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"Application of International Environmental Laws regarding the Use of International Waterways: the Palestinian-Israeli Conflict"

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Abstract

Among other issues being disputed currently within the Israeli-Palestinian conflict is the matter of water and the legal right of each party to access the scarce resources available in the region. Specifically, the question of which side holds a claim to the water of the West Bank Mountain and Gaza Aquifer must be addressed if an effective agreement is to be reached between the parties. This paper addresses the manner in which principles of international law dealing with international shared watercourses may help resolve the parties' water rights. Specifically, the paper analyses the legal principles which guide international water basins and the emerging doctrines of "significant harm" and "reasonable and equitable use" in the context of underground shared water.

The paper finally attempts to provide some outlines which may provide a basis for a future settlement between Israel and any Palestinian legal entity which may arise as a consequence of a final or temporary agreement over the West Bank and Gaza territories.

Key words: Palestinian-Israeli conflict, Mountain and Gaza Aquifers, International Environmental Law, Water Rights, Customary Law, Jewish Settlements.

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La aplicación de las leyes internacionales ambientales referente al uso de vías acuáticas: El conflicto Israeli-Palestino

Resumen

Entre los múltiples asuntos bajo discusión relacionados al conflicto Israelí-palestino se encuentra el asunto de vías acuáticas y los derechos legales de cada parte en cuanto al acceso a estos recursos tan escasos en la región. El asunto de quien controla los derechos a los recursos acuíferos de la sierra occidental y de Gaza debe ser atendido para lograr un acuerdo entre las partes. Este trabajo versa sobre la manera en que los principios de derecho internacional, que tratan del uso compartido de vías acuíferas, pueden ser aplicados para resolver este asunto. Específicamente, se analizan los principios legales que versan sobre acuíferos internacionales y las doctrinas sobre "daños apreciables" y el uso equitativo y razonable de los acuíferos subterráneos compartidos. Finalmente, se ofrecen unos lineamientos que podrían ser una base para resolver este problema entre Israel y cualquier entidad legal Palestina que puede surgir como consecuencia de un acuerdo final o temporal con respeto a Gaza y la sierra occidental.

Palabras clave: Conflicto Palestino-Israelí, los acuíferos de la sierra occidental y Gaza, leyes ambientales internacionales, derecho acuíferos, la ley tradicional, asentamientos judíos.

Introduction

The Arab-Israeli conflict brings to mind images of conflict born of political, religious and ideological issues. This perception overshadows a secondary, though nonetheless important element of the tension which has somehow affected the dynamics of the conflict: water.

This paper addresses the mode in which different principles of law dealing with international shared watercourses can help in

the resolution of water conflicts. International environmental law is not only linked with the determination of the parties' water rights, but with the management of water resources in light of the danger presented by water pollution. One of the main characteristics of environmental regimes is the desire to preserve a balance between economic human activity and the use of a scarce resource such as freshwater. Thus, this paper will examine the Israeli-Palestinian dispute over the Mountain Aquifers in light of this balancing objective.

I will begin by reviewing the current status of international law with respect to freshwater basins in light of the two concepts above-mentioned: protection of the environment and human economic needs. I will then attempt to provide some outlines which may provide a basis for a future settlement between Israel and any Palestinian legal entity which may arise as a consequence of a final agreement over the West Bank and Gaza territories.

Pollution of joint water basins: principles of International Law

Customary Law

International law finds its origins in the development of three different recognized sources (1). The first two, international Conventions and the "general principles of law" are, with regard to shared waterways, of limited use. The number of treaties covering international waters is very limited. In addition, the "general principles of law" regarding shared waterways have been subject to many interpretations and have been also limited in their application (2). The focus of this section is, then, on the current state of affairs regarding the law of the use of international watercourses through an analysis of customary law.

The starting point in the consideration of customary law is the law which governs riparian rights. "Stripped to its essentials, the riparian rights doctrine means that only those who have ac-

cess to water through ownership of land have the right to use that water"(Teclaff, 1996:362). This doctrine aimed at achieving a minimum degree of protection of the interests of the riparian communities by trying to reduce the possibility of change and the scope of new uses (Teclaff, 1996:362).

The development of riparian law served as a bedrock for future legal developments as well, as it conferred a widely agreed-upon framework regarding the use of international waterways (Dellapenna, 1994:34). The principle, however, fell short of the needs of modern economies with growing populations, which demanded an increasing use of natural resources like water. This phenomenon was particularly felt in arid regions of the world such as the Middle East. The post-World War I partition of formerly unified river basins in this region between French and British mandates, and the subsequent establishment of most Middle East states following the colonial boundaries, only added another obstacle to the rational management of water resources, as the nation state broke the ecological unity of international watersheds.

In this context, two conflicting claims over shared water resources have arisen. Upstream states demand "absolute territorial sovereignty", commonly asserting the right to dispense with the water regardless of its effect on other downstream states. Downstream states claim the "absolute integrity of the river" or other surface water source, basing their claim in the traditional riparian rules, alleging that upper-riparian states could do nothing that substantially modified the quantity or quality of water available to the lower state.

The two positions were irreconcilable and a third approach developed: the notion of "restricted sovereignty". This doctrine offers a middle-road solution by which "each state recognizes the right of all riparian states to use some water from a common source, and the obligation to manage use so as not to interfere with the similar use of other riparian states"(Dellapenna,

1996:36). The principle of "restricted sovereignty" also addresses the problems related to environmental protection, overcoming the artificial detachments created by political divisions.

Eventually, the doctrine of "restricted sovereignty" set grounds in the international legal community. In 1996, the International Law Association addressed these developments at the Helsinki Conference, producing a document called the Helsinki Rules] which delineated the fullest and most detailed blueprint of principles for the cooperation of states in developing shared water resources ever made (Teclaff, 1996:369). The Helsinki Rules attempt to spell out the customary law developed at that time, recognizing the right of each basin state to a "reasonable and equitable" share in the beneficial uses of international watercourses.

This principle of "equitable utilization" has since, gained support by consistent state practice and has been endorsed in varoius decisions of international tribunals and opinions of eminent jurists and international organizations (Hodges, 1995:380-81).

The Helsinki Rules lay down a series of factors used to determine what is "reasonable and equitable". They include: "*geography, hydrology, climate, past and present utilization, economic and social needs of the riparians, population, costs of alternative measures, other resources, practicability of compensation in instances of dispute, and how the needs of one riparian may be fulfilled without substantial injury to another riparian*" (Telerant, 1995:186). The Rules do not favor one reasonable use over another in theory, though "in reality, two factors tend to predominate: human conditions over natural properties, and past and present uses over potential uses" (Telerant, 1995:186-87).

Likewise, past development of international law reflected in cases such as the *Island of Palmas*, the *Trail Smelter* and the *Corfu Channel* (3), opened the door for the introduction of principles which addressed harmful effects, also known as the "good neighbour principle". Thus, the Helsinki Rules imposed a duty to

prevent "any new form of water pollution" (4) of international rivers and a more lenient recommendation to "take all reasonable measures to abate existing water pollution" (5).

Further awareness of the transboundary characteristics of the effects of pollution put the principle of no harm at the top of the international agenda. The issue continued to be invoked in diverse international forums such as in the 1972 *Stockholm Declaration of the United Nations Conference on the Human Environment* and *Resolution 2995 of the United Nations General Assembly* (6).

The Helsinki Rules were finally followed by the 1994 *Draft Articles on the Law of Non-Navigational Use of International Watercourses* prepared by the International Law Commission [hereinafter Draft Articles] (7). The Draft Articles are the most recent authoritative expression of the theory of "restricted sovereignty". The Articles have not been formally adopted, but in practice they have a significant impact on the practice of riparian states.

Two provisions are especially relevant when examining the Draft Articles: Article 5 and Article 7. The Draft Articles reaffirmed the principle of "equitable and reasonable use" and qualified the prevention of pollution -defined in terms of "significant harm"- as a "due diligence" obligation. According to the Draft Articles "a watercourse State can be deemed to have violated its due diligence obligation only if it knew or ought to have known that the particular use of an international watercourse would cause significant harm to other watercourse States" (Tadros, 1996:1110).

Nevertheless, there remains a potential for conflict between the doctrines of "equitable and reasonable" and due diligence since harm may ensue from an "equitable" allocation. In fact, almost any use of international watercourses will result in some harm, perhaps even significant harm being caused to other riparian states. The Draft Articles, then, are not particularly clear on whether equitable and reasonable use relieves a state of its burden not to cause harm. What the Draft Articles attempt to

achieve, therefore, is a balance between modern socioeconomic realities and environmental protection goals.

The difficulty presented by the absence of guidance regarding the priority of harm over "reasonable and equitable use" or vice versa needs to be addressed in light of these balancing objectives. Thus, in the case of an agreement over shared waterways, one can presume that what is determined between parties as "reasonable and equitable" will not likely be challenged as causing "significant harm" later on. Presumably, the "no significant harm" principle will be included in negotiations between the parties. One could also argue that there cannot be a "reasonable" allocation of waters resulting in "significant" harm. It is almost as if the threshold is an intrinsic element of what is "reasonable" (Tadros, 1996:1110). Given this threshold, a due diligence defense becomes a much higher standard to be met: "under the Draft Articles a State may develop an equitable and reasonable use only where it knows or ought to know that it would not cause significant harm to other states" (Tadros, 1996:1111).

A "no significant harm" threshold still strives for a minimal standard of environmental protection and while giving sufficient leeway to parties which cannot enter into close collaboration due to a protracted conflict, such as the Arab-Israeli one. In this later context, the resolution of a conflict over water pollution between Middle Eastern states is usually intermingled with questions of national security which intensify the difficulty to reach an understanding (8). The Palestinian-Israeli case involves two water scarce parties coalescing in a singular political reality in which the mutual confidence between parties is low or almost nonexistent. In such a scenario, the difficulties arising from the contradictory objectives of customary international law are not the only ones that need to be considered in analyzing the dynamics of the conflict.

The Law Related To Underground Water

The rules regarding subterranean water experienced a lower level of development than the doctrines related to surface waterways. The former were "considered of minor interest to the state and its disposition was left mostly to the owner of the overlying land" (Teclaff, 1996:372).

The Helsinki Rules deal with groundwater only insofar as it is connected with surface water. The Rules ignore unconnected groundwater (Teclaff, 1996:373). The Seoul Conference of the International Law Association [hereinafter Seoul Conference] which took place in 1986 complements the Helsinki Rules (9). The Seoul Conference recognizes transboundary aquifers without connection to surface basins as international basins for the purpose of the Helsinki Rules (10). Article 1 reiterates the proposition "that a state shall refrain from acts causing 'substantial injury' to a co-riparian as long as the principle of equitable utilization does not justify an exception" (Telerant, 1995:187).

The Draft Articles, the other legal instrument relevant to the use of international waters, do not include confined transboundary groundwater, although they do recommend that states apply the principles of the Draft Articles to groundwater usage (Telerant, 1995:187). In other words, both the Seoul Conference and the Draft Articles endorse a similar treatment for ground and surface water resources (11). They are the most authoritative documents codifying customary international law regarding the use of shared groundwater resources (12), as well as representing a method of guidance for a future agreement over the Mountain and Gaza Aquifers.

Accordingly, the next section will examine the application of the doctrines of "equitable and reasonable use" and the duty not to cause "significant harm" in order to discuss the positions of both Israelis and Palestinians with respect to a future agreement over the aquifers.

The Mountain and Gaza Aquifers

Geographical Data (13)

The groundwater reservoir beneath the Judea and Samaria Mountains in the West Bank is called the Mountain Aquifer, which by the early 1990 supplied 600 million cubic meters per year (MCMY) (Benvenisti and Gvirtzman, 1993:552). The Aquifers provide "about one-third of the water consumed in Israel annually, as well as most of the water consumed by Palestinians residing in the West Bank (14).

The Mountain Aquifer is divided into three different reservoirs which spread unevenly in and out of the territories under Israeli control after 1967: the West or Yarqon Tanninim basin, the North or Nablus-Gilboa basin and the East basin (Benvenisti and Gvirtzman, 1993:555-56).

According to the riparian rules, the only international doctrines related to the use of fresh water which can be clearly identified as having been incorporated into customary law are the ones regarding riparian rights: "a watercourse must at some point either pass through the territory of the state, or at least touch its borders" (Naff and Marson, 1984:166).

The aquifers are not linked with any other groundwater or surface water such as the river Jordan, and consequently, only the aquifers themselves can be considered a shared natural resource (15). In other words, any Palestinian legal claim to the Jordan River as a riparian would be only dependent on access to the Jordan River. At this stage of the negotiations, it is not clear whether the Jordan Valley will be devolved to the Palestinian Authority. The likelihood of a settlement which will include Palestinian sovereignty over the banks of the river Jordan remains as an open question, in light of the security reassessments that the Israeli Government will eventually make following the violent clashes that have been taking place since November 2000. Nor does the Israel-Jordan Peace Treaty

mention the possibility regarding any future Palestinian claim as a riparian to the Jordan river (16).

The result of either a complete withdrawal of Israel from the West Bank or a more likely territorial compromise between the parties (with Israel retaining some major Jewish settlements an/or strategic positions such the Jordan Valley) will prompt the law of international water resources to apply in each of the three basins. Thus this section will not consider a Palestinian claim over the waters of the Jordan River, but will only deal with the Palestinian and Israeli claims over the Mountain Aquifers.

The legal literature on underground water has classified the use of underground water resource in three main categories (Barberis, 1991:168):

1. Underground water belonging to a state "when the whole aquifer is found within the State's territory, its recharge area is in the State, and it is not hydrologically linked with surface water on groundwater of a neighboring State" (Barberis, 1991:167-8). The Gaza Aquifer lays entirely within the Strip and no use is made from the Israeli territory pre-1967. It is very likely that a future Palestinian entity will include the current Gaza Strip without major territorial changes. Nevertheless, the Jewish enclaves in the Strip also use the only existent aquifer in the Strip. This situation renders the otherwise "domestic" status of the Gaza Aquifer in a *sui generis* category.
2. Groundwater found entirely in the territory of a State linked hydrologically with an international river. This category does not apply either to the Strip or to the West Bank.
3. Underground water found in shared territory. The three aquifers in the West Bank fit this last category.

"Equitable and Reasonable" Use

The Palestinian side argues that underground water should be allocated according to the geographic factor, namely, the fact that that large sections of the Mountain Aquifers are inside the West Bank. The claim, however, misapprehends the purpose of the geographic factor when asserting what is "reasonable and equitable" as the Helsinki Rules do not favor one reasonable use over another. Natural factors should be used mainly to "set the background for the legal analysis" (Benvenisti and Gvirtzman, 1993:78). They only help in the determination of factual conditions of the shared drainage basin, "such as the availability of water, as well as special problems such as drought conditions, potential building of dams and other structures, and delimitation of basin boundaries, which in turn determine the states that are parties to the basin" (Benvenisti and Gvirtzman, 1993:549-50).

The acceptance of the Palestinian position would defeat the underlying goals of customary international law (i.e. what is "reasonable and equitable without "significant harm"), which aims to achieve a balance between environmental protection and socioeconomic needs. The Palestinian stand has a striking resemblance to the traditional doctrine of "absolute territorial sovereignty".

"Prior use" is another factor to be considered. The Palestinian-Israeli context reveals a much more complex situation than the negotiations over the Jordan basin between Jordan and Israel, with regard to the establishment of prior existing uses. Before 1967, Israel used 340 of the 360 MCMY available in the West basin and about 115 of the 153 MCMY available from the North basin. These numbers are important because Jordan, which controlled the West Bank before 1967, never challenged the extraction of water by Israel. Israel, therefore, has a strong *prima facie* case, based on prior use, tough only in relation to the West and North basins.

A different problem arises in the case of the East basin from which Israel extracted no water from the (1967) 58 MCMY yield.

After 1967, however, the Israelis developed a new pumping system which enhanced the yield of the East basin to the present 100 MCMY. In addition, it will be difficult for Israel to argue prior use on the basis of the water used by Jewish settlers in the territories, who receive most of their water from the West basin. The *Israeli-Palestinian Declaration of Principles on Interim Self-Government Arrangements* [hereinafter *Declaration*] of 1993 partially addressed this issue, in that it gives the Palestinians exclusive use of the eastern aquifer (Telerant, 1995: 202).

A different problem arises from both Israeli and Palestinian patterns of water use arising in the West Bank and Gaza Strip *after* the 1967 War. It is difficult to find a similar pattern based in any tacit agreement. In fact, "the Israeli authorities who have administered the Area since 1967 have prevented Palestinian challenges to Israeli utilization by consolidating their control over all of the local water systems, and by severely limiting Palestinian access to additional water resources" (Benvenisti and Gvirtzman, 1993:545) (17). Thus, it would be dubious to characterize such unilateral policy as a custom-based practice adequate to help determine future water allocations. The right of Israel over a "reasonable and equitable" allocation of the water used within the West Bank and Gaza Strip by Jewish settlers should not be rooted in the priority of historical uses.

The consideration of "vital human needs" is another important factor that needs to be considered. This analysis is not only important due to the lack of a domestic customary law with respect to the underground water used by the Jewish settlers in the West Bank and Gaza Strip, but more importantly, because the Israelis extracted significant quantities of underground water from their own territory before 1967.

By 1994, Israel was using over ninety-five percent of the total water supply of the West Bank, while West Bank Arabs used less than five (Ditcher, 1994:573). Regardless of the prima facie

case Israel may have over its present levels of water extraction in Israeli non-disputed territory, it is evident that the current allocation levels will need to be balanced against potential Palestinian demands for "developmental equity". This calls for some reassessment of water allocation which will need to come together with a political and territorial settlement.

In order to take "developmental equity" principles into consideration, it is necessary to look at the different patterns of water use, as the way water is used carries a different weight. Thus, domestic uses take priority over agricultural and industrial uses (Ditcher, 1994:561). This is especially true in situations in which the scarcity of water is becoming a major problem, as it is the case of the Middle East region.

Some scholars have underscored the impossibility of calculating precisely how much of the water pumped by Israel (mostly from the West basin) from the pre-1967 boundaries goes to irrigation, industrial uses, or domestic consumption since the water enters into the general Israeli water bank (18). Other sources actually do make estimates of Israeli allocations. The following is one example:

Entity	**Water Budget (MCMY)**	**Natural Potential (MCMY)**	**Agr (%)**	**Dom (%)**	**Ind (%)**
Israel	1800	1600	73	22	5
Jordan	870	870	85	10	5
West Bank	115	115	78	22	0
Gaza	95	60	85	15	0

Israeli natural potential of about 1600 MCM./yr. is augmented through wastewater reuse, some desalination, and, until 1991, a 200 MCM. annual groundwater overdraft. Adapted from A. Wolf, "Water for Peace in the Jordan River Watershed" (1993) 33 Nat. Resources J. at 799.

Thus, it appears that the priority of domestic uses "would lead in the future to the allocation of additional quantities to the Palestinians for domestic purposes, since the current Palestinian average per capita consumption is less than one-third of average per capita consumption in Israel" (Wolf, 1993:799).

Appraising the weight to be given to industrial and agricultural needs, however, is a much more difficult task than the case of domestic uses. For instance, "(t)here are many factors, aside from the availability of water and land, that determine the economic viability of agriculture, and hence the potential demands it creates for water" (19). Benvenisti illustrates this problem by referring to the possibility of "almost double the number of irrigated fields in the Area [West Bank]" by means of drip irrigation rather than flooding (Benvenisti, 1994:562).

This last example is linked with another point which must be taken into account when assessing human needs: the total costs and benefits of each state resulting from groundwater withdrawals. Alternative resources or new ways to use water more efficiently may very well satisfy increased demand for water in one state, pending the availability of more efficient irrigation techniques, without significant changes in the existing allocation.

In the case of the Western Aquifers, this may be translated into measures directed to enhance water resources. This could involve a scheme in which Israel exchanges its efficient agricultural technology for a greater share of water or some other commodity (20). In fact, the region is currently embarking on an effort to move water away from agriculture and into the industrial sector, "but these measures clash with national ideologies and entrenched water institutions of nations built around the mystique of the fellah and the kibbutznik" (Wolf, 1993:815). In addition, both Israel and the Palestinians may be reluctant to become major food importers for security reasons, even if it is more economical to do so.

Israelis and Palestinians could also engage in the importation and desalination of brackish and saline water. The first proposition, however, would place both parties in a rather vulnerable position from a security standpoint. Desalination, on the other side, is an expensive process and whether the two sides will be able to pay such high costs is an open question.

Jordan has been suggested as another possible source of water. In negotiations which took place in 1953 between Jordan and Israel over the allocation of water from the Jordan basin, both parties reached an agreement. "In the context of its own national water diversions along the East Ghor [Canal], 70-150 MCMY of water were allocated to the West Bank, at the time an integral part Jordan. A siphon was planned, but never built, to move water from the East Ghor Canal for this purpose"(Wolf, 1993:817). That being the case, the argument follows, Jordan still "owes" this water to the West Bank. Nevertheless, the Israel-Jordan Peace Treaty omits such important proviso in the Peace Treaty. It is highly unlikely that this was accidental. Presumably, neither Israel nor Jordan were interested in adding another party to an already limited resource such as the Jordan Basin (from which the Jordanian contribution was supposed to come).

Harm

The allocation of costs due to future environmental depletion, invites the consideration of the "significant" harm threshold. "The harm that one State may cause another in connection with a given aquifer could affect the quantity or quality of the water or its geological structure" (Barberis, 1991:169). The quantity of water in an aquifer can be adversely affected in two ways:

1) Through exploitation in excess of the aquifer's rate of recharge.

The West Bank

"In the forty years after 1949, Israel's population grew four times and its water consumption increased over eight times"

(Ditcher, 1994:568). Indeed, Israel is running at a deficit of 200 MCMY (Telerant, 1995:180) and its current consumption of water exceed the sustainable annual yield of water. “Such a depletion could have very damaging effects on the overall water supply: as overpumping causes the water table to fall lower, the dividing boundary between fresh and sea water rises higher, causing salinization” (Ditcher, 1994:569).

The projections for the future are grim as well: “the amount of water consumption in Israel will increase by thirty percent from the 1991 level of 2100-2200 million cubic meters to 2800-2900 in the years 2015-2020” (Ditcher, 1994:569). Presumably, this increase will impose an additional constraint in the Mountain Aquifers. It will, as well, negatively affect the current water supplies the West Bank is getting from the Israeli National Carrier to prevent over-pumping of its own groundwater wells. To this one must add the even higher West Bank population growth rates (21) and the fact that the area is currently at one hundred percent of potential usage.

In fact, the same critique regarding the Palestinian claim over “natural rights” can be extended to Israel over the current levels of use of the Mountain Aquifers. The principle of due diligence not to harm originates from the abandonment of the historical contention of “absolute territorial sovereignty”, by which each state adopted substantive laws under which rights to the use of water were consummated, disregarding the detrimental environmental effects generated by those activities in other states. The Israeli current rates of use, regardless of Israel's historical rights over water use, do not meet the “significant harm” threshold mentioned before. This is another reason why some reallocation needs to take place. This type of consideration is not only important for the evaluation of costs and the estimation of who should bear them, but because Israel could easily avoid any legal contentions over the use of water by the settlements in the West

Bank by withdrawing the water from the western and northeastern aquifers in Israel and then shipping it to settlers in that area.

The Gaza Strip

With regard to the use of water by Jewish settlements, the situation in Gaza is similar to the one in the West Bank. The same type of analysis used for the West Bank settlements can be applied to the settlements located inside the Strip. Gaza's underground aquifer is used and situated entirely within the strip and there are no real uncertainties regarding the allocation of water between the Palestinians and Israel *per se*. Thus, absent any claim based in prior uses, Israel could only bring a claim for a share of the exploitation of water based on the "human needs" of the Jewish settlers. In other words, any balance made between the harm caused by the settlers (which must also be balanced against the already chronic shortage in the Strip which cannot even meet a level of sustainable yield (22) and the harm caused to the settlers by a reallocation of the water available to them should take place considering taking into consideration the lack of an Israeli right to prior use (23). In fact Israel, whether by way of a recognition to this analysis or simply due to the precarious water situation in Gaza (worsened by the Strip's extremely large population growth rate (24), has pledged to provide a significant increase of 28 MCMY of water to the Palestinians in the *Declaration* (Telerant, 1995:202; Wouters, 1996:434-35).

2) Through pollution of the aquifer's replenishment sources.

The second way in which "significant" harm can be caused is through the modification of the aquifers' sources of supply leading to the pollution of the resource. "Supply modification may occur, for example, if any artificial alteration is made in the volume of flow of a river feeding the aquifer or if any modification occurs in the terrain in the natural recharge area" (Barberis, 1991:169).

As a downstream riparian to the Mountain Aquifers, Israel has expressed apprehension regarding the effects that any future

Palestinian management of water resources can have on the quantity and quality of the Mountain aquifers. Groundwater pollution can ensue from the introduction of chemicals or microorganisms into the aquifers. "Human activities having such consequences are varied, including farming, industry, mining, and urban sewage and drainage services" (Barberis, 1991:172). In effect, Israel may be affected by unhindered Palestinian water development or pollution in the hills west of the watershed line wich could endanger both the quantity and quality of water sources on which Israel relies (Wolf, 1993: 809).

Thus, Israel's grounds for restricting pumping in the West Bank have been argued as defensive measures, "necessary to protect its coastal wells and the integrity of the water system as a whole" (Wolf, 1993: 809). This is a well-founded concern which will need to be addressed if a territorial settlement is achieved, as some areas of recharge will no doubt remain under Palestinian control.

To some extent, this question could be addressed through an agreement in which the Palestinians commit not to extract more water than the current amount and Israel pumps and sends water back to the Palestinians in amounts agreed on the basis of "equitable and reasonable" uses. Note that such scheme would also save the Palestinians the costs of drilling new wells. A similar scheme was used in *the Convention for the Protection, Use and Recharge of the Genevois Water* (25). According to the document, the artificial recharge station for the water table is provided by, and is the property of, the Canton of Geneva. France's contribution to defraying the recharge costs is assessed by reference to the amount of water taken by French users together with the contribution to the natural recharge of the aquifer made by French territory. The governing pattern of mutual mistrust between Israelis and Arabs, however, challenges the feasibility of any arrangement which may leave one side dependent on the proper delivery of the other.

"Optimal Utilization"

The last factor to be considered when deciding an "equitable and reasonable allocation" is the aim to secure the maximum possible yield of water. Related to this principle is the recognition of Israel's improvement of the East Aquifer supply mentioned before. The use of these waters did not bring any harm to the reservoir, since the water not used was left to reach its natural outlets and became saline (Benvenisti and Gvirtzman, 1993: 559). Therefore, some recognition of this improvement, in the form of compensation for costs incurred or water reallocations, should be addressed in future negotiations.

Final comments regarding a future agreement over the aquifers

Following the principle of reasonable and equitable apportionment, any agreement between the Palestinians and Israel should include further exchange of relevant information and continued negotiations. This framework is not only necessary to address future issues which may not have been addressed by a Treaty, but is essential in dealing with future problems which may arise due to new sources of pollution. In addition, the occurrence of droughts, and the variance of actual yearly precipitation "could create the need to reapportion the available water on an ad hoc basis" (Benvenisti and Gvirtzman, 1993:564). Moreover, "withdrawal effects may take many years to be transmitted from well to well; without monitoring, it is impossible to verify the amounts of water pumped by the co-riparians. Furthermore, underground reservoirs are sensitive to overpumping and contamination, which may cause irreversible damage. Sometimes it is difficult to determine whether an aquifer has been polluted, or to identify the source of the pollution" (Benvenisti and Gvirtzman, 1993:565).

In other words, customary principles of international waterways have to be tailored to the particular local conditions. This

reality calls for the appointment of a commission/s in charge of protecting groundwater against pollution.

So far, the Israeli-Palestinian *Declaration* provides, in Annex III, for the parties to "establish a Continuing Committee whose first task is to discuss the cooperation in the field of water, including studies on the water rights of each party and the equitable utilization of joint water resources" (Benvenisti and Gvirtzman, 1993:543-44). Whether this proviso might serve as a basis for the development of a body fit for the management of the underground waters is open to debate.

At any rate, it is not likely that the parties will establish institutions with wide powers such the as, for example, the *Tennessee Valley Authority* (TVA) (26). It is one thing to create a corporation with inter-state powers. It is quite different to achieve the same level of authority at the international level, in which questions of sovereignty and national interests play a major role (Teclaff, 1996:383). This is especially true in the Middle East, given the lack of trust between the parties involved and the different significance of water in such an arid region.

It is more likely that an agreement will facilitate the establishment of an organization with consultative powers such as the one set up in the Israel-Jordan Peace Treaty. These types of commissions, however, usually have their scope of authority limited for specific purposes such as allocation of water, pollution control or power production (27). Nevertheless, the experience of other regions shows that a limited pattern of cooperation may spill over into broader issues (28).

Conclusion

Clearly, the position of both Israelis and Palestinians has been shaped by a protracted historic conflict. However, underlying the parties' attitudes towards the water issue, one can identify a shared concern over their present and future availability of

water resources. Needless to say, any comprehensive legal settlement of international water rights will only be possible when a definite demarcation of the boundaries will be achieved.

The resolution of an equitable and reasonable solution which does not result in significant harm is then, inextricable linked with a territorial settlement. Similarly, a territorial settlement between Palestinians and Israelis that does not address current and future environmental problems will leave this critical question unresolved, which will likely be a source of potential future conflicts.

Notes

1. The following analysis follows the principles stated in Article 38(1) of the *Statute of the International Court of Justice*[hereinafter *ICJ*], which "is considered as the authoritative statement of the law-creating processes of international law". H. Kindred et al., *International Law Chiefly as Interpreted and Applied in Canada*, 5th ed.(Toronto: Edmond Montgomery Publications Limited,1993), p. 78.
2. Some scholars have pointed out to the futility of the use of general principles of law in the Middle East context See T. Naff & Ruth Marson, eds. *Water in the Middle East: Conflict or Cooperation?* (Boulder, Col.: Westview Replica Edition, Westview Press, 1984), p.167.
3. *U. S. v. Neth*. (1928) 2 R. Int'l Arb. Awards, p. 839; *U. S. v. Can*. (1938 and 1941) 3 R. Int'l Arb. Awards p. 1965; and *Gov't of the U. K. and N. Ire. v. Albania*, [1949] I.C.J. Rep., p. 22.
4. *Helsinki Rules*, Art. 10(1)(a).
5. *Ibid*., Art. 10(1)(b).
6. *Stockholm Declaration of the United Nations Conference on the Human Environment*, Report of the U.N. Conference on the Human Environment, held at Stockholm, June 5-16, 1972,

U.N. Doc. A/CONF.48/14/Rev. 1 (1972), Principle 21. Reprinted in 11 I.L.M. 1416; The U.N. General Resolution reads: "that, in the exploration, exploitation and development of their natural resources, States must not cause significant harmful effects in zones situated outside their national jurisdiction. G. A. Res. 2995 (XXVII).

7. Report of the International Law Commission on the Work of Its Forty- Sixth Session: The Law of the Non-Navigational Uses of International Water Courses, U.N. GAOR 6th Comm., 49th Sess., Supp. No. 10, at 207, U.N. Doc. A/49/10 (1994) [hereinafter Draft Articles]. Of course, customary international law does not have the same enforcement mechanisms domestic laws possess. The Helsinki Rules are not enforceable since the International Law Association is an unofficial organization. Likewise, the International Law Commission Draft Articles do not yet have the force of a multilateral agreement or treaty. The principles of shared international waterways do not even fall under the jurisdiction of the International Court of Justice, since Art. 38 of the Statute which creates this international tribunal does not grant jurisdiction over matters of equity.

8. "Water scarcity can jeopardize a country's national security and stability in at least two ways. First, it can degrade the quality of life within a country by increasing deaths due to dehydration and by creating nonsanitary conditions, which spread serious and fatal diseases. Secondly, because countries are dependent on water to sustain basic agricultural and industrial activities, water scarcity can directly threaten a country's basic economic base" (Kukk and Deese, 1996: 31).

9. International Law Commission, *Report on the Sixty-Second Conference: The Law of International Groundwater Resources*, Seoul Complementary Rules at 251 (1986). The Seoul Rules, like the Helsinki Rules, have no binding power on states.

10. Article 2.2 states that a transboundary aquifer that does not contribute water to, or receive water from, the surface waters of an international drainage basin constitutes an international drainage basin for the purpose of the Helsinki Rules. *Ibid.*. at 259.

11. See *Seoul Rules, supra* note ix at Art. 1; *Draft Articles, supra*, Art. 1 (definition of watercourse system).

12. There have been regional efforts to clarify rules on this subject such as the United Nation's Economic Commission for Europe (ECE), "Charter on Ground-Water Management", *ECE Annual Report (1989*-90), ECOSOCOR 1989, Supp. No. 15.

13. For a comprehensive description of the hydrological characteristics of the West Bank. See Benvenisti and Gvirtzman, *supra*.

14. Israel (including Jewish settlements in the Area) uses about 495 MCMY, while the Palestinians use about 105 MCMY. For Israel, this Aquifer is the source of about 35 percent of its total annual consumption, which is about 1,400 MCMY of fresh water (Benvenisti and Gvirtzman, 1993:559).

15. Some residue from winter rainfall is carried to the Jordan via intermittent tributary wadis, but they are located primarily on the Jordanian side.

16. *Israel-Jordan: Treaty of Peace*, 26 October, 1994, 34 I.L.M. 43. Some commentators, however, see this omission as a deficiency of the Treaty.

17. These limitations include nationalization and integration of West Bank water with the Israeli grid, and limitation of agricultural allocations to 1967 levels.

18. Nevertheless, "a recent report of the Israeli State Comptroller found that due to the high quality of this water, this basin, which is considered the principal long-term reservoir of the Israeli water system, provides the main source of drinking wa-

ter for most of Israel's large towns, including the Tel-Aviv area and its suburbs, Jerusalem, and Be'er Sheva" (Benvenisti and Gvirtzman, 1993:558).

19. "Among these factors are growth of population in the region; use of agrotechnical techniques, including automated machinery, fertilizers, pesticides, and greenhouses; efficiency of possible methods of irrigation; availability of human power; and existence of potential markets" (Ditcher, 1994:562).

20. For example, Israeli farmers, "have more than doubled their food production in the last twenty years without increasing the amount of water used", utilizing a drip irrigation technique which allows exactly the right amount of water to reach each plant through holes in plastic hoses (LeRoy, 1995: 323-24).

21. Including a potential absorption of Palestinian refugees, the West Bank's current 900,000 population is projected to increase at a growth rate of 3.4%, which will mean that by the year 2020, the area is expected to have 2,370,000 people (Wolf, 1993: 800).

22. In Gaza "bringing the level of output into line with the would require a reduction in exploitation to half of current levels" (Ditcher, 1994:572).

23. After the 1948 War of Independence, the Gaza Strip remained under the control of Egypt until 1967.

24. Gaza's population growth was estimated at 3.4%, which means that by the year 2020, the Strip will add another 980,000 people to the 600,000 estimated in 1991 (Wolf, 1993: 800).

25. Treaty of June 9, 1978, between the Canton of Geneva and the Department of Haute-Savoie on the Genevois water table. Lejeune, Recueil des accords internationaux conclus par les Cantons suisses, Berne/Frankfurt/M 200 (1982).

26. Other regions of the world with lower levels of political conflict than the Middle East implemented similar schemes as the *TVA* but never with its same wide coverage. Examples are the Convention Creating the Niger Basin Authority, Nov. 21, 1980, in *U.N. Department of Technical Co-operation for Development, Treaties Concerning the Utilization of International Water Courses for Other Purposes Than Navigation: Africa 56*, U.N. Doc. ST/ESA/141 (1984); *Treaty for Amazonian Co-Operation*, July 3, 1978, 17 I.L.M. 1045; and the *River Plate Treaty*, Apr. 23, 1969, 8 I.L.M. 905.

27. The Peace Treaty "grants neither judicial nor legislative authority to the Committee and does not provide a dispute settlement remedy" (Fatahllah, 1996: 133). See other examples in Teclaff, 1996:384.

28. "An outstanding example is the International Joint Commission, United States-Canada (I.J.C.), which, at its inception and for a long time afterward, had jurisdiction only over frontier waters" (Teclaff, 1996: 385).

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