Tel Aviv University

The Armand Hammer Fund for Economic
Cooperation in the Middle East

SOME EXAMPLES OF COOPERATION IN THE MANAGEMENT AND USE OF INTERNATIONAL WATER RESOURCES

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Deborah Housen-Couriel

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FOREWORD

The Arab-Israeli conflict has endured for over 40 years, and some say 100 years. To many who have studied the conflict and its evolution over time, it has become clear that a solution has to be found quickly for the sake of all parties. Global and local political changes have made an agreement on principles of peace seem imminent since the Madrid Conference in 1991. However, it is also clear that the resolution of crucial issues will ultimately determine the nature of peace in the region. Multilateral committees have been established to hammer out five issues that have been identified as critical. One of these five issues is water.

The water issue had already appeared on the modern map of the Middle East at the turn of the century. It affected the post-World War I borders of Palestine. Water continued to be a major item on the agendas of pre- and post-World War II international committees that were formed to solve internal crisis in Palestine. Provisions relating to water appeared in the 1949 armistice agreements between Israel and its Arab neighbors. Water disputes were responsible for most of the military activities along the Jordan basin in the 1950s and early 1960s.

The first attempt to settle these disputes with the aid of the fledgling international water laws was made by Mr. Johnston, a special envoy of President Eisenhower to the Middle East. While many characterized his four missions during the 1950s as failures, *de facto*, his suggestions for sharing the Jordan basin have been followed to this day. The 1967 war and the occupation of the West Bank and Gaza by Israel created another water front: the aquifers in this area and entitlement to utilization of their waters. The dispute deepened due to the widening gap between the quantity of water consumed *per capita* by the Israeli settlers in the West Bank and Gaza, and that consumed by the indigenous population.

The prevalence of water disputes, of water in abundance in one area while scarcity and shortage dominate a neighboring area, is not unique to the Middle East. However, in this region, due to both climate on one hand and economic and demographic growth -- primarily west of the Jordan River—on the other, water disputes have always been a sufficient cause for war.

The Hammer Fund began to research water issues and search for technologically feasible, economically viable, and politically acceptable solutions in its early days. The current study by Deborah Housen-Couriel, LL.M., contributes a new dimension to the studies on water. Investigating aspects that were not dealt with previously, it looks at the principles of the international water laws and the nature of water disputes settlements

throughout the world. The study thus places the Middle East water conflict within a more general framework. The message that this work conveys is clear cut: international law, coupled with good will and adequate economic resources, could play a role in solving the Middle East water conflict, thus removing what perhaps may be the greatest hurdle to peace in the region.

The Harry S Truman Research Institute of the Hebrew University of Jerusalem also, independently, identified the water issue as a major obstacle to genuine sustainable peace between Israel and its Arab neighbors. While each institute follows its own path on water-related research, the present study is a joint effort of the Truman Institute and the Hammer Fund to learn further about the options for settling the water disputes, present and future, using the framework of the international water law, and to educate the policy-makers on both sides.

I would like to thank Professor Haim Ben-Shahar, the Chairman of the Steering Committee, the Armand Hammer Fund and Professor Moshe Ma'oz, Director of the Truman Institute, for joining forces to publish this highly valuable study. The publication was made possible through the generosity of the Hammer Fund and Dr. Susan Gitelson, sponsor of the Truman Institute Peace Papers.

Professor Gideon Fishelson
Scientific Coordinator
The Armand Hammer Fund

INTRODUCTION

There is no longer any doubt that the development and management of the Middle East's water resources is one of the crucial issues which must be settled sooner, rather than later, by multilateral negotiations among the countries of the region. Notwithstanding the brief reprieve in the area's water crisis granted by bounteous precipitation during the winter of 1991-92, the Jordan River Basin has reached a critical point beyond which international cooperation is necessary to ensure the continued existence of usable water resources. The dire consequences of non-cooperation in the near future have been outlined elsewhere, and we shall not reiterate here the various scenarios proposed in this context.[1] Rather, our task is to focus on possible solutions to this basin's water problem.

Fortunately, since transboundary water resources are not exclusively a Middle Eastern phenomenon (they are, in fact, the global rule rather than the exception), many precedents exist for the peaceful resolution of similar water-sharing disputes. Much fruitful work has been accomplished by countries which have reached the critical point for shared water resources in the past, or which came to agreement on common development policy purely for the sake of efficiency and economic gain. Naturally, each water basin possesses unique characteristics which will determine the type of regime most suited to it; on the other hand, over the years certain methods and techniques of water management have proven to be effective across a wide range of variables and circumstances. The role of international law in the development of a successful regime for the common administration of international water resources is central. Although the relevant body of legal norms has not yet reached the level of maturity and sophistication which is perhaps desirable given the urgent nature of world water problems, important principles and rules have evolved.

International water law thus provides an important tool for the establishment of water management schemes, including mechanisms for the division of authority between states, conflict management, and compensation to a state for alternative uses of its water resources by other basin states. It is our underlying assumption that the elucidation of applicable legal norms has the potential for assuring reasonable and efficient resource management in the Jordan River Basin, and may also help to avoid serious conflict there in the future.

The following study is divided into three parts. It begins with a review of the legal issues which arise in the joint management and use of international water resources based on the concept of the international drainage basin. Part Two focuses on specific

examples of treaty regimes which are presently in force. It is by no means a comprehensive survey of the more than one hundred such arrangements which presently exist,[2] but rather provides a basis for further inquiry. We have chosen to analyze four such regimes in depth (the Columbia River Basin, the La Plata Basin, Lake Chad, and the Indus Basin) followed by a schematic survey of an additional eighteen. Part Three discusses some lessons garnered from this comparative study, on both the legal and administrative levels. Finally, the conclusion discusses some ramifications of the study for resolution of the water problems in the Jordan River Basin itself.

I am pleased to acknowledge the support for this research expressed by both the Armand Hammer Foundation and the Truman Institute. Additionally, members of the 1991-1992 Hebrew University faculty seminar on water problems provided helpful information and critique of this work throughout its writing. Errors and omissions are of course, my sole responsibility.

Deborah A. Housen-Couriel
Jerusalem, 1994

I. LEGAL ISSUES WHICH ARISE IN THE JOINT MANAGEMENT AND USE OF INTERNATIONAL WATER RESOURCES

A. *GENERAL*

Water resources, by their very nature, ignore the political boundaries which divide the globe into nation-states. This fact would not necessarily pose problems in a world of abundant and ever-renewable water supply: unfortunately, such is not our world. Increasingly, available water resources within national boundaries are being overutilized by burgeoning populations, irrevocably polluted by industries, badly managed by water commissions, and spoiled by salinization. Around the world, preservation of this precious resource and its development is fast becoming a high priority on national agendas, motivated by the realization that the only effective solution to water problems lies in transboundary cooperation and planning.

It is important to review several facts which characterize the world's water supply. The total volume of the earth's water is about 1.4 billion cubic kilometers.[3] 97.3 percent of this total volume is salt water—only 2.7 percent is fresh, and most of this (77.2 percent) is frozen into ice caps and glaciers. Of the remaining 22.8 percent of fresh water, 22.4 percent is to be found in underground aquifers. Only 0.36 percent is readily available for human use in lakes and rivers: the rest is present in gaseous form in the earth's atmosphere.[4] Thus, the types of water which make up the hydrological cycle are several: seawater, ice, atmospheric water, groundwater, and surface water. Until recently, international law had addressed itself only to the last category of water, but of late groundwater and atmospheric water have also come under consideration by legal scholars.[5]

A useful indicator of the severity of the water problem in varying localities is the "water stress index" developed by Falkenmark during the 1980s. The index measures the "...minimum level of total water resources required by a modern country to survive in an arid zone area."[6] Several Middle Eastern countries, including Israel, hover around the danger zone for water stress.[7] Such countries are naturally in relatively greater need of urgent action to remedy their water problems.

Treaty regimes which have been established to regulate the joint utilization of water resources deal overwhelmingly with surface water, specifically rivers and lakes, although some exceptional treaties address groundwater issues.[8] Navigation of rivers was one of the earliest topics to be addressed by international conventions, and tend even today to be regulated independently of other uses of surface water. Likewise, in many instances

pollution control and fishing rights are often separated out from the general treaty regimes because of their special nature.

It is difficult to generalize regarding the many conventions which have been concluded for the management of international water resources, yet some conclusions may be drawn from an empirical examination of the pre-conditions for international cooperation. Unquestionably, the ultimate common goal of the long-term preservation and welfare of the water resource must be recognized by all participating states. Once this point of departure has been agreed upon, three requisites are essential:

> One requisite is the active support and long-term committment on the part of top-level political representatives; the second is the mobilization of the available geological, meteorological, legal, economic, social, engineering and other expertise; the third is a domestic governmental structure capable of effective international cooperation and collaboration.[9]

The establishment of an international regime may then proceed. Most commonly, such a regime is embodied in a bilateral or multilateral treaty between states and is meant to be long-standing. The intention of the parties may be to bind only themselves; or, alternatively, "...to serve the general interest with the creation of a regime which endows the area with a general status *erga omnes*."[10] This raises the question of whether some of the states which share a body of water may come to an agreement which will have binding force on the others, an issue which will be touched upon in our concluding section. However, there is no doubt that the most effective regimes will include as signatories all states which possess water rights in a given river or lake basin.

B. *THE INTERNATIONAL DRAINAGE BASIN*

Both hydrologists and international lawyers agree today that the critical unit of analysis for international water resources is that of the international drainage basin. One of the first formal definitions of this term appears in Article 2 of Helsinki Rules on the Uses of the Waters of International Rivers, drafted by the International Law Association in 1966:

> An international drainage basin is a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.[11]

Likewise, a basin state is defined as "...a State the territory of which includes a portion of an international drainage basin."[12]

In 1986 the scope of definition was widened by the ILA to include basins which are completely underground, being composed exclusively of international aquifers.[13] Nonetheless, the basic concept remains that of the interconnectedness of water sources in a common basin, be they surface or underground. This development reflects developments in hydrological research in recent years. Thus, the term "international drainage basin" has come to replace other characterizations such as "international rivers," and "international water resources."[14] In the words of the drafters of the Helsinki Rules,

> The drainage basin is an indivisible hydrologic unit which requires comprehensive consideration in order to achieve maximum utilization and development of any portion of its waters.[15]

It should be noted that in 1991, the International Law Commission (ILC) prepared a set of Draft Articles on the Law of Non-Navigational Uses of International Watercourses.[15a] The 1991 Draft Articles have adopted alternative terminology to the ILA's "drainage basin," by utilizing the term "international watercourse." Nonetheless, the substantive definition of the term would appear to be identical to the drainage basin concept. "Watercourse" is defined in Article 2(b) of the Draft Articles as:

> ...a system of surface and underground waters constituting by virtue of their physical relationship a unitary whole and flowing into a common terminus.

By way of clarification, the Draft Articles define an "international watercourse" as including parts which are "...situated in different states."[15b]

The unity of definition in these two important documents of international water law points to an important consensus regarding the identification of the basic unit of analysis for lawyers, hydrologists and others.

(1) CHARACTERISTICS OF AN INTERNATIONAL DRAINAGE BASIN

According to a United Nations survey carried out in 1975, there exist approximately two hundred international drainage basins.[16] Twenty of them cover an area greater than a million square kilometers. Seventy-one are between 100,000 and a million square kilometers, and the remaining hundred-odd are smaller than 100,000 km^2. For the sake

of comparison, the Jordan River Basin is approximately 50,000 km^2, and is thus relatively small.

Naturally, the defining factor in a given basin will be the quantity and type of water resources available to the human population, either directly or indirectly. Yet important influences are often brought to bear within a basin by other factors such as: the utilization of the land area, the climate, flora and fauna, industry, water, land and air pollution levels, hydroelectric facilities, and communication and transportation networks. All of these are intimately connected to the existing water resources of the basin, although they may in some instances compete with them as the defining characteristic of the region. This phenomenon can pose difficulties when basin states enter the joint planning process, since the international drainage basin does not always conform geographically to other "resource basins" or "planning basins."[17]

Basins may also contain a wide variety of surface water resources: many rivers may converge into a single delta, a single river may possess numerous tributaries, a lake may serve as the focal point of several rivers, or various combinations of these configurations may be present.

Finally, basins (or parts of basins) may be characterized by exceptional political strife, exacerbated by lack of agreement between basin states regarding the territorial boundaries between them. In these instances, the establishment of successful treaty regimes for basin management depends upon bypassing the political disputes and focusing on legal rights to water utilization. Several international agreements have taken this approach, without prejudice to future claims of territorial sovereignty within the basin.[18]

(2) TYPICAL PROBLEMS OF WATER MANAGEMENT

As outlined above, each basin possesses unique geographical and hydrological characteristics which define the needs and priorities of the basin states. However, the same sorts of problems are seen consistently in a variety of basin types, due to the uses to which humankind has so far been able to put the earth's water resources. These problems divide into the obvious and the more esoteric.

The most obvious problem which arises in all basins is that of distribution of the water resources between basin states. It becomes especially acute in regions which lack water generally, but problems may also occur as a result of different prioritization of water uses by each basin state. Associated with this issue is the question of compensation to basin states (how much, and in what form) for alternative or joint uses of the water located in their territory. Other outstanding issues are navigation, irrigation, and

fishing rights, timber floating, and pollution control and prevention. The overarching issue will always be that of long-range, comprehensive planning for the basin, and the direction which this process should take.

The more esoteric matters of basin management may include the extent and type of technical backup which is necessary for the coordination of national policies; the allocation of authority for day-to-day administration of the basin; conflict management; establishment and maintenance of communication channels between states; contingency planning; control of water flow by dams and other installations; and the dovetailing of national water legislation and policy of basin states.

This is by no means a comprehensive listing of problems which arise in international drainage basins, but merely an indication of some major difficulties which have arisen in past experience.[19] In the survey of specific regimes in Part Two below, specific problems and their solutions will be treated in greater depth.

C. *THE LAW OF INTERNATIONAL WATER RESOURCES*

(1) DEVELOPMENT OF THIS BRANCH OF THE LAW

It is important to emphasize at the outset that the international law of water resources is still at a relatively early stage of development. This immaturity finds expression on two levels: first, in the regulation of only a small portion of the earth's water resources, surface and ground; and second, in the lack of comprehensive and binding rules which have been formally codified. On the other hand, important progress has been made in the field in the second half of the twentieth century, clearly indicating the directions in which this branch of the positive law is evolving.[20] The many examples of international agreements for basin management tend to reinforce the general trends by adoption of legal norms which have proven effective in previous treaties, such as the requirement of equitable distribution of water between basin states and that of prior notification by one basin state to others of planned water installations. This dependence on legal and managerial precedent in establishing new regimes appears to be inherent in the process of establishing new water regimes. And rightly so: water resources are in many cases too precious to gamble with, and planners cannot usually afford the luxury of radical experimentation.[21] Thus, we would suggest that the self-reinforcing nature of the hundred or so treaty regimes which have been established in international drainage basins may at some point in the relatively near future give rise to binding norms of customary law on the international plane.[22]

A number of rivers which flow between or through the territories of two or more states have long been subject to international regimes, especially if they serve as important channels of navigation. Examples are the Danube regime (from 1856),[23] the Rhine regime (from 1868)[24] and the treaties dealing with Lake Geneva (from 1816).[25] A general regime governing navigation on international rivers was signed at Barcelona in 1921[26]; and an additional multilateral treaty on the production of hydraulic energy on international rivers was concluded at Geneva in 1923.[27]

Many inter-governmental and non-governmental organizations have had occasion to deal with issues which arise through the common use of water resources by several states, especially in the past three decades. Outstanding among the contributions which these groups have made are the 1911 International Regulations regarding the Use of International Watercourses for Purposes other than Navigation, codified by the Institute of International Law; the 1961 Resolution concerning the Utilization of Non-Maritime Waters for Purposes other than Navigation, also of the Institute; the 1966 Helsinki Rules on the Uses of Waters of International Rivers, which are the product of many years of work by the International Law Association[28]; the 1977 Mar del Plata Action Plan of the United Nations Water Conference[29]; the ILA's "Complementary Rules" of 1986; and that organization's Seoul Rules on International Groundwater of the same year. Most recently, the International Law Commission has drafted rules on international water use.[29a] Several specialized agencies of the United Nations (the IBRD, the FAO the WHO and the IAEA) have also contributed much to the evolution of international water law, in a variety of contexts. Finally, a number of important cases have been decided by international tribunals, including the *Jurisdiction of the European Commission of the Danube* advisory opinion,[30] the *Diversion of the Waters of the Meuse* case between Belgium and the Netherlands,[31] and the *Lake Lanoux* arbitration between France and Spain.[32] These precedents have collectively confirmed the principle of freedom of navigation on international rivers, the reciprocity of rights and duties between co-riparians, the requirement of prior notification and consent of all riparians regarding water works which will affect the river's flow (in effect, a requirement to consult substantively), and the hydrological unity of the drainage basin.

Currently, major efforts to further the development of the law of international water reesources have been initiated by the International Law Association, the European Economic Community, the OECD, the Institute of International Law, and the International Law Commission of the United Nations.[33] In the words of a former Rapporteur of the ILA Committee on Water Resources Law, Justice E.J. Manner of Finland,

> "[t]he increasing importance of water resources development in many parts of the world, and the new understanding of water as an essential part of the environment...together with many other relevant factors relating to the economic, technical and social development of our time, all lay stress on the need to codify the Law of International Water Resources."[34]

(2) LEGAL DOCTRINES OF WATER UTILIZATION

Five legal doctrines governing the utilization of shared water resources are identifiable in the literature, representing different historical and juridical approaches. We shall now review them briefly.

The Harmon Doctrine of Absolute Sovereignty

The best-known proponent of this outdated approach was U.S. Attorney-General Judson Harmon, who expounded it in a well-known opinion submitted to his government in the course of a dispute with Mexico over the Rio Grande in 1895. In effect, the doctrine claims the absolute freedom of a riparian state to utilize the waters flowing through its territory, regardless of the effect of its actions on other riparian states either upstream or downstream. The Harmon doctrine never won international acceptance, and is today contrary to general international law.[35]

The Doctrine of Absolute Riverain Integrity

At the other extreme to the Harmon doctrine lies the theory that a state may not alter the natural flow of waters passing through its territory in any manner which will affect the behavior of the waters in another state, be it upstream or downstream. This doctrine has been occasionally applied to settle water disputes between member states of a federal state, and at least twice at the international level, yet it would appear to be a highly impractical limitation on state behavior in the present international framework.[36]

The Doctrine of Limited Territorial Sovereignty

This intermediate approach has been taken in resolution of the majority of international water disputes. It conforms to the general legal principle of *sic utere tuo ut altenum non laedas* (the obligation to use one's property in a manner which will not

cause injury to others). In a nutshell, the doctrime limits a state's utilization of international water resources by requiring it to take into account the needs and priorities of other basin states. The precise parameters of these needs and priorities are the subject of much debate, but it can be confidently stated that

> [t]he concurrence among lawyers and legal scholars that international rivers cannot be the subject of exclusive appropriation by one state is persuasive, when considered with the overwhelming evidence... that the limited sovereignty principle is a rule of international law.[37]

The Doctrine of the Communality of International Waters

This approach is perhaps the most suited to the concept of the international drainage basin. It presupposes a communality of interest between basin states, and treats the total volume of basin water as a shared resource. Development and distribution costs may be shared by basin states, and joint planning can be greatly simplified when its benefits are divided equitably. The key concept to the successful application of this doctrine is, indeed, the principle of equitable distribution, which will be discussed in section (3) below.

The Doctrine of Correlative Rights

In certain United States jurisdictions, the doctrine of correlative rights has been applied to ground water utilization, and may be extrapolated to international basins. In California, for example, a landowner's use of groundwater is limited "...to amounts that he can beneficially use on his own land and subject to the corresponding rights of other landowners sharing the same aquifer."[38] Surplus water may be appropriated by any user in the basin. Thus, the emphasis is on the most efficient utilization of joint water resources, rather than on ownership rights. This criterion may become decisive in international basins where water stress has reached the critical point.

In summary, international water law currently encompasses a number of legal doctrines. Of the five reviewed here, the doctrine of limited territorial sovereignty appears to be the most widely accepted by state practice, in treaties, and in the opinions of experts and scholars. The parameters of its application are subject to ongoing debate in the scholarly literature, but it is important to note that specific legal regimes applicable in international drainage basins tend to stipulate the limitations on state sovereignty in a precise manner, naturally subject to the agreement of states parties.

(3) PRINCIPLES OF INTERNATIONAL WATER LAW

We will restrict the discussion of these principles of international water law which are at present broadly accepted both in the scholarly literature and in many treaty regimes and which relate to the non-navigational uses of drainage basins. Likewise, we shall focus on the rules pertaining to surface water, which are more highly developed than those applying to transboundary groundwater, although the clear direction of international water law is to treat both surface water and groundwater as a single definitive unit.[39]

Several authors have traced the development of water law in various jurisdictions throughout history, in order to glean cultural concepts of water sharing which are potentially relevant today.[40] The Islamic law relating to water resources is particularly cited as recognizing them as a common good which must be shared between owners and non-owners under certain circumstances.[41] Notwithstanding the historical importance of such research, international water law today is based on two elements: general principles derived from public international law[42]; and principles which apply specifically to shared water resources.

The first group of principles represents legal norms which are without question binding on states today. It includes the above-mentioned obligation to use one's own property in a manner which will not cause harm to one's neighbor[43]; the obligation to settle disputes in a peaceful manner[44]; the requirement to act reasonably and in good faith[45]; and state responsibility for damages caused by acts or omissions attributable to it[46]; these norms may be specifically integrated into a basin regime or not; even if they are not stated in an outright manner, they will be binding. On the other hand, parties to an international regime may specifically opt out of these obligations, with the exception of peaceful settlement of disputes, which is a cognitive norm of international law today.[47]

Principles applicable to international drainage basins are probably not yet to be considered as binding customary law; yet, as mentioned previously, they have been reiterated in international treaties and reinforced by state practice on numerous occasions.[48] The most masterful listing of these principles appears in the 1966 Helsinki Rules drafted by the International Law Association (and their 1987 amendments): these rules will serve as the basis of our analysis.[49] The more recent rules drafted by the International Law Commission in 1991 will be referred to as relevant.

The international drainage basin, which has been defined in Section (B) above, is the geographical unit to which the Helsinki Rules apply. Within this area, Articles IV-VIII of

the Rules prescribe that basin waters shall be used reasonably and equitably by the basin states. Article IV (compare the ILC's Article V) is worth quoting in full:

> Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

The definition of a "reasonable and equitable share" in any given case is naturally a difficult task. Article V (the ILC's Article VI) stipulates that all relevant factors must be taken into account, including but not limited to:

(a) the basin's geography and drainage area
(b) its hydrology
(c) climate
(d) past and existing utilizations of basin waters
(e) economic and social needs of basin states
(f) population
(g) comparative costs of alternative means of satisfying (e)
(h) availability of other resources
(i) the avoidance of unnecessary waste
(j) the practicability of compensation to states as a means of settling conflicts among uses
(k) the degree to which a state's needs may be satisfied, without causing substantial injury to a co-basin state.

The ILC Draft rules add the factors of potential uses of the waters; and the effects of the use by one state of the waters on that of other states.

No hierarchy of relevant factors is determined (Article VI); rather, all of them are to be considered holistically (Article V [3]). However, existing reasonable uses of basin waters have precedence over future uses, with certain exceptions (Articles VII and VIII).

The important innovation in these Articles is the focus on the equitable enjoyment of the waters' *beneficial use*, rather than *the waters themselves*. Crucial to this distinction is the perception of the total volume of basin waters as a common resource of all basin states. This approach must apply to underground aquifers as well as surface water in order to achieve optimal results.

Chapters 3, 4 and 5 of the Helsinki Rules are not of interest in this context, as they deal with pollution, navigation and timber floating, respectively.[50] The final chapter, 6, outlines procedures for the prevention and settlement of international disputes as to the legal rights or other interests of basin and non-basin states. It includes a recommendation

that basin states give prior notice to all other affected basin states of "...any proposed construction or installation which would alter the regime of the basin in a way which might give rise to a dispute...." Prior notice must be given enough time in advance to allow for other basin states to assess the likely impact of the proposed project. Failure to give notice forfeits a state's right to have the project be considered as part of the equitable use of the basin's waters. Article VII of the ILC Draft Rules include an obligation not to cause appreciate harm to another state by utilizing the waters.

In 1987 the ILA reviewed its work on water resources law, and offered five recommendations as to additional refinements which should be addressed by the international community. Two of these relate to the prevention of disputes and their settlements: on the one hand, "a wider, more general need for the sharing of information and data" between basin states was recognized; on the other, the dispute resolution mechanisms provided in Chapter 6 are deemed "inadequate and being no more up to date." A third recommendation referred to the need to unify terminology and concepts related to the international drainage basin. The final two recommendations are on a more substantive level. The importance of addressing the problem of state responsibility for injurious acts and omissions in the drainage basin context is emphasized. And finally, the ILA mentions the issue of diversion of water out of and into the international basin. This is of special significance in the Jordan River Basin, since Israel has been accused by other basin states of illegally diverting water to the Gaza Strip. In this regard, the ILA states:

> After only preliminary study and discussion, the Committee could not resolve whether all aspects of the question were adequately covered by the Helsinki Rules, though there seemed to be general agreement that extra-basin diversion was not *per se* contrary to general international law (emphasis added).[51]

The Rules on International Groundwater, drafted by the ILA and published in 1986 (see Appendix 4) augment the Helsinki Rules. They impose the principle of equitable utilization on aquifers as well as surface waters, and emphasize the hydraulic interdependence of the two types of basin waters. Perhaps future rules will take into account the full hydrological cycle, including atmospheric water.[52]

Other international advisory bodies, including the United Nations' International Law Commission, have readily adopted the international drainage basin concept and the principle of equitable utilization, although different terminology is occasionally used.[53]

An additional, important legal principle which was not enunciated in these codifications, found clear expression in the 1957 *Lake Lanoux* arbitration between France and Spain.[54] There, France contemplated a scheme to divert waters from the lake toward the Atlantic Ocean, away from its direction of natural flow into the Carol River, which passes through Spain. The project was planned to supply hydroelectric energy to Southern France. In order to calm Spanish fears, France proposed that the full amount of water extracted would be returned to the Carol, that an annual minimum amount of water in the river would be guaranteed, and that a mixed (bi-national) commission would supervise the process.

Spain objected to the entire project on the basis that it affected the whole water system of the Carol, and that the diversion would modify the physical features of the hydrographic basin.[55]

The arbitral tribual ruled that the replacement of the total extracted water volume by France was in accordance with international law, confirming the hydrological unity of the drainage basin. In deciding against Spanish claims, it also expressed the principle that one basin state may not have an automatic power of veto over water works proposed by another basin state.

In summary, we may state the principles applicable to states which possess resources in international drainage basins as follows:

GENERAL BINDING PRINCIPLES

- A state must utilize its water resources in a manner which will not cause harm to other states.
- Disputes between states must be settled in a peaceful manner.
- States must act reasonably and in good faith in their relations with each other.
- A state bears international responsibility for damages caused by its acts and omissions.

PRINCIPLES OF INTERNATIONAL WATER LAW

- The international drainage basin is the critical unit for cooperation in the management of shared water resources.
- Surface and groundwater are to be treated in a comprehensive and holistic manner.
- Benefits deriving form the use of resources in the international drainage basin are subject to equitable and reasonable distribution between basin states.

- No single existing use of water resources necessarily takes precedence over another. However, present uses have priority over future uses.
- Prior notice of projected water works which are liable to affect other basin states should be given by the initiating state.
- Diversion of water from one drainage basin into another is not necessarily unlawful.
- No basin state has an automatic power of veto over other states' proposed water works.

II. EXAMPLES OF INTERNATIONAL COOPERATION

A. *METHODOLOGY OF ANALYSIS*

We have chosen to analyze twenty-two treaty-based regimes for the cooperative administration of international drainage basins. Some deal exclusively with a single river or lake, others with complex riverain networks. Three treaty regimes for enclosed or semi-enclosed seas (the Red Sea, the Mediterranean Sea and the Baltic Sea) have also been included, due to their special relevance to the problems of the Jordan River Basin. Naturally, the basins represent a broad range of geographic and hydrologic factors, although the emphasis is placed on identifying effective solutions to widespread problems of water use and abuse. Four regimes are discussed in depth: the Columbia River Basin, the La Plata Basin, Lake Chad, and the Indus Rivers. They are also surveyed schematically along with eighteen others, and references are supplied for further study.

Each legal regime is analyzed in accordance with five criteria: its general interest as an example of international cooperation (explained in the INTRODUCTION to each regime); PHYSICAL CHARACTERISTICS of the basin; special PROBLEMS AND ACHIEVEMENTS; the applicable TREATY REGIME; and the contribution which the regime has made to international cooperation (explained in the CONCLUSION to each regime).

The sources used in compiling each regime profile are listed in the schematic survey. It should be noted that they represent the literature available in Israel in 1992, and that certain geographical and legal factors may have changed since that time.

Throughout the analysis, an attempt has been made to highlight salient issues which have possible ramifications in the Jordan River Basin.

B. *FOUR CASE STUDIES*

(1) *THE COLUMBIA RIVER BASIN*

Introduction

This basin, which crosses the far western boundary between the United States and Canada, is governed by one of the most successful legal regimes for international drainage basin management. Nonetheless, major political conflicts between the basin states characterized the period prior to the conclusion of the 1961 Columbia River Basin Treaty and its 1964 Protocol. The countries share a long history of negotiation and dispute settlement in the basin dating from the nineteenth century, and it is important to stress that the Columbia River is only one of a number of rivers crossing the U.S.-Canada border which have been subject to similarly successful regimes. The outstanding element of its legal regime, for present purposes, is the inclusion of the legal principles of equitable utilization of basin resources and prior notification of national water projects on either side of the border to a Joint Commission. The legal regime also stipulates a sophisticated and efficient mechanism for conflict management between the parties, and is based on extremely thorough technical research and monitoring of the basin.

Physical Characteristics

The Columbia River is 1,225 miles long, 480 of which are in Canada and 745 of which lie in the United States. The entire basin, which contains many tributaries of the Columbia, extends over 259,000 square miles—an area larger than France. The river and its tributaries cross the political boundary between the two countries at several points.

A chief characteristic of the Columbia River Basin is its enormous potential for producing hydroelectric energy, due to the sharp slope of the river as it falls from sources in Canada's western mountains into the Pacific Ocean. It has been estimated that one-fifth of the potential hydroelectric power of the world's rivers is located in North America. Of this amount, one-third may be extracted from the Columbia Basin. Thus, the legal regime has been charged with regulating an especially valuable water resource, and has succeeded in fostering the efficient joint use of hydroelectric potential.

The basin's climate is quite varied, due to the irregular topography of the basin and the wide range of precipitation between northern and southern zones. On the Canadian side of the border, the human population is rural and dispersed; on the American side, it is more urban. The regional economy is based on its abundant natural resources

(water, fishing, timber, mining and agriculture), although in recent years hydroelectric installations and industry have increased significantly. Because of the disproportionate relationship between energy production and human population in the basin, the benefits of equitable utilization of the basin's waters (*i.e.*, hydroelectric energy) are actually exported from the basin on both sides of the border. Another important joint concern is the prevention of flooding in the southern part of the basin, which has been dealt with by the construction of a network of dams upriver. Fishing, navigation and timber floating are additional issues for joint management, although they are excluded from the present analysis.

Special Problems and Achievements

In the modern period, the main conflict between Canada and the U.S. in the basin was engendered by an American plan in the thirties and forties to develop the southern basin by constructing a series of dams in American territory. The intended effect was to store water and potential hydroelectric energy on the Canadian side of the border, without compensating Canada for this use. The Americans claimed that they were not to blame for their northern neighbors' lateness in developing basin resources, and that in any event similar installations would have to be introduced eventually on Canadian territory in order for the Columbia's waters to be fully utilized. Canada's response was a complete rejection of the American argument, which it countered by its own development plan for the northern basin, which included the siphoning off of Columbia Basin waters to other drainage basins in Canada. The political dispute between the two countries over this issue became quite heated during the 1940s and 1950s.

Fortunately, an exemplary mechanism for conflict resolution on shared water issues between them had been formally established by treaty as early as 1909. Under the conditions of the Boundary Waters Treaty between the U.S. and Britain (on behalf of Canada), a permanent International Joint Commission (IJC) had been established to prevent disputes regarding the use of all boundary waters, to settle pending questions of national rights, and to make provisions for the adjustment and settlement of all future questions.

The Legal Regime

Under the 1909 treaty, the IJC is composed of six commissioners, three from each country, and is invested with significant powers on the judicial, investigative and administrative levels. It has jurisdiction over all types of river use: in particular, the prior

approval of the ICJ is required for all planned water projects which affect boundary waters. The Commission may investigate, upon its own initiative, possible treaty infractions, and its decisions by majority are binding. In the decades following the establishment of the ICJ several disputes were handled successfully by the IJC.

Thus, within the framework of the 1909 treaty, the U.S. submitted its plans for the development of the Columbia Basin to the ICJ in 1944. As mentioned above, the political fallout was severe. Nearly twenty years later, in 1961, a compromise agreement was reached, in the form of the Treaty Relating to the Cooperative Development of the Water Resources of the Columbia River Basin. The 1961 Treaty provides that the two countries must divide the benefits of water storage within the basin on a completely equitable basis. In exchange for the hydroelectric power and flow regulation from which the U.S. alone benefits, it must compensate Canada fully. Interestingly, compensation may take the form of monetary reimbursement or transfer of hydroelectric power. On the other hand, Canada is expressly forbidden from transferring Columbia waters to other drainage basins in Canada, although this is probably not contrary to international law (see Part One above).

The treaty regime provides that each party shall bear the costs of development of the basin on its own territory, although joint projects will be undertaken in accordance with future needs and arrangements. In this respect, a detailed plan for co-development in the basin has been adopted, which is intended to suffice until the year 2021.

A permanent staff of hydrologists and other scientists is responsible for the ongoing collection of information and technical data within the framework of the treaty. The IJC may request that specific studies be carried out by them.

The settlement of disputes by the ICJ has proven to be efficient and effective over time. Under Art. VIII of the 1909 treaty, if the Commission is divided evenly over an issue, either a joint report or separate reports will be prepared and submitted to both governments. If they cannot achieve a negotiated settlement, the dispute must be referred to an agreed umpire or arbitrator, whose formal decision will be binding.

The legal regime refers only to the surface waters of the Columbia Basin, leaving untreated the issue of underground aquifers.

Conclusion

The legal regime governing the Columbia River Basin has proven itself satisfactory to both parties, even under significant political pressures. The economic benefits to be gained by joint use of the basin's waters are undoubtedly an important motivating factor. Nonetheless, several legal principles have been particularly expressed and adhered to by

the parties: equitable utilization of the benefits resulting from basin water use; the obligation to settle disputes peacefully; joint development of resources; and a clear preference for cost-efficient utilization of the water. In addition, it is significant to note that Canada was specifically enjoined by the 1961 treaty to refrain from extra-basin transfer of the Columbia's waters, apparently in contrast to permitted state conduct.

(2) *THE LA PLATA RIVER BASIN*

Introduction

Like the Columbia Basin, the La Plata River Basin possesses enormous potential for exploitation and shared use; however, unlike the Columbia, this potential has barely been realized in the years since 1969, when the legal regime was formally established. The basin covers one-sixth of the South American continent, includes five states, four major rivers and 56 million inhabitants. Historically, the basin states (Paraguay, Uruguay, Argentina, Bolivia and Brazil) have expressed the political readiness to cooperate in management of the La Plata basin, and have stressed their interdependence in use of the rivers for navigational and communication purposes. Nonetheless, as we shall see below, the efforts at cooperation in the basin have not been as fruitful as might have been expected, due to a number of drawbacks in the 1969 agreement.

Physical Characteristics

This huge basin covers more than 3 million square kilometers in the center of South America, between the Andes and the mountains of Brazil. The percentages of state territories which are included in the basin are as follows: 100 percent of Paraguay; 80 percent of Uruguay; 32 percent of Argentina; 19 percent of Bolivia; and 17 percent of Brazil. These figures are of utmost importance for the coordination of basin and national planning. In addition, the basin possesses special geographic and strategic importance for each basin state in the areas of navigation, communications, forestry, hydraulic energy, and agriculture—although this region is relatively well-watered. The climate is extremely varied, yet an important characteristic is common to most of the area: the slope of the basin is extremely gradual, to the extent that heavy silting presents a difficult obstacle to navigation on the basin rivers. Thus, a principal common interest of the basin states is the clearing and maintenance of the riverbed in the four major transboundary rivers (the Paraguay, the Uruguay, the Parana and the La Plata).

Special Problems and Achievements

The La Plata River Basin is rich in water and natural resources, but a major difficulty involved in administering the basin is its sheer size. It is all but impossible to maintain a consistently high standard of technical and scientific monitoring throughout the basin. The coordination of the policies of five large countries also presents real problems. Nonetheless, the La Plata Basin Treaty of April 1969, as well as the subordinate treaties concluded regarding particular sub-basins, represents an attempt to focus on common interests and solutions. For example, all of the states require open lines of navigation and communication on the rivers, either for access to hinterland regions (Brazil, Uruguay and Argentina) or to the open sea (Bolivia and Paraguay).

On the other hand, due to the relatively undeveloped nature of the basin, its vast potential for hydroelectric energy production and industrial development was largely neglected in the 1969 treaty.

In summary, important progress has been made since 1969 in the clearing-out of riverbeds and the control of silting, especially with the aid of the United Nations Development Program (UNDP). In other areas of potential cooperation, success has been limited.

The Legal Regime

Significantly, the legal regime which applies to the La Plata Basin is a mixed one. Several bilateral treaties regarding specific rivers (such as the Uruguay and La Plata rivers) co-exist with the 1969 umbrella agreement, although we shall examine only the latter here. The scope of the treaty is wide. Its fundamental objective is to coordinate efforts for "promoting the harmonious development and physical integraiton of the River Plate Basin, and of its areas of influence which are immediate and identifiable" (Art. I). To that end, basin states have agreed to identify areas of common interest, to undertake joint surveys, programmes and water works, and to provide the appropriate legal support through operating agreements the treaty restrict itself to addressing issues arising from the utilization of the basin's waters: it also prescribes cooperation in education, health and management of non-water resources such as soil, forests, flora and fauna.

The Treaty is implemented by a standing Inter-Governmental Coordinating Committee (*CIC*), which is responsible for the day-to-day administration of the regime; and the Ministers of Foreign Affairs of the La Plata Basin countries, who decide policy. The authority of the Ministers is superior within the framework of the treaty. They draw up basic policy directives, evaluate results, consult, and direct the actions of the CIC.

Decisions are made unanimously at meetings which take place several time a year. The CIC is chiefly responsible for implementing the decisions of the Ministers, although it may also propose studies, research and action programs and appoint working groups of experts. Its decisions must also be unanimous. Neither organ is especially enjoined with conflict management or dispute settlement.

A severe defect in the operation of these two bodies is that neither has been vested with explicit legal authority to be exercised independently of the member states. No new legal entities were created by the Treaty, and this has crippled its implementation. Of the 167 resolutions issued by the ministers of Foreign Affairs by the mid-1980s, only twenty-eight had so far been duly implemented. In addition to this problem of treaty administration, its territorial scope is ambiguous extending beyond the basin to "areas of influence which are immediate and identifiable." If these areas had been defined as conforming specifically to the political boundaries of the basin states, implementation would have been considerably eased.

Conclusion

The important accomplishment of the La Plata regime is the creation of a powerful potential framework for wide-scale cooperation. So far, this framework has been underutilized. On the one hand, the basin states have strong motivations for cooperation, in the field of development: the water supply is abundant enough to satisfy their present, and probably future, needs. On the other, it would appear that the 1969 treaty, despite its broad scope, is severely flawed insofar as the legal mechanisms which it provides. No over-arching legal principles (besides the general injunctive to cooperate) were enunciated in the Treaty. No supra-national authority was created to administer the basin. Finally, no provisions were made to implement an effective proces of dispute resolution. In addition to these omissions, the La Plata regime extends over an ambiguously defined geographical region.

On the positive side, various basin projects undertaken with the support of the UNDP have been successful, especially in the area of river navigation.

(3) *LAKE CHAD*

Introduction

The Lake Chad Basin presents interesting problems of international cooperation and basin management. The lake touches upon the borders of four countries: Chad, Niger,

Nigeria and Cameroon. A fifth state, the Central African Republic, is to be considered a basin state by virtue of the rivers flowing from its territory which empty into the lake, supplying over 40 percent of the total inflow. Water rights have been fiercely contested by the basin states, to the point of armed conflict having broken out in 1983 between Chad and Nigeria, claiming 300 victims. The water stress factor is severe in this extremely arid region, and is exacerbated by the irregularity of the water supply and the gradual drying up of water sources. Indeed, at the time of this writing, it is questionable whether Lake Chad will survive at all.

In 1964 the four littoral basin states came to an agreement regarding many issues of joint water management. One of the major motivations for conclusion of the Convention and Statute relating to the Development of the Lake Chad Basin was the financial support promised by various United Nations agencies, including the UNDP, UNEP, FAO and UNESCO. The agreement embodies the principle of equitable utilization and intentionally bypasses hotly contested issues of state sovereignty within the basin area. It is also important to note that the scope of the agreement goes beyond water issues and includes common security measures and a regime for the protection of flora and fauna.

Physical Characteristics

Lake Chad is located at the southern edge of the Sahara Desert, in northern central Africa. Due to its location, it is in constant danger of evaporation. The body of water itself is unusual, in that seasonal fluctuations in rainfall cause its surface to waver between 10,000 and 25,000 square kilometers. The maximum depth of the lake is ten meters. In contrast, the international drainage basin, which includes the rivers and aquifers associated with the lake, extends over 427,300 square kilometers, including a large portion of the territory of the Central African Republic. Unlike the other regimes analyzed in depth, there is no outlet to the sea from the basin—it is a landlocked unit. Utilization of the water resources has so far taken place along traditional lines, and includes domestic use, fishing and basic agriculture. The shallowness of the waters precludes extensive navigation, and hydroelectric energy is a distant prospect for the local population.

Special Problems and Achievements

As noted above, severe fluctuations in the water supply have caused political tensions between basin states. In 1907, and again in 1976, the northern part of the lake evaporated completely, so that one of the coastal towns is now located 150 kilometers

from the shoreline. To this is added the fact that borders between the basin states are still contested in the area, complicated by the exposure of new land areas previously under water. In spite of these obstacles, the 1964 agreements provides an appropriate framework for joint basin management, and important lessons can be learned from the progress made so far.

The Legal Regime

Prior to the signature of the Convention and Statute, the lake had been divided into national sections, determined by a system of straight lines connecting astronomical and geological reference points. Thus, the 1964 agreements do not provide for the complete internationalization of the lake, but rather establish the principle of common use of its waters by member states without prejudice to sovereign rights (Art. 3 of the Convention). Article 5 of the Statute sets down the obligation incumbent upon all member states to consult each other prior to initiating measures which are likely to have an appreciable effect on water quality or quantity in the basin. Certain categories of existing projects are exempt from this rule.

The institutional framework established by the treaty is to be implemented by the Lake Chad Basin Commission. The Commission is composed of two members from each riparian state, and meets twice a year on a regular basis, although its sub-commissions operate year-round. The decisions of the Commission are taken unanimously. According to Article 7 of the Convention, it may act as a dispute settlement body, with eventual recourse to the Organization of African Unity.

The primary objective of the Commission is the joint management of surface and ground water resources in the basin. It also provides a forum for wider regional cooperation, which has borne fruit in sub-agreements on topics such as protection of flora and fauna, and negotiations on border demarcation, allocation of water resources between basin states, extension of the agreement's jurisdiction to the entire basin area (the Central African Republic was not an original signatory), and coordinated regional development.

Many of the achievements of the Lake Chad regime may be attributed to the financial and developmental assistance provided by the UNDP, the UNEP, the FAO and UNESCO. These organizations have provided a much-needed impetus for the preservation and development of those basin waters which remain. In 1987, the UNEP prepared a draft plan (adopted by the Commission) to re-establish an optimum water level for the lake by importing water from other nearby drainage basins.

Conclusion

The Lake Chad Basin suffers from many problems which plague the Jordan River Basin: unsettled national borders, political hostility, water stress, and contention over water rights. Nonetheless, the littoral states of the lake, aided by international development organizations, have reached a *modus vivendi*. They have even gone beyond the terms of their original agreement in efforts to coordinate basin development. The legal principle of equitable distribution has not yet been formally adopted into the regime, but prior consultation and the peaceful settlement of water disputes are required.

In light of the experience in the Lake Chad Basin, it is impossible to overemphasize the necessity of coordinating actions of the basin states while there remains a water resource left to manage and develop.

(4) *THE INDUS RIVER BASIN*

Introduction

This basin represents an especially complex example of co-utilization of water resources. In fact, the two hostile basin states have "agreed to disagree" regarding the utilization of the six major rivers of the basin, by dividing the rights to their use in an absolute manner based on the principle of equitable utilization. The agreement which established the present legal regime is the Indus Waters Treaty of 1960 between India, Pakistan and the World Bank. Two additional operation and development agreements were concluded between the latter two parties. All three treaties are the fruit of much technical background work and laborious negotiations which commenced in the 1950s under the auspices of the World Bank. Under the present regime, the six rivers which feed the vast irrigational system of the Indus Basin have been divided as follows: the Ravi, Beas and Sutlej are controlled by India; and the Indus, Jhelum and Chenab by Pakistan. Although the basin has in effect been divided into areas of national influence, the Indus Waters Treaty is widely perceived as applying the principle of equitable apportionment as eventually formulated in the Helsinki Rules and other current statements of international water law.

Physical Characteristics

The Indus River Basin contains the largest unified irrigation system in the world. It covers 360,000 square miles, and is inhabited by approximately 45 million people, who

are chiefly supported by agriculture. The six major basin rivers originate in the Himalaya mountains in the north, flowing down to the Indus Plain over a 15,000 foot drop. Once they reach the Plain (still 1,000 miles from the ocean), the slope is reduced to less than ten inches per mile. As a result, the Indus rivers have created a gigantic alluvial plain, rich in water and other resources. Most of the basin is fairly homogenous geographically and climatically, although precipitation levels vary greatly from season to season. The basin has benefited from irrigation systems from at least 1,000 B.C.E., but a major achievement was reached by the political unification of the entire basin under the British during the 19th century. The scientists and engineers working in the colonial administraiton constructed a sophisticated network of canals, dams and power stations which has proven workable up until the present.

Special Problems and Characteristics

In 1947, British India split into independent India and Pakistan, immediately causing the Indus Basin to become an international one. Almost all of the sources of the basin's rivers were located on Indian territory. In March 1948 India closed the flow of two rivers into Pakistan, cutting off water and energy to the city of Lahore and paralysing eight percent of Pakistan's arable land at the beginning of a growing season. At the time, India maintained its absolute right to control water flowing through its territory (in accordance with the Harmon doctrine outlined in Part One above). Pakistan refused to accept a situation in which it was at the complete mercy of India's good will—or bad will—for a significant part of its water supply, and charged that the withholding of water was an illegal use of force on India's part. Twelve years of intensive negotiations later, under the sponsorship of the World Bank, the two basin states came to a formal agreement regarding water rights.

The chief hydrological problem in the water-abundant basin is the efficient use of resources. Because of the seasonal precipitation, the rivers must be carefully managed and water levels controlled so that over-saturation of the land does not occur.

Important achievements of the 1960 treaty include the abandonment of each party's earlier position on its share of the basin's water, the stipulation of binding legal principles for the management of the basin, joint development programs, a sophisticated mechanism for the resolution of disputes, and provision for close scientific and technical cooperation.

The Legal Regime

The comprehensive legal regime is based on thorough hydrological research conducted by India, Pakistan and the World Bank. It emphasizes the unity of the basin

for purposes of development, yet separates water rights in a decisive manner, apportioning three of the six major basin rivers to India, and three to Pakistan. Each state has the exclusive right to utilize "its" river waters, with the provision that each must permit a free flow into the other country (this was subject to some exceptions). The guiding principle was the equitable utilization of the beneficial uses of the basin's waters, as distinguished from the waters themselves. Parties are also bound to prior notification of proposed water works. The settlement of the Indus dispute in this manner directly influenced the work of the ILA in formulating the Helsinki Rules.

The permanent Indus Commission, composed of two national commissioners, was charged by the 1960 treaty with its implementation and the promotion of cooperation in the development of the basin. The Commission's authority is extensive, and includes the initiation of hydrological studies, the settlement of disputes, undertaking tours of inspection, and appointing working groups under its authority.

The provisions made for conflict management are extensive. In the first instance, the Commission is obligated to negotiate. If negotiations do not succeed, it may then call upon a neutral expert ("a highly qualified engineer"). If he or she cannot resolve the issue, the dispute is then referred to mediators or a Court of Arbitration, the decision of which is final and binding, Time limits are imposed on these procedures, which greatly ameliorates their effectiveness.

Conclusion

It is difficult to imagine that the Indus Basin conflict would have been so well-managed without the consistent backing of the World Bank consortium, which was determined to see the establishment of a binding legal regime in the basin. The three parties to the 1960 agreements were careful to base their work on the binding legal principles of basin unity, equitable distribution and prior notification. At the same time, they built into the legal regime highly refined and hierarchical techniques for conflict management. As a result, hostility between India and Pakistan has not been eradicated, but joint water resources are being efficiently administered.

C. *SURVEY OF TREATY REGIMES (INCLUDING CASE STUDIES)*[*]

The following section surveys some legal regimes in a schematic manner. The four preceding analyses have also been condensed and included, for the sake of comparison. As stated above, some non-basin regimes have been included for their intrinsic interest and possible relevance to the Jordan River Basin. We reiterate that source materials reflect the resources available in Israel in 1992.

1. AMUR RIVER BASIN AND THE ARGUN RIVER

TREATY: Agreement on Joint Research Operations to Determine the Natural Resources of the Amur River Basin and the Prospects for Development of Its Productive Potentialities and on Planning and Survey Operations to Prepare a Scheme for the Multipurpose Exploitation of the Argun River and the Upper Amur River ("Peking Agreement").
DATE: August 18, 1956.
REFERENCE: UN Legislative Series, *Legislative Texts and Treaty Provisions Concerning the Utilization of International Rivers for Other Purposes than Navigation,*
ST/LEG/SER. B/12.
SOURCES: United Nations, *Management of International Water Resources: Institutional and Legal Aspects,* New York 1975, p. 199.
STATES PARTIES: former USSR and China.
COMMENTS: The Peking Agreement was intended to serve as a basis for research operations in the Amur River Basin between 1956 and 1960. Joint planning and survey operations are envisaged in the Agreement, to the eventual end of bilateral, multi-purpose exploitation of the basin's resources. The institutional framework consisted of a joint Scientific Council, the task of which was to coordinate and oversee the research; and national "all-purpose field parties." The field parties were to carry out surveys and other operations independently on their own national territory. In border areas, joint efforts were to be coordinated between parallel working groups.

Neither of these organs was entrusted with supra-national decision-making authority by the two governments, and each country was to bear the expenses of its own field parties and scientific council representatives.

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[*] *N.B.* Abbreviations used in this section are as follows: *AJIL - American Journal of International Law; BFSP - British Foreign and State Papers; ICLQ - International Comparative Law Quarterly; ILM - International Legal Materials; UNTS - United Nations Treaty Series; UN Doc. - United Nations Document; UST - United States Treaties; LNTS - League of Nations Treaties Series*

2. BALTIC SEA

TREATY: Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts ("Gdansk Convention"); Protocol Amending Gdansk Convention to Provide for EEC Membership; Convention on the Protection of the Marine Environment of the Baltic Sea Area ("Helsinki Convention").
DATE: September 13, 1973; November 11, 1982; March 22, 1974.
REFERENCE: 12 *ILM* 1291 (1973); 22 *ILM* 705 (1983); 13 *ILM* 544 (1974).
SOURCES: G. Alexandersson, *The Baltic Straits*, M. Nijhoff, The Hague-Boston-London, 1982; R. Laguni, "Baltic Sea," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 32.
STATES PARTIES: Denmark, Sweden, Finland, former USSR, Poland, Germany.
COMMENTS: The Baltic Sea is a special sea area which is often cited as a successful example of international cooperation among littoral states. Although territorial sea claims overlap in the maritime area, a series of bilateral and multilateral conventions has established a special cooperative regime along the lines of Articles 122 and 123 of the 1982 Convention on the Law of the Sea, which provide for enclosed and semi-enclosed seas. Several multilateral treaties (*i.e.*, the Gdansk Convention mentioned above) provide for the protection of fisheries in the sea area. The Helsinki Convention of 1974, signed by all littorals and having come into force in 1980, treats several areas of environmental concern in a comprehensive manner. Detailed measures of cooperation in preventing and combating marine pollution are outlined in the Convention's Annex VI. The Baltic Marine Environment Protection Commission was established under the Convention to ensure its implementation, although enforcement powers and measures have been left to the states themselves. Under Article 18 of the Convention, disputes which arise under its terms may be referred to the parties themselves for negotiation, or to third parties for use of their good offices, mediation, or arbitration. The International Court of Justice is the final instance for resolution of disputes. All of these methods must be agreed to by the parties. Finally, the Convention provides in its Article 16 for scientific and technological cooperation between the parties.

3. COLUMBIA RIVER BASIN

TREATIES: Treaty Relating to Boundary Waters and Questions Arising Along the Boundary Between Canada and the United States and the Establishment of an International Joint Commission; Treaty Relating to the Cooperative Development of the Water Resources of the Columbia River Basin; Exchange of Notes Regarding Sale of Canada's Entitlement & Downstream Benefits (with attached Protocol); Exchange of Notes Authorizing the Canadian Entitlement Purchase Agreement.
DATES: January 11, 1909; January 17, 1961; January 17, 1961; September 16, 1964.

REFERENCES: 102 *BFSP* 137 (1908-1909); 542 *UNTS* 244 (1965); 542 *UNTS* 302 (1965); 542 *UNTS* 312 (1965).

SOURCES: C. Bourne, "Columbia River," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 73; R. Johnson, "The Columbia Basin," in A. Garretson et al (eds), *The Law of International Drainage Basins*, Oceana, New York, 1967, p. 167; United Nations, *Management of International Water Resources: Institutional and Legal Aspects*, New York, 1975, p. 259; L. Bloomfield and G. Fitzgerald, *Boundary Waters Problems of Canada and the United States*, Carswell, Toronto, 1958.

STATES PARTIES: United States and Canada.

COMMENTS: The arrangements between the United States and Canada for joint administration and planning in the Columbia Basin provide an example of successful international cooperation in the joint management of water resources. The Joint Commission established in the 1909 Boundary Waters Treaty is invested with supra-national exclusive authority to permit works in the river basin, The Columbia Basin is rich in water resources, and has been an important source of hydroelectric power for both the US and Canada. Interestingly, much of this power is transferred out of the Columbia Basin, raising questions of the transportability of water-based energy. Canadian plans, developed during the 1940s and 1950s, to divert some of the basin's water resources themselves out of the basin were blocked by a special provision in the 1961 Treaty. In sum, the success of these arrangements has depended upon the economic interests of both states parties, an efficient and authoritative Joint Commission, solid technical background work and monitoring, and a reliable mechanism for the resolution of disputes, which is capable of binding the parties.

4. DANUBE RIVER BASIN

TREATY: Convention Regarding the Regime of Navigation on the Danube ("Belgrade Convention").

DATE: August 18, 1948.

REFERENCE: 33 *UNTS* 181-225.

SOURCES: L. Teclaff, "Fiat or Custom: The Checkered Development of International Water Law" 31 *National Resources Journal* 45 (1991); I. Seidl-Hohenveldern, "Danube River," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 80. United Nations, *Management of International Water Resources: Institutional and Legal Aspects*, New York, 1975, p. 206, G. Kaeckenbeek, *International Rivers*, Oceana and Wildy, New York and London, 1962, sections 98-180.

STATES PARTIES: former USSR, Germany, Austria, Bulgaria, former Czechoslavakia, Hungary, Romania, the Ukraine, former Yugoslavia.

COMMENTS: The Western bloc states did not originally recognize the Danube regime, which was established in 1948, under Soviet auspices. These states argued that the Convention could

not supersede the myriad earlier agreements between riparian states. Germany and Austria began to participate in the regime from 1960 on. Under its provisions, riparian states retain full control over those parts of the river which run through their territories, but must uphold freedom of navigation. Equality of treatment towards third parties is omitted, and right of access to river ports depends on bilateral arrangements between the flag state and the port states. Freedom of navigation is not extended to tributaries of the Danube. The Danube Commission, the task of which it is to oversee administration of the Convention, consists of state representatives of the riparians, although various sections of the river have separate special administrations (Braila to the Black Sea, Iron Gates). The powers of the Commission include maintenance and development of navigational facilities, levying of tolls, and long-term planning. Beyond its mandate in the field of navigation, the Commission is also concerned with the development of hydroelectric power, irrigation systems in the vicinity of the river, and underground water sources.

5. EMS-DOLLARD REGIME

TREATIES: Ems-Dollard Treaty; Supplementary Agreement Regarding Oil and Natural Gas Resources; Treaty of Cooperation.
DATES: April 8, 1960; May 14, 1962; September 10, 1984.
REFERENCES: 509 *UNTS* 4; 509 *UNTS* 140; [no reference available].
SOURCES: "Ems-Dollard," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 98.
STATES PARTIES: Germany, the Netherlands.
COMMENTS: The Ems-Dollard regime applies to a particularly complex marine area. The German river Ems flows through a shallow estuary separating Germany and the Netherlands before it enters the North Sea. The Dollard is a bay within this estuary. The two port cities on the estuary, one German and one Dutch, have access to the open sea only through channels which must be constantly dredged. In addition, the two states disagree on the location of the political boundary between them. Despite this problem, they have attempted to find pragmatic solutions to problems which arise in the common marine space.

In Article 1 of the Ems-Dollard Treaty, both parties reserve their claims with respect to the international boundary, and pronounce their commitment to cooperation in the area covered by it. The scope of the treaty goes beyond purely navigational matters to include hydraulic works, land reclamation, and fishing rights. The important principle of prior notification is enshrined in the Treaty: no party may unilaterally undertake changes in the estuary. A Joint Commission holds advisory competences, and a special arbitral tribunal determines solutions to controversies between the parties.

A supplementary agreement was concluded in 1962 to deal with the common development of newly discovered natural gas and oil resources, and include provisions for the sharing of revenues.

In a 1984 treaty, additional provisions address the environmental repurcussions of a German initiative to build a harbor and re-locate the river bed. Close cooperation in environmental cooperation is mandated by the establishment of the Ems-Dollard Advisory Commission, which may make recommendations to the governments in the economic and environmental fields.

It is important to emphasize that these working arrangements have been established in spite of a lack of agreement on sovereign rights in the area.

6. GAMBIA RIVER

TREATY: Convention for the Creation of the Gambia River Basin Development Organization ("Kaolack Convention").
DATE: June 30, 1978.
REFERENCE: UN Doc. ST/ESA/141, p. 42.
SOURCES: *The International Geographic Encyclopedia and Atlas*, de Gruyter, Berlin, 1979, p. 266; C. Legum and M. Doro (ed.s), *Africa Contemporary Record*, Holmes and Meier, New York, 1980, p. B611 and 1989, p. B29.
STATES PARTIES: Gambia, Guinea, Senegal, Guinea-Bissau.
COMMENTS: The Gambia River is 1,125 km in length. It rises in northern Guinea, flows northwest through Senegal, bisects Gambia along that country's entire length, and finally empties into the Atlantic at Banjul, Gambia's capital city. The river is navigable for the entire length of Gambia, and oceangoing vessels can travel from Bangul to Georgetown, 280 km upstream. Within Gambia, a chief use of the river is the transport of groundnuts and other crops for export.

The Gambia River Development Organization was originally based on the treaty regime established in 1963 for the Senegal River Basin. Its primary aim is the joint exploitation of Gambia River resources by the signatories, and projects have been initiated to improve irrigation and to contain salinization in the dry season. Much of the financial support for these projects is drawn from the international community.

One of the major objectives of the 1978 Convention was to utilize Gambia River resources to bring basin states to self-sufficiency in food agriculture. Two major projects undertaken so far, the bridge-barrage scheme at Ballingho, Gambia and an upstream dam at Kekriti in Senegal, have suffered from financial difficulties and have not yet been completed.

7. GANGES RIVER

TREATY: Agreement on Sharing of the Ganges Waters.
DATE: November 5, 1977.
REFERENCE: 17 *ILM* 103 (1978).

SOURCES: T. Hassan, "Ganges River," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 127; N. Gulhati, *Development of Inter-State Rivers: Law and Practice in India*, Allied Publishers, Bombay, 1972, pp. 165-173.
STATES PARTIES: India and Bangladesh.
COMMENTS: The Ganges is approximately 2510 km in length, and flows through India and Bangladesh, finally emptying into the Bay of Bengal. Historically, the chief uses of the river have been inland navigation and crop irrigation, although the river has tremendous hydroelectric potential. One of the major problems which plagues the river basin is silting, especially in the delta region. Other issues of contention are diversion of basin waters by India and the equitable division of resources between the basin states.

The 1978 Ganges Waters Treaty dealt with two topics: the equitable sharing of waters and regulation of basin flow. It does not address the question of the apportionment of rights, and leaves long-term planning to the Joint Rivers Commission established in 1972. Two extensions of the 1978 Treaty's legal force have been approved but concrete planning proposals have not been adopted so far.

8. GREAT LAKES BASIN

TREATIES: Boundary Waters Treaty; Agreement Between the USA and Canada Concerning the Great Lakes Water Quality; Agreement on Great Lakes Water Quality.
DATES: January 11, 1909; April 15, 1972; November 22, 1978.
REFERENCES: *Martens Nouveau Receuil,* Vol. 4 (1911) 208-216; Canada Treaty Series No. 12 (1972); 30 *UST* 1383 (1978-1979).
SOURCES: D. Piper, "Great Lakes," in R. Berhhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 134.
STATES PARTIES: United States and Canada.
COMMENTS: The Great Lakes cover an area of 5,000 square miles, and constitute the largest body of fresh water in the world. They lie on the border between the U.S. and Canada, and these two countries have established a legal regime for the joint management of the lakes. Cooperative efforts include regulation of navigation, pollution control, fishing rights, and monitoring of water quality.

Although several bilateral treaties govern the Great Lakes, the most comprehensive is the 1909 Boundary Waters Treaty, which establishes a general regime regarding all uses of the waters except for navigation. This treaty empowers a bilateral Joint Commission to investigate disputes, recommend solutions to problems which arise, and to initiate technical studies. The Boundary Waters Treaty also requires cooperation between Canada and the U.S. in the utilization of the lake waters which are international (*i.e.*, the four lakes excluding Lake Michigan, which lies entirely

in U.S. territory). Projects undertaken by either country, even in its own territory, require the prior approval of the Joint Commission.

The major conflicts which have arisen in recent years involve the problem of diversion of waters in the Great Lakes basin (one U.S. project diverts water out of this basin and into the Mississippi Basin), fluctuations in the water level, and pollution. In 1972 and 1978, bilateral treaties were signed dealing with the last topic.

9. INDUS WATERS BASIN

TREATY: The Indus Waters Treaty.
DATE: September 19, 1960.
REFERENCE: 419 *UNTS* 125 (1962).
SOURCES: D. Rauschning, "Indus Waters Dispute," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 6, North-Holland, Amsterdam-New York-Oxford, 1990, p. 214; A. Michel, *The Indus River*, Yale University Press, New Haven, 1966; R. Barter, "The Indus Basin," in A. Garretson et al (eds), *The Law of International Drainage Basins*, Oceana, New York, 1967, p. 443; N. Gulhati, *Development of Inter-State Rivers: Law and Practice in India*, Allied Publishers, Bombay, 1972, pp. 133-164.
STATES PARTIES: India, Pakistan, The World Bank (IBRD).
COMMENTS: The Indus Waters regime provides an important example of the equitable sharing of water reesources between two hostile countries. A crucial role in financing and enforcing the agreement is played by the World Bank, which undertook the resolution of the Indus waters dispute during the 1950s. The regime's scope covers six major rivers located in the Indus Basin. In effect, it divides the basin between India and Pakistan in accordance with the principle of equitable utilization: the three western rivers (Indus, Jhelum, Chenab) come under the exclusive control of India; and the three eastern rivers (Ravi, Beas, Sutlej) under that of Pakistan. There exists close coordination between the two countries for purposes of controlling water flow, chiefly from Indian territory into Pakistani territory.

The outstanding characteristic of the Indus Basin is its huge and intricate irrigation network, which is the largest in the world. Although thousands of years old, it was rebuilt and systematized by the British during the nineteenth and twentieth centuries. Upon independence of India and Pakistan in 1947, a major water conflict between them erupted, and Pakistan's water supply was partially cut off. The Indus Treaty of 1960 represents the fruit of long-term negotiations between the parties.

The Treaty provides for equitable division of water resources, as stated above; for joint projects and development under the supervision of a Joint Commission and for regulation of water flow. An additional agreement between Pakistan and the World Bank deals with future development of that country's irrigation system.

Although the 1960 Treaty effectively divides the Indus Basin in two, it represents yet another codification of the principle of equitable sharing of water resources, and the peaceful settlement of a severe international dispute on a pragmatic basis.

10. LA PLATA RIVER BASIN

TREATIES: Treaty for La Plata Basin [and other bilateral treaties between basin states].
DATE: April 23, 1969.
REFERENCE: 875 *UNTS* 3 (1973).
SOURCES: W. Hummer, "La Plata Basin" in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 6, North-Holland, Amsterdam-New York-Oxford, 1990, p. 245; UNITAR, *International Navigable Waterways*, New York, 1975, p. 161; R. Hayton, "The Plata Basin," in *The Law of International Drainage Basins*, A. Garretson et al (eds), Oceana, New York, 1967, p. 298.
STATES PARTIES: Argentina, Brazil, Uruguay, Paraguay, Bolivia.
COMMENTS: The Plata Basin covers one-sixth of the land area of the South American continent, and contains four major international rivers (the Uruguay, the Parana, the Paraguay, and Rio de la Plata). The numerous tributaries of which are also governed by the La Plata regime. The basin is characterized by its moderate slope, making silting of the waterways a prime problem for the riparian states, which all depend heavily upon the rivers for inland transport.

It is important to emphasize that the 1969 Treaty is in fact an "umbrella" for a number of bilateral agreements between riparians regarding the management and regulation of specific rivers. As such its territorial scope is extremely wide, extending to the Basin and "its areas of influence which are immediate and identifiable." The two principal organs of implementation are the Meetings of the Foreign Ministers of the Basin States and the Inter-Governmental Coordinating Committee. The former meets only infrequently and makes policy decisions; the latter supervises the day-to-day implementation of the treaty, but has little authority beyond the formulation of recommendations and the establishment of *ad hoc* technical commissions. The regime has thus been plagued by inefficient management and a lack of true supra-national authority.

11. LAKE CHAD BASIN

TREATY: Convention and Statute Relating to the Development of the Chad Basin and Additional Protocols.
DATE: May 22, 1964; October 22, 1972; December 3, 1977.
REFERENCES: 18 *Journal Officiel de la republique federale de Cameroon* 1002 (1964); 34 *ZabRV* 936 (1974); 10 *Journal Officiel* 927 (1978).

SOURCES: P. Sand, "Lake Chad," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 213; I. Agoro, "The Establishment of the Chad Basin Commission," 15 *ICLQ* 542 (1966).
STATES PARTIES: Cameroon, Chad, Niger and Nigeria.
COMMENTS: Lake Chad is situated in one of the most arid regions of the globe, surrounded by states which disagree about the political borders betwen them, are in dire need of water, and have come into military confrontation about these issues in the past. In addition, the lake's size fluctuates greatly according to season: at its largest it can extend over 25,000 km^2, yet it reaches a maximum depth of only 10 meters.

The Lake Chad Convention and Statute, together with additional protocols, declare the basin open to the use of all member states without prejudice to sovereign rights. Common rules of navigation are to be agreed upon. Most importantly, Article 5 of the Convention requires prior consultation before the initiation of any measures which are likely to affect water quality or quantity. The Lake Chad Basin Commission coordinates policy and utilization of the basin and has the capacity to act as a body for dispute settlement. It consists of two representatives from each littoral state.

A major impetus to the adoption of the treaty was the committment of the United Nations Development Program to invest in the future development of Lake Chad. Other UN organs (UNESCO, FAO) have also supported efforts to coordinate policy and to improve the water quality of Lake Chad.

One drawback in the original Convention is the exclusion of the Central African Republic, also a basin state, although negotiations are underway to repair this situation.

A variety of UN-financed development studies have been initiated in the basin, although the future survival of Lake Chad is currently in question.

12. LAKE GENEVA

TREATIES: Convention on the Determination of the Boundary of Lake Geneva; Franco-Swiss Agreement (1976); Convention for the Protection, Use and Recharge of the Genevois Water Table; Franco-Swiss Agreement (1980); Franco-Swiss Convention Concerning the Protection of the Waters of Lake Geneva Against Pollution; Agreement on the Dephosphorization of the Waters of Lake Geneva.
DATES: February 25, 1953; December 7, 1976; June 9, 1978; November 20, 1980; November 16, 1962.
REFERENCES: [Swiss] *Receuil officiel des lois federales*, 1957, p. 884; [French] *Journal officiel de la Republique Francaise* (1978), p. 1987; [no ref.] [French] *J.O.* (1981) p. 3489; 922 *UNTS* 50.
SOURCES: M. Villiger, "Lake Geneva," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 219.
STATES PARTIES: France and Switzerland.

COMMENTS: The political boundary between France and Switzerland on the waters of Lake Geneva has been satisfactorily determined in the past by long-standing treaties and agreements. However, the joint utilization of lake waters was not addressed in earlier treaties, and therefore has been treated only recently. In 1924 a Joint Commission was established to deal with issues of use which arise. Navigation on the lake is governed by a 1976 agreement, and fishing rights by a 1980 treaty. Severe levels of pollution in Lake Geneva led to a 1962 Convention providing for cooperation between the two countries in this matter, including the establishment of an International Commission with the Protection, Use and Recharge of the Genevois Water Table and Agreement on the Dephosphorization of the Waters of Lake Geneva.

13. LOWER MEKONG BASIN

TREATIES: Convention Between France and Siam; Paris Convention; Pau Convention; Statute of the Committee for Coordination of Investigations of the Lower Mekong Basin.
DATES: February 14, 1925; December 29, 1954; December 23, 1950; October 31, 1957.
REFERENCES: 43 *LNTS* 189; 8 *Annuaire Française de Droit International* 112 (1962); *UN Doc.* E/CN.11/WRD/MKG/L.237 (1968); Legislative Texts and Treaty Provisions Concerning the Utilization of International Rivers for Other Purposes than Navigation, UN Doc. ST/LEG/SER.B/12.
SOURCES: P. Lawrence, "Mekong River," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 225; *Management of International Water Resources: Institutional and Legal Aspects*, United Nations, New York, 1975, p. 230; W. Griffin, "The Use of Waters of International Drainage Basins under Customary International Law," 53 *AJIL* 50 (1959).
STATES PARTIES: Burma, Laos, Thailand, Cambodia, South Vietnam and France (acting in the past on behalf of its protectorates).
COMMENTS: In 1957, at the instigation of the United Nations Economic Commission for Asia and the Far East (ECAFE), a single umbrella committee was formed to oversee the management of the Lower Mekong Basin, called the Committee for Coordination of Investigations of the Lower Mekong Basin ("The Mekong Committee"). The governments of Cambodia, Laos, Thailand, and South Vietnam are each represented on the Committee by a single member. In December 1958, the Committee appointed a permanent Executive Agent to oversee the day-to-day implementation of the basin agreements and an international Advisory Board to advise on technical matters. Each member state has also established a National Mekong Committee to coordinate national and joint basin policy.

The Mekong Committee holds basic powers of coordination and recommendation, and has initiated many joint projects in a variety of areas (dam projects, fisheries, pump irrigation, environmental and health surveys, and flood control surveys, for example).

14. MEDITERRANEAN SEA BASIN

TREATY: Convention for the Protection of the Mediterranean Sea against Pollution ("Barcelona Convention"); Protocol for the Prevention of Pollution by Dumping from Ships and Aircraft; Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency; Protocol Against Pollution from Land-Based Sources; Protocol Concerning Mediterranean Specially Protected Areas.
DATE: February 16, 1976; February 16, 1976; February 16, 1976; May 17, 1980; April 2, 1982.
REFERENCE: 15 *ILM* 290 (1976); *ibid* at 300; *ibid* at 306; 19 *ILM* 869 (1980); 21 *ILM* (1982).
SOURCES: S. Milenkovic, "Mediterranean Pollution Conventions," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 9, North-Holland, Amsterdam-New York-Oxford, 1986, p. 264; G. Timagenis, *International Control of Maritime Pollution*, Vol. 1, Oceana, Dobbs Ferry N.Y., 1980, p. 294; S. Truver, *The Strait of Gibraltar and the Mediterranean*, Sijthoff and Noordhoff, The Netherlands-USA, 1980.
STATES PARTIES: Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Lybia, Malta, Monaco, Morocco, Spain, Tunisia, Turkey, former Yugoslavia.
COMMENTS: Although this maritime area does not fit into the definition of an international drainage basin, the Barcelona Convention and its subsequent protocols provide an important precedent for large-scale regional cooperation for the management of a common water resource. The trend of pollution of the Mediterranean is so severe that the Sea is in real danger of biological death: hence the motivation for close cooperation between basin states. No new international bodies have been created by the Convention; rather, states parties are required to implement monitoring procedures, pollution control, regular reporting, and to closely control the issuance of pollution permits. Regular meetings between states parties provide a framework for ongoing exchange of information. A legal difficulty with the Barcelona Convention is the fact that it is not self-executing, thus requiring national legislation of its provisions by states parties.

15. MOSELLE RIVER

TREATY: Moselle Treaty and four subsequent protocols.
DATE: October 27, 1956; December 20, 1961; November 28, 1974; June 23, 1983; May 12, 1987.
REFERENCE: [German] *Bundesgesetzblatt* (1956 II) 1838-1862; 940 *UNTS* 211; [German] *Bundesgesetzblatt* (1975 II) 1110; [German] *Bundesgesetzblatt* (1984 II), 539-540; [German] *Bundesgesetzblatt* (1988 II) 587.
SOURCES: G. Nolte, "Moselle River," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 228.
STATES PARTIES: France, Luxembourg, Germany.

COMMENTS: Only after World War II was an international regime for the Moselle established. It has been likened to the regime applying to the Rhine, although an important difference is the toll system in use on the Moselle. The chief concern of the Moselle Treaty and its protocols is river navigation, including the transboundary transport of goods and persons between Metz and Coblenz. It does not cover cabotage transports. The principle of freedom of navigation applies *ergo ommes*, including equal areas to public ports and certain river installations.

The Moselle Commission, which consists of representatives of Member States, supervises the implementation of the Treaty and Protocols. It has no direct powers of enforcement, and relies upon States Parties to give effect to its recommendations. Pollution control is regulated by a separate international commission.

Settlement of disputes is provided for in the framework of Moselle Shipping Tribunals, the decisions of which may be appealed by an independent Appeal Board of the Moselle Commission. Disputes may also be referred to an international arbitration procedure.

16. NIGER RIVER BASIN

TREATIES: Act Concerning Navigation and Economic Cooperation Between States of the River Niger Basin ("Niamey Act"); Agreement Concerning the Commission of the River Niger and Navigation and Transportation on the River Niger; Convention Establishing the Niger Basin Authority.

DATES: October 26, 1963; November 25, 1964; November 21, 1980.

REFERENCES: 587 *UNTS* 9, 587 *UNTS* 19, 10 *Annuaire Française de Droit International* 813 (1964); [reference not available].

SOURCES: Schrieber, "Vers Un Nouveau Regime International du Fleuve Niger," 9 *Annuaire Française de Droit International*, 866 (1963); L. Teclaff, "Fiat or Custom: The Checkered Development of International Water Law" 31 *National Resources Journal* 45 (1991); *Management of International Water Resources: Institutional and Legal Aspects*, United Nations, New York, 1975, p. 240; G. Ofosu-Amaah, "Niger River Regime," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 247; G. Kaeckenbeek, *International Rivers*, Oceana and Wildy, New York and London, 1962, sections 181-274.

STATES PARTIES: Guinea, Mali, Ivory Coast, Niger, Nigeria, Chad, Cameroon, Benin, Burkina Faso.

COMMENTS: Freedom of navigation is ensured in the treaty for ships of all flags plying the Niger River, tributaries, and subtributaries. Each riparian has the right to develop the waters under its jurisdiction. A joint commission is changed with the enactment of implementory regulations.

The 1963 Act provides for close cooperation between basin states in exploiting resources of the basin, and guarantees freedom of navigation to signatories and third parties on the Niger River, tributaries, and subtributaries. The scope of the treaty extends to navigational, agricultural and

industrial uses of the waters, including exploitation of flora and fauna. The Niger River Commission is entrusted with coordinating policies and implementing the treaty. The basin states are required to notify the Commission (replaced in 1980 by the Niger Basin Authority) of any projects or plans which may have an effect on basin waters. In 1980 several reforms occurred in the original regime to the end of increasing its efficiency. The governing body is the Conference of Heads of States and Government, a Council of Ministers serves as a controlling organ, and an Executive Secretary is responsible for administration. Disputes which are not settled by negotiation are to be brought before the Conference, the decisions of which are consensual, conclusive and binding.

17. NILE RIVER BASIN

TREATY: Agreement for the Complete Utilization of the Nile Waters and Protocol Concerning the Establishment of the Permanent Joint Technical Committee; Owen Falls Dam Agreement (Exchange of Notes), Kagera Basin Agreement.
DATE: November 8, 1959; January 17, 1960; 1949-1955; [date not available].
REFERENCE: 453 UNTS 51 (1964); Command Paper 9642, *Great Britain Treaty Series* 85 (1955); [reference not available].
SOURCES: *Management of International Water Resources: Institutional and Legal Aspects*, United Nations, New York, 1975, p. 242; A Garretson, "The Nile Basin," in Garretson et al, *The Law of International Drainage Basins*, Oceana, New York, 1967, p. 256; W. Griffin, "The Use of Waters of International Drainage Basins Under Customary International Law," 53 *AJIL* 50 (1959); N. Kliott and A. Soffer, *Water Scarcity*, 1992 (unpublished); A. Garretson, "The Nile River System," *Proceedings of the American Society of International Law* (1960), p. 136.
STATES PARTIES: United Arab Republic [succeeded by Egypt], Sudan.
COMMENTS: Historically, Egypt has been the user of the largest quantity of Nile waters, followed by Sudan and the rest of the riparians (in order of share in basin area: Ethiopia, Uganda, Tanzania, Kenya, Zaire, Rwanda and Burundi). Although Egypt and Sudan contribute no water to the Nile other than sparse precipitation, according to present utilization patterns these two countries take advantage of 98 percent of the river's total water supply. This has been justified by their extreme economic and social dependence upon Nile waters. The 1959 Nile Waters Agreement between the UAR (Egypt) and Sudan is thus characterized by its incomplete nature: only two of the Nile's nine riparians are party to the regime. Its purpose is less the equitable utilization of Nile waters than ensuring a constant and adequate supply to Egypt. Article 1 of the Agreement determines allocation of water shares according to historical and established rights, according to which Egypt enjoys a 2/3 share of the Nile waters and Sudan the remaining 1/3. The other two agreements (Owen Falls and Kagera) deal with hydroelectric power, and will not be discussed here.

The 1954 Agreement and its 1960 Protocol provide for cooperation in carrying out hydrological survey work on the upper reaches of the Nile; for the implementation of joint projects; and for securing adequate water supplies for each country. An eight-member Joint Technical Committee holds executive authority for carrying out the agreement and developing the Nile's resources, although its proposals must be approved by the two governments.

18. ORINOCO RIVER BASIN

TREATY: Statute Regulating the Frontier Regime; Joint Declaration of Bogota; Joint Presidential Declaration of July 1976.
DATE: August 5, 1942; August 9, 1969, July 23, 1976.
REFERENCE: *Coleccion de Tratados Publicos y Acuerdos Internacionales de Venezuela*, Vol. 7 (1945), p. 422; [reference not available]; [reference not available].
SOURCES: S. Burchi, "Orinoco River" in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 271.
STATES PARTIES: Columbia and Venezuela.
COMMENTS: The Orinoco River Basin covers 950,000 square kilometers, and encompasses 4/5 of Venezuelan territory and 1/4 of Columbian territory. The river and its tributaries have been important historically as major lines of transportation, communication and commerce: They flow through two countries and spill out into the Atlantic Ocean. A principal concern of the states parties to the legal regime is freedom of navigation, which was unilaterally granted on the waters within Venequelan territory to all nations engaged in inland trading in 1869, subject to several procedural requirements. The 1942 bilateral Statute governs other uses of the waters as well, including fishing and boating. The joint declarations of 1969 and 1976 call for further joint development of the river by means of a mixed commission, although formal arrangements have not yet been concluded.

19. RED SEA BASIN

TREATY: Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment ("The Jeddah Treaty"); Protocol concerning Regional Cooperation in Combating Pollution by Oil and Harmful Substances in Cases of Emergency.
DATE: February 14, 1982.
REFERENCE: W.E. Burhenne (ed.), *International Environmental Law, Multilateral Treaties,* 982:13/11-14 (1974 with supplements); *Ibid.*
SOURCES: S. Less, "Red Sea" in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 302; F. Ali Taha, "The Conservation

of the Red Sea and the Gulf of Aden Environment," 42 *Revue Egyptienne de Droit International* 229 (1986).

STATES PARTIES: Jordan, Saudi Arabia, Sudan, Somalia, Democratic Republic of Yemen, Arab Republic of Yemen, "Palestine" [*sic*].

COMMENTS: The Jeddah Treaty represents an attempt on the part of several littorals on the Red Sea to embark upon a joint program of preservation of Red Sea waters and their utilization. However, it is important to note that three littorals have been expressly excluded from the regime: Egypt, Ethiopia and Israel. Article 2 (1) of the treaty provides that the regime applies to the sea areas and ecosystems of the Red Sea, Gulf of Aden, Gulf of Suez, and the Suez Canal. Internal waters of the contracting parties are excluded from its scope. Its objectives include the development of coastal and marine resources, protection of the ecosystem, pollution control and prevention, and development of Red Sea resources. An eventual goal of the Convention is the harmonization of national policies in these areas. The Protocol to the Jeddah Treaty provides for the establishment of a Marine Emergency Mutual Aid Center, which will be subject to the supervision of the Commission of the Regional Organization for the Conservation of the Red Sea and Gulf of Aden Environment, the headquarters of which are in Jeddah. The Commission consists of a Council, a General Secretariat and a Committee for the Settlement of Disputes. Article 24 of the Convention obliges the parties to settle disputes by negotiation. In the event that a solution is not reached, the dispute will be referred to the Council and then to the Committee for the Settlement of Disputes, the decision of which is binding.

In general, the Jeddah Treaty has not been well-implemented by the states parties. Undoubtedly, full and effective implementation of its provisions depends upon the future participation of all littoral states, not only the signatories.

20. RHINE RIVER BASIN

TREATY: Rhine Navigation Convention of Mannheim; Treaty of Versailles; Revised Mannheim Convention and Additional Protocols; Agreement for Protection of the Rhine

DATE: October 17, 1868; June 28, 1919; November 20, 1963; April 29, 1963.

REFERENCE: 138 *Darry's Treaty Series* 167; 225 *Parry's Treaty Series* 189; [German] *Bundesgesetzblatt* 1966 (II), p. 561; 994 *UNTS* 3.

SOURCES: L. Teclaff, "Fiat or Custom: The Checkered Development of International Water Law":, 31 *Natural Resources Journal* 45 (1991); F. Meibner, "Rhine River," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 310; W. Eysinga, *La Commission Centrale pour la navigation du rhin*, Sijthoff. Leiden, 1935; G. Kaeckenbeek, *International Rivers*, Oceana and Wildy, New York and London, 1962, pp. 80-88.

STATES PARTIES: Many original signatories are no longer in existence. Today, the regime binds Belgium, Germany, The United Kingdom, France, The Netherlands, and Switzerland.

COMMENTS: The Rhine is one of the world's most important international rivers: It is the second-most-frequently navigated waterway (after the Great Lakes), a main artery for European trade and commerce, and a major source of drinking water for two of its riparians, Germany and the Netherlands. Legally speaking, the Central Commission for the Navigation of the Rhine, established in 1831, was the first true supranational organization invested with independent jurisdictional powers. Many multilateral and bilateral treaties have been concluded among riparians for management of Rhine resources (especially commerce and navigation), yet only the most general ones will be dealt with here.

The most important innovations introduced by the original Mannheim Convention ensured freedom of navigation to all nations (now restricted to European Community member states) and the elimination of trade barriers in order to encourage riparians are permitted to enforce national regulations under police law to maintain public safety on the Rhine and to reduce shipping risks.

The Central Commission for the Navigation of the Rhine is a standing conference of the governments of the states parties. It acts as both a legislative commission for the Mannheim Convention's implementation and a judicial instance the decisions of which are binding and enforceable in riparian states. It issues Agreed Regulations in matters of safety, social welfare, taxes and technical aspects of the Agreement's implementation. The Commission is also charged with supervision of the Agreement's provisions.

Specific agreements have been concluded between riparians to control the level of pollution in Rhine water.

With the advent of the Eueopean Community, conflicts have arisen between the Rhine regime and the European Community legal system (especially in the area of trade and commerce), since all of the riparians except for Switzerland are European Community members. These conflicts are both institutional and substantive, and have not yet been resolved.

21. RIO GRANDE BASIN

TREATY: Upper Rio Grande Treaty; Utilization of Waters Treaty; Lower Rio Grande Treaty.
DATE: May 21, 1906; February 3, 1944; November 14, 1949.
REFERENCES: *US Treaty Series*, No. 455; [reference not available]; *US Treaty Series*, No. 994.
SOURCES: W. Griffin, "The Use of Waters of International Drainage Basins Under Customary International Law," 53 *AJIL* 50 (1959); C. Meyers, "The Colorado Basin," in A. Garretson (ed.), *The Law of International Drainage Basins*, Oceana, New York, 1967, p. 486; *Management of International Water Resources: Institutional and Legal Aspects*, United Nations, New York, 1975, p. 233; H. Baade, "American-Mexican Boundary Disputes and Cooperation" ("The Rio Grande Boundary"), in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 6, North-Holland, Amsterdam-New York-Oxford, 1980, p. 8; *Chamizal Arbitration*, 11 *RIAA* 309 (1911).
STATES PARTIES: US and Mexico.

COMMENTS: The treaties concluded between Mexico and the U.S. symbolize the rejection of the earlier US doctrine, called the Harmon doctrine, and embody the principle of equitable utilization of river waters by upstream and downstream states. Generally speaking, the USA has committed itself to reimbursing Mexico for upstream use of Rio Grande waters in accordance with equitable utilization. Inevitably, the issue of the international boundary between the two riparians has been a stumbling block to the resolution of questions of co-utilization of the Rio Grande. Additionally, the course of the river is subject to constant change because of uneven (and at times torrential) water flow. Boundary questions aside, the distribution and management of Rio Grande waters have been treated by several agreements in this century. Perhaps the most important is the 1944 Utilization of Waters Treaty, which extended the jurisdiction of the already-existing joint boundary commission and gave if its present appellation as the International Boundary and Water Commission. It is composed of a Commissioner and a Consulting Engineer from each riparian. The joint decisions of the former are binding on both governments. The reduction of border disputes in the past several decades has contributed greatly to the efficiency of joint management of Rio Grande resources.

Specifically, the 1944 Treaty determines priorities for utilization of the shared waters as follows: (1) domestic and municipal use; (2) agricultural and stock-raising; (3) electric power; (4) other industrial uses; (5) navigation; (6) fishing and hunting; (7) other beneficial uses. All of these are subject to necessary sanitary measures.

22. SENEGAL RIVER BASIN

TREATY: Convention Concerning General Development of the Basin of the Senegal River; Additional Agreement of 1964.
DATE: July 26, 1963; February 7, 1964.
REFERENCE: *Africa South of the Sahara*, 1979-1980, Europa, London, 1979, p. 110.
SOURCES: L. Teclaff, "Fiat or Custom: The Checkered Development of International Water Law," 31 *Natural Resources Journal* 45 (1991); *The International Geographic Encyclopedia and Atlas*, de Gruyter, Berlin, 1979, p. 699; C. Legum and M. Doro (eds), *Africa Contemporary Survey*, Holmes and Meier, New York, 1989, p. B141-142; *Africa South of the Sahara*, 1979-80, Europa, London, 1979, p. 110.
STATES PARTIES: Mauritania, Senegal, Mali (Guinea has withdrawn).
COMMENTS: The Senegal River itself is 1,610 km in length, formed by the confluence of the Bafing and Bakoy Rivers, both of which rise in northern Guinea. The Senegal proper is formed in southwest Mali, and then flows north west to form the Mauritania-Senegal border before emptying into the Atlantic. It is an important source of irrigation water for the basin states. Within the framework of economic cooperation envisaged by the Convention, two dams have been constructed at Diama, at the river's mouth, and Manantali, Mali; in order to prevent salt water from the Atlantic from entering the river, to provide irrigation, to ease navigation, to give

Mali access to the Atlantic, and to provide hydroelectric power. A major project recently undertaken is the hydro-electric project at Manantali, which is suffering from lack of funding.

The body responsible for administering the Convention is the Organization for the Development of the Senegal River. It was founded in March 1972 to replace earlier, similar organizations, and is composed of three bodies: the Conference of Heads of State, Council of Ministers, and High Commission. The first two are advisory groups which determine and approve general policy for Senegal Basin Development. The High Commission is the executive body of the organization, and is responsible to the first two for policy implementation.

In 1974, the Heads of State approved an overall development plan for the basin, which is to be carried out before the year 2014. It includes hydroelectric projects, port development, agricultural development, industry, mining projects and a transport system for these last.

III. SOME LESSONS GARNERED FROM THE COMPARATIVE SURVEY OF LEGAL REGIMES

We have classified these findings into two types, legal and administrative. They are addressed separately, although in practice there may be overlap and cross-influence in their inclusion in a specific international agreement.

A. *LEGAL*

The regimes studied are embodied in a variety of legal documents. Most take the form of a single, comprehensive treaty signed by all of the basin states. Less commonly found were bilateral agreements within a multi-national basin governing specific rivers, or treaties which were signed in succession (*i.e.*, a preliminary accord followed by a transitional period at the conclusion of which a final agreement was signed). Many instances were noted of a series of multilateral treaties which dealt with various topics, such as navigation, fishing, environmental quality and groundwater. Although bilateral, serial or topical treaties represent a viable political option, the most efficient legal regimes are the most comprehensive: those which include all basin states and deal with a majority of the problematic issues which are liable to arise within the basin. An additional point to be considered in this context concerns the legal and practical difficulties when a single (or several) basin states have not given their express consent and support to the legal regime: clearly, basin development will suffer, as it is not possible to force their compliance, given the present state of international water resources law.

The inclusion of specific over-arching principles of international water law in the treaty is important. It clarifies the rights of the parties and tends to narrow differences of opinion in any future disputes which arise. Also joint planning benefits from the establishment of legal guidelines of the type found in the ILA's Helsinki Rules. In particular, equitable utilization of basin resources, prior notification, coordination of basin state water policies and joint basin development ought to be firmly anchored in the legal regime.

Perhaps the crucial element for a successful basin regime is the assignment by member states of real authority to a joint international commission. The commission bears direct responsibility for implementation of the treaty, and should be vested with investigative, legislative, and executive powers to that end. Policy may be determined either by the commission or some other forum, but provision should be made for frequent examination and evaluation of its implementation.

Of equal importance is the presence of an effective, hierarchical mechanism for conflict management to which the basin states agree to be bound in advance. The commission may fulfill this function, or special judicial instances may be established as needed. The usefulness of such a mechanism is reinforced when procedures are outlined in detail, including timetables for the decision made at each successive level and the composition of arbitral boards.

The territorial scope of the basin regime should be well-defined.

Decisions regarding the drainage basin's management and future contingencies should be taken by consensus among basin states.

Finally, it is highly desirable to aim for the eventual harmonization of national water laws within the basin, although this objective has rarely been achieved.

B. *ADMINISTRATIVE*

The functions of the joint international commission are best outlined as clearly as possible within the treaty. Technical and scientific advice should be readily available: it is difficult to overemphasize the key role played by hydrologists and engineers in the ongoing success of regimes such as the Columbia and the Indus, for example. Other working groups which might be useful to the commission could deal with environmental quality, aquifers, financing, basin development, and specific uses of the basin such as fishing, agriculture, and navigation.

The issue of financial support for basin development is beyond the scope of this study, yet it should be noted that external financing has often proven to be an effective galvanizing force for recalcitrant states (as in the Lake Chad Basin and the Indus Basin).

On the other hand, internal financing permits the basin states much more freedom to determine long-range policy and planning goals. A compromise solution might be to allow international investment and corresponding policy input, subject to the consensual approval by basin states.

Extensive technical surveys and joint data collection would seem to be a pre-requisite to the establishment of an effective regime based on equitable distribution.

As we mentioned in the Introduction above, the hydrological basin often does not conform to other "resource basins" or "planning basins," and it is well to be aware in advance of possible conflicts. On the other hand, it is important to limit the scope of the treaty regime according to the implementative authority which states are prepared to transfer to the Joint Commission, in order to ensure the latter's effectiveness.

IV. CONCLUSION: SOME RAMIFICATIONS FOR THE JORDAN RIVER BASIN

It is not proposed in the present context to offer a radically new or comprehensive solution of the water problems of the Jordan River Basin. That is a matter for internal policy-makers in the basin states to decide and finalize through multilateral negotiations. Rather, some general points are raised on the basis of the comparative survey outlined in previous sections.

The ultimate consideration in any proposed solution ought to be *the future welfare of the resources contained in the entire drainage basin.* As stressed above, the basin is a critical hydrological unit, and damage done to any part of it inevitably affects the whole. Thus, construction of factories, dams or other water projects along the Jordan or its feeders by any state ought to be coordinated with other basin states, and ought to conform to strict hydrological and ecological criteria. Ideally, a future agreement will specifically adopt the principle of *equitable distribution*, permitting *flexibility* in the division of basin benefits through the exchange of (for example) phosphate products extracted by Israel from the Dead Sea for an increased water supply in the northern basin.

Any future arrangements should be firmly based on prior *joint technical and scientific studies*, which ought to be maintained on an ongoing basis following the conclusion of a treaty. The present mode of cooperation between Israel and Jordan might serve as a catalyst for this process.

An effective regime for conflict management, including binding methods of dispute resolution between basin states, must be instituted. This regime could take into account

the legal principles applied within the Arab states as well as Israel. Likewise, a *joint international commission* possessing powers of implementation is essential. This commission may be composed of international water or financial planning experts, as agreed by the parties to the regime.

International versus regional *funding* is another crucial issue to be considered by the basin states, the primary consideration being the feasability of full and effective implementation of a long-range plan for basin development.

Other regimes have shown that the highly problematic isue of state sovereignty over portions of joint water resources can be effectively sidestepped by focusing on *technical solutions to practical problems*. The outstanding example is the Indus regime, where a third party (the World Bank) intervened to impress upon the parties the crucialness of cooperation. Political sacrifices do not necessarily have to be an element of the basin regime, especially where the principle of equitable distribution is applied.

In summary, joint management of the Jordan River Basin would appear not only to be feasible at this stage, but also absolutely necessary for the preservation of water resources. *Tempus fugit.*

NOTES

1. See, for example, G. Fishelson, *The Middle East Conflict Viewed Through Water: A Historical View*, The Armand Hammer Fund for Economic Cooperation in the Middle East, Tel Aviv University, 1989; J. Starr, "Water Wars," 82 *Foreign Policy* 17 (1991); and M. Elliott, "The Global Politics of Water," *The American Enterprise*, September/October 1991, pp. 27-31.
2. FAO, *Systematic Index of International Water Resources Treaties, Declarations, Acts and Cases by Basin*, Vols I and II, United Nations, Rome, 1978 and 1984.
3. *Report of the UN Water Conference*, Mar del Plata, March 14-25, 1977, UN Doc. E/Conf.70/CBP/1 at 10 (1977).
4. These statistics are taken from J. Barberis, "Water, International Regulation of the Use of," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 9, North-Holland, Amsterdam-New York-Oxford, 1986, p. 406.
5. *Ibid.* See, for example, the *Report of the International Water Resources Law Committee* (prepared under the auspices of the International Law Association and presented at its sixty-second conference in Seoul, Korea in 1986), which specifically addresses groundwater issues. (*See* Appendix 4). Another helpful reference is J. Barberis, "The Development of International Law of Transboundary Groundwater," 31 *Natural Resources Journal* 167 (1991).
6. As explained in H. Shuval, "Approaches to Resolving the Water Conflicts between Israel and Her Arab Neighbors - A Regional Water-for-Peace Plan" [draft copy] (publication pending in *Water International - Journal of the International Water Resource Association*)
7. The water stress readings for Middle East countries in 1991 are as follows, with a value of 0.500 thousands of cubic meters per person per year representing the danger point: Turkey - 4.500; Iraq - 4.400; Lebanon - 3.000; Syria - 1.300; Egypt -1.200; Israel -0.375; and Jordan - 0.260. For the sake of comparison, the indices in zones of water abundance such as Canada, Northern Europe and the United States range from 1 to 10 (*ibid*).
8. See Barberis, *supra* note 5. An interesting recent example is the agreement between France and Switzerland governing the utilization of groundwater in the Lac Leman area (Treaty of June 9, 1978; Lejeune, *Receuil des accords internationaux conclus par les Cantons suisses*, Berne/Frankfurt/M 200 (1982)).
9. United Nations, *Management of International Water Resources: Institutional and Legal Aspects*, New York, 1975, p. 19.
10. E. Klein, "International Regimes," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 9, North-Holland, Amsterdam-New York-Oxford, 1986, p. 203.
11. The Rules were adopted by the International Law Association at the fifty-second conference, held at Helsinki in August 1966 (*Report of the Committee on the Uses of the Waters of International Rivers*, ILA, London, 1967). They have no binding force, but represent an important indication of the status of international water law at the time. (*See* Appendix 1).
12. *Ibid.*
13. Article 1 of the 1986 Seoul Rules on International Groundwater states: "The waters of an aquifer that is intersected by the boundary between two or more states are international groundwaters if such an aquifer with its waters forms an international basin or part thereof. Those states are basin states within the meaning of the Helsinki Rules whether or not the aquifer and its waters form surface waters part of a hydraulic system flowing into a common terminus" (*supra* note 5 and Appendix 4).

14. J. Barberis, "International Rivers," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 9, North-Holland, Amsterdam-New York-Oxford, 1986, p. 212; Barberis, *supra* note 4, at 408; and United Nations, *supra* note 9, at 9.
15. Commentary to Article 2, *supra* note 11.
15a. The Draft Articles were published as *UN Doc. A/46/10* (1991).
15b. *Ibid*, Article 2.
16. *Supra* note 9, at Annex 1.
17. For example, a basin rich in water resources may be sparsely populated, requiring the export of hydroelectric energy from the basin to achieve maximum benefit from its resources (See the discussion in Part Two below of the Columbia River Basin). One could also argue that in an area such as the Nile Basin, the surrounding desert is of as much significance to planners as the river itself.
18. See "Resource Development Disputes" in J. Prescott, *Political Frontiers and Boundaries*, Allen and Unwin, London, 1987, at 125; P. Sand, "Lake Chad," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 213; and H. Baade, "American-Mexican Boundary Disputes and Cooperation," *ibid*, Vol. 6, 1983, at 8 ("The Rio Grande Boundary").
19. *See* United Nations, *supra* note 9, and A. Garretson et al (eds), *The Law of International Drainage Basins*, Oceana, New York, 1967.
20. Here, it is important to explain that international law is based on several legal sources, listed in Article 38 of the Statute of the International Court of Justice: treaties, customary law, general principles of law, court decisions, and expert opinions. The first three are relevant for our purposes. In brief, *treaties*, are defined as bilateral or multilateral agreements between states, international organizations, and some international corporations. *Customary law* is based on the consistent behavior of states overtime combined with the conviction that they are acting in conformity with international law, even when no rules have been specifically codified in treaty form. *General principles of law* are those which are found in a majority of municipal legal systems, and which logically bind states in their relationships with one another, such as the injunction to honor all of the terms valid agreements or the prohibition on retroactivity in criminal law.
21. This does not mean, of course, that innovation should not be part of the resource management planning process, although most regimes tend to be conservative and cautious. For an example of the pitfalls of poor planning in the Aral Sea region, see Elliott, *supra* note 1, at 29-30.
22. For an explanation of customary law, see *supra* note 20. There are some authors who claim that certain norms have already achieved the status of custom: "Due to the uninterrupted series of international treaties on river exploitation which have been signed since the middle of the last century, similar clauses are being regularly repeated and, as a result, some of them have become customary international law" (Barberis, *supra* note 4, at 214). See also L. Teclaff, "Fiat or Custom: The Checkered Development of International Water Law," 31 *Natural Resources Journal* 45 (1991) at 72. Manner concurs that codification of international water law is imminent (*infra* note 26, at 140).
23. I. Seidl-Hohenveldern, "Danube River," in R. Bernhardt (ed.), *The Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 80.
24. I. Seidl-Hohenveldern, "Rhine River," in R. Bernhardt (ed.), *The Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 310.
25. "Lake Geneva," in R. Bernhardt (ed.), *The Encyclopedia of Public International Law*, Vol. 12, North-Holland, Amsterdam-New York-Oxford, 1990, p. 219.

26. Convention et Statut sur le régime des voies navigables d'intêrét international, signés à Barcelona le 20 avril 1921 (from E. Manner, "The Present State of International Water Resources Law," in M. Bos (ed.), *The Present State of International Law and Other Essays*, Kluwer, The Netherlands, 1973, p. 131).
27. Convention relative à l'amenagement des forces hydrauliques interessont plusieurs etats, Geneve, le 9 decembre 1923. Only 11 states have adhered to this convention, which was never put into practice (*ibid*).
28. See the references in *ibid*. The latter two codifications appear in Appendices 1 and 2.
29. *Supra* note 3.
29a. Note on *ILC* rules.
30. *Advisory Opinion*, Permanent Court of International Justice, Series B, No. 14 and Series C, No. 13 (IV), Vols I-IV.
31. *Judgement*, Permanent Court of International Justice, Series A/B, NO. 70 (1937), 4-89.
32. Lac Lanoux Case (France-Spain), 12 *RIAA* 281 (1963).
33. The International Law Association in planning a conference on water resources for 1996; the EEC is focusing legislative efforts on water quality in heavily polluted European rivers; and the International Law Commission of the United Nations has been charged by the General Assembly with ongoing work on the topic (see Resolution 2669 (XXV) of 1970, for example).
34. Manner, *supra* note 26, at 140.
35. Barberis, *supra* note 4, at 213; and W. Griffin, "The Use of Waters of International Drainage Basins Under Customary International Law," 53 *American Journal of International Law* 50 (1959).
36. Barberis, *ibid*; and J. Lipper, "Equitable Utilization," in Garretson et al, *supra* note 19, at 18.
37. Lipper, *ibid*, at 38.
38. *Report of the International Water Resources Law Committee*, *supra* note 5, at 244.
39. See the 1987 Seoul Rules, *supra* note 5 and Appendix 4.
40. *Report of the International Water Resources Law Committee*, *supra* note 5 at 241; Teclaff, supra note 22; and D. Caponera and D. Alheritiere, "Principles for International Groundwater Law," 2 *Natural Resources Forum* (1978).
41. "In the Muslim tradition, water...was free, a common good; everyone is in principle entitled to the use of a public good, subject to the rights of prior users...Owners may under certain circumstances be obliged to share water for domestic use with others; however, the exclusive right to use the water for irrigation is in the owners." (*Report...*, *ibid*, at 242). See also Caponera and Alheritiere, *ibid*.
42. See *supra* note 20.
43. This principle was expounded in the Corfu Channel Case (*International Court of Justice Reports* (1949), p. 4) and the Trail Smelter arbitration (Award II, 1941, *RIAA*, iii, p. 1905).
44. See the UN Charter, especially Articles 2(4) and 33.
45. See the discussion of general principles of international law in I. Brownlie, *Principles of Public International Law*, 3rd ed., Clarendon Press, Oxford, 1979, pp. 19-20, and G. von Glahn, *Law Among Nations*, 4th ed., MacMillan, New York, 1981, pp. 24-25.
46. Chorzow Factory Case (merits), *P.C.I.J.*, Ser. A, no. 17, p. 29; Trail Smelter Arbitration (*supra* note 43).
47. Brownlie, *supra* note 45, at 513-514.
48. See the examples in Part Two below.
49. The Rules have been called "...a crowning acheivement of the ILA after many years of labor" (Teclaff, *supra* note 22, at 68-69). They were preceded by the International Law Institute's Madrid Declaration of 1911 and its Salzburg Declaration of 1961 (see Appendices 1 and 2).

50. See Appendix 1.
51. *Supra* note 5.
52. "International law, in its present stage of development, does not consider water in its totality (surface, atmospheric and ground water)..." (Barberis, *supra* note 4, at 407).
53. *I.e.*, the "international watercourse system" referred to above. See *Report of the International Law Commission* on the work of its thirty-second session (1980), *G.A. Records of the Thirty-Fifth Session*, Sup. No. 10 (A/35/10), pl. 251, at 247.
54. *Supra* note 32. See the commentaries in K. Hailbronner, "Lac Lanoux Arbitration," in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. 2, North-Holland, Amsterdam-New York-Oxford, 1980, p. 166; and J. Laylin, "The Role of Adjudication in International River Disputes," 53 *American Journal of International Law* 30 (1959).
55. Hailbronner, *ibid*, at 166.

LIST OF APPENDICES

1. The Helsinki Rules of the Uses of the Waters of International Rivers, 1966.

2. Resolution on the Utilization of Non-Maritime International Waters, Adopted by the Institute of International Law, 1961.

3. Complementary Rules Applicable to International Water Resources, 1986.

4. The Seoul Rules on International Groundwater, 1986.

APPENDIX 1

THE HELSINKI RULES ON THE USES OF THE WATERS OF INTERNATIONAL RIVERS[a]

CHAPTER 1. GENERAL

ARTICLE I

The general rules of international law as set forth in these chapters are applicable to the use of the waters of an international drainage basin as may be provided otherwise by convention, agreement or binding custom among the basin States.

ARTICLE II

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

ARTICLE III

A "basin State" is a State the territory of which includes a portion of an international drainage basin.

CHAPTER 2. EQUITABLE UTILIZATION OF THE WATERS OF AN INTERNATIONAL DRAINAGE BASIN

ARTICLE IV

Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

ARTICLE V

1. What is a reasonable and equitable share within the meaning of article IV is to be determined in the light of all the relevant factors in each particular case.
2. Relevant factors which are to be considered include, but are not limited to:
   (a) The geography of the basin, including in particular the extent of the drainage area in the territory of each basin State;
   (b) The hydrology of the basin, including in particular the contribution of water by each basin State;
   (c) The climate affecting the basin;
   (d) The past utilization of the waters of the basin, including in particular existing utilization;
   (e) The economic and social needs of each basin State;
   (f) The population dependent on the waters of the basin in each basin State;
   (g) The comparative costs of alternative means of satisfying the economic and social needs of each Basin State;
   (h) The availability of other resources;
   (i) The avoidance of unnecessary waste in the utilization of waters of the basin;
   (j) The practicability of compensation to one or more of the co-basin States as a means of adjusting conflicts among uses; and
   (k) The degree to which the needs of a basin State may be satisfied, without causing substantial injury to a co-basin State.
3. The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable share, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

[a]Adopted by the International Law Association at the fifty-second conference, held at Helsinki in August 1966. *Report of the Committee on the Uses of the Waters of International Rivers* (London, International Law Association, 1967), 56 p.

ARTICLE VI

A use or category of uses is not entitled to any inherent preference over any other use or category of uses.

ARTICLE VII

A basin State may not be denied the present reasonable use of the waters of an international drainage basin to reserve for a co-basin State a future use of such waters.

ARTICLE VIII

1. An existing reasonable use may continue in operation unless the factors justifying its continuance are outweighed by other factors leading to the conclusion that it be modified or terminated so as to accommodate a competing incompatible use.
2. (a) A use that is in fact operational is deemed to have been an existing use from the time of the initiation of construction directly related to the use or, where such construction is not required, the undertaking of comparable acts of actual implementation.
   (b) Such a use continues to be an existing use until such time as it is discontinued with the intention that it be abandoned.
3. A use will not be deemed an existing use if at the time of becoming operational it is incompatible with an already existing reasonable use.

CHAPTER 3. POLLUTION

ARTICLE IX

As used in this chapter, the term "water pollution" refers to any detrimental change resulting from human conduct in the natural composition, content, or quality of the waters of an international drainage basis.

ARTICLE X

1. Consistent with the principle of equitable utilization of the waters of an international drainage basin, a State:
   (a) Must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State;
   (b) Should take all reasonable measures to abate existing water pollution in an international drainage basin to such an extent that no substantial damage is caused in the territory of a co-basin State.
2. The rule stated in paragraph 1 of this article applies to water pollution originating:
   (a) Within a territory of the State, or
   (b) Outside the territory of the State, if it is caused by the State's conduct.

ARTICLE XI

1. In the case of a violation of the rule stated in paragraph 1 (a) of article X of this chapter, the State responsible shall be required to cease the wrongful conduct and compensate the injured co-basin State for the injury that has been caused to it.
2. In a case falling under the rule stated in paragraph 1 (b) of article X, if a State fails to take reasonable measures, it shall be required promptly to enter into negotiations with the injured State with a view towards reaching a settlement equitable under the circumstances.

CHAPTER 4. NAVIGATION

ARTICLE XII

1. This chapter refers to those rivers and lakes portions of which are both navigable and separate or traverse the territories of two or more States.
2. Rivers or lakes are "navigable" if in their natural or canalized state they are currently used for commercial navigation or are capable by reason of their natural condition of being so used.
3. In this chapter the term "riparian State" refers to a State through or along which the navigable portion of a river flows or a lake lies.

ARTICLE XIII

Subject to any limitations or qualifications referred to in these chapters, each riparian State is entitled to enjoy rights of free navigation on the entire course of a river or lake.

ARTICLE XIV

"Free navigation," as the term is used in this chapter, includes the following freedom for vessels of a riparian State on a basis of equality:

(a) Freedom of movement on the entire navigable course of the river or lake;
(b) Freedom to enter ports and to make use of plants and docks;
(c) Freedom to transport goods and passengers, either directly or through trans-shipment, between the territory of one riparian State and the territory of another riparian State and between the territory of a riparian State and the open sea.

ARTICLE XV

A riparian State may exercise rights of police, including but not limited to the protection of public safety and health, over that portion of the river or lake subject to its jurisdiction, provided the exercise of such rights does not unreasonably interfere with the enjoyment of the rights of free navigation defined in articles XIII and XIV.

ARTICLE XVI

Each riparian State may restrict or prohibit the loading by vessels of a foreign State of goods and passengers in its territory for discharge in such territory.

ARTICLE XVII

A riparian State may grant rights of navigation to non-riparian States on rivers or lakes within its territory.

ARTICLE VIII

Each riparian State is, to the extent of the means available or made available to it, required to maintain in good order that portion of the navigable course of a river or lake within its jurisdiction.

ARTICLE XIX

The rules stated in this chapter are not applicable to the navigation of vessels of war or of vessels performing police or administrative functions, or, in general, exercising any other form of public authority.

ARTICLE XX

In time of war, other armed conflict, or public emergency constituting a threat to the life of the State, a riparian State may take measures derogating from its obligations under this chapter to the extent strictly required by the exigencies of the situation, provided that such measures are not inconsistent with its other obligations under international law. The riparian State shall in any case facilitate navigation for humanitarian purposes.

CHAPTER 5. TIMBER FLOATING

ARTICLE XXI

The floating of timber on a watercourse which flows through or between the territories of two or more States is governed by the following articles except in cases in which floating is governed by rules of navigation according to applicable law or custom binding upon the riparians.

ARTICLE XXII

The States riparian to an international watercourse utilized for navigation may determine by common consent whether and under what conditions timber floating may be permitted upon the watercourse.

ARTICLE XXIII

1. It is recommended that each State riparian to an international watercourse not used for navigation should, with due regard to other uses of the watercourse, authorize the co-riparian States to use the watercourse and its banks within the territory of each riparian State for the floating of timber.
2. This authorization should extend to all necessary work along the banks by the floating crew and to the installation of such facilities as may be required for the timber floating.

ARTICLE XXIV

If a riparian State requires permanent installation for floating inside a territory of a co-riparian State or if it is necessary to regulate the flow of the watercourse, all questions connected with these installations and measures should be determined by agreement between the States concerned.

ARTICLE XXV

Co-riparian States of a watercourse which is, or is to be, used for floating timber should negotiate in order to come to an agreement governing the administrative regime of floating, and if necessary to establish a joint agency or commission in order to facilitate the regulation of floating in all aspects.

CHAPTER 6. PROCEDURES FOR THE PREVENTION AND SETTLEMENT OF DISPUTES

ARTICLE XXVI

This chapter relates to procedures for the prevention and settlement of international disputes as to the legal rights or other interests of basin States and of other States in the waters of an international drainage basin.

ARTICLE XXVII

1. Consistently with the Charter of the United Nations, States are under an obligation to settle international disputes as to their legal rights or other interests by peaceful means in such a manner that international peace and security, and justice are not endangered.
2. It is recommended that States resort progressively to the means of prevention and settlement of disputes stipulated in articles XXIX to XXXIV of this chapter.

ARTICLE XXVIII

1. States are under a primary obligation to resort to means of prevention and settlement of disputes stipulated in the applicable treaties binding upon them.
2. States are limited to the means of prevention and settlement of disputes stipulated in treaties binding upon them only to the extent provided by the applicable treaties.

ARTICLE XXIX

1. With a view to preventing disputes from arising between basin States as to their legal rights or other interest, it is recommended that each basin State furnish relevant and reasonably available information to the other basin States concerning the waters of a drainage basin within its territory and its use of, and activities with respect to, such waters.
2. A State, regardless of its location in a drainage basin, should in particular furnish to any other basin State, the interests of which may be substantially affected, notice of any proposed construction or installation which would alter the regime of the basin in a way which might give rise to a dispute as defined in article XXVI. The notice should include such essential facts as will permit the recipient to make an assessment of the probable effect of the proposed alteration.
3. A State providing the notice referred to in paragraph 2 of this article should afford to the recipient a reasonable period of time to make an assessment of the probable effect of the proposed construction or installation and to submit its views thereon to the State furnishing the notice.
4. If a State has failed to give the notice referred to in paragraph 2 of this article, the alteration by the State in the regime of the drainage basin shall not be given the weight normally accorded to temporal priority in use in the event of a determination of what is a reasonable and equitable share of the waters of the basin.

ARTICLE XXX

In case of a dispute between States as to their legal rights or other interests, as defined in article XXVI, they should seek a solution by negotiation.

ARTICLE XXXI

1. If a question or dispute arises which relates to the present or future utilization of the waters of an international drainage basin, it is recommended that the basin States refer the question or dispute to a joint agency and that they request the agency to survey the international drainage basin and to formulate plans or recommendations for the fullest and most efficient use thereof in the interests of all such States.
2. It is recommended that the joint agency be instructed to submit reports on all matters within its competence to the appropriate authorities of the member States concerned.
3. It is recommended that the member States of the joint agency in appropriate cases invite non-basin States which by treaty enjoy a right in the use of the waters of an international drainage basin to associate themselves with the work of the joint agency or that they be permitted to appear before the agency.

ARTICLE XXXII

If a question or a dispute is one which is considered by the States concerned to be incapable of resolution in the manner set forth in article XXXI, it is recommended that they seek the good offices, or jointly request the mediation of a third State, of a qualified international organization or of a qualified person.

ARTICLE XXXIII

1. If the States concerned have not been able to resolve their dispute through negotiation or have been unable to agree on the measures described in articles XXXI and XXXII, it is recommended that they form a commission of inquiry or an *ad hoc* conciliation commission, which shall endeavour to find a solution, likely to be accepted by the States concerned, of any dispute as to their legal rights.
2. It is recommended that the conciliation commission be constituted in the manner set forth in the annex.

ARTICLE XXXIV

It is recommended that the States concerned agree to submit their legal disputes to an *ad hoc* arbitral tribunal, to a permanent arbitral tribunal or to the International Court of Justice if:

(a) A commission has not been formed as provided in article XXXIII, or
(b) The commission has not been able to find a solution to be recommended, or
(c) A solution recommended has not been accepted by the States concerned, and
(d) An agreement has not been otherwise arrived at.

ARTICLE XXXV

It is recommended that in the event of arbitration the States concerned have recourse to the Model Rules on Arbitral Procedure prepared by the International Law Commission of the United Nations at its tenth session[b] in 1958.

ARTICLE XXXVI

Recourse to arbitration implies the undertaking by the States concerned to consider the award to be given as final and to submit in good faith to its execution.

ARTICLE XXXVII

The means of settlement referred to in the preceding articles of this chapter are without prejudice to the utilization of means of settlement recommended to, or required of, members of regional arrangements or agencies and of other international organizations.

* * *

[b] *Yearbook of the International Law Commission*, 1958 (United Nations publication, Sales No. 58.V.1).

APPENDIX 2

UTILIZATION OF NON-MARITIME INTERNATIONAL WATERS (Except for Navigation)[a]

Resolution adopted by the Institute of International Law at its session in Salzburg (3-12 September 1961

The Institute of International Law,

Considering that the economic importance of the use of waters is transformed by modern technology and that the application of modern technology to the waters of a hydrographic basin which includes the territory of several States affects in general all these States, and renders necessary its restatement in juridical terms,

Considering that the maximum utilization of available natural resources is a matter of common interest,

Considering that the obligation not to cause unlawful harm to others is one of the basic general principles governing neighbourly relations,

Considering that this principle is also applicable to relations arising from different utilizations of waters,

Considering that in the utilization of waters of interest to several States, each of them can obtain, by consultation, by plans established in common and by reciprocal concessions, the advantages of a more rational exploitation of a natural resource,

Recognizes the existence in international law of the following rules, and formulates the following recommendations:

ARTICLE 1

The present rules and recommendations are applicable to the utilization of waters which form part of a watercourse or hydrographic basin which extends over the territory of two or more States.

ARTICLE 2

Every States has the right to utilize waters which traverse or border its territory, subject to the limits imposed by international law and, in particular, those resulting from the provisions which follow.

This right is limited by the right of utilization of other States interested in the same watercourse or hydrographic basin.

ARTICLE 3

If the States are in disagreement over the scope of their rights of utilization, settlement will take place on the basis of equity, taking particular account of their respective needs, as well as of other pertinent circumstances.

ARTICLE 4

No State can undertake works or utilizations of the waters of a watercourse or hydrographic basin which seriously affect the possibility of utilization of the same waters by other States except on condition of assuring them the enjoyment of the advantages to which they are entitled under article 3, as well as adequate compensation for any loss or damage.

[a]Utilisation des eaux internationales non maritimes (en dehors de la navigation), 49 (2) *Annuaire de l'Institut de Droit International* 370 (1961); English text from 56 *American Journal of International Law* 737 (1962) (Briggs transl.).

ARTICLE 5

Works or utilizations referred to in the preceding article may not be undertaken except after previous notice to interested States.

ARTICLE 6

In case objection is made, the States will enter into negotiations with a view to reaching an agreement within a reasonable time.

For this purpose, it is desirable that the States in disagreement should have recourse to technical experts and, should occasion arise, to commissions and appropriate agencies in order to arrive at solutions assuring the greatest advantage to all concerned.

ARTICLE 7

During the negotiations, every State must, in conformity with the principle of good faith, refrain from undertaking the works or utilizations which are the object of the dispute or from taking any other measures which might aggravate the dispute or render agreement more difficult.

ARTICLE 8

If the interested States fail to reach agreement within a reasonable time, it is recommended that they submit to judicial settlement or arbitration the question whether the project is contrary to the above rules.

If the State objecting to the works or utilizations projected refuses to submit to judicial settlement or arbitration, the other State is free, subject to its responsibility, to go ahead while remaining bound by its obligations arising from the provisions of articles 2 to 4.

ARTICLE 9

It is recommended that States interested in particular hydrographic basins investigate the desirability of creating common organs for establishing plans of utilization designed to facilitate their economic development as well as to prevent and settle disputes which might arise.

* * *

APPENDIX 3

COMPLEMENTARY RULES APPLICABLE TO INTERNATIONAL RESOURCES, 1986

Adopted by the International Law Association at the Sixty-Second Conference Held at Seoul in 1986

ARTICLE 1: SUBSTANTIAL INJURY

A basin state shall refrain from and prevent acts or omissions within its territory that will cause substantial injury to any co-basin State, provided that the application of the principle of equitable utilization as set forth in Article IV of the Helsinki Rules does not justify an exception in a particular case. Such an exception shall be determined in accordance with Article V of the Helsinki Rules.

ARTICLE 2: MEASURES WITHIN THE TERRITORY OF OTHER BASIN STATES

If an undertaking, to be executed by a basin State, requires works or installations within the territory of a co-basin State, or the utilization of water resources in that territory, all questions connected with these measures are to be determined by agreement. The States concerned shall use their best endeavors to reach a just and reasonable agreement in accordance with the principle of equitable utilization.

ARTICLE 3: NOTIFICATION AND OBJECTION

1. When a basin State proposes to undertake, or to permit the undertaking of, a project that may substantially affect the interests of any co-basin State, it shall give such State or States notice of the project. The notice shall include information, data and specifications adequate for assessment of the effects of the project.
2. After having received the notice required by paragraph 1, a basin State shall have a reasonable period of time, which shall be not less than six months, to evaluate the project and to communicate its reasoned objection to the proposing State. During that period the proposing State shall not proceed with the project.
3. If a basin State does not object to the project within the time permitted under paragraph 2, the proposing State may proceed with the project in accordance with the notice. If a basin State objects to the project, the States concerned shall make every effort expeditiously to settle the matter consistent with the procedures set forth in Chapter 6 of the Helsinki Rules. The proposing State shall not proceed with the project while these efforts are continuing provided that they are not unduly protracted. If these efforts become unduly protracted, or an objecting State has refused to have resort to third party procedures for settlement of the remaining differences, the proposing State may, on its own responsibility, proceed with the project in accordance with the notice.
4. The notice and other communications referred to in this Article shall be transmitted through appropriate official channels unless otherwise agreed.

* * *

APPENDIX 4

THE SEOUL RULES ON INTERNATIONAL GROUNDWATER, 1986

Adopted by the International Law Association at the Sixty-Second Conference Held at Seoul in 1986

ARTICLE 1: THE WATERS OF INTERNATIONAL AQUIFERS

The waters of an aquifer that is intersected by the boundary between two or more States are international groundwaters if such an aquifer with its waters forms an international basin or part thereof. Those states are basin States within the meaning of the Helsinki Rules whether or not the aquifer and its waters form surface waters part of a hydraulic system flowing into a common terminus.

ARTICLE 2: HYDRAULIC INTERDEPENDENCE

1. An aquifer that contributes water to, or receives water from, surface waters of an international basin constitutes part of an international basin for the purposes of the Helsinki Rules.
2. An aquifer intersected by the boundary between two or more States that does not contribute water to, or receive water from, surface waters of an international drainage basin constitutes an international drainage basin for the purposes of the Helsinki Rules.
3. Basin states, in exercising their rights and performing their duties under international law, shall take into account any interdependence of the groundwater and other waters including any interconnections between aquifers, and any leaching into aquifers caused by activities and areas under their jurisdiction.

ARTICLE 3: PROTECTION OF GROUNDWATER

1. Basin states shall prevent or abate the pollution of international groundwaters in accordance with international law applicable to existing, new, increased and highly dangerous pollution. Special consideration shall be given to the long-term effects of the pollution of groundwater.
2. Basin states shall consult and exchange relevant available information and data at the request of any one of them -
   (a) for the purpose of preserving the groundwaters of the basin from degradation and protecting from impairment the geologic structure of the aquifers, including recharge areas;
   (b) for the purpose of considering joint or parallel quality standards and environmental protection measures applicable to international groundwaters and their aquifers.
3. Basin states shall cooperate, at the request of any one of them, for the purpose of collecting and analyzing additional needed information and data pertinent to the international groundwaters or their aquifers.

ARTICLE 4: GROUNDWATER MANAGEMENT AND SURFACE WATERS

Basin states should consider the integrated management, including conjunctive use with surface waters, of their international groundwaters at the request of any one of them.

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ABSTRACTS

تنقسم هذه الدراسة الى ثلاثة اجزاء رئيسية . فقبل كل شيء تبحث الدراسة في المجالات القانونية لادارة مصادر مياه دولية بما في ذلك الاخذ بنظر الاعتبار التطورات في هذا المجال على صعيد القانون الدولي. ثانيًا : تستعرض الدراسة ٢٢ نموذجًا للتعاون الدولي في الادارة المشتركة بين الدول لمصادر المياه التي تقطع حدودها . واخيرًا تعرض الدراسة المعطيات والمستمسكات القانونية والادارية التي تُستخلص من الدراسة القانونية . هناك تطرّق الى انعكاسات المعطيات على حوض نهر الاردن.

המחקר הזה מחולק לשלושה חלקים עיקריים. ראשית כל, הוא דן בהיבטים המשפטיים של ניהול משאבי מים בין-לאומיים. כולל התיחסות להתפתחות בתחום זה במישור של המשפט הבין-לאומי. שנית, סוקר המחקר-22 דוגמאות של שיתוף פעולה בין לאומי בניהול משותף, בין מדינות, של מקורות מים שחוצים את גבולותיהם.
לבסוף, מוצגים ממצאים משפטים וניהוליים שעולים מהמחקר ההשוואתי. יש התיחסות להשלכות הממצאים על אגן נהר הירדן.