2. SHARED NATURAL RESOURCES: FUTURE CONFLICTS OR PEACEFUL DEVELOPMENT?

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Introduction

Ever since the time of Aristotle, people have expressed concern on whether enough natural resources will be available for human consumption for the future generations. With a steadily increasing population and our quest for a better standard of living for all the world's citizens, there is no doubt that the demand for natural resources to sustain and improve the present momentum for development has increased as well. This, in turn, has put increasing pressure on our biosphere, which means that better management of our natural resources than is being practised at present — both nationally and internationally — is an urgent necessity, if we are to improve the living standards of a significant percentage of the human race which is living in abject poverty at present and at the same time maintain our environment on which the sustainability of the development process depends. It is a complex task and a daunting challenge that is not going to be resolved either easily or quickly.

Difficult though it is going to be to institute rational and efficient management of natural resources that are contained totally within the geographical boundaries of individual sovereign States, the problem is likely to be even more serious and complex when the management and development processes of natural resources shared by two or more nations are considered. The problems of shared natural resources can be divided into four basic categories. First is the directly identifiable natural resources which are shared by two or more States. Typical examples are water bodies — rivers, lakes or aquifers — and forests that are shared by at least two States. The second type of problem arises when activities carried out in using natural resources in one country (even though when the natural resources are wholly contained within that country and the specific resources in question cannot be considered *prima facie* to be shared

natural resources) have adverse impacts on other countries. Typical examples are the following: use of fossil fuels in one country without adequate environmental control systems to reduce sulphur emissions which result in acid precipitation in other countries; or deforestation and overgrazing in the upper catchment area of a river in one country that contributes to destabilization of the watershed and results in increased flooding and accelerated erosion in the downstream reaches of that river in other countries. The third type of problem arises from the management of global commons, i.e., use of oceans, space or radio frequency, in which all nations are interested, and which are in the international sphere. The fourth are geographical areas over which no one country or group of countries has overall jurisdiction, i.e., Antarctica.

Management of Shared Natural Resources: Present Status

While it is true that the management of shared natural resources has not received the attention it deserves thus far, there have been some discussions of the problem in various international fora from time to time. The progress achieved so far, however, has been very limited and painfully slow (Biswas, 1982).

The General Assembly of the United Nations, in its Resolution No. 1401 (XIV) of 21 November 1959, recommended that preliminary studies should be carried out on the problems associated with the development and use of international rivers in order to determine whether the subject can be codified. More than a decade later, in Resolution No. 2669 (XXV) of 8 December 1970, the United Nations General Assembly further observed on the need for development and codification of international law on shared water resources as follows:

> "despite the great number of bilateral treaties and other regional regulations, as well as the Barcelona Convention of 1921 on the Régime of Navigable Waterways of International Concern and the Convention relating to the Development of Hydraulic Power affecting more than one State signed at Geneva in 1923, the use of international rivers and lakes is still based in part on general principles and rules of customary law".

The United Nations Conference on the Human Environment, held at Stockholm in 1972, did discuss some aspects of management

of shared natural resources. Principles 21 and 22 of the Declaration of that Conference deal with this issue. According to Principle 21:

> "States have . . . the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within the jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction." (United Nations, 1972.)

Similarly, according to Principle 22:

> "States shall co-operate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction." (United Nations, 1973.)

Five years later, in March 1977, the United Nations Water Conference held at Mar del Plata, Argentina, urged that:

> "In relation to the use, management and development of shared water resources, national policies should take into consideration the right of each State sharing the resources to equitably utilize such resources as the means to promote the bonds of solidarity and co-operation." (Biswas, 1978.)

A few months later, in September 1977, the United Nations Conference on Desertification, held at Nairobi, Kenya, in Recommendation 26 under International Co-operation stated:

> "Experience has shown that processes of desertification at times transcend national boundaries, making efficient regional co-operation essential in the management of shared resources, with the objective of preventing ecological imbalance which can cause desertification.
>
> In order to achieve judicious management and equitable sharing of resources on the basis of equality, sovereignty and territorial integrity, it is recommended that countries concerned should co-operate in the sound and judicious management of shared water resources as a means of combating desertification effectively." (United Nations, 1978.)

The Desertification Conference reaffirmed the recommendation of the United Nations Water Conference that "in the absence of bilateral or multilateral agreements, member States should continue to apply generally accepted principles of international law in the use, development and management of shared water resources" (United Nations, 1978).

In spite of the above-mentioned declarations and resolutions, there has been very little progress on developing principles for the guidance of States in the management and harmonious exploitation of shared natural resources. To some extent the lack of progress should not have been unexpected, especially if one reviewed what actually happened at both the Stockholm and Mar del Plata Conferences. The Stockholm recommendations on the destruction of tropical forests were insipid, primarily because certain countries — notably Brazil — strongly asserted that the use of forests, like other natural resources, was a matter of national decision-making only. Accordingly, deforestation recommendations finally approved were diluted and somewhat insipid: basically amounting to exhortations for further studies, surveys and data collection (Biswas and Biswas, 1982). The situation was somewhat different at the Mar del Plata Conference, where shared natural resources were implicitly considered to be a sensitive issue, and the discussions on this topic were very limited. As the Secretary-General of the Water Conference has noted in a retrospective analysis,

> ". . . two other documents would have proved most useful in placing, more forcefully, before the Conference the questions of financial arrangements and shared water resources. It was felt that both these areas were not tackled satisfactorily at the Conference." (Mageed, 1982.)

In addition to the afore-mentioned developments, the United Nations Assembly adopted Resolution 3129 (XXVIII) on 13 December 1973, which stated:

> "*Considers* that it is necessary to ensure effective co-operation between countries through the establishment of adequate international standards for the conservation and harmonious exploitation of natural resources common to two or more States in the context of the normal relations existing between them;

> *Considers further* that co-operation between countries sharing such natural resources and interested in their exploitation must be developed on the basis of a system of information and prior consultation within the framework of the normal relations existing between them."

The General Assembly then requested the Governing Council of the United Nations Environment Programme (UNEP) to "report on measures adopted for their implementation".

The principles referred to above in the General Assembly resolution were also endorsed at the Fourth Conference of Heads of State or Governments of Non-Aligned Countries at Algiers (5-9 September 1973) and later reconfirmed by Article 3 of the Chapter on Economic Rights and Duties of States as contained in the General Assembly Resolution 3281 (XXIX).

In response to the General Assembly resolution, UNEP established an Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States, with the objective of preparing draft principles for the guidance of States. The Group worked from 1976 to 1978, and formulated 15 principles. These "Draft Principles of Conduct" were formally approved by the Governing Council of UNEP on 24 May 1978, during its Sixth Session. The Governing Council authorized the Executive Director of UNEP to transmit the report to the General Assembly and invited "the Assembly to adopt the draft principles". The issue was considered by the United Nations General Assembly in December 1978, but by then the situation had changed somewhat. The General Assembly resolution did not "approve" the draft principles as the UNEP Governing Council had invited it to do, rather it merely took "note" of the report and asked the United Nations Secretary-General "to transmit the report to Governments for their study and comments" and then to report back to the General Assembly the following year. Thirty-four governments expressed their views, out of which 28 governments were in favour of adoption of the principles. The strongest criticisms came from Brazil ("give excuse for interference in environmental policies of sovereign States by outsiders"), Ethiopia ("vague, ambiguous, too general, incomplete and impractical") and Japan ("doubts whether UNEP or the United Nations is the proper forum for dealing with this topic"). The United Nations Secretary-General suggested that the principles be adopted, but the

General Assembly in 1979 decided again only to "take note" of the principles: it did not approve them.

In May 1982, the Governing Council of UNEP authorized its Executive Director to submit his report on co-operation in the field of environment concerning natural resources shared by two or more States to the General Assembly at its 37th session. It recommended to the General Assembly that terms of the earlier Assembly resolution should be reiterated, "including its requests to all States to use the principles on the conservation and harmonious utilization of natural resources shared by two or more States as guidelines and recommendations in the formulation of bilateral and multilateral agreements regarding such resources". It further recommended that the General Assembly should request a further progress report in 1985 from the UNEP Governing Council on the implementation of its earlier resolution.

Undoubtedly one of the major hurdles on the management of shared natural resources and that of global commons has been the question of national sovereignty, and the issue of national self-interest against international morality. The problem was clearly outlined by Dr. Soedjatmoko (1982), Rector of the United Nations University, who aptly observed at the Session of Special Character of the Governing Council of UNEP that commemorated the 10th Anniversary of the Stockholm Conference:

> "If individual nations continue to overload the atmosphere with carbon dioxide, overfish the seas, or recklessly destroy tropical rain forests – with little heed to the larger international interests – it will only be a matter of time until these commons suffer irreversible damage."

Dr. Soedjatmoko (1982) went on to say that given

> "the reluctance that so many governments have displayed to date in establishing legal measures to enforce environmental practices, it may be that we have no other choice but to start at the international level first in establishing standards and agreements – in anticipation that national governments would then eventually follow suit. I say this in no derogation of the sovereign rights of nation-States. It is rather in recognition of the fact that there are certain pressing environmental problems that are too global in their implications and potentially capable

> of too disastrous an impingement on the lives of all humanity to be left untended."

It is evident that real progress since 1972 on developing principles and processes for shared natural resources management has been scanty: there has not been even an agreement on the definition for shared natural resources! This, however, does not mean the urgency of managing shared natural resources has become any less since 1972: the situation – if anything – has become even more serious. To quote Dr. Soedjatmoko (1982) again:

> "to put them aside – in favour of the more immediate or the more solvable – would only mean that they would still be there, grown larger, more cancerous, and less likely of solution, during the lives of our children".

Management of Shared Water Resources

The magnitude of the problems associated with shared natural resources management, and the potential for future conflicts can be realized by considering one resource alone – water. Water is an essential component for solving two major crises immediately facing mankind – food and energy. An essential prerequisite for further increase in food production, both for higher yield and horizontal expansion of agriculture, in developing countries is availability and control of water for irrigation. This is clearly indicated by the fact that currently some 80 per cent of all water used in the world is for agricultural purposes (Biswas, 1979). Without better water control, it is highly unlikely that the *per capita* food production on a global basis can even be maintained at the present level, let alone improve the existing inadequate status, because of the continual increase in the world population.

Similarly, water is an essential ingredient for energy production, especially in terms of large-scale electricity generation. Ever since the oil prices started to increase significantly from October 1973, there has been increasing interest in most countries to develop indigenous energy resources to alleviate balance of payment problems and to ensure a reliable supply on a long-term basis. This has meant increasing interest in hydroelectric energy, especially in many developing countries where significant potential currently exists for such developments. The annual hydroelectric potentials of different

regions are shown in Table 1, which clearly indicates that much development is likely in developing countries of Africa, Asia and Latin America. Furthermore, it should be noted that a large quantity of water is equally essential to dissipate heat, even if electricity is generated by fossil fuel or nuclear power plants.

Since water is not consumed during either hydroelectric power generation or for cooling requirements in fossil fuel or nuclear power plants, the same water can be used for irrigation purposes. In other words, water uses for irrigation and electricity generation purposes are compatible.

Thus, water requirements for developing countries are likely to increase significantly due to further industrial development and also due to both increasing *per capita* requirements and population. When all these water uses are considered collectively – agricultural, industrial, energy and municipal – it is evident that the demands for water in developing countries are bound to increase significantly.

As water demands increase, the pressure to develop available water resources will undoubtedly increase as well. This will result in the development of those water bodies that are easier to develop – technically, economically and politically. As these projects become fully developed, there will be increasing need and pressure to develop difficult and complex sites. Some countries have already reached this position.

TABLE 1. ANNUAL HYDROELECTRIC POTENTIALS OF DIFFERENT REGIONS

Regions	Theoretical potential 10^{12} KWh	Technical usable potential 10^{12} KWh	Operating potential 10^{12} KWh	Potential under construction 10^{12} KWh	Planned potential 10^{12} KWh
Africa	10.118	3.14	0.151	0.047	0.201
America (North)	6.15	3.12	1.129	0.303	0.342
America (Latin)	5.67	3.78	0.299	0.355	0.809
Asia (excluding USSR)	16.486	5.34	0.465	0.080	0.368
Oceania	1.5	0.39	0.059	0.020	0.032
Europe	4.36	1.43	0.842	0.094	0.197
USSR	3.94	2.19	0.265	0.191	0.17 (estimated)
Total	44.28	19.39	3.207	1.090	2.12

One of the results of this situation is undoubtedly going to be the need for developing water resources shared by two or more countries, which have not been developed thus far because of their inherent political and legal complexities. Since water follows laws of nature and not of Man, it has no regard for the world's political or administrative boundaries. Nor does water consider the economic needs of regions through which it passes. Hence, what is necessary for the management of international water bodies is to develop appropriate linkages between laws of nature and laws of Man, and between availability of water in nature and demands of Man to ensure that these two sets of requirements are compatible. As the late historian Arnold Toynbee once observed: "Life and law must be kept closely in touch, as you cannot adjust life to law, you must adjust law to life. The only point in having law is to make life work. Otherwise there will be explosion." Herein lies one of the most fundamental principles for the management of shared water resources: neither lawyers nor technicians nor politicians can alone resolve the problem on an optimal basis. The essentiality of multi-disciplinary approach to the solution of shared water resources problems, which often extend far beyond the physical boundaries of the basins concerned, has to be clearly recognized, accepted and acted upon.

As the demand for water increases, unilateral exploitation of shared water by one country -- be it construction of a dam to provide an additional quantity of water for further agricultural and economic development or discharge of wastes into a river that will reduce the potential downstream uses of water -- without appropriate agreements with other countries sharing that water, is likely to become a fertile area for major future conflicts between the nations concerned. This would not be an entirely new development in the international arena: such conflicts between nations have occurred in the past, exist at present and there is absolutely no reason to doubt that they will not occur in the future. In all probability the number of these types of conflicts is likely to multiply manifold in the future. The rivalry, distrust and ill-feeling between neighbouring countries, lack of well-established institutional infrastructures and internationally accepted legal mechanisms for negotiating international agreements, existing political climate, presence and strengths of various special interest groups within countries, lack of adequate technical expertise and financial resources, and

differing priorities placed on the identical water development by the nations sharing the common water resources are likely to contribute to delays and frustrations in developing shared water systems. A review of the past conflicts can only reinforce this contention. For example, the seeds of dispute between India and Pakistan over the use of the water of the Indus River and its tributaries began to germinate as early as 1920, even when both were part of one nation. The issue later became an international dispute, and thus more complex, when India and Pakistan became separate nations in 1947, and the Indus River and its tributaries were shared by both the countries. The Indus River treaty was eventually signed in 1960. Similarly planning and negotiation between the United States and Canada over the Columbia River took 20 years, even though both had friendly relations and shared similar economic, political, cultural, social and religious conditions. All available evidence points to long gestation periods for resolution of international river development agreements: such delays are norms rather than exceptions. Thus, if a nation is hard-pressed for additional water, and feels that the co-basin country or countries involved are not negotiating in good faith, the potential for conflicts increases significantly. In addition, as the number of co-basin countries involved in disputes increases, it becomes progressively more difficult, frustrating and time-consuming to reach agreements that are acceptable to all parties and at the same time optimal in terms of the use of the available water (Biswas, 1983).

Magnitude of Shared Water Resources Problem

The magnitude, extent and importance of the problems associated with the development and management of shared water resources on a global basis have, unfortunately, not been widely recognized thus far. Currently there are not many engineers, economists, political scientists and lawyers who have specialized in the management of international water bodies. Even those that have specialized, a majority of them have tended to be immersed in the problem of specific basins. Consequently, the broader global picture has not been generally recognized.

The global magnitude of the problem can be best indicated by the fact that nearly 47 per cent of the area of the world (excluding Antarctica) falls within shared rivers and lake basins, ranging from

TABLE 2. COUNTRIES WHERE AT LEAST 80 PER CENT OF TOTAL AREAS FALL WITHIN INTERNATIONAL BASINS

Countries	Total Area ($10^3 km^2$)	Area Within International Basin ($10^3 km^2$)	Percentage of Country Within International Basins
Africa			
Benin	112.6	104.8	93
Burundi	27.8	27.8	100
Central African Republic	622.9	623.0	100
Congo	342.0	283.5	83
Equatorial Guinea	28.1	28.1	100
Ethiopia	1,221.9	972.1	80
Gabon	267.7	229.7	86
Gambia	10.3	9.5	91
Guinea	245.6	198.2	81
Lesotho	30.4	30.4	100
Malawi	118.5	113.5	96
Nigeria	923.8	805.0	87
Rwanda	26.4	26.4	100
Sudan	2,505.8	2,035.9	81
Swaziland	17.4	17.4	100
Uganda	236.0	236.0	100
Upper Volta	274.2	274.2	100
Zaire	2,345.4	2,339.8	99
Zambia	752.6	752.6	100
Zimbabwe	390.6	389.4	100
Asia			
Afghanistan	647.5	587.0	91
Bangladesh	142.8	123.3	86
Bhutan	47.0	47.0	100
Iraq	434.9	362.5	83
Kampuchea	181.0	158.0	87
Laos	236.8	222.9	94
Nepal	140.8	140.8	100
Europe			
Andorra	465.0	465.0	100
Austria	83.9	83.9	100
Belgium	30.5	29.3	96
Bulgaria	110.9	88.0	80
Czechoslovakia	127.9	127.9	100
G.D.R.	108.27	100.3	93
Hungary	93.0	93.0	100
Liechtenstein	157.0	157.0	100
Luxembourg	2.6	2.6	100
Poland	312.7	298.6	95
Romania	237.5	233.0	98
Switzerland	41.3	41.3	98
Yugoslavia	255.8	211.9	83
Latin America			
Bolivia	1,098.6	1,018.2	93
Paraguay	406.8	406.8	100
Uruguay	177.6	172.3	97
Venezuela	912.0	734.2	80

a high of nearly 60 per cent of the area in Africa and South America to a low of about 40 per cent in North and Central America. Expressed in a different fashion, there are 44 countries where at least 80 per cent of the total area lies within international basins. Of these 44 countries, 20 are in Africa, 7 in Asia, 13 in Europe and 4 in Latin America (Biswas, 1983). These countries, and their respective areas within international basins, are shown in Table 2 on the previous page.

There are at present 214 river and lake basins in the world that are shared by two or more countries. Their distribution by regions is shown in Table 3.

TABLE 3. NUMBER OF INTERNATIONAL RIVER AND LAKE BASINS

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

Of these 214 international basins, the vast majority -- 156 or 73 per cent -- are shared by two States. There are, however, nine river and lake basins that are shared by six or more nations. These are the following (arranged in a descending order by the number of countries involved in each basin):

Danube (12 countries – Romania, Yugoslavia, Hungary, Austria, Czechoslovakia, Federal Republic of Germany, Bulgaria, USSR, Switzerland, Italy, Poland, Albania)

Niger (10 countries – Mali, Nigeria, Niger, Algeria, Guinea, Cameroon, Upper Volta, Benin, Ivory Coast, Chad)

Nile (9 countries -- Sudan, Ethiopia, Egypt, Uganda, Tanzania, Kenya, Zaire, Rwanda, Burundi)

Zaire (9 countries – Zaire, Central African Republic, Angola, Congo, Zambia, Tanzania, Cameroon, Burundi, Rwanda)

Rhine	(8 countries – Federal Republic of Germany, Switzerland, France, Netherlands, Austria, Luxembourg, Belgium, Liechtenstein)
Zambezi	(8 countries – Zambia, Angola, Zimbabwe, Mozambique, Malawi, Botswana, Tanzania, Namibia)
Amazon	(7 countries – Brazil, Peru, Bolivia, Colombia, Ecuador, Venezuela, Guyana)
Lake Chad	(6 countries – Chad, Niger, Central African Republic, Nigeria, Sudan, Cameroon)
Mekong	(6 countries – Laos, Thailand, China, Kampuchea, Viet Nam, Burma)

It should be noted that the countries listed in the brackets are arranged in a descending order on the basis of the percentage share of the total basin area per country.

Resolution of Conflicts on Shared Water Resources

International conflicts on shared water resources generally stem from four important facts. These are:

(i) order of priority for various uses of water in the countries concerned;
(ii) apportionment of exact quantity of water that can be used by the co-basin countries;
(iii) activities of the upstream countries which have deleterious impacts on water quality, which in turn restricts water use in downstream countries; and
(iv) payment of compensation due to inundation in one country due to construction of a dam in another. This could involve two types of issue:

- direct compensation for damages due to flooding of the land and related resources as was the case for the 1959 Nile Waters Agreement between Egypt and Sudan over the construction of the Aswan High Dam, and
- sharing of benefits by the flooded downstream State from the water developments carried out in the upstream case. A typical example of this issue is the Canada-United States Treaty of 1961 over the Columbia River.

While it is not difficult to identify the reasons for conflicts over shared water resources, it is not easy to resolve them for various reasons. Only the major reasons will be discussed herein.

Firstly, water development projects are capital-intensive and permanent. Once the dams and the ancillary works are constructed the situation becomes irreversible. Thus, unlike international trade, where agreements can be for a stipulated period and then modified in the light of actual results to resolve unexpected problems, there is little flexibility in water development projects once they are completed, and the infrastructure is in place. Since it is not always easy to anticipate accurately the long-term implications of water development, countries like to be doubly confident of the reliability of the results of investigations and analyses before they agree to a treaty. This naturally increases the time required for settling such disputes. This is also one of the main reasons as to why it has been historically easier to negotiate inter-State water treaties where only navigation is concerned, in contrast to full-fledged water developments, especially where navigation requires limited development costs and since it does not consume any water.

Secondly, resolution of inter-State water conflicts has three major components – legal, technical and political – all of which are closely interrelated and are often inseparable. Past experiences indicate that it has been comparatively easier to reach agreements when only technical aspects were considered. Consideration of technical aspects alone, however, has not generally resulted in the full development of water bodies but rather been restricted to exchange of collected data and technical information.

Political considerations often play an important part in the resolution of inter-State water disputes. Thus, strategic military requirements was one of the considerations for the United States to agree to a treaty with Canada, which was economically unfavourable to itself, on the Columbia River (Krutilla, 1967). Similarly, one of the main reasons for the 1973 treaty between the United States and Mexico over controlling the salinity of the Colorado River, where the United States agreed to pay the full cost of the control programme, was the American desire to promote better relations with Mexico in particular, and Latin America in general. In contrast, the Netherlands, which is located at the downstream end of the Rhine River, agreed to pay France in 1972, 35 per cent of the costs of controlling salt discharge from the French potash

industry which was affecting Dutch water use. Similarly, it is also worth noting that Switzerland, which is at the upstream end of the Rhine, agreed to pay 5 per cent of the cost of controlling the French salt discharges, even though it would have no impact on the quality of Swiss water.

The above examples also indicate one of the essential requirements for successful resolution of conflicts over shared resources: existence of good relations between the parties concerned. Wherever there has been a history of good relations and good neighbourliness between the countries concerned, the conflict resolutions have been comparatively quicker and painless. In contrast, if the disputes between parties have become historically developed, with each party attempting to extract as much benefit as possible with a "beggar thy neighbour" attitude, and if there exists a long history of suspicion, mistrust and rivalries between the co-basin countries, the negotiations tend to become acrimonious and protracted and tend to produce suboptimal results.

The third major constraint in resolving inter-State conflicts is the lack of reliable and acceptable methodology for allocating both benefits and costs from the proposed water development projects. While it has been fashionable to recommend the concept of equitable utilization of water, no criteria have been put forward and internationally accepted as to what constitutes equitable distribution, the process by which it can be agreed to, and how it can be achieved. The lack of suitable methodologies for allocation of benefits and costs, including social and environmental costs, and the inherent difficulties for the participating countries to agree on the exchange rates between the various currencies, impacts of different rates of inflation in the co-basin countries on different components of the project, and the choice of price levels of materials (black market rates may have to be considered) and commodities, complicate the attempts for quick and harmonious resolution of the conflicts.

The fourth constraint stems from the fact that national water laws differ from one country to another. Since water is an essential ingredient for sustaining life, not surprisingly most major religions and cultures have historically developed their own legal régimes for water. Currently 11 systems of water law can be identified in different parts of the world – each with its own special characteristics. These are: Hindu-Bali, Moslem, Asian, British, French, Italian,

Soviet, Spanish, Israeli, United States and Latin American. Each of these systems generally exists not only in countries where they initially originated but also in those areas which came under the domination of the respective groups. This situation also indicates that water laws from one country cannot be duplicated indiscriminately in another, if the socio-cultural conditions are different. As a corollary, this also means it is often not possible to transfer directly successful experiences from one international drainage basin to another. This fact was recognized in the Exchange of Notes between the United Kingdom and Egypt on 7 May 1929 on the use of the Nile Waters for irrigation, which stipulated:

> "Precedents in this matter of water allocation are rare and practice varied . . . Moreover, there are in the present case special factors, historical, political and technical, which might render inappropriate too strict an application of principles adopted elsewhere." (*League of Nations Treaty Series,* 1929.)

The fifth problem is due to the fact that even though national water laws in many parts of the world are well-developed, concomitant progress has not occurred in international water laws. Several international water treaties have been in operation in the present century, but some of these specifically stipulate that the signings did not constitute establishment of a legal precedent or norm or principle of international law. Thus, Article V of the Treaty of Washington of 21 May 1906, between the United States and Mexico, on the irrigational use of the waters of the Rio Grande, stated:

> "The delivery of water by the USA is not a recognition by it of any Mexican damage claims, and that by the making of the treaty the United States does not concede the establishment of any general principles or precedents."

Similarly the Indus River Treaty of 19 September 1960 between India and Pakistan stated under Article XI:

> "Nothing in this treaty shall be construed by the Parties as in any way establishing any general principle of law or any precedent."

Thus, these treaties, while resolving specific inter-State water disputes, cannot serve as a basis for developing international legal norms (Chauhan, 1981).

Some of the treaties signed thus far did not contain any provision

for settlement of disputes, an omission that has hampered progress (United Nations, 1981). The International Law Association (ILA), however, approved some rules in 1966 at Helsinki, commonly known as the Helsinki Rules, which included "procedures for the prevention and settlement of disputes".

The Helsinki Rules undoubtedly constitute a major advance in international water law, and could provide a basis for the management of shared water resources, but there are many problems which have to be overcome before they can become an integral part of international law. Firstly, the ILA is not an official organization, and accordingly its resolution cannot be accepted as a part of international water law, unless they are approved in the form of a multilateral convention by the States. Without the full support of all governments, it is unlikely that the Helsinki Rules can have binding validity in international law.

Secondly, the Helsinki Rules do not resolve some of the most fundamental problems. For example, one of its key principles is "equitable utilization" which entitles countries concerned to have a "reasonable and equitable share in the beneficial uses of the waters of an international drainage basin" (Article IV, Chapter 2). While it is difficult to disagree with this overall philosophy, the real question is not whether this principle is acceptable, but rather what are the criteria by which "equitable distribution" and reasonable and equitable share" can be determined objectively so that the disputing nations will accept the figures.

Two other shortcomings of the Helsinki Rules are worth mentioning. Since the Rules were formulated before environmental considerations became a focus of major international attention, water quality aspects are not treated in a comprehensive fashion. Articles IX, X and XI do have water quality implications, but these need to be broadened and strengthened. Similarly, the Rules are not very helpful in resolution of disputes concerning international aquifers.

Concluding Remarks

During the past decade several long-standing conflicts have emerged over international water bodies. With increasing population and the need for economic development, pressures for further accelerated development of these water bodies will become even

more critical. For example, the Ganges Basin alone may have to support some 500 million people by the year 2000. With this type of pressure, the potential for conflicts between nations, in all probability, will increase dramatically.

There is an urgent need to identify existing and emerging conflicts, as well as to carry out comprehensive reviews of past disputes that have been resolved in order to determine the effectiveness of different treaties, types of problems, if any, being encountered by the various countries. From such studies, it may be possible to identify and develop processes and guidelines along which such potentially difficult problems can be resolved fairly and quickly before they become full-fledged conflicts. Management of shared natural resources, including global commons, carried out rationally and efficiently, will undoubtedly benefit mankind greatly, but if neglected or done improperly, it has the potential of becoming a major new arena for international conflict which can only prove to be detrimental to our future well-being.

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