 4 in Latin America.

The CNRET study can at best be considered to be a preliminary assessment of the magnitude of the problem, which incidentally was also the intention of its originators. It suffered from some serious methodological shortcomings, and was based exclusively on maps available at the United Nations Map Library. It was exclusively a desk study with maps, some of which were of the scale of 1:15 000 000, or even less.

Unfortunately the results of the CNRET study have been repeated often in the past without any technical scrutiny. Not surprisingly, these figures are now accepted as facts. This uncritical acceptance of the written word is all the more difficult to justify when one considers the fact that during the intervening two decades many countries such as the Soviet Union, Czechoslovakia and Yugoslavia have been split up into new countries, thus creating new international river and lake basins.

In retrospect, the uncritical acceptance of the number of international river and lake basins has had at least one unfortunate side-effect. Since the number is unquestionably an underestimate, it has given the erroneous impression that the overall magnitude and extent of the problem is much less serious than it is at present, and is likely to become in the foreseeable future. This issue has now been finally resolved by the work of Wolf *at al.* in this issue.

This underestimation has been further compounded by the fact that international organizations such as the various United Nations Agencies, World Bank and the Regional Development Banks have for the most part shied away from the issue of the management of international basins, except for consideration of

non-controversial and non-threatening issues like expert group meetings, which in reality often achieve very little. These organizations have progressively become more and more risk-averse, an issue that will be discussed in the next section. The two factors mentioned, to a significant extent, can explain why the issue of the management of international waters has not been as high up the international political agenda during the past two decades as it should have been.

Role Played by International Organizations

During the past two decades, international organizations have played a very limited role in terms of facilitating agreements on international river basins. Unquestionably the most noteworthy and successful case where an international organization has played a critical role as a catalyst to get the co-basin countries to agree to a treaty was for the Indus River Basin between India and Pakistan. Eugene Black, the then President of the World Bank, clearly and unambiguously indicated to the leaders of India and Pakistan, at the highest political levels, his own personal interest in resolving the conflict over the Indus Basin amicably and speedily. He not only made the resources of the Bank available to both the countries in terms of mediation, but also kept himself fully briefed on progress during the almost decade-long negotiation. When there was an impasse, he was not afraid to play a critical role in assisting the countries to overcome it. The Bank played the role of an 'honest broker' properly and impartially. The 'carrot' that the Bank extended in terms of offering to finance new development projects, subject to a mutually acceptable agreement between the two countries on the sharing of the waters of the Indus River system, proved to be a very attractive incentive for both parties. The Indus Treaty was formally signed by India and Pakistan on 19 September 1960 (Biswas, 1992).

It is interesting to note that even though the negotiations between the two countries took less than a decade, the subsequent agreement between the four provinces of Pakistan on the allocation of this water took an additional three and a half decades!

The entire negotiating process between the two countries was a remarkably short period for the successful completion of such a complex treaty. The Indus Treaty is indeed a major tribute to the astute and dynamic leadership of President Black, who not only accepted the risk of potential failure but also was prepared to get involved personally and had no hesitation in putting his own personal reputation on the line.

The most unfortunate aspect during the 1960–96 period has been the near total absence of the courageous and prudent leadership shown by Black, either by the World Bank or any other international organization. In 1976, another World Bank President, Robert McNamara, did discuss the issue of the sharing of the Ganges waters between India and Pakistan, but no progress was made, for many reasons, among which were:

- It was the technical professionals at the World Bank who were interested in the resolution of the problem. By the mid-1970s the Ganges issue had already been highly politicized in the countries concerned. The Bank career professionals had very little, if any, access to the highest levels of political decision making, especially in India. Without such high-level access, it was simply

impossible to find a solution that would have been politically acceptable to all the countries concerned.

- In contrast to the 'honest broker' role played by the Bank for the Indus River Treaty, it was no secret that the Bank's own idea for a Ganges solution was closer to the one advocated by Bangladesh. Not surprisingly, India distrusted that the Bank could play an impartial role in any mediating process, and thus it summarily rejected the overtures of the Bank.

In addition to all the above factors, it has to be admitted that the Bank's credibility and overall impact on developing countries were significantly higher in the 1950s as compared with the 1970s and later.

Two other international organizations have attempted to play a role in managing international rivers: the United Nations Environment Programme (UNEP) on the Zambesi River, and United Nations Development Programme (UNDP) on the Mekong River.

The first is the Zambesi Basin, which covers eight countries: Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. UNEP convened a Conference of Plenipotentiaries on the Environmental Management of the Common Zambesi River system in Harare, Zimbabwe, in May 1987. The primary objective of the conference was to approve the draft Zambesi Action Plan (ZACPLAN), which was prepared by UNEP in close consultation with most of the countries concerned. The plenipotentiaries of five co-basin countries (Botswana, Mozambique, Tanzania, Zambia and Zimbabwe) did sign an 'International Agreement on the Action Plan for the Environmentally Sound Management of the Common Zambesi River System' (David, 1988; Nakayama, 1997). While initially considered to be a success for UNEP, real progress in terms of its implementation of the plan in over more than a decade has been minuscule.

The second is the role played by UNDP in facilitating the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, which was signed in 1995 by the four lower co-basin countries mentioned earlier. It is too early to make any judgement on the impact of this agreement. However, the fact remains that UNDP had played "the roles of godfather, referee, rich uncle and fund-raiser to the Mekong Committee" (Miller, 1996), which had already spent hundreds of million of dollars. The disappearance of the Interim Mekong Committee, which appeared to be a distinct possibility in 1992, would have been a serious moral blow to UNDP, since all these investments would have been lost. UNDP subsequently played a very constructive role, which led to an agreement being signed on the Lower Mekong by Cambodia, Lao PDR, Thailand and Vietnam. China, the most powerful country in the region, and the most upstream on the river, was not a signatory to the agreement. It is also not a member of the new Mekong River Commission. This is likely to be a major constraint in the future for any basin-wide integrated development.

While the agreement on the Lower Mekong is a step in the right direction, it is unlikely to contribute significantly to the sustainable development of the Mekong River Basin for at least the following two reasons. First, water requirements for all uses in China are increasing rapidly, and thus it needs to develop its water resources as much as possible, and as quickly as possible. Currently, several provinces of China have plans to develop the water resources of the Upper Mekong. China has steadfastly refused to join the earlier Interim Mekong

Committee or the present Commission. Also, the fact that China was one of only three countries which voted on 21 May 1997 against the resolution to establish an International Convention on the Law of the Non-Navigational Uses of International Watercourses at the United Nations may have some negative implications for future developments in the Mekong.

Second, the most difficult part of any international agreement in the developing world is the actual water allocation between the various co-basin countries. The Mekong Agreement does not include any specific allocation of water between the countries. It contains terminology such as 'reasonable and equitable utilization', and 'prevention and cessation of harmful effects', on which even independent, objective experts may not agree, let alone countries with a vested interest. The potential for conflicts between the countries on this issue in the future is therefore very high. Thus, overall, no matter what criteria are used for analysis, international organizations have played a very marginal role in resolving conflicts on international rivers and lakes in recent decades. Given real leadership in the major international institutions, they could have played a significantly more effective role in this area during the past three and a half decades. Regrettably there are no signs that this situation is changing for the better.

Resolution Process of Locational Water Conflicts

Since water does not respect political boundaries, and it is mobile, countries on an international river could use its resources as it moves sequentially from upstream to downstream. When a river forms a boundary between two countries, it is a mobile resource and two political units which would have simultaneous authority over it could contribute to the generation of several types of transboundary water conflicts.

Because of potential conflicts between co-basin countries on international rivers and lakes, historically many nations have negotiated mutually acceptable agreements as to how such water bodies can be used. Over 3600 treaties can be noted on international water bodies between 800 AD and 1985, the majority of which deal with navigation, which was the primary form of transportation during earlier times. Especially after the Second World War, many treaties were negotiated on international water bodies, which dealt with non-navigational uses like flood control, hydropower development, water quality management and water allocation. It should be noted that generally it has been easier to negotiate treaties on the navigable uses of rivers, since these do not require water allocation or use considerations. Historically, it has been most difficult to get the countries to agree on the actual allocation of water quantities between the appropriate co-basins.

The first important study on the legal aspects of using the waters of the international rivers was carried out by Prof. H.A. Smith of London. His book on *The Economic Use of International Rivers* was published in 1931. He reviewed more than 100 treaties and studied several conflicts on the use of international rivers. He emphasized the doctrine of riparian rights, which entitled the lower riparian states to a share of the natural flow of a river. He also noted that some of the treaties considered the concept of equitable utilization.

In 1956, the International Law Association (ILA) published the Dubrovnik rules for international rivers, in 1959, Bolivia introduced a resolution in the

United Nations General Assembly which requested the Secretary General to prepare a report on laws related to international rivers. This resolution was passed. However, what led Bolivia to propose this resolution is unknown at present.

In 1966, ILA adopted the so-called 'Helsinki Rules' for international watercourses. In 1970, Finland introduced a resolution in the UN General Assembly on the laws for international watercourses, which suggested that the Helsinki Rules should be considered as a model.

During the ensuing discussions, three reservations regarding the Helsinki Rules surfaced. These were the following:

- The rules were formulated by a professional organization, which did not represent nation-states.
- Since nation-states had not participated in the formulation of the Helsinki Rules, their adoption as a model could precede new considerations of this complex issue.
- The rules were based on a drainage basin approach, which could be a potential threat to national sovereignty.

An analysis of the ensuing discussion indicates that the most important reservation centred on the use of the drainage basin concept. Belgium, Brazil, China and France argued that such an approach would be a radical departure from the traditional channel-based international law. In contrast, Finland and The Netherlands felt that the drainage basin framework was the most rational and scientific approach. Certain other countries opined that the problem of international river basins was so diverse that codification may be not possible.

The resolution to refer to the Helsinki Rules was lost. However, a similar resolution was passed with only one negative vote (Brazil), after the reference to the Helsinki Rules was deleted. This resolution recommended that the International Law Commission (ILC) should "take up the study of the law of the non-navigable uses of international watercourses with a view to progressive development and codification".

In 1974, the ILC sent out a questionnaire to all the members of the General Assembly soliciting their view on nine key questions. The responses, however, were not encouraging. By 1975, only 21 of the 147 UN members had bothered to reply. Four additional countries replied by 1978, one by 1979, four by 1980 and two by 1982. Not surprisingly, on the critical issue of the appropriateness of the drainage basin concept, the countries were sharply divided. Approximately half the countries supported the concept (Argentina, Finland and The Netherlands) and the other half were either strongly negative (Austria, Brazil and Spain) or ambivalent. Because of such sharp differences, the ILC decided to begin with the formulation of general principles, and then determine the scope of the term 'international watercourses' later. The scope of this term was finally addressed in 1991, when the ILC produced a draft report on the law of the non-navigational uses of international watercourses.

Considerable discussion took place during the 1991-97 period on the ILC draft. Finally, on 8 July 1997, the UN General Assembly approved the resolution on non-navigational uses of international watercourses. It is interesting to review the voting pattern on this resolution, especially in terms of existing disputes on international basins (Biswas, 1997).

- *In favour*: Bangladesh, Brazil, Cambodia, Jordan, Lao PDR, Nepal, South Africa, Sudan, Syria, Thailand, Vietnam;
- *Against*: Burundi, China and Turkey;
- *Abstaining*: Argentina, Egypt, Ethiopia, India, Israel, Pakistan, and France.

The General Assembly resolution adopted the 'Convention on the Law of the Non-Navigational Uses of International Watercourses', and it is now open for signature by the states. Since some 106 countries voted for the Convention, it is highly likely to be ratified in the foreseeable future.

Future

Now that a convention on non-navigational uses of international watercourses is likely to be a reality within the next 2–3 years, a major issue is what its potential impact is likely to be in terms of resolving existing and future disputes. In all probability it will have very marginal impact on the resolution of conflicts, for the following reasons.

First, not all countries that are currently parties to disputes on international watercourses are likely to sign the convention. For example, let us consider some of the current conflicts and the voting patterns of the countries concerned on the proposed convention in the United Nations General Assembly.

- *Euphrates–Tigris*: Syria in favour, Turkey against, and Iraq not involved;
- *Ganges*: Bangladesh and Nepal in favour, but India abstained;
- *Jordan*: Jordan in favour but Israel abstained;
- *Mekong*: Cambodia, Lao PDR, Thailand and Vietnam in favour, but China against;
- *Nile*: Sudan in favour; Egypt and Ethiopia abstained and Burundi against;
- *Plata*: Brazil in favour but Argentina abstained.

This probably means that, if and when the convention is ratified, there would be parties to specific conflicts who are unlikely to be signatories. As past experience with the nuclear non-proliferation treaty has shown, moral pressures are likely to be of little value in the face of strong, entrenched, vested national interests. Experience with this new convention, in all probability, is unlikely to be any different.

Second, while the 1997 convention could be considered to be an important benchmark, its two basic principles are similar to what had generally been accepted much earlier: equitable and reasonable utilization, and obligation not to cause appreciable harm. Thus, the proposed convention did not break any new ground, at least conceptually.

One of the main problems with the proposed convention is that it is full of vague, broad and general terms (Waterbury, 1997), which can be defined, and in certain cases quantified, in a variety of different ways. Accordingly, expert advice can easily be 'tailored' to legitimize each country's political views and demands. Technical analyses can be produced to justify and support appropriate national positions. Such occurrences, however, are not new; they have happened in the past and will no doubt continue to occur in the future. Furthermore, the convention does not give any practical guidance to the negotiators and no operational assistance to the technical experts. It simply outlines a very broad, general framework, within which everything is considered to be relevant and

important. It is likely to contribute to the generation of significant differences of opinion among the negotiators and technical experts as to how such general articles should be interpreted in operational terms.

One can argue that the convention outlines certain factors which could determine one of the fundamental principles, that of 'equitable and reasonable use'. According to the convention, such a process should take "into account all relevant factors, and circumstances", including:

- geographic, hydrographic, climatic, ecological and other factors of a natural character;
- social and economic needs of co-basin countries;
- the effect of the uses of the watercourse on other co-basin states;
- existing and potential uses of the watercourse;
- conservation, protection, development and economy of use of the watercourse resources and the cost of the measures taken to that effect;
- availability of alternatives, of corresponding value, to a particular planned or existing use.

None of the above factors can be defined uniquely or precisely since they are general and broad in character. Accordingly, when all the factors are integrated to define 'equitable and reasonable use', the countries in conflict would find it a very difficult task to arrive at a mutually acceptable estimate. The estimates are likely to differ significantly, even when groups of truly independent and objective experts make such attempts separately.

Third, the prevailing national political sentiments in each negotiating riparian country, as well as the incentives to negotiate in good faith, are likely to be important factors in the resolution of all such conflicts. In addition, as the number of riparians increase to four or more in any international basin, the importance and relevance of any proposed settlement could range from exceedingly important from one country to total indifference or even downright hostility from another. For a basin such as the Nile, which has ten riparians, the incentives for all the countries to arrive at any specific settlement are likely to vary from very high to of no discernible interest. Equally, the types of settlements preferred by the different countries are likely to vary very significantly. The new convention can at best be of limited help in such cases.

Finally, ratification of the Convention is an important requirement. The Convention can enter into force on the "ninetieth day following the date of deposit of the thirty-fifth instrument of ratification, acceptance, approval or accession with the Secretary-General of the United Nations". The Convention is open for signature until 20 May 2000.

Nearly two years after the approval of the Convention by the General Assembly, only four states (Finland, Norway, South Africa and the Syrian Arab Republic) have ratified it so far. Whether another 31 states will ratify it in approximately one year is an open question at present. Accordingly, the potential impacts of the Convention on the resolution of disputes on international rivers and lakes cannot be surmised at present.

The above considerations and other related factors mean that agreements in individual international basins will continue to occur only through protracted negotiations between the riparian concerned. The convention, even when it is ratified is unlikely to speed up the time needed to reach mutually acceptable agreements in the vast majority of disputes on international river basins.

Conclusion

As the 21st century dawns, it is becoming evident that, like oil some two decades ago, the era when water could be considered to be a cheap and plentiful resource is now virtually over. Increasing water demands, limited availability of this resource and higher levels of contamination mean that the water management profession will face a problem, the magnitude and complexity of which no earlier generation has had to face. In the run-up to the 21st century, the water profession really has two fundamental choices: to carry on as before with only incremental changes and a 'business as usual' attitude and thus endow our future generations with a legacy of inefficient water management practices and potentially serious conflicts on international water bodies; or to continue in earnest in an accelerated effort to plan, manage and use international water-courses sustainable and fairly.

The root for the English word *rival* is from the Latin term *rivalis*, which originally meant using the same river (*rivus*). But as the world becomes increasingly interconnected, countries sharing the same river should no longer consider each other as rivals. With properly conceived frameworks, management and use of international water bodies should result in 'win-win' situation for all the parties concerned. Contrary to popular belief, these are not zero-sum games.

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