

# Application of international law of water quality to recent Middle East water agreements

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## Abstract

This paper examines the fit between water and environmental quality issues as articulated in the *Law of the Non-navigational Uses of International Watercourses* approved by the United Nations General Assembly in 1997 and the water provisions that were included in the Israel–Jordan Treaty of 1994 and the Israel–Palestinian Authority Accord of 1995. It also examines the differences and commonalities of the two agreements with regard to these issues and examines the process of implementation to date. © 2001 Elsevier Science Ltd. All rights reserved.

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## 1. Introduction

The subject of water quality is all too often neglected in international agreements that deal with shared waters (Wolf, TFDD, current). Its inclusion would represent a significant advance in water treaty-making, the focus of which heretofore has mostly been allocation, and often navigation, hydro-electric and flood control developments, to the exclusion of the effects of environmental pollution and water quality.

While water quality has long engaged the interest of the international legal community, it was not until 1997 that the United Nations General Assembly approved the Convention on the *Law of the Non-navigational Uses of International Watercourses* that included provisions on the subject. This Convention, based on a draft submitted by the International Law Commission (ILC) (1994),

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provides, *inter alia*, a framework and principles for including protection of water quality in formal treaties (United Nations, 1997).

One of the purposes of this paper is to examine the fit between these general principles and the water provisions that were included in two recent international peace agreements—the Israel–Jordan Treaty (1994)<sup>1</sup>, and the Israel–Palestinian Authority Accord (1995)<sup>2</sup>, referred to as Oslo II. A second objective is to examine the differences, as well as the commonalities of these two water agreements in regard to water and environmental quality issues. This analysis reported here is an extension of a study in which the institutional frameworks for management of 13 transboundary rivers were analyzed (Kliot, Shmueli, & Shamir, 1997). One question that is addressed is whether relative political power status may explain differences between the two treaties. Israel and Jordan entered their treaty negotiations as political equals; the talks between Israel and the Palestinians were characterized by the political asymmetry between the occupying power and an emerging autonomous entity.

Events since the signing of the Oslo II accord that include the failed Camp David and Taba talks and the subsequent Intifada of October 2001 have put on hold the negotiations for a permanent status agreement between the two parties. At the same time, the parties continue to operate according to the Oslo Agreement, based on a mutual interest in cooperation on matters relating to water and sewage. This is exemplified in the joint declaration by both sides of the Joint Water Committee, in their respective media, stating that water should be kept outside the circle of violence (Schiff, 2001). Another question is whether, because these agreements reflect contrasting geographic and water settings, they require protocols that have different emphases. The Israel and Jordan concerns for water quality relate primarily to a shared river water environment, which lies on the border between them, and to a lesser degree to the quality of shared groundwater. Israel and the Palestinians share waters that are primarily subsurface—mainly in the mountain aquifer, and to some extent in the coastal aquifer—and their territories (whose boundaries are yet to be finalized) overlie common groundwater sources.

Finally, the paper will examine the process of treaty implementation: what has been and is being done on the ground in the time since the agreements have been signed. Do environmental interest groups within the treaty entities possess the political will and clout to assure implementation of the water quality provisions?

## **2. Approaches in international law affecting non-navigational uses of international river basins**

Brown–Weiss (1996) posits that international law provides the normative framework and the procedures for coordinating behavior, controlling conflict, facilitating cooperation and establishing values among civilized states in relations with one another. However, the international law of water resources remains at a relatively early stage of development. The following guidelines offered by three international bodies have yet to be widely adopted in state practice, but represent a powerful stimulus to water-treaty making in the future.

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<sup>1</sup>Treaty of Peace between the State of Israel and the Hashemite Kingdom of Jordan, 26 October 1994. specifically Article 6 and Annex II.

<sup>2</sup>The Israel–Palestinian Interim Agreement (Agreed Version—September 18, 1995). Specifically Annex III, Article 40—Water and Sewage.

1. *The Institute de Droit International*, a non-official body established in 1873, offered two resolutions concerning shared water resources. They are:

- (a) The 1961 Salzburg Resolution, which declares that a state's right to make use of shared water is limited by the right of use of the other riparians.
- (b) The 1979 Athens Resolution declares that states must “ensure” that activities within their borders cause no pollution to the waters of international rivers and lakes beyond their boundaries. There are also provisions concerning data exchange prior to potential polluting activities, and consultation concerning pollution problems.

2. *The International Law Association (ILA)* adopted the Helsinki Rules in 1996 on the uses of waters of international rivers, reflecting the following principles:

- (a) The entire drainage basin is an indivisible hydrologic unit. It must be managed as a single unit in development of any portion of its waters in order to ensure the maximum utilization.
- (b) Restricted sovereignty through a rule of equitable utilization (Caponera, 1995). States are entitled to a reasonable and equitable share in the beneficial uses of the waters of an international basin. An existing use may have to give way to a new use, in order to achieve an equitable apportionment of shared water resources; however, there is no requirement for compensation to be paid for the impairment of the existing use. On the contrary, Helsinki is silent on the issue of compensation, recognizing that poor countries might be precluded from developing their equitable share of a resource because they lack the means to compensate their wealthier neighbors for existing uses that might be displaced.

The Helsinki Rules do not cover the need for conservation, protection and development of the economic use of water.

3. *The International Law Commission (ILC)*, a United Nations-affiliated body designated to codify customary international law, did undertake to address the conservation and protection issues. While it first began to consider the subject as early as 1970, it was not until 1991 and again in 1994 that the ILC submitted sets of draft articles to the UN General Assembly. These led to the Convention on the Law of the Non-navigational Uses of International Watercourses which was adopted on May 21, 1997 (27 years after the work commenced!) by the General Assembly of the United Nations. Only 13 countries out of the required 32 ratified the Convention by mid-2000, the specified date for ratification. Still, the Convention may be the de-facto international law. It is worth while noting, however, that the Convention does not provide definitive rules for water allocation, only a list of factors to be taken into account and adapted to the specific local conditions.

The explicit scope of the articles as set out in Article I.1 of the Convention is: ... The present articles apply to the uses of international watercourses and of their waters for purposes other than navigation and to measures of protection, preservation and management.

Additional sources from which general principles of water laws of international river basins develop are, national water laws and decisions of international tribunals (i.e. the International Court of Justice).

All of these sources generally agree on the following:

- International drainage basins or river systems are an *aggregate of surface and ground waters* flowing into a common terminus (Caponera, 1995).
- Equitable use requires exchange of data and information and prior notification about future planned uses.
- The obligation not to cause harm includes the duty of preventive and cooperative action. Appreciable harm resulting from water pollution is a violation of the principle of equitable use. The World Bank requires the assessment of potential significant harm before approving projects on an international river (Solanes, 1992; Caponera, 1995).
- Joint development of international rivers is difficult to achieve because of questions of sovereignty, ownership of waterworks, jurisdiction, financing, definitions of scope of cooperation, etc.
- The doctrine of territorial sovereignty over international rivers has never been a generally recognized principle of international law. However, the idea of sovereignty affects the initiation of basin-wide programs, and is a major obstacle to achieving integrated development of international rivers. Many treaties divide ownership of, and jurisdiction over, otherwise indivisible waterworks (Solanes, 1992).

Historically, most international water treaties have been based upon the international law doctrine of “equitable and reasonable” use, although the terms have to be interpreted and applied in the local context, since there is no universal agreement as to what they mean in each local context. This rule puts the emphasis on the allocation of water quantities. The International Law Commission attempted to shift the debate by developing rules that attempt to find a balance between this doctrine and that of “no significant harm” (sometimes also referred to as “no appreciable harm”), which has its origins in environmental protection (Utton, 1996). The debate regarding the relative importance of the two terms as reflected in the ILC Draft Articles has never been resolved, and experts differ in their opinion in this regard. Those who give preference to “no significant harm” assign this principle the responsibility for “equitable and reasonable” allocation, which, if not maintained, causes harm. The UN Convention approved by the General Assembly differs from the ILC Draft Articles in one significant respect. The UN Convention makes clear that the obligation to avoid significant harm is subordinate to the principle of equitable utilization.

### **3. UN Convention on the Law of the Non-navigational Uses of International Watercourses (to be referred to as the UN Convention)**

Since the ILC Articles have been adopted by the United Nations General Assembly (1994), they represent a formal codification of guidelines for environmental protection, preservation and management of international waters.

The following are the relevant articles in the six parts of the Convention:

#### Part I. Introduction

##### *Article 1—Scope*

No. 1 explicitly cites measures of *protection, preservation and management* as related to uses of watercourses and their waters. Preservation addresses uses that result in degradation of water quality, not only from pollution, but also from other environmental impacts such as erosion, sedimentation and salt water intrusion (Commentary, Draft Articles, 1994, p. 198). In referring to management, the articles include various forms of suggested institutionalized or non-institutionalized cooperation.

*Article 3—Watercourse agreements*

No. 4 requires that watercourse agreements *define the waters* to which agreement applies—either an entire international watercourse or any part thereof, provided that the agreement does not adversely affect, to a significant extent, the use by one or more other watercourse States.

Part II. General principles

*Article 5—Equitable and reasonable utilization and participation*

Sets out the principle that a watercourse State has the right to utilize an international watercourse in an equitable and reasonable manner, and has the *obligation not to exceed its right to equitable utilization* and not to deprive other watercourse States of their right to equitable utilization.

*Article 6—Factors relevant to equitable and reasonable utilization*

No. 1, a–g *specifies as factors*, natural factors; social and economic needs; population dependence; mutual effects of use; existing and potential uses of the watercourse; conservation, protection, development and economy of use of the water resources and the costs of measures taken to that effect; and the availability of alternatives. No. 2 refers to the need to enter into consultations in a *spirit of cooperation*.

*Article 7—Obligation not to cause significant harm*

No. 1. obliges due diligence in use of watercourse so as not to cause significant harm to other users.

No. 2. dilutes No. 1 to the extent that it does not bar activities that result in significant harm.

In such cases, the State responsible for the harm shall consult with the affected State, and take all appropriate measures to *eliminate or mitigate* it, and, where appropriate, discuss *compensation*. This article is subordinate to *Article 5 on equitable utilization*.

*Article 8—General obligation to cooperate*

Goal is to attain *optimal utilization and adequate protection* of an international watercourse.

*Article 9—Regular exchange of data and information*

No. 2 specifies that, where information is unavailable, the State requested to provide the information may condition its compliance upon *payment of reasonable costs* by the requesting State.

*Article 10—Relationship between different kinds of uses*

No 1 gives *no priority* to one use of an international watercourse over another.

No. 2, however, directs that, in the event of a conflict in uses, special regard be given to the requirements of *vital human needs*.

Part III. Planned measures

*Article 12—Notification concerning planned measures with possible adverse effects*

#### Part IV. Protection, preservation and management

##### *Article 20—Protection and preservation of ecosystems*

Obligation is upon watercourse States, individually and, where appropriate, jointly, to protect the ecosystems of international watercourses. The term ‘ecosystem’ refers to an ecological unit consisting of *living and non-living components that are interdependent* and function as a community. The article uses this term rather than ‘environment’ because the intent is more specific, relating only to the aquatic system, whereas ‘environment’ could be construed to refer to areas surrounding and outside the watercourse (Commentary, ILC 1994, p. 280).

##### *Article 21—Prevention, reduction and control of pollution*

Establishes the fundamental *obligation to prevent, reduce and control the pollution of international watercourses*. It defines the term ‘pollution’, spells out the obligation and establishes a procedure for arriving at mutually agreeable measures and methods to prevent, reduce and control pollution. *Measures and methods* include setting joint water quality objectives and criteria, establishing techniques and practices for addressing pollution from point and non-point sources and drawing up agreed lists of dangerous substances that should be subjected to special controls. In this article the term ‘environment’ is used, which is meant to encompass a broader concept than that of ‘ecosystem’ as used in Article 20.

*Articles 22 and 23—Introduction of alien or new species and protection and preservation of the marine environment.*

##### *Article 24—Management*

Techniques may include *entering into consultations* and establishment of a *joint management mechanism*.

##### *Article 25—Regulation of water flow*

Describes the need for cooperation and participation on an *equitable basis* (unless otherwise specified) in the construction and maintenance or defrayal of *the costs of regulation mechanisms*. Regulation of the flow of water may be necessary in achieving optimal utilization and, at the same time can be possibly harmful. This demonstrates the importance of cooperation between watercourse States.

##### *Article 26—Installations*

Best efforts must be made by watercourse States to *maintain and protect water flow regulation installations* within their own territories.

#### Part V. Harmful conditions and emergency situations

##### *Article 27—Prevention and mitigation of harmful conditions*

Deals with a wide variety of “conditions” related to international watercourses that may be harmful to watercourse States, including severe environmental impacts *from natural causes or from human conduct*.

##### *Article 28—Emergency situations*

Obliges watercourse States to respond to *emergency situations*, and when necessary, *jointly develop contingency plans*.

#### Part VI. Miscellaneous provisions

##### *Article 31—Data information vital to national defense or security*

*Exempts* watercourse States from providing data or information that would compromise their national defense or security.

*Article 33—Settlement of disputes*

Calls for *third-party mediation or arbitration* when parties cannot reach agreement by negotiation. Any of the parties may request impartial fact-finding, the results of which must be *considered in good faith* by all the parties.

#### 4. Application of water quality convention principles to the Middle East water agreements

How closely the two water agreements conform to the guidelines set forth by the UN Convention with respect to water quality and the environment is analyzed in this section.

The Treaty of Peace between the State of Israel and the Hashemite Kingdom of Jordan (designated hereinafter as IJ) was signed in October 1994. Article 6 and Annex II deal with water related issues, as components of this comprehensive treaty.

OSLO II is the interim agreement signed by the Palestinians and the Israelis in September 1995 (designated hereinafter as IP). Article 40 of Annex III, titled “Water and Sewage”, links the two topics, reflecting the danger which sewage poses to water resources and the environment, and wastewater’s importance as a source for irrigation for the region. Schedules 5–8 detail elements of Article 40.

As with the Israeli–Jordanian Treaty, water in Oslo II is one part of an overall accord. However, it should be noted that, unlike the definitive nature of the Israeli–Jordanian agreement, Oslo II may indicate directions for the final status agreement, but is not binding for the final stage.

#### 5. The regional setting and the water agreements

The Israel–Jordan water agreement covers two areas. The Northern part contains the Jordan River, from the Kinneret (Sea of Galilee) to where Wadi Yabis enters the Jordan River opposite Tirat Zvi on the Israeli side, and that part of the Yarmouk River which lies along the common border, until it enters the Jordan River (Fig. 1 shows the Regional Water Setting). The Southern part deals with groundwater in the Araba/Arava Valley (all names appear in the Treaty in their Arabic and Hebrew forms).

Jordan is to take its share of Yarmouk water from a diversion point called Adassiya/Point 121. A dam across the Yarmouk, whose construction began in 1998, is designed to ensure Israel’s share of 13 and 12 MCM, in summer and winter (the seasons are defined by specific dates), from the Yarmouk, while Jordan is entitled to all the rest (IJ I.1).<sup>3</sup> Further, *Jordan concedes to Israel pumping an additional (20) MCM from the Yarmouk in the winter in return for Israel conceding to transferring to Jordan during the summer period the quantity specified in paragraph (2.a) below from the Jordan River (IJ I.1.a)*. The average annual flow of the Yarmouk

<sup>3</sup>Notation. The citations from the Israeli–Jordanian Treaty are mostly from Annex II Water Related matters, detailing implementation under Article 6. Annex II, Article (roman numerals I–VII), Number (1,2...), Subcategories (a–i). Annex II will not be noted; **IJ I.4.b** is Annex II, Article I, no. 4, subcategory a. When citations are taken from Article 6, they will read: IJ 6.number, subcategory, e.g. **IJ 6.4.d** (Article 6, number 4, subcategory d).

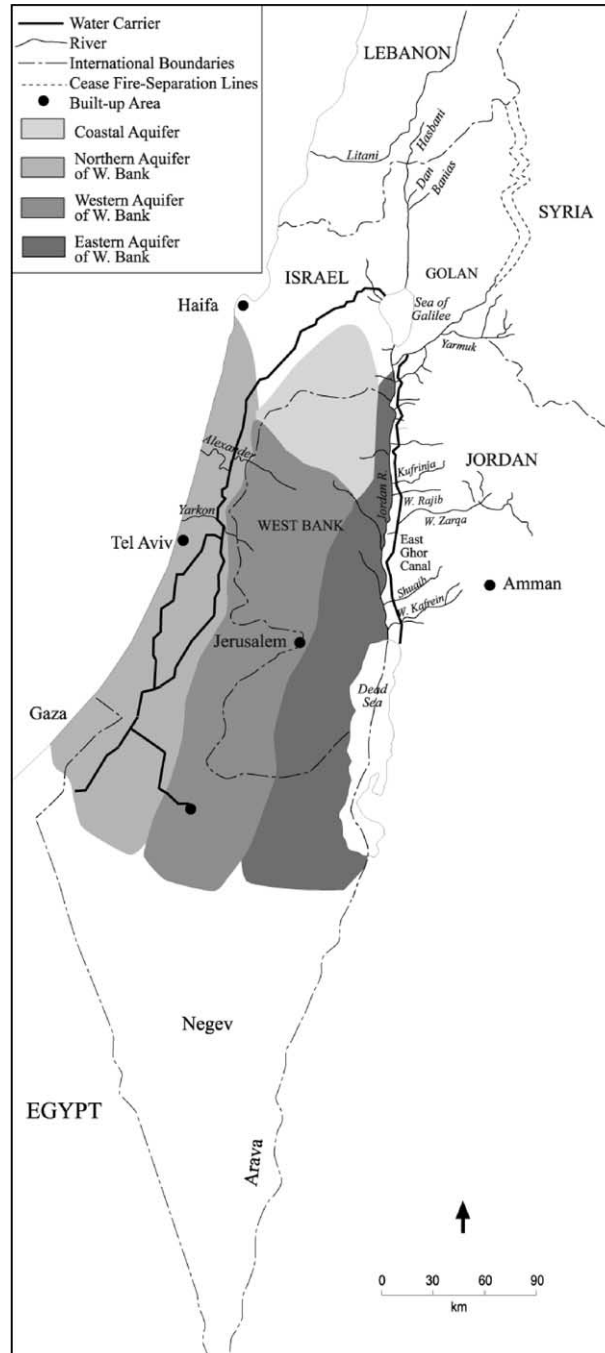


Fig. 1. Regional water setting.



after it enters Jordan from Syria is currently about 285 MCM, and is subject to influence by Syria upstream.

Jordan is entitled to water from the Jordan River, below the Kinneret. This includes 20 MCM in summer: *In return for the additional water that Jordan concedes to Israel in winter in accordance with paragraph (IJ I.1.b) above, Israel concedes to transfer to Jordan in the summer period (20) MCM from the Jordan River directly upstream of the Deganya gates on the river (IJ I.2.a)*. A pipeline was constructed a few months after the Treaty was signed, to carry the water from the Jordan River to the 105 km long King Abdullah Canal (KAC), which carries water diverted from the Yarmouk River at Adassiya, along the Jordan Valley to provide drinking and irrigation water. A pumping station at Deir Allah lifts water from the KAC, through an elevation difference of some 1300 m, to Amman, 30 km away.

*In winter Jordan is entitled to store for its use a minimum average of (20) MCM of the floods in the Jordan River south of its confluence with the Yarmouk” (IJ I.2.b) while ... Israel is entitled to maintain its current uses of the Jordan River waters between its confluence with the Yarmouk and its confluence with Wadi Yabis/Tirat Zvi” (IJ I.2.c).*

Salinity of the Kinneret is controlled by diversion of saline springs and wells located along its northwest shore, by a canal along the Western shore; the saline water is discharged into the Jordan River just downstream of its exit from the Lake. The Treaty calls for desalination of 20 MCM/yr of these saline waters, of which Jordan will receive 10 MCM/yr of desalinated water. Until this comes into operation, Israel is to provide Jordan with an additional 10 MCM/yr from the Jordan River, outside the summer period.

The ecology of the Kinneret is quite complex and fragile. Experts differ in their opinions as to the possible effect of various actions that might be taken in or around the Lake, such as lowering the minimum allowed level to drop below its current value of –213 m below sea level (in summer 2000 the level reached close to –214 m), or bringing Yarmouk water into the Lake. There is consensus that care must be exercised when considering any such action. A dominant feature of the ecology is annual bloom of algae. Thus, treatment of the water from the Lake must be adjusted to a variable load of organic matter. Kinneret and Yarmouk waters are mixed in the KAC, and Jordan must adjust its treatment accordingly. The Treaty states that: *The quality of water supplied from one country to the other at any given location shall be equivalent to the quality of the water used from the same location by the supplying country (IJ III.4).*

Some wastewater from settlements in the area ends up in the Jordan River below the Kinneret. The Treaty stipulates that no wastewater shall be released into the waterways unless it is treated to a quality suitable for unrestricted agricultural use. This, together with the removal of the saline waters from the Jordan River, is designed to restore its environmental value.

In the Arava Valley, the border was moved westward, giving Jordan additional land, and 14 wells that Israel drilled in this area are now in Jordanian territory. Under the Treaty, Israel continues to operate these wells, at the same rates as before. Furthermore, Israel is entitled to explore for additional groundwater, up to 10 MCM/yr, provided *that this undertaking is hydrogeologically feasible and does not harm existing Jordanian uses (IJ IV.3).*

The geographical situation between Israel and the Palestinian Authority (PA) is quite different. Whereas Jordan and Israel occupy close but separate territories, the PA and Israel are situated on the West Bank in an intertwined layout. The boundaries between the territories of the two parties are yet to be determined, but it is clear that they will both occupy areas overlying the Mountain

Aquifer. Both depend on groundwater from this aquifer, plus import via hydraulic systems from farther sources; Jerusalem and vicinity get water from the Israeli National Carrier. The Mountain Aquifer is made of three sub-basins, one flowing East to the Jordan Valley, one West to Israel (called the Yarkon–Taninim Aquifer, for its original natural outlets into these two rivers which flow towards the Mediterranean), and one to the North-East, with outlets in the Beit-Shean and Yizrael Valleys.

Israel lies downstream of the West Bank, for both surface water and groundwater. For Israel, the Yarkon–Taninim aquifer is a major source of high quality drinking water, tapped largely to the West of the 1967 border between Israel and the West Bank. Increased use in the West Bank affects flows to the West, and pollution originating in this area has a significant effect on both ground and surface waters quality. For these reasons, the nature of the agreement on water and sewage (Article 40 of Annex III in Oslo II),<sup>4</sup> is quite detailed with respect to quality issues.

In the Gaza Strip the geographical situation is somewhat simpler. The Gaza Strip is situated over the Southern part of the Coastal Aquifer, to the South of the Israeli part. Flow is largely perpendicular to the coastline, so that there is little interaction between the Israeli and Palestinian parts of the aquifer. However, some of the aquifer also extends eastward and inland into southern Israel so that even in this Southern part of the Coastal Aquifer the interdependence of usage as it impacts on both water allocation and quality must be taken into account.

### 5.1. *Application of UN Convention part I—scope and watercourse agreements*

Protection of water quality and environment are integral parts of the two agreements. Both establish Joint Water Committees (JWC). Oslo II also specifies a Joint Supervision and Enforcement Mechanism (JSET) as a monitoring and enforcement body.

In the Israel–Jordan Treaty, protection of water quality and the environment is an integral part of the scope of the Treaty (IJ III), although no reference to environmental conservation is made (except for the protection on the Jordan River watercourse by preventing the entry of untreated wastewater and saline waters).

Cooperation is framed through the formation of a Joint Water Committee (IJ VII) as a permanent institution charged with implementing the Treaty and with resolving additional water-related matters that may arise subsequently. It consists of three members from each side. Within the areas of cooperation outlined in Article 6.4 (IJ 6.4), prevention of contamination of water resources is specified. The Treaty establishes two JWC sub-committees, one each for the Northern and Southern areas (IJ VII.2).

The Oslo II Agreement is more comprehensive in scope and more detailed (IP 11–15 and Schedule 8) than the Israel–Jordanian Treaty relative to protection of water. While recognizing sovereignty in their respective areas *both sides agree to coordinate the management of water and*

<sup>4</sup>Notation. The citations from Oslo II are from Article 40 or Schedules 5–8 detailing elements of the Article. Citations will be assumed to be from Article 40, unless otherwise noted and will read: IP number (1–25). subcategory (a,b...). sub-subcategory ((1), (2), (3)...), e.g. **IP 3.a**. Citations from Schedules 5–8 will read: IP Schedule (5–8). number.sub-category, e.g. **IP Schedule 5.1.a**.

*sewage resources and systems in the West Bank* (IP 3). The principles of Article 40 encompass *sustainable use in the future, in quantity and quality* (IP 3.c). Further elaboration of the responsibility to protect resources and systems appears in IP 21–24.

The Agreement does not specify the size of the JWC, stating only that representation must be equal in number. The functions of the body are detailed in IP 12 and IP Schedule 8, and significantly, all new water development in the area under jurisdiction must receive approval from the JWC, starting from the planning stages onward (IP 12). All decisions are to be *reached by consensus, including the agenda, its procedures, and other matters* (IP 14). The Agreement also establishes enforcement arms of the JWC, termed “Joint Supervision and Enforcement Teams” (JSETs), to be comprised of at least two members from each side, with costs shared equally (IP Schedule 6).

The UN Convention calls for definition of the international watercourse to which the agreement applies, but neither the Jordan–Israeli Treaty nor Oslo II includes definitions of the resources to which they apply. Each deals with specific elements of the regional water resources, and thus—by exclusion—leave any other parts which may be of interest to the two sides outside the scope of the agreement. The reasons for these (intentional) omissions are beyond the scope of the present paper.

The Israeli–Jordanian Treaty does state that the parties agree mutually to recognize the rightful allocations of both of them in Jordan River and Yarmouk River waters and Arava/Araba groundwater, in accordance with agreed-upon acceptable principles, quantities and quality as set out in Annex II, which shall be fully respected and complied with (IJ 6.1).]

## 5.2. *Application of UN Convention part II—general principles*

Some of the factors relevant to equitable and reasonable utilization in Part II are covered in the agreements, while others are not.

The Israel–Jordan Treaty makes a clear-cut attempt to preserve the current patterns of water use of both parties. The status quo (prior to the agreement) was not acceptable to Jordan, claiming that Israel’s use does not leave enough water to meet its rightful needs. The allocations specified in the Treaty provide for amelioration of Jordan’s severe water shortage in the near future, and in this respect reflect a move in the direction of what Jordan would consider an allocation based on the concept of ‘equitable utilization’.

In IJ I.2.c Jordan is entitled to an annual quantity equivalent to that of Israel, provided that *Jordan’s use will not harm the quantity or quality of the ... Israeli uses*. IJ IV.1 refers to the use of wells and states that *neither country shall take, nor cause to be taken, any measure that may appreciably reduce the yields or quality of these wells and systems*.

In the Jordanian–Israeli Treaty, natural factors—which include seasonal variability and hydrological uncertainty—are considered through the definition of the seasons, the different operation in each (IJ I.1–2), and the manner in which the allocations are defined: one side receives a given quantity from a source while the other takes all the rest. Another example are the conditions under which Israel is entitled to increase its production from groundwater in the Arava (IJ IV.3) such that *this undertaking is hydrogeologically feasible and does not harm existing Jordanian uses*.

While no references to either social and economic needs or to the population's dependence upon the water sources are made in the Jordan–Israel agreement, the effects of the uses of the watercourses in one State on the other watercourse State is set out explicitly: *The Parties...jointly undertake to ensure that the management and development of their water resources do not, in any way, harm the water resources of the other Party* (IJ 6.2).

IJ III.3 explicitly states that *Israel and Jordan will each prohibit the disposal of municipal and industrial wastewater into the courses of the Yarmouk and the Jordan Rivers before they are treated to standards allowing unrestricted agricultural use. Implementation of this prohibition shall be completed within three years from the entry into force of the Treaty*. By the time of this writing in 2000, more than six years after IJ Treaty came into force, this commitment has not yet been fulfilled. This demonstrates a difficulty associated with implementing environmental stipulations of an international agreement. While there are clearly strong interests in the quantity aspects (water users), rarely if ever are protectors of the environment represented around the table (of negotiations or implementation), and the result is that environmental interests are not awarded the same degree of urgency and commitment as other matters.

The Treaty does not explicitly discuss either conservation or its costs. Protection of both water resources and the environment is inherent in many articles of the Treaty. IJ III deals with Water Quality and Protection, emphasizing protection of shared waters, so that respective allocations will not be harmed. On the other hand, there is no reference directly or indirectly to the comparative cost of alternative means of satisfying the economic and social needs of each Basin State.

In the Oslo II Interim Agreement the principle (Schedule 7) followed is of maintaining existing quantities of utilization. Specific reference to equitable and reasonable use is not included in the Agreement.

The Palestinian–Israeli Agreement speaks of adjusting the utilization of the resources according to variable climatological and hydrological conditions (IP 3.d). The concept of conservation is covered by such language as: *using the water resources in a manner which will ensure sustainable use in the future, in quantity and quality* (IP 3.c).

The Agreement is both comprehensive and specific in terms of the effects of use on each party; existing and potential uses of the watercourse; and conservation, protection and costs. IP 3 speaks of coordinating management of water and sewage in the West Bank while maintaining existing quantities and utilization from resources. This takes into consideration the need for additional quantities of water, preventing the deterioration of water quality, and treating, reusing or properly disposing of all domestic, urban, industrial and agricultural sewage. IP 21–24 set out to protect water resources and water and sewage systems, both collectively (IP 21 and 22), and with regard to potential damage to the other side: *Each side shall take all necessary measures to prevent any pollution or contamination of the water and sewage systems, including those of the other side* (IP 23). The Agreement goes beyond this to direct *each side [to] reimburse the other for any unauthorized use of or sabotage to water and sewage systems situated in the areas under its responsibility which serve the other side* (IP 24).

The UN Convention includes a general reference that obliges due diligence in not causing significant harm to other users. However, it does not bar activities that might cause such harm, and is silent on the issue of compensation when harm is caused by one side to the other. The IJ

and IP agreements are more specific on this point, both in terms of intent and implementation. Compensation for non-compliance, however, is mentioned only in Oslo II which specifies reimbursement to the counterpart for any unauthorized use or sabotage (IP 24) to water systems under its responsibility.

The general principle governing the obligation to cooperate in gaining optimal utilization and adequate protection of international water courses, is incorporated in both agreements. The establishment of the Joint Water Committees, which must operate on a consensus basis, reflects this principle. Regular exchange of data and information is part of this cooperative spirit, and both treaties go beyond the UN Convention in this area.

The Jordan–Israel treaty calls for monitoring of the quality of water along their river boundary by jointly established monitoring stations to be operated under the guidance of the Joint Water Committee (IJ III.2). This goes beyond the regular exchange of data to the joint gathering and monitoring of data.

Oslo II goes into even greater detail on this point. The responsibilities of the Joint Supervision and Enforcement Mechanism (IP Schedule 6) include setting up supervisory control and data acquisitions (SCADA) systems for monitoring and operation of water supply and wastewater systems. In regard to the Gaza Strip, Israel is directed to provide the Palestinian Council with all data concerning the number of wells in the Jewish Settlements and the quantities and quality of the water pumped from each well, on a monthly basis (IP Schedule 8.3). Subcommittees are established to deal with all issues of mutual interest including the exchange of all data relevant to the management and operation of the water resources and systems and mutual prevention of harm to water resources (IP Schedule 8.8).

The UN Convention gives no ranked priority to different kinds of uses. However, it does state that, in the event of conflict among uses, special regard must be accorded to the requirements of *vital human needs*.

Oslo II preserves existing utilization of the aquifers (Schedule 7), and takes into consideration the need of additional water for the Palestinians as detailed in IP 6–10. Neither agreement makes provision for dealing with the requirements of vital human needs when conflicts among uses arise.

### 5.3. *Application of UN Convention part III—planned measures*

The UN Convention calls for *notification concerning planned measures with possible adverse effects*. The two agreements deal with this issue directly. The Jordan–Israel Treaty stipulates that each country must notify the other, *six months ahead of time*, of any intended projects that are likely to change the flow of the rivers, *or the quality of such flow* (IJ V.2). Oslo II subjects all development of water resources and systems to prior JWC approval (IP Schedule 5.1.b). *Plans for construction of new water and sewage systems or modification of existing systems require the prior approval of the JWC* (IP Schedule 5.2.d), without specifying the timing of the advance notice.

### 5.4. *Application of UN Convention part IV—protection of water resources and water sewage systems*

The subject of protection, preservation and management that is dealt with in the UN Convention is well covered in the two agreements. The sections relating to water refer only to

water quality in general, without spelling out the need to preserve ecosystems or the broader environment.

However, in the annex relating to the environment (Annex IV) of the Jordan–Israel Treaty there is specific reference to the *ecological rehabilitation of the Jordan River* (Annex IV.d.2.1). The water annex refers only to protection of water quality in general.

The Jordan–Israel Treaty explicitly cites *the prevention of contamination of water resources* as a central factor in achieving a comprehensive and lasting settlement of water problems (IJ 6.4.b). Water quality and protection goals are set forth in Article III for surface waters, and include treatment standards for all municipal and industrial wastewater that flows into Yarmouk and Jordan Rivers. The goal is to permit *unrestricted agricultural use* of these waters (IJ III.3). The implementation date for these new standards was set at October 1997—3 years after the Treaty came into force—but has not yet been fully implemented by 2000. Groundwater quality in the Arava is mentioned in IJ IV.1.

The Treaty also spells out the criterion that the quality of water supplied from one country to the other at any given *location shall be equivalent to the quality of the water used from the same location by the supplying country* (IJ III.4). It also decrees that *Israel and Jordan will protect water systems each in its own territory, supplying water to the other, against any pollution, contamination, harm or unauthorized withdrawal of each other's allocations* (IJ III.6). No lists of prohibited substances are included, nor are levels (or reduction levels) set for actual pollutants, trusting in mutual adherence to an acceptable level. Protection of the marine environment is mentioned only in Annex IV (Environment).

Neither Article 40 or any of the Oslo II sections on environment (Annex III, Articles 12–14, 25–27 and their respective schedules) spell out the need to preserve water-based ecosystems or the broader water-based environment. Oslo II spells out the need to prevent deterioration of water quality. It calls for utilizing water resources in a manner which ensures sustainable use through treating, reusing or properly disposing of all domestic, urban, industrial and agricultural sewage, and taking all necessary measures to prevent any harm to the water and sewage systems (IP 3.a–i and IP 21–24).

The function of the JWC as it relates to all water and sewage issues is dealt with in IP 12. It is based on coordinated management and protection of resources and water and sewage systems. The Agreement specifies that existing regulations concerning measurement and monitoring shall remain in force until the JWC decides otherwise.

IP 20 calls for cooperation in a variety of areas—water-related technology transfer, research and development, training and *setting of standards* (IP 20.e).

Oslo II also sets up Joint Supervision and Enforcement Teams (JSETs) controlled by the JWC. These teams monitor, supervise and enforce, as well as rectify a situation of infringement. This includes *prevention of contamination and pollution of water resources and systems* (IP Schedule 6.4d). The JWC is charged with developing a list of approved laboratories to carry out water and sewage quality analyses and ascertain that these laboratories operate according to accepted standards and practices (IP Schedule 6.4).

Neither of the agreements deals explicitly with protecting marine environments, including the introduction of alien or new species, as called for by the UN Convention.

With respect to the regulation of water flow, the Jordan–Israel Treaty includes the cooperative building of a diversion/storage dam on the Yarmouk River as well as other projects

(IJ II). Oslo II calls for cooperation in the development of water and sewage-related projects (IP 20). Both agreements commit the parties to protect installations against deterioration and damage. However, there is no reference to the magnitude of costs or how they would be allocated.

### 5.5. *Application of UN Convention part V—harmful conditions and emergency situations*

Both agreements explicitly state the parties' individual and joint responsibility in the prevention and mitigation of harmful conditions, as called for in UN Convention Article 27 (IJ 6.1 and 6.4, III; IP 21–24). However, neither of the agreements includes reference to specific actions required in emergency situations, nor to the development of mechanisms to deal with water and sewage-related natural and man-made emergencies and extreme conditions, as required by UN Convention Article 28. It is assumed that the JWC will deal with such emergencies.

### 5.6. *Application to UN Convention part VI—miscellaneous provisions*

UN Convention Part VI focuses on data information vital to national defense, and on settlement of disputes. The agreements make no reference to the first topic, which is understandable in light of the absence of a firm resolution to the Arab–Israeli conflict.

The subject of third party mediation, arbitration or fact-finding is dealt with Article 29 of the general Israel–Jordan Treaty, which states that *Disputes arising out of the application or implementation of this Treaty shall be resolved by negotiations. Any such disputes which cannot be settled by negotiations shall be resolved by conciliation or submitted to arbitration*. Oslo II calls for all decisions of the joint oversight bodies to be reached by *consensus, including the agenda, its procedures, and other matters* (IP 14). Neither here, nor elsewhere in the general Oslo agreement is there reference to arbitration or other third party dispute resolution mechanisms, although the JWCs are obviously entitled to seek advice or involvement by external entities, if they so agree.

The above findings are summarized in Table 1, which is organized as follows: the first column lists the UN Convention principle, the next two columns relate the Jordan–Israel Treaty and the final two to Oslo II; in each case we list the location in the agreement, and a symbol indicating the degree to which the agreement conforms/fulfills the UN Convention Principle. Admittedly, these indications are somewhat subjective, since they involve a search through the agreements for items which relate to the Principle and comparison of texts—an imprecise science, at best.

## 6. Conclusions

As indicated in the table above, the provisions of the two water agreements do broadly reflect the principles on water quality articulated in the UN Convention. Of the 20 UN Convention articles that have been analyzed for the relevance of the principles embodied in them, only five are not explicitly addressed in the Middle East agreements. Some of the 15 UN Convention themes that are covered in the agreements are treated in considerable depth. The Israel–Jordan Treaty provisions are either similar or stronger, as compared with 13 of the UN Convention articles, and

Table 1  
Relationship between UN Convention principles and water agreements<sup>a</sup>

UN Principles UN Convention Articles	Reflected in agreements			
	Israel–Jordan Treaty Article <sup>b</sup>	Relation	Oslo II Article	Relation
<i>Part I—Introduction</i>				
No. 1—Scope	6,III	=	3,11–15,21–24, Schedule 8	↑
No. 3—Watercourse agreements	6.1	↓	3.a, Schedule 7	↓
<i>Part II—General Principles</i>				
No. 5—Equitable and reasonable use	6.1, I.2, III, IV.1	=	3	↓
No. 6—Factors relevant to Article 5	6.2, I.1–2, III, IV	↓	3.d, 7, Schedule 8	↓
No. 7—Obligation not to cause significant harm	6.2, III, IV.1, IV.3, V	=	3, 20–24, Schedule 8.8	↑
No. 8—General obligation to cooperate	6.2–4, III.2, VI, VII	=	3, 1–17, 20, Schedules 5,6 and 8	=
No. 9—Exchange of data and information	6.4.d, III.2, IV.2, VI, VII	↑	9, 12, 20.g, Schedules 7 and 8	↑
No. 10—Relationship between different kinds of uses	I.2.c, III.3	=	6–10	=
<i>Part III—Planned Measures</i>				
No. 12—Notification of possible adverse affects	V	↑	Schedules 5.1–2	=
<i>Part IV—Protection, Preservation and Management</i>				
No. 20—Protection and preservation of ecosystems	Annex IV	X	Annex III Article 12	X
No. 21—Prevention, reduction and control of pollution	6.4.b, III, IV.1	↑	3, 12, 20–24, Schedule 6.4	↑
No. 22—Alien and new species		X		X
No. 23—Marine environment	Annex IV	↓		X
No. 24—Management techniques	VII	↑	11–17, 20, Schedules 5 and 6	↑
No. 25—Regulation of water flow	6.3–4, II	=	Schedule 5	=
No. 26—Installations	I.4, II, IV	=	7–10, 20, 22–24, Schedules 5 and 8	↑
<i>Part V—Harmful Conditions and Emergency Situations</i>				
No. 27—Prevention and mitigation of harmful conditions	6.1–2, 6.4, I.2. c, III, IV	=	3, 21–24	=
No. 28—Emergency situations		X	20.f	X
<i>Part VI—Miscellaneous provisions</i>				
No. 31—National security information		X		X
No. 33—Settlement of disputes	Article 29 of the general treaty	=	12,f, 14	↓

<sup>a</sup> Legend: = The agreement conforms/is similar to the principles, ↑ The agreement exceeds/is stronger than the principles, ↓ The agreement falls short of/is weaker than the principles, X The agreement does not contain/does not mention the relevant principle.

<sup>b</sup> I–J notation consistent with footnote number 1; I–P notation consistent with footnote number 2.



weaker with respect to three. In the Israeli–Palestinian agreement, correspondence to the UN Convention articles is similar or stronger in 10 provisions and weaker in four.

Both agreements are stronger in certain categories of their provisions than the corresponding UN Convention articles. For example, the guidelines exceed those of the UN Convention in the area of data and information exchange. In terms of joint management mechanisms, the Israeli–Jordanian agreement is less detailed than the Israeli–Palestinian agreement, but both go beyond the UN Convention rules by setting up Joint Water Committees with substantial powers.

Both agreements are not as complete in other respects, for various reasons. For example, not all affected areas are included. For the Israeli–Jordanian rivers, the Syrian and Lebanese riparians are not party to the Treaty. The Israeli–Palestinian Agreement refers to the West Bank and Gaza in a certain manner, which reflects the fact that this is not a permanent agreement. Another area missing, relative to the UN Convention rules, is the comparative costs of social and economic needs. While UN Convention rules do not give ranked priority to some types of uses over others, they do emphasize the salience of vital human needs. The two agreements make no such provision explicitly, so that this is left for the interpretation by the JWCs.

The Israeli–Jordanian Treaty goes beyond the UN Convention rules in spelling out time guidelines for notification of planned projects. In terms of prevention, reduction and control of pollution, it sets extremely high treatment standards. In fact, the parties may agree to allow somewhat lower quality than the *unrestricted agricultural use* mentioned in IJ III.3 for treated wastewater discharged into the rivers, if they find that this is too expensive and not justified.

The Israeli–Palestinian Agreement, likewise, is stronger than the UN Convention in certain areas. It has greater breadth than the UN Convention in combining the issues of water and sewage, and by explicitly discussing sustainability. The Agreement includes clauses for reimbursement for harm caused by one party to the other.

In some areas the Israeli–Palestinian Agreement is weaker than the UN Convention guidelines. While the Agreement emphasizes maintenance of existing quantities of water utilization, it only partially and implicitly affirms equitable and reasonable use. In addition, the Agreement does not include a provision for third party intervention in resolving future disputes when consensus is not reached.

While both agreements provide for Joint Water Committees, the Israeli–Palestinian Agreement also establishes Joint Supervisory Enforcement Teams (JSETs). This reflects the recognition by both parties that due to the sensitivity of the water resources in the West Bank, controlling the execution of the provisions of the agreement requires real-time supervision and enforcement. Also, control and prevention of damage to water and sewage installations are important elements of the Israeli–Palestinian Agreement, and the JSETs are vital mechanisms for assuring that a strong monitoring and enforcement system is put in place. In general, because groundwater flowing from the West Bank into Israel is an important component of its water resources, Israel places special emphasis on oversight of practices that might contaminate or limit these resources. The fact that both parties view this aquifer as an important resource helps explain the priority given to the JSETs in the accord.

Protection of water quality and of the environment is reflected in the two agreements. There is, however, some concern whether the execution of these provisions will be acted upon with the same vigor as those that relate to water quantity. There are strong interests for water quantity represented at the negotiation table and in the JWCs, but the interests of the environment are not

directly present there. Other sections of both agreements deal specifically with the environment: Annex IV of the Israeli–Jordanian Treaty is very vague and nebulous: Annex III, article 12 of the Israeli–Palestinian Agreement is more detailed but does not deal with ecosystems. Since protecting the environment incurs costs, and is sometimes in competition with having more water, there is a danger that environmental objectives may suffer, as compared to those of water quantity: “There is a concern that while other parts of the Agreement have strong interests behind them (water users), the environmental interests may not have strong and specific interests to stand for them.” (Shamir, 1998, pp. 279–280).

Since the signing of the agreements, implementation of the provisions regarding water quality and the environment has been variable.

### *6.1. The Israel–Jordan agreement*

- The desalination plant for treating the saline water springs near the Kinneret has not been constructed. The saline waters still enter the Jordan River close to the outlet from the Lake.
- The wastewater systems in the area of the Kinneret have not been constructed. There is only partial control of entry into the waterways of wastewater that has not been adequately treated.
- In the summer of 1998, a serious incident occurred in Jordan as a result of exceeding the capacity of the treatment plant that provides water to the city of Amman. This supply comes from water from the Jordan River mixed with water from the Yarmouk in the King Abdullah Canal (KAC) after passing through the treatment plant. The well-known, annual summer increase in algae concentration could not be handled, and the resultant poor water quality caused an outbreak of intestinal disease in a large number of people in Amman. Israel denied responsibility, since under IJ III.4 of the agreement, the receiving party gets water of the same quality as the provider takes from the source. However, Jordanian factions which objected to the Treaty took the opportunity to blame Israel, as did Jordan’s Minister of Water.
- No mechanism was introduced for continuous monitoring of water quality, which would prevent problems like the one described above. While quantity is continuously measured and allocations adhered to very closely, there is no similar attention to quality.
- Jordan was reluctant to carry out an environmental impact assessment for the planning of the diversion/storage dam on the Yarmouk. It was eventually done as a result of pressure from the international funding entities and the Israeli Ministry for Environmental Protection.

It is clear that water quality aspects of the agreement were not sufficiently explicit. Incidents, such as that of 1998, which affect health, may have serious political repercussions.

### *6.2. The Israeli–Palestinian Oslo II agreement*

- Many of the wastewater treatment plants required for West Bank cities, towns and villages have not been constructed. Therefore sewage still constitutes a major threat to water resources and to the environment.

- In the negotiations for Permanent Status, there is continued concern over water quality as it relates to the following factors:
  - flow of untreated or inadequately treated wastewater into the aquifer and into wadis and waterways;
  - irrigation with wastewater effluents with inadequate levels of treatment;
  - disposal of wastewater treatment sludge;
  - disposal of solid and hazardous waste;
  - pollution causing industrial activities and agricultural use of fertilizers, herbicides and pesticides;
  - pumping beyond annual replenishment, which may result in declining water levels and intrusion of saline water bodies.

The fact that the principles and implementation mechanisms of both agreements continue to be respected by the various parties is a matter of primary political as well as water policy importance. At a time when the Israeli–Palestinian relations have been undermined by the Al-Aksa Intifida, and those between Israel and Jordan have been strained by the escalating violence between Israelis and Palestinians, the water accords continue to connect the Israelis and Palestinians and the Israelis and Jordanians to a peaceful solution of their mutual water problems. This serves as perhaps the sole lifeline in the broader search for peace that now eludes Israel and the Palestinian Authority and what in turn threatens to undermine Israel–Jordan relations.

## References

- Brown-Weiss, E. (1996). *The Changing Structure of International Order. Inaugural lecture*, Georgetown University, Washington, DC.
- Caponera, D. (1995). Shared waters and international law. In G. Blake, W. Hildesley, & M. Pratt, et al. (Eds.), *The Peaceful Management of Transboundary Resources* (pp. 121–126). London/Dordrecht: Graham and Trotman.
- Kliot, N., Shmueli, D., Shamir, U. (1997). *Institutional frameworks for management of transboundary water resources, Vol. I: Frameworks reflected in thirteen river basins*. Water Research Institute, Technion—Israel Institute of Technology.
- Schiff, Z. (2001). Unlikely cooperation. *Ha'Arezt Daily Newspaper*. (English Edition), February 13, 2001.
- Shamir, U. (1998). Water agreements between Israel and its neighbors. In J. Albert, M. Bernhardsson, & R. Kenna (Eds.), *Transformations of middle eastern natural environments: Legacies and lessons* (pp. 274–296). Yale School of Forestry and Environmental Studies, Bulletin Series, No. 103.
- Solanes, M. (1992). Legal and institutional aspects of river basin development. *Water International*, 17(3), 116–122.
- United Nations (1997). *Convention on the law of the non-navigational uses of international watercourses*.
- United Nations General Assembly (1994). The law of the non-navigational uses of international watercourses. Draft, report of the international law commission on the work of its forty-sixth session, 2 May–22 July.
- United Nations General Assembly (1997). The law of the non-navigational uses of international watercourses.
- Utton, A. (1996). Which rule should prevail in international water disputes: That of reasonableness or that of no harm. *Natural Resources Journal*, 36(3), 635–641.
- Wolf, A. *Transboundary Freshwater Dispute Database (TFDD)*, at website <http://terra.geo.orst.edu/users/tfdd>.