Water in the Jordan Valley:
The Potential and Limits of Law

by

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Water's unique status as a resource has made it a frequent object of international controversy and even conflict. The most cordial and cooperative of neighboring states, and not just hostile and conflicted neighboring states, have found it difficult to achieve mutually acceptable arrangements to govern their transboundary surface waters.[1] Even states within a single federal union have engaged in long drawn out and bitter political and legal struggles over the waters they share.[2] All of this has taken place with the problems of transboundary aquifers having hardly begun to be considered.[3]

Conflicts over water have had a most unusual feature, at least in the twentieth century: no matter how violent conflict between states sharing a common watersource might have become, and especially when water itself has played a central role in the conflict, water facilities have remained off limits to combat, cooperative water arrangements have still been negotiated, and pre-existing arrangements have remained intact. For example, India and Pakistan have engaged in three full-scale, albeit limited, wars since 1948, as well as numerous other skirmishes

and serious threats of war. Yet in each instance they did not target water facilities or interfere in the operations of a joint Indo-Pakistani water management administration.[4]

Nowhere have these patterns been more salient to the simmering conflicts in a region than in the Middle East, but until recently few topics have been more neglected in public discourse in the peace process there than water.[5] While some have even seen Israeli conduct as dictated by a "hydraulic imperative,"[6] one need not go so far to conclude that the most cursory examination of the needs of the various actors in the Jordan Valley for water, and the water available to them, demonstrates that no long-term peace is possible in the region without an arrangement over the use of water that is acceptable to all significant actors. Recently this awareness has begun to reach a wider public than the handful of academics who have considered the problem since the failure of the Johnston Plan in 1955.[7]

In the fall of 1989, a political party calling itself "Tsomet: Zionism Unmistakably Resolute" has undertaken a major press campaign in opposition to any withdrawal from the West Bank, with fear of loss of control over 60% of the water supply of Israel as one of its three major points.[8] The Arab press has noted the Israeli fear of "giving [their] drinking water to Yassir Arafat."[9] Even without such publicity, water inevitably (as this article will demonstrate) would have become a major focus of any negotiations which might emerge between Israel and representatives of the Palestinian people.

Now is an opportune time for a serious reexamination of the factual and legal context in which such negotiations will have to be concluded. If peace is to come to the Jordan Valley, each side will have to discover ways to accommodate the legitimate needs of the other, and to assure that its own needs are adequately protected. While this article will demonstrate that international law as it now exists cannot by itself create a solution to the potential impasse, no solution is possible without the creation of international legal arrangements to express and assure the outcome negotiated by the parties. International law might not be the answer, but there can be no answer without international law.

I. The Hydrologic Context

A. The Jordan River[10]

The Jordan River is a small stream that arises from karstic springs on the slopes of Mt. Hermon (Jebel esh-Sheikh). The Jordan watershed has a total surface area of 18,300 sq. km., and produces an average annual flow that is only 2% of the flow of the Nile River.

The Jordan River arises from three small, spring-fed streams: the Banias (in Hebrew, Nahal Hermon), the Dan (Nahal Liddani), and the Hasbani (Nahal Senir). The Dan varies the least of the sources, ranging from 173 to 285 MCM/yr,[11] and contributing about half of the normal flow of the Jordan River. The Hasbani has varied from 52 to 236 MCM/yr, averaging 138

MCM/yr The Banias has ranged from 63 to 190 MCM/yr, averaging 121 MCM/yr.

The springs contribute 50% to 70% of the flow of the upper Jordan River (depending on the amount of rainfall), the remainder coming from direct run-off from rainfall. While the springs respond quickly to rainfall changes, they vary less than the surface runoff, and they provide more water to the Jordan River than can be accounted for solely from current rainfall over their watershed. Thus, one can surmise that the springs represent the outflow of a large, regional aquifer.

The Jordan River is "exotic", flowing down from well-watered highlands into an arid zone. The Jordan River, however, picks up one major tributary (the Yarmuk) in the arid zone, and it receives additional water below the Yarmuk, even while losing considerable water through seepage and evaporation. The Jordan River is also stabilized by a large natural reservoir (Lake Tiberias, known in Israel as Yam Kinneret, and from the Bible as the Sea of Galilee). Finally, the Jordan River ends in the Dead Sea.

The waters of the upper Jordan River are "sweet" (i.e., of low salt content). They flow down through the Red Sea Rift Valley, so that most of its course is below sea-level. After crossing the Huleh basin (formerly Lake Huleh), the Jordan River enters Lake Tiberias. Lake Tiberias is already 210 m below sea-level. The Jordan River provides an average of 660 MCM/yr into the somewhat saline lake. (Another 130 MCM/yr also enter the

lake from local run-off.) About 500 MCM/yr flow out of the lake into the lower Jordan River.

Lake Tiberias serves as a natural reservoir for the waters of the Jordan River. Its normal volume (4,000 MCM) averages 6.5 times the Jordan River's inflow, and 8 times the outflow to the lower Jordan River, providing a measure of stability to the flow of the lower Jordan River, and to uses of water extracted from the Jordan River. The major tributary of the Jordan River, the Yarmuk River, enters the Jordan River 10 km south of Lake Tiberias, averaging 500 MCM/yr. This water is derived from local rainfall and lava-bed springs. These waters are also sweet. Without a natural reservoir, the flow of the Yarmuk is more seasonably variable than the flow from Lake Tiberias.

From the confluence of the Yarmuk, the Jordan River receives further inflows of water from occasional wadis and (more importantly) local springs. While these sources average 523 MCM/yr, their flow is extremely variable as the Jordan River cuts its way through a deep valley to the Dead Sea. Also the ground water, in particular, is highly saline. Thus salinity rises rapidly below the confluence of the Yarmuk, until the Jordan River ends in a deep desert sink that is called the Dead Sea because of its high salinity (7 times as salty as the ocean). The Jordan River delivers an average of 1,850 MCM/yr to the Dead Sea. At 398 m below sea-level, the surface of the Dead Sea is the lowest point on the surface of the Earth.

B. Groundwater[12]

As the frequent references to springs show, most of the flow of the Jordan River is the result of outflow from springs and other groundwater sources. Thus, no management scheme for the Jordan River can neglect managing related aquifers, even if one were not interested in using the groundwater directly. Many communities located in or near the Jordan Valley, however, depend directly on groundwater for their needs.

The aquifers that feed the Jordan River underlie the region of Mt. Hermon, the headwaters area of the Yarmuk, and the hills of the West Bank and Israel. The rainfall on these areas feed aquifers that support other systems as well as the Jordan River, complicating any management scheme. Thus, for management purposes, at least, the region between the Jordan River and the Mediterranean can be divided into three aquifers: the coastal plain, the hill country, and the Jordan valley. (Because these aquifers fall between the Jordan River and the nearest coast, I shall refer to these aquifers collectively as the "coastal aquifers".) The hill country aquifer actually feeds both of the other aquifers, however, and thus management of these aquifers cannot be completely divorced.

C. The Litani[13]

The Litani River arises a few kilometers from the headwaters of the Orontes River. The Litani flows down the Bekaa Valley between the Lebanon and Anti-Lebanon Mountains, drawing its waters from runoff off the two mountain systems supplemented by

infusions of groundwater from the valley. At Qirwan the Litani enters a gorge between the Lebanon Mountains and Mt. Hermon--the source of the Jordan River. After flowing parallel to the Hasbani River for a considerable distance, at Nabatiya the river swings sharply to the west and flows across the hilly Galilean Uplands to the Mediterranean.

The Litani basin, surrounded by high mountains and wafted by breezes off the Mediterranean, receives the greatest rainfall in the Middle East--and casts a "rain shadow" over Syria to the east. The basin is small, so the flow of the Litani averages only 700 MCM/yr, of which only 60 MCM/yr are contributed below Nabatiya, i.e., after the river leaves the mountains. As this suggests, the river is "exotic", and flow drops during the dry season (July to October) to only 12% of its flow during the rest of the year. The water is sweet throughout its course.

The Litani is a separate river system from the Jordan River. Yet its proximity to the Hasbani has lead many commentators to argue that the Jordan River and the Litani should be part of a single management system. Both Israel and Lebanon (with the support of other Arab actors in the region) have put forward plans to connect the two rivers, although the two plans would have the diversions flow in opposite directions.

II. The Political Context

A. Geopolitical Actors

In terms of the pre-1967 borders in the region, the Jordan River had a complex political structure as both a "border" and a

"successive" river. This political structure both contains and protects the uses of water in the Jordan valley. The average annual flow of the Jordan River is central to these uses, providing almost twice as much water as all other sources available in Israel and the occupied territories, and three times as much water as is available from all other sources in the Kingdom of Jordan. Thus, despite the Jordan River's small size, no real peace is likely without the creation of a stable political structure regarding the use of that river.

While the political structure of the valley changed abruptly in 1967, and is likely to change again, some such complex political structure will persist regardless of what the precise outcome of the current peace process is. The Valley is a scene of extraordinary conflict, so much so that there is even trouble getting the various state or state-like actors to agree on who the actors are. The significant actors include the four nations of Israel, the Kingdom of Jordan, Lebanon, and Syria, and also the occupied Palestinian territories of Gaza and the West Bank.

Whether to count Syria as riparian to the Jordan River proper depends on the status of the Golan Heights. Syria remains a direct actor regardless of the Golan Heights, however, because it is riparian to the Yarmuk. Furthermore, while the needs of Gaza and the West Bank can not be excluded in any analysis, their importance will vary considerably depending on the degree the needs are treated as independent of the needs of Israel or the Kingdom of Jordan. These same actors share the aquifers related to the Jordan River.

Before 1967, the three sources of the Jordan River each arose in a different country. The largest source (the Dan Spring) was just inside Israel. The Hasbani arose and flows in Lebanon for a considerable distance before crossing into Israel. The Banias arose in Syria on the Golan Heights and, after a short course across the north of the Heights, crossed the border into Israel. After flowing through Israel through the Huleh basin (formerly Lake Huleh) to Lake Tiberias and the confluence with the Yarmuk, the Jordan River formed the international border between Israel and the Kingdom of Jordan for about 40 km. Thereafter, all the way down to the Dead Sea, the Jordan River was an internal river to the Kingdom. The lower part of the Dead Sea again formed the Israeli-Jordanian border. The coastal aquifers were also divided between Israel and the Kingdom of Jordan.

By occupying the Golan Heights and the West Bank (of the Jordan River) in 1967, Israel dramatically changed the geopolitical situation. On the Golan Heights, Israel gained control of the Banias, giving it direct control of two of the three sources of the Jordan River. With the West Bank in Israeli control, the Jordan River (and the Dead Sea) became, in effect, a boundary river between Israel and the Kingdom of Jordan for its entire length below the confluence of the Yarmuk River; and Israel gained complete managerial control of the coastal aquifers.

Some saw a desire to gain control over the Hasbani and over the Litani Rivers as behind the Israeli invasion of Lebanon.[14]

With the Israeli Defense Forces in Beirut, the entire Hasbani River was in the control of Israel, and with it all sources of the Jordan River. Those forces had also occupied the lower Litani, and the ongoing clashes in the Bekaa Valley could be seen as pointed at gaining control of the upper Litani. When the Israeli forces first withdrew from Beirut, they withdrew only as far as the Awali River into which a considerable part of the natural flow of the Litani had been diverted, ostensibly because the Awali offered an easily defensible line.[15] This gave Israel continued control over the two Rivers; even with the complete Israeli withdrawal from Lebanon, Israel still defines its "defense zone" in Lebanon as including the Hasbani River, although it no longer reaches (officially) to the Litani.

When the West Bank and Gaza gains autonomy or independence under a Palestinian state, the geopolitical context would change dramatically again. Much of the lower Jordan River would become a boundary river between Palestine and the Kingdom of Jordan, and the coastal aquifers would straddle the border between Palestine and Israel. Other possible outcomes of the peace process could produce other which would be changes similarly alarming to Israel.[16] A return of the Golan Heights to Syria would return the Banias River to Syria, while a stabilized and effective government in Lebanon would return the Hasbani and Litani Rivers completely to Arab control.

B. The Conflicts over Water[17]

Prior to World War I, there was no international conflict over the waters of the Jordan Valley for the simple reason that the entire basin and related aquifers were part of the Ottoman Empire. Also, during that time there were no utilization projects of more than purely local scale.[18] With the partition of the basin and aquifers into British and French Mandates, and the further partition of those Mandates into the modern actors in the region, conflict over water became virtually inevitable.[19]

The British began studies on the use of the waters of the Jordan River as early as 1921, and granted the Rutenberg Concession to develop hydroelectric power on the Jordan and Yarmuk Rivers in 1926.[20] Already other proposals to develop the waters of the basin were blocked by the growing Arab-Jewish controversy up to the British abandonment of the Mandate, despite the numerous surveys and plans to estimate the available water and to design optimum means for using that water.[21] As the surveys tended to support the claimed lack of sufficient water to sustain a massive Jewish migration to Palestine, some of these plans began including the Litani River in programs "to develop the Jordan River".[22]

The first Arab-Israeli war in 1948-1949 left Israel and the Kingdom of Jordan with difficult problems requiring large applications of water. Israel contained more land outside the basin of the Jordan Valley than in it, and much of this land (particularly the Negev Desert) was highly arid.[23] The Israeli lands abutting the Jordan River from Lake Tiberias north were

demilitarized "without prejudice to sovereignty", a sovereignty disputed by Syria. At the same time, under an open immigration policy, the Jewish population in Israel grew explosively from 650,000 to 1,600,000 between 1948 and 1952.[24] (The total population did not grow by much due to the Arab exodus from the land that became Israel).

The Kingdom of Jordan, the other major riparian state, straddled the Jordan River after annexing the West Bank in 1950. The Kingdom found itself burdened with population problems similar to Israel's: the Kingdom had to absorb ~~close~~ more than 500,000 refugees from the territory which had become Israel, not counting the similar number of Palestinians living in the West Bank before the war (overall, 80% of the Kingdom's population).[25] The Kingdom, furthermore, was even more arid and had a less developed economy and thus faced greater difficulties in utilizing what water it could obtain.[26]

The armistices that ended the first Arab-Israeli war made no mention of water. Therefore, even before the firing ceased, both sides began to make unilateral plans to develop the waters of the Jordan Valley for their own use. These plans brought about cease-fire violations as early as the spring of 1951, when Israel invaded the Demilitarized Zone along the upper Jordan River, expelled Arab villagers, and undertook major drainage and water diversion works. Occasional less extreme violations continued throughout the years before the Six-Day War, although none so dramatic as the first.[27]

Because of the Israeli military ascendency, Jordanian plans focused on developing the Yarmuk River rather than the Jordan River proper, with assistance from the United Nations Relief and Works Agency.[28] The United Nations also opposed Israeli plans to divert water from the Jordan River from within the Demilitarized Zone.[29] Only American pressure, however, forced Israel to develop a diversion from a less technically desirable point not in violation of the Demilitarized Zone. The American government also pressured the Kingdom of Jordan into abandoning the plans for a major dam on the Yarmuk, apparently on the grounds that the dam would violate the now Israeli-owned Rutenberg Concession.[30]

Recognizing the impossibility of peace in the region without a workable arrangement over such a scarce yet essential resource as water, President Eisenhower undertook in 1953 to negotiate a cooperative arrangement for the development of the waters of the Jordan, Yarmuk, and Litani Rivers.[31] These negotiations culminated in 1955 in the Johnston or Unified Plan which would have established quotas for the states riparian to the Jordan and Yarmuk Rivers, joint water storage and diversion facilities to be built by the United Nations Relief and Works Agency, and on-going management by a three-member "Neutral Engineering Board".[32] After the plan was accepted by technical committees from both sides, and before a final decision by the Israeli government, the Arab Council rejected the Unified Plan in 1955.[33]

Despite the formal rejection of the Unified Plan, both sides unilaterally implemented the quotas, and objected (occasionally through cease-fire violations) to alleged violations of those

quotas by the other side.[34] This in effect functioned as a customary legal regime for the surface waters of the Valley.[35] The pattern of conflict changed dramatically with the Six-Day War. With the considerable improvement of the hydrostrategic position of Israel, no other actor could use the waters of the Jordan Valley without at least tacit Israeli consent.[36] The Kingdom of Jordan felt compelled to abandon the Mukheiba and Maqarin Dams on the Yarmuk River, and Israel imposed stringent controls on the pumping of groundwater by Arabs in the Occupied Territories.

The Israeli controls on Arab pumping of groundwater had the effect of gradually squeezing down Arab use, leaving additional groundwater to percolate down to Israel or to be pumped by Jewish settlers in the Occupied Territories.[37] Attempts by the Palestine Liberation Organization to counter these steps by targeting Israeli water facilities, such as the Naharaim pumping station, brought about open military skirmishes between the Israeli Defense Force and Iraqi and Jordanian detachments in the East Jordan Valley.[38] Finally, Israeli bombing of the East Ghor Canal in the summer of 1969 led to a secret Israeli-Jordanian agreement to prevent conflicts over water.[39] This agreement apparently contributed to the Jordanian decision to expel the Palestine Liberation Organization in the "Black September" of 1970.[40]

Since 1970 there has been no overt conflict over water between the actors in the region despite recurring, and continually more severe, water shortages in the region.[41] Each

actor has returned to the pre-Six Day War pattern of unilateral development generally consistent with the rejected Unified Plan, with the exception of the gradual, but steady, diversion of water from the Arab inhabitants of the Occupied Territories to Israel and the Jewish Settlements.[42]

The only possible outbreak of violence over water in the region since 1970 involved the Litani River, and not the waters of the Jordan Valley as such. While the several Israeli invasions of Lebanon were publicly justified on grounds that had nothing to do with water, and while these public explanations might well have expressed the motivations for the invasions,[43] the conflict did create fleeting possibilities for the long-standing Israeli plan of combining the waters of the Litani River with those of the Jordan Valley.[44] The failure of the Israeli Defense Force to maintain itself on the line of the Awali River, well north of the Litani River (and the destination of the considerable water diverted from the Litani by the Lebanese), meant the failure of any such ambition.[45]

The Litani River's entire course is within Lebanon, so theoretically there should have been no international ramifications from Lebanese development plans. Still, Lebanese plans for the Litani River from 1948 to 1970 seemed to have been motivated more by assuring denial of those waters to Israel than by any needs in Lebanon.[46] Lack of financial resources and the growing internal disorder in Lebanon prevented these projects from being realized. Today, the Litani River remains largely undeveloped except for hydroelectric generation, with the Litani

Valley being divided between various conflicting Lebanese factions expressing various religious sentiments and supported by various outside actors, including (at least) Iran, Israel, and Syria. Despite the political chaos in Lebanon, however, there has been little interference in the existing water works on the Litani or Awali Rivers.

III. The Economic Context

A. Israel[47]

Israel in 1949 had few assets other than its burgeoning population. That population, however, in many ways only exacerbated the daunting water problems Israel faced.[48] The European immigrants consumed more water per capita than the displaced Arabs had, and they had few of the necessary agricultural, industrial, and technical skills necessary to build the society envisioned by Israel's leaders. Yet security needs, coupled with an ideological commitment to "make the desert bloom", required the settlement of people, often in small agricultural settlements, in all areas of Israel, including the most arid. The resulting emphasis on agriculture created more demand for water than had ever before been experienced in the region: agriculture generally makes more intensive use of water than urban domestic or industrial uses, and the new agriculture made more intensive use of water than traditional Arab agriculture.[49]

Beginning in 1951, and interrupted by only occasional military targeting of water facilities, Israel undertook several

major water projects. First, the Huleh basin (a swamp with a small lake) was drained.[50] Second, the "National Water Carrier" --a system that pumped water from near Lake Tiberias across the length of Israel down to the Coastal Plains and the northern Negev Desert --was constructed as the centerpiece of Israel's water development.[51] Finally, Israel gradually increased its dependence on the pumping of groundwater, much of which became available within the pre-1967 borders of Israel because of stringent restrictions on the pumping of groundwater in the Occupied Territories.[52]

The current total annual demand for water in Israel is about 1,750 MCM. Approximately 74% of this is used for agriculture, 19% for domestic uses, and only 7% for industrial uses.[53] In recent years Israel water consumption has approached or exceeded 100% of the water available within its pre-1967 borders.[54] While Israel's per capita water consumption (537 m^3 per year) is not out of line with its other industrial societies, it remains much higher than the water consumption of its neighbors. While various proposals to conserve water, including plans to recycle sewage water, are underway,[55] Israel is, and will likely remain, dependent on water attributable to rainfall in the Occupied Territories which percolates down to recharge "Israeli aquifers".[56]

B. The Kingdom of Jordan

In 1949 the Kingdom of Jordan was in even more desperate need for water development than Israel, and in even less of a

position to undertake the development it needed.[57] With a massive influx of Palestinian refugees, a small base of low-quality arable land, and few opportunities for gravity-flow irrigation, the Kingdom had to depend on outside aid to finance the necessary projects. This in turn made the Kingdom dependent on the political stances of those willing and able to fund the Kingdom's water projects.

The Kingdom of Jordan began to make progress on developing its water supplies only much later than Israel.[58] As late as 1980, the Kingdom consumed only 555 MCM per year (again mostly for irrigation) for a population nearly as large as Israel's.[59] Some differences between Israel and the Kingdom of Jordan in the consumption of water originated in cultural differences regarding the use of water, but differences on this scale could only be sustained by drastic rationing of water in the Kingdom. For example, in Amman (the capital and largest city) water is pumped for domestic uses only one day per week, and the shortfall for domestic needs has been estimated as high as 50%.[60]

Faced with an ever-increasing deficit fed by a population-growth rate of more than 3% per year, the Kingdom of Jordan has embarked on an ambitious program of building new dams on the Yarmuk and on various wadis designed to double the available water by the year 2000. Yet there is growing evidence that Israel, from its perch on the Golan Heights, has been diverting substantial amounts of water from the Yarmuk into Lake Tiberias,[61] further complicating the prospects for Jordanian development. Only some comprehensive settlement holds any hope

for the Kingdom to gain access to the water necessary for its development.

C. Lebanon

As Lebanon is better watered by rainfall than most other areas in the region, Lebanon felt little pressure to develop irrigation agriculture despite a burgeoning population. Lebanon has undertaken a very different program of development from Israel or Jordan, stressing hydroelectric development to support a growing industrial base rather than to provide water for agriculture.[62] Such projects also provide a more rapid return on investment than irrigation would have, and provided cash income from the sale of surplus electricity to Syria.

Occasional proposals to divert the flow of the Hasbani River either into the Litani River or into the Yarmuk River seem to have been entirely political, designed to deny the waters to Israel rather than to gain the waters for Lebanon.[63] These proposals died with the Israeli occupation of the Golan Heights. Lebanon has never made any significant use of the Hasbani River (one of the sources of the Jordan River).

After years of planning, Lebanon began work on a project to divert the bulk of the flow from the Litani River into the Awali River, using the drop between the rivers to generate electricity and (incidentally) providing water to irrigate fields in the Awali Valley and surrounding hills.[64] The plan was adopted and implemented despite fairly clear technical demonstrations that more electricity could be produced more cheaply by diverting the

waters of the Litani River into the Hasbani River (and hence into the Jordan River system). Today, so much water has been diverted from the Litani to the Awali that Ariel Sharon has described the Litani as "a trickle" not worth diverting, and the Awali has become the largest river in Lebanon.[65]

D. Syria

None of the water sources under discussion here have ever figured significantly in the Syrian nat'l water budget.[66] Syrian participation in various projects related to the Jordan or Litani Rivers have all been directed at denying the water to Israel rather than at developing water for Syria: virtually all the water that would have been realized by the projects would have inured to the benefit of Jordan (or occasionally Lebanon) rather than Syria.[67] Israeli occupation of the Golan Heights has reduced Syria to a minor actor in relation to the Jordan River, but Syrian forces continue to occupy the Bekaa Valley--the headwaters of the Litani and Orontes Rivers. A comprehensive settlement could alter this relationship significantly.

E. The Occupied Territories[68]

The Israel Defense Force occupies three widely separated areas outside the pre-1967 borders of Israel: the Gaza Strip, the Golan Heights, and the West Bank of the Jordan River. None of these areas provide exportable sources of surface water. The Golan Heights, whose water has been developed for support of strategic settlements on the Heights, also provides direct

control over one of the sources of the Jordan River and up-stream access to the Yarmuk River.[69] The Gaza Strip has no significant surface sources of water. The Jordan River along the West Bank is too saline and too far below the level of potential users for significant use.[70]

The importance of the West Bank lies not in its surface water, but in that it shares the Coastal Aquifers with Israel. Rain on the hills of Palestine percolate into the soil and down both towards the Mediterranean (Israel) and the Jordan Valley (the West Bank). The amount of water available from the precipitation on the West Bank itself is disputed: Israeli sources estimate it at 120 MCM/year--slightly in excess of the consumption of 100 MCM/year in the West Bank and Gaza; Arab and outside sources estimate the amount at between 750 MCM and 900 MCM/year--indicating a massive surplus.[71]

Most water consumption in the West Bank and Gaza is for irrigation; both irrigation and domestic uses in these areas remain well below the consumption levels in Israel. The best estimates are that urban consumption on the Occupied Territories are at about 13% of the level of per capita consumption in Israel, and in rural villages at about 33% of the level of per capita consumption in Arab villages in Israel.[72] As with the Kingdom of Jordan, the differences in the consumption of water per capita originated from very different life styles, including fundamentally different approaches to agriculture,[73] but the differences today are compelled by Israeli policies.

As early as 1949 Israeli authorities began to confiscate former Arab wells and pumps to turn over to Israeli farmers--but at that early date the confiscated wells at least had been abandoned by owners who fled during the war.[74] A decade later, Israel, through the Ministry of Agriculture, imposed rationing on wide areas of the country,[75] and by 1976 throughout Israel and the Occupied Territories.[76] As a result, even within pre-1967 Israel, Arab farmers received only 2% of the water made available for agriculture[77] despite their cultivating 20% of the agricultural land, with half of their farms in the Negev Desert.[78]

Not surprisingly, Israeli policies have kept Arab farmers within Israel proper noncompetitive with Jewish farmers.[79] Only about 5% of Arab land is irrigated (compared to 43% in Israel).[80] These disadvantages can hardly have been an accident. Mekorot (the Israeli National Water Authority) is set up as a corporation owned jointly by the government, Histradut (the national labor union), the Jewish Agency, and the Jewish National Fund,[81] while the Water Board within the Ministry of Agriculture contains representation from the World Zionist Organization.[82] One should not be surprised, therefore, to discover that Mekorot does not deliver to Arabs even the small amount of water allocated to them.[83]

Even more restrictive policies have been followed in the Occupied Territories.[84] Although Israel has established water conservation regulations which ostensibly apply to everyone in the Occupied Territories, very different policies in fact apply

to the Jewish settlements than to the Arab population. Israeli authorities accomplish this through conditions imposed on the pumping licenses required of all well-users. For example, in 1977, the 88 Arab wells in the Jordan Valley were limited to 9.9 MCM/year, while the 17 Jewish wells were allowed 17 MCM/year.[85] When the powerful Jewish pumps lower the watertable (drying up an Arab well), the occupation authorities usually do not permit the Arabs to deepen their well or to drill a new well. As a result, irrigated Arab lands in the West Bank (and Gaza) are less extensive than in 1966,[86] and the Jewish settlements now irrigate about half as much farmland as the much larger Arab population does.[87]

There is little direct export of water from any of the Occupied Territories to Israel proper; the taking of water is more subtle. If, as appears nearly certain, large amounts of the rain which falls on the West Bank seeps into the ground and is pumped by no one, those waters percolate down to lower levels. A large part of this water finds its way into Israel, where it can be pumped. One estimate has found that the entire increase in water consumption in Israel since 1967 (600-700 MCM/year) can only be accounted for in this fashion.[88] Giving Arab populations control and responsibility for their own development, including the use of a reasonable share of the available water, must then inevitably lead to their modes of living and levels of water consumption becoming more like that of the Jewish populations in Israel. This in turn can only have dramatic impacts on modes of living in Israel, yet, given the growing recognition under

international law of a right to development, a more equitable sharing of water is something that Israel can no longer deny to the Palestinian people.[89]

IV. Alternative Institutional Opportunities

Both Israel and Kingdom of Jordan depend on the same sources of water. To date only Israel's military dominance has allowed Israel to meet its water needs. The resulting relationship between these actors is inherently unstable, both because it contributes to the continuing tension and conflict in the region, and because Israel's needs are beginning to outstrip the water than can be obtained through military dominance. With both Israel and the Kingdom of Jordan already running deficits in their national water budgets, and with the Occupied Territories kept on an artificially depressed water budget, how are the needs of the existing states to be met after the Palestinian people take charge of their own fate? When a new Palestinian entity takes possession of its land, where will water for its needs come from?

In his part of the article, I will argue that the foregoing questions cannot be answered unilaterally by each state-like actor. The factual contexts already reviewed should indicate that attempts by each actor to manage water available (or to become available) solely in its own interests without concern for its effects on other actors in the region can leads inevitably to further bloodshed. Nor can the existing customary international law of water management function adequately to regulate water

usage by each actor in the region. Only cooperative management that accords equitable treatment to all the populations in the region can hope to create a less tense atmosphere in which peace is possible. In fact, the development of such cooperative management could well be the only basis on which cooperation among might replace conflict between the actors in the region. To be effective in promoting peace and eliminating water as a source of further military conflict, cooperative management must be embodied in a mutually beneficial, lasting, and effective legal structure.

A. Management Options

The management options capable of meeting the needs of all the various populations in the region of the Jordan Valley are few indeed.[90] The elements that would go into cooperative management are easy to identify, if difficult for the actors to agree on.[91] First, there would have to be agreed shares for the waters from various sources. Second, there must be equitable conservation schemes that could bring future water needs more in line with potentially available water in the region in order to share the burden of shortages in the region. Third, new sources of water must be developed to supplement existing supplies. Finally, some mechanism other than military intervention or retaliation must be devised to resolve the inevitable disputes over whether any management agreement has been violated. This last, to be effective, must be an institutional framework within

which management decisions can be made in the interests of all, and as an obligation of each.

In addition to emphasizing the application of advanced, water-saving technology, any commitment to conservation must de-emphasize agriculture as the social base. If each state in the region genuinely accepts the right to coexist of every other state in the region, the need to occupy the land as a measure of military security will diminish. Irrigation uses immense quantities of water while adding very little value to the societies in the region. The ideological dream of "making the desert bloom" just cannot be justified in a context where countries with extremely limited economic bases and inadequate water resources can only accomplish their dreams by depriving their neighbors of water.

The development of new sources of water might involve such expensive technological solutions as desalination of sea-water or cloud seeding. More likely would be the importation of water from other watersheds, such as the Litani River, the Orontes River, the Euphrates River, or the Nile River.[92] Importation would necessarily entail enlarging the geographic scope of the agreement since (except for the Litani River), these rivers all traverse states which are not riparian to the Jordan River and thus would not be parties to an agreement solely among the states that are riparian to the Jordan.

B. The Potential for Law[93]

International law, in its somewhat current primitive state of development,[94] cannot solve the management problems of the region. Yet, no solution is possible without the creation of the necessary law: if a cooperative management system is to be put in place in the region, it must entail the creation of some sort of legal mechanism for resolving disputes. Even such a seemingly technical solution to water shortages as cloud-seeding would in effect deprive water from other states in the region, and thus could only be undertaken in a significant measure by a cooperative management agreement among affected states if it is to be a source of easing tensions in the region rather than exacerbating them.

In the absence of express international agreements, international law operates through custom (regional or general) developed through a process of claim and counterclaim between states.[95] Such custom serves both to empower international actors by legitimating their claims, and to limit them by circumscribing the kinds of claims they are permitted to make. In the absence relevant consensus, however, international law has nothing better to offer than the law of the vendetta.[96]

In the case of non-navigational uses of water, international disputes were rare and rather easily contained before the modern industrial era.[97] When such conflict became a central issue of international life due to the intensive use and extensive diversion of water from its original sources, the resulting international claims and counterclaims quickly settled into a

predictable pattern, depending on the riparian status of the state making the claim.[98] While there is far less experience regarding disputes over aquifer management, the same principles would no doubt be applied by analogy.[99]

To begin with, all states agree that only riparian states--states along whose border, or through which, a river flows--have any legal right, absent agreement, to use the water of a river.[100] The uppermost riparians go on to base their claims on "absolute territorial sovereignty".[101] They claim the right to do whatever they choose to with water within their borders regardless of its effect on other riparians. Downstream states begin with a claim to the "absolute integrity of the river".[102] The lower riparians thus claim that upper riparians can do nothing that affects the quantity or quality of water that flows down to them.

Often lower riparians, particularly those wedged along a river so as to be both upper and lower riparians on the same stream, come around to a theory of restricted sovereignty.[103] By this claim, the riparian state recognizes the right of all riparians to use some specified quantity of water from a single source and the obligation to manage that use in order not to interfere with the like uses of other riparian states. Most often, the specific quantity of water is defined according to some historic pattern of use, although occasionally some other more or less objective measure of need is advanced (population, area, arable land, etc.).[104]

Eventually some modus vivendi has been worked out on most international river systems that can be described as recognizing a community of property in the watersource.[105] Under the community of property concept, each riparian state is held entitled to a vaguely defined equitable share of the river defined by some legal process.[106] The restrictive sovereignty theory is really a special form of the community of property system, with the difference being that the vaguer concept of community of property, in order to function effectively, virtually requires the creation of some continuing mechanism for resolving the disputes that arise from time to time, ranging from a barely formal arbitration process up to full-fledged cooperative administration.[107]

C. The Role of Law in the Jordan Valley

The standard pattern of international claim and counterclaim has been largely replicated regarding the waters in the Jordan Valley. Lebanon, in the enviable position of being the uppermost riparian on every significant river which touches it, has consistently espoused a claim to absolute territorial sovereignty.[108] The Kingdom of Jordan, although the most downstream state on the Jordan River, before 1967 also espoused absolute territorial sovereignty--apparently out of a sense of Arab solidarity and because it saw its water needs as soluble from cooperative development of the Yarmuk River with Syria (on which Syria and the Kingdom of Jordan are upper riparians).[109] After 1967, however, the Kingdom's riparian position was so

altered that it shifted to a claim of restricted sovereignty in the rivers.[110]

Syria's position was more troubled than either Lebanon or the Kingdom of Jordan.[111] Syria was an upper riparian on both the Jordan and the Yarmuk, but it is a lower riparian on the rivers that are its major sources of water: the Euphrates and the Orontes.[112] After equivocating for 15 years, Syria adopted a claim of absolute sovereignty in 1964, thereby effectively abandoning any legal basis for claims against Turkey or Lebanon relating to the Euphrates, the Orontes, and the Tigris. Syria put forward the claim of absolute sovereignty to justify the plan then proposed to divert the headwaters of the Jordan into the Yarmuk and thereby to deprive Israel of its major source of water.[113] The headwaters diversion plan contributed to the ensuing Six-Day War in 1967 in which Israel's occupation of the Golan Heights served to block any possible diversion scheme. As Syria has found itself in recent years involved in disputes with Turkey (and Iraq) over the Euphrates,[114] Syria has returned to equivocating about the proper rule of customary law for non-navigational uses of rivers.

Israel's position has also evolved through the years.[115] Dependent as it was on water flowing down from Syria and Lebanon, Israel initially adopted a claim to the absolute integrity of the river, yet set out to ignore any Jordanian claim on the river on the grounds that such would infringe Israeli sovereignty. The patent inconsistency could be evaded because the Jordan River is too saline for use by the time it reached the Kingdom of

Jordan.[116] After 1967, Israel was in effect the uppermost riparian on the Jordan River. Predictably, and more consistently, Israel has put forth a claim to absolute territorial sovereignty since 1967.

In addition to various possible claims specifically directed at non-navigational uses of water, the region is beset by other claims that impinge upon the use of water by the various national or nation-like actors. In particular, one can make serious arguments that the Israeli policies regarding water use in the Occupied Territories violate customary international legal rules on the rights and obligations of occupying powers towards the occupied populace.[117] This in turn raises international legal questions about the status of the Occupied Territories and of Israel as the occupying power, including whether such a long-term occupation is contemplated by, and thus governed by, whatever customary rules might be invoked in such a controversy. And in any event, an emergent Palestinian state cannot be expected to abide by the present restrictions whereby the water available to a growing Palestinian population, already less per capita than the water available to the Jewish population in Israel, continues to shrink in order to make more water available for Israel's needs.[118]

The informal legal system that alone today both legitimates and limits claims to use shared water resources of the Jordan Valley is inherently unstable: it becomes unsettled either when one or more states consider that it is so militarily dominant that it can disregard the interests of its neighbors, or when one

or more states consider that its interests are so compromised by the existing situation that even the risk of military defeat is more tolerable than to continue the present situation without challenge.[119] The remarkable thing is that this informal system has worked as well as it has in the Jordan Valley.

As for the Jordan River itself, one might argue that its use is governed by a special custom derived from the abortive Johnston or Unified Plan.[120] Israel and the Kingdom of Jordan, at least, have purported to be guided by the plan and to protest alleged violations of the plan by the other party. There have been few overt conflicts over water, and none since 1970.

Such an informal system pretty clearly cannot survive the emergence of a Palestinian state or any other significant shift in the military-strategic balance in the region.[121] Even if each state-like actor were to agree to treat water as a shared resource, there would still be disputes over what should be the common standard, while disputes about its proper interpretation would ultimately lead back to the law of the vendetta. Israel, in particular, will have to compromise on its use of water before peace can become possible in the region.[122] Even with such an agreement, conflict cannot be avoided if there is no mechanism for peacefully investigating and resolving the inevitable disputes.[123]

The inevitably of overt military conflict would remain under a concept of restrictive sovereignty where water consumption is tied to some more or less objective record of need (historic use, etc.) so long as there is no effective alternative mechanism for

resolving the inevitable disputes. The situation would be even worse if the actors were to adopt the concept of a community of property in the water resources of the region under which the right to use water would be measured by a vaguely defined equitable apportionment.[124] The closest analogue to this system is the riparian rights system (and its interstate analogue of "equitable apportionment") as applied in the eastern United States--a system that has barely functioned in areas of the country that are without chronic water shortages and with a strong judicial structure to resolve disputes between users.[125]

Whenever water use in the eastern United States permanently outstrips the available sources of water, riparian rights have simply been abandoned in favor of a system of water rights that are heavily administered by state agencies, whether the rights to use water are defined by temporal priority (as under the international theory of restrictive sovereignty) or by "reasonable use" (or "reasonable-beneficial use"--as under the international theory of a community of property).[126] Clearly, what is needed in the Jordan River region is to convert the existing tacit cooperation over water in explicit institutions of cooperative management.[127]

Cooperative management has taken many forms around the world, ranging from continuing and unceasing consultations, to a system of active cooperative management that remains in the hands of the participating states, to the creation of a variety of forms of regional institutions capable of making and enforcing their decisions directly.[128] However the states in the Jordan

Valley might work out the cooperation in detail, it would constitute the emergence of a formal legal order in place of the present informal or customary legal order. Furthermore, the structure might well need to be regional, extending somewhat beyond the Jordan Valley states because the only lasting solution might require importation of water from nearby, nonneighboring states.

A formal legal order such as suggested here would have to embody concepts of cooperative management in a structure capable of determining the facts of water use in each nation, to resolve disputes between the interested nations, to guide responses to unusual temporary water shortfalls, to regulate long-term answers to the serious permanent shortages that exist in the region, and to enforce its decisions.[129] Whether such a structure could be negotiated over such a vital resource between actors with such deeply entrenched distrust and hostility might seem unlikely. Reason to hope for success arises the alternative might seem to the actors to be even more unbearable.

Since ancient times, water has been a central political factor in the Middle East.[130] Water continues to be central today. Its very importance makes conflict over water appear likely, but in fact this importance has made cooperation over water more likely than conflict.[131] As in ancient times, the shared need for optimum management of this scarce resource can become a source of regional unity rather than regional discord. Water can become the key to building peace in the region if the two sides are now prepared to exploit this possibility actively

and effectively[132] rather than to allow themselves to drift into mutually destructive competition.

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I take this opportunity to thank Professor John Quigley of the Ohio State University College of Law for his helpful suggestions on an earlier draft of this article. In particular, Professor Quigley provided leads to much of the information related in the text at notes 74-83. Responsibility, of course, remains mine.

[1] Consider the apparently never ending disputes between the United States and Canada, notwithstanding the highly successful operations of the International Joint Commission on Boundary Waters. See generally L. Bloomfield & G. Fitzgerald, Boundary Waters Problems of Canada and the United States (1958); J. Krutilla, The Columbia River Treaty (1967); D. Piper, The

International Law of the Great Lakes (1967); Johnson, The Columbia Basin, in The Law of International Drainage Basins 167 (A. Garretson, R. Hayton, & C. Olmstead eds. 1967). For studies of similar problems between other neighbors, see S. Gorove, Law and Politics of the Danube (1964); The Law of International Drainage Basins, supra; N. Hundley, Dividing the Waters (1966); J. Mueller, The Restless River (1975); L Teclaff, The River Basin in History and Law 152-184 (1967); U.N. Dev. Auth'y, River Basin Development (1976).

[2] See, e.g., the struggle between Arizona and California over the sharing of the lower Colorado River, a struggle made more difficult by the involvement of Mexico, of other states of the United States, of tribes of American Indians, and of other public and private interests. This case was begun in the Supreme Court of the United States in 1929 after more than a decade of political struggle. Arizona v. California, 283 U.S. 423 (1931). The struggle, in both political and legal fora, continues today after no less than eight Supreme Court opinions. The most developed of these opinions is Arizona v. California, 373 U.S. 546 (1963). See generally Trelease, Arizona v. California: Allocation of Water Resources to People, States, and Nation, 1963 Sup. Ct. Rev. 158. Colorado and Kansas have had an even longer-lasting struggle. Kansas v. Colorado, 475 U.S. 1079 (1986); Colorado v. Kansas, 320 U.S. 383 (1943); Kansas v. Colorado, 206 U.S. 46 (1907); Note, The Parting of the Waters--the Dispute between Colorado and Kansas over the Arkansas River, 24 Washburn L.J. 99 (1984). For similar, if less intense, battles between

other states, see Texas v. New Mexico, 482 U.S. 124 (1987); Colorado v. New Mexico, 467 U.S. 310 (1984); Wisconsin v. Illinois, 388 U.S. 426 (1967); Texas v. New Mexico, 352 U.S. 991 (1957); New Jersey v. New York, 345 U.S. 369 (1953); Nebraska v. Wyoming, 325 U.S. 589 (1945); Wyoming v. Colorado, 309 U.S. 572 (1940); Washington v. Oregon, 297 U.S. 517 (1936); Nebraska v. Wyoming, 295 U.S. 40 (1935); New Jersey v. New York, 283 U.S. 336 (1931); Connecticut v. Massachusetts, 282 U.S. 660 (1931); Wisconsin v. Illinois, 281 U.S. 179 (1930); Wyoming v. Colorado, 259 U.S. 419 (1922); Missouri v. Illinois, 200 U.S. 496 (1906). See generally Tarlock, The Law of Equitable Apportionment Revisited, Updated, and Restated, 56 Colo. L. Rev. 381 (1985); Note, Equitable Apportionment and the Supreme Court: What's So Equitable about Apportionment?, 7 Hamline L. Rev. 405 (1984). See also Hussain, The Law of Interstate Rivers in India: Principles of Equitable Apportionment of River Waters, 17 Indian J. Int'l L. 41 (1977).

[3] Again, some of the most intense and illustrative examples come from the courts of the United States. See, e.g., City of El Paso v. Reynolds, 597 F. Supp. 694 (D.N.M. 1984). See generally International Groundwater Law (L. Teclaff & A. Utton eds. 1981); Rodgers & Utton, The Ixtapa Draft Agreement Relating to the Use of Transboundary Groundwaters, in Transboundary Resources Law 151 (A. Utton & L. Teclaff eds. 1987); Note, Mexican-United States Shared Groundwater: Can It Be Managed?, 1 Geo. Int'l Envtl. L. Rev. 113 (1988).

[4] See generally Note, The Indus Waters Treaty: Three Decades of Success, Yet, Will It Endure?, 1 Geo. Int'l Envtl. L. Rev. 55 (1989). See also Teclaff, supra note 1 at 163-165, 183-184; Baxter, The Indus Basin, in The Law of International Drainage Basins, supra note 1 at 443.

[5] A remarkable number of recent major studies of Israeli settlement on the West Bank and the Golan Heights say not one word about the water policies relating to those settlements, let alone any possible relevance of such water policies for Israel proper. See, e.g., G. Aronson, Creating Facts: Israel, Palestinians and the West Bank (1987); H. Cattan, The Palestine Question (1988); J. Gainsborough, The Arab-Israeli Conflict (1986); A. Gerson, Israel, the West Bank, and International Law (1978); W. Mallison & S. Mallison, The Palestine Problem in International Law and World Order (1986); The National Lawyers Guild, Treatment of Palestinians in Israeli-Occupied West Bank and Gaza (1978); A. Perlmutter, Israel: the Partitioned State (1985); M. Shamgar, Military Government in the Territories Administered by Israel 1967-1980 (1982); E. Zureik, The Palestinians in Israel: a Study in Internal Colonialism (1979); Lustick, Israel & Jordan: the Implications of an Adversarial Partnership, 6 Pol'y Papers in Int'l Aff. 1 (1978). The neglect, at least in foreign language sources, extends well beyond the Arab-Israeli conflict. Thus, standards works in English on Islamic law often have no index entries relating to water, directly or as a species of property. See, e.g., Law in the Middle East (M. Khadduri & H. Liebesny eds. 1955); C.

Weeramantry, Islamic Jurisprudence (1988). The one well-known work to cover the topic at all, does so in less than one full page, J. Schacht, An Introduction to Islamic Law 142-143 (1964).

[6] See, e.g., L. Schmida, Keys to Control--Israel's Pursuit of Arab Water Resources (1982); Cooley, Behind the News: the Hydraulic Imperative, 205 Middle East Int'l 10 (July 22, 1983). See also Cooley, The War over Water, 54 For. Aff. 3 (1984); Stauffer, The Lure of the Litani, Middle East Int'l (July 30, 1982); Symposium, Water Politics, The Middle East, Spec. Rep. No. 76 at 47-54 (1981).

[7] Johnston, Jordan River Valley Development, 29 Dep't State Bull. 892 (1953); Johnston, Mission to the Middle East, 30 Dep't State Bull. 283 (1954); Johnston, The Near East and the West, 30 Dep't State Bull. 790 (1954). The best description of these negotiations remains S. Saliba, The Jordan River Dispute 89-107 (1968).

[8] See, e.g., Jerusalem Post, Sept. 30, 1989, at 6.

[9] See, e.g., Ferreira, Water Major Issue in Palestinian-Israeli Conflict, al-Fajir, Oct. 23, 1989, at 8.

[10] See generally Saliba, supra note 7 at 32-45; Water in the Middle East supra note * at 17-21.

[11] Million Cubic Meters/year.

[12] See generally Water in the Middle East supra note * at 22.

[13] See generally id. at 63-65.

[14] See, e.g., the sources cited supra note 5.

[15] Water in the Middle East, supra note * at 76-78.

[16] See the Tsomet advertisement in the Jerusalem Post, supra note 7.

[17] See generally Saliba, supra note 7; Water in the Middle East, supra note * at 28-53, 69-80.

[18] Saliba, supra note 7 at 8.

[19] Id. at 8; Stevens, The Jordan River Valley, International Conciliation, No. 308, at 235 (Jan. 1956).

[20] Water in the Middle East, supra note * at 30.

[21] Saliba, supra note 7 at 8-23. See also J. Hays, T.V.A. on the Jordan: Proposals for Irrigation and Hydro-Electric Development in Palestine (1948); W. Lowdermilk, Palestine: Land of Promise (1944); Ionides, The Disputed Waters of the Jordan, 7 Middle East J. 153 (1953).

[22] Hays, supra note 21; Lowdermilk, supra note 21.

[23] Saliba, supra note 7 at 42-45. See also N. Gil & Z. Rosensaft, The Soils of Israel and Their Land Use Capabilities (1955).

[24] Water in the Middle East, supra note * at 33.

[25] Saliba, supra note 7 at 39; Water in the Middle East, supra note * at 34.

[26] Saliba, supra note 7 at 39-42; Water in the Middle East, supra note * at 34-35.

[27] Ionides, supra note 21. At least 11 cease-fire violations can be counted between 1951 and 1967. Water in the Middle East, supra note * at 36-37.

[28] Water in the Middle East, supra note * at 38.

[29] Id. at 38-39.

[30] Whether the international agreements which authorized the Rutenberg Concession survived the partition of Palestine has been questioned, Hirsch, Utilization of International Rivers in the Middle East, 50 Am. J. Int'l L. 81, 91 n.40 (1956); Louis, Les Eux du Jourdain, [1965] Annuaire Francais de Droit International 832, 860-861.

[31] Saliba, supra note 7 at 84-85.

[32] Id. at 84-107; Water in the Middle East, supra note * at 39-42.

[33] Saliba, supra note 7 at 104-107; Water in the Middle East, supra note * at 41.

[34] Saliba, supra note 7 at 107-112; Water in the Middle East, supra note * at 43-44.

[35] Cf. Sohn, Unratified Treaties as a Source of Customary International Law, in Realism in Law-Making 231-289 (A. Bos & H. Siblesz eds. 1986).

[36] Water in the Middle East, supra note * at 44-53.

[37] Id. at 47-49.

[38] Id. at 45.

[39] Id.

[40] Id. See also Hareuveni, The Jordan Valley Goes Back to Days of Calm, Maariv, Nov. 11, 1971.

[41] The absence of conflict over water is all the more remarkable given the pervasiveness of conflict within the region relating to almost every other resource, not to mention the steady growth of low-intensity conflict world-wide in recent decades. On the latter process, see International Incidents: the Law that Counts in World Politics (W. Reisman & A. Willard eds. 1988).

[42] Water in the Middle East, supra note * at 49-53.

[43] Id. at 76-80.

[44] The first published proposal so to link the two river systems was the Lowdermilk Plan of 1944, id. at 32. See Hays, supra note 21; Lowdermilk, supra note 21. See also es-Said, The Great Water Robbery, 13 Monday Morning, April 16, 1984 at 36; Stauffer, supra note 6.

[45] See note 15 supra.

[46] Water in the Middle East, supra note * at 69-73.

[47] See generally Z. Grinwald, Water in Israel (1980).

[48] Water in the Middle East, supra note * at 33-34.

[49] Even today, only 5% of Arab farmlands in Israel (22% of all cultivated lands in Israel) are irrigated, while 37% of Jewish farmland is irrigated, id. at 47. Note also that water consumption on the occupied Golan Heights has doubled since 1967 even though the population has declined considerably, id. at 47.

[50] Id. at 35.

[51] Id.

[52] Id. at 47-49.

[53] Id. at 27.

[54] One responsible estimate is that Israel's sustainable water yield from within its borders is only 1,500 to 1,600 MCM per year, Galnoor, Water Policymaking in Israel, 4 Pol'y Anal. 339 (1978).

[55] Water in the Middle East, supra note * at 46, 59-60.

[56] Id. at 27.

[57] Id. at 34-35.

[58] Id. at 49-52. See also Peretz, River Schemes and Their Effect on Economic Development in Jordan, Syria, and Lebanon, 18 Middle East J. 293 (1964).

[59] Water in the Middle East, supra note * at 28.

[60] Id. at 51.

[61] Id. at 52-53.

[62] Id. at 70-73. See also Peretz, supra note 58.

[63] Water in the Middle East, supra note * at 43-44.

[64] Id. at 70-71.

[65] Id. at 77.

[66] The major sources of water in Syria are the Orontes and Euphrates Rivers (and their tributaries), id. at 83-101, 115-123. See also Peretz, supra note 58.

[67] Water in the Middle East, supra note * at 38-39, 43-44.

[68] See generally Israeli Min. Defense, Judea-Samaria and the Gaza District: a Sixteen-Year Survey (1967-1983) (1983).

[69] Water in the Middle East, supra note * at 47.

[70] Id. at 21.

[71] Id. at 48.

[72] Id.

[73] See supra note 49.

[74] 1 Knesset Debates 399 (Apr. 26, 1949) (statement of David ben Gurion). See also T. Segev, 1949: the First Israelis 73-74 (1986).

[75] Water Law, arts. 1, 36, in 13 Laws of Israel 173 (1959).

[76] D. Kretzmer, The Legal Status of Arabs in Israel 118 (1987).

[77] Central Bureau of Statistics, Statistical Abstract of Israel 1983 (no. 34), at 484.

[78] I. Lustick, Arabs in the Jewish State 167 (1980).

[79] Kretzmer, supra note 76 at 120. See generally Amun, Davis, & San'allah, Deir al-Asad: the Destiny of an Arab Village in Galilee: a Case Study towards a Social and Political Analysis of the Palestinian-Arab Society in Israel, in Palestinian Arabs in Israel: Two Case Studies 1-92 (H. Amun ed. 1977).

[80] Water in the Middle East, supra note * at 27, 48.

[81] Israeli Water Law, supra note 75, art. 46.

[82] Id. at art. 126. Uri Davis has described this arrangement as one of the "legal structures of [Israeli] apartheid." Davis, Israel's Zionist Society: Consequences for Internal Opposition and the Necessity for External Intervention, in Committee for the Elimination of All Forms of Racial Discrimination & Jewish Alternatives to Zionism, Judaism or Zionism: What Difference for the Middle East? 176, 179 (1986).

[83] Amun, Davis, & San'allah, supra note 79 at 45-46.

[84] See generally Kretzmer, supra note 76 at 118-120.

[85] Id. at 48. See also Stork, Water and Israel's Occupation Strategy, 13 Merip Rep. 19 (1983).

[86] See generally M. Benvenisti, M. Benvenisti, 1986 Report: Demographic, Economic, Legal, Social and Political Developments in the West Bank 8-10 (1986) (hereafter cited as 1986 Report); M. Benvenisti, The West Bank Data Project 12-15 (1984); M. Benvenisti, Z. abu-Zayed, & D. Rubinstein, The West Bank Handbook 1 (1986) (hereafter cited as Handbook); S. Roy, The Gaza Strip Survey 38-51 (1986).

[87] Note that urban Jewish settlements would create negligible demands for water compared to the demands generated by the dominant agricultural settlements.

[88] Water in the Middle East, supra note * at 49. See also 1986 Report. supra note 86 at 20-22; Handbook, supra note 86 at 223-225; Royal Sci. Soc'y, West Bank Resources and its Significance to Israel 7-10 (1979); N. Selbat, Water Policy Alternatives for Israel (1981); Khouri, Israel Drains West Bank Waters, 71 Middle East 38 (1979).

[89] See, e.g., Kiwanuka, Developing Rights: the UN Declaration on the Right to Development, 1988 Netherlands Int'l L. Rev. 257.

[90] Water in the Middle East, supra note * at 53-61, 80-81. See also J. Starr & D. Stoll, U.S Foreign Policy on Water Resources

in the Middle East (1987); Caelleigh, Middle East Water: Vital Resource, Conflict, and Cooperation, in A Shared Destiny--Near East Regional Development and Cooperation 121-136 (J. Starr ed. 1983).

[91] Compare Caponera, Patterns of Cooperation in International Water Law, in Transboundary Resources Law, supra note 3 at 1-25. For good general studies of managing the agreement process, see R. Bilder, Managing the Risks of International Agreement (1981); W. Habeeb, Power and Tactics in International Negotiations (1988); T. Schelling, The Strategy of Conflict (1960).

[92] Water in the Middle East, supra note * at 170-171. See also Chesnoff, When Water Feeds Flames: Growing Shortages in the Mideast Add to Regional Tensions, U.S. News & World Rep., Nov. 21, 1988 at 47.

[93] See generally Water in the Middle East, supra note * at 157-180; M. Khadduri, Major Middle Eastern Problems in International Law 105-121 (1972).

[94] Water in the Middle East, supra note * at 157-160.

[95] Id. at 158-162, 167. The classic description of this process is found in McDougal & Schlei, The Hydrogen Bomb Test in Perspective: Lawful Measures for Security, 64 Yale L.J. 648 (1955). See also C. de Vissher, Theory and Reality in International Law (1968).

[96] Water in the Middle East, supra note * at 161. See also Bilder, Some Limitations of Adjudication as an International Dispute Settlement Technique, 23 Va. J. Int'l L. 1 (1982); Falk, The Beirut Raid and the International Law of Retaliation, 63 Am. J. Int'l L. 415 (1969).

[97] See generally Teclaff, supra note 1 at 75-112.

[98] See generally International L. Comm'n, Report on the Law of Non-Navigational Uses of Rivers, Y.B. Int'l L. Comm'n, A/CN.4/Ser. A, 1971-1988; F. Berber, Rivers in International Law (1959); G. Kaeckenbeeck, International Rivers (1962); The Law of International Drainage Basins, supra note 1; Saliba, supra note 7 at 46-70; Teclaff, supra note 1; Hostie, Problems of International Law Concerning Irrigation in Arid Lands, 31 Int'l Aff. 61 (1955). On the work of the International Law Commission generally and its status, see The Work of the International Law Commission (4th ed. 1988); I. Sinclair, The International Law Commission (1987). The law governing the non-navigational uses of international rivers has been on the agenda of the Commission since 1949, Sinclair, supra at 27, but has been interrupted by resignations of the responsible Special Rapporteurs, Sinclair, supra at 40. Work on the international rivers project has proceeded more rapidly in recent years. The Work of the International Law Commission, supra at 100-105; Sinclair, supra at 107-109, 169-170. A significant factor in this recent progress has been the strong support for such a development from Third World countries. Sinclair, supra at 114.

[99] International Groundwater Law (L. Teclaff & A. Utton eds. 1981).

[100] Water in the Middle East, supra note * at 166-167.

[101] Id. at 164-165. This theory was eloquently once expressed by U.S. Attorney-General Harmon, 21 Op. Att'y Gen. 274, 281-282 (1898). This "Harmon Doctrine" has been disapproved by the U.S. State Department, Memorandum to the Legal Advisor, Nov. 23, 1942, in 3 M. Whiteman, Digest of International Law 950-954 (1964). See also Lipper, Equitable Utilization, The Law of International Drainage Basins, supra note 1 at 20-23; Saliba, supra note 7 at 51-55.

[102] 1 L. Oppenheim, International Law 474-475 (8th ed., H. Lauterpacht ed. 1955); Water in the Middle East, supra note * at 165; Lipper, supra note 101 at 18-20.

[103] Water in the Middle East, supra note * at 165-166.

[104] See generally Saliba, supra note 7 at 51-54, 57-59; Teclaff, supra note 1 at 157-165; Baxter, supra note 4; Fahmi, International River Law for Non-Navigable Rivers with Special Reference to the Nile, 23 Revue Egyptienne de Droit International 39 (1967); Garretson, The Nile Basin, in The Law of International Drainage Basins, supra note 1 at 256; Hosni, The Nile Regime, 17 Revue Egyptienne de Droit International 70 (1961); Lipper, supra note 101 at 49-57; Meyers, The Colorado Basin, in The Law of International Drainage Basins, supra note 1 at 486; Note, supra note 4.

[105] Water in the Middle East, supra note * at 165-166. See generally Case of the Territorial Jurisdiction of the Int'l Comm'n of the Oder River, [1929] P.C.I.J., ser. A, No. 23 at 27; The Lake Lanoux Arbitration (France v. Spain), 24 I.L.R. 101, 139 (1957); International L. Assoc., The Helsinki Rules on the Uses of the Waters of International Rivers (Rep. of the 52d Conf. held at Helsinki, Aug. 14-20, 1966); Berber, supra note 98 at 25, 272-274; Lipper, supra note 101 at 23-40, 57-66; D. O'Connell, International Law 556-558 (2d ed. 1970); Saliba, supra note 7 at 48-51, 54-57, 59-70; H. Smith, The Economic Uses of International Rivers 150-151 (1931); Teclaff, supra note 1 at 152-157, 165-184; Water in a Developing World (A. Utton & L. Teclaff eds. 1978); Andrassy, L'Utilization des Eux des Bassins Fluviaux Internationaux, 16 Revue Egyptienne de Droit International 23 (1960); Caponera, supra note 91 at 3-10; Johnson, supra note 1; Hayton, The Plata Basin, in The Law of International Drainage Basins, supra note 1 at 298.

[106] See generally U.N. Legislative Series, Legislative Texts and Treaty Provisions Concerning the Utilization of International Rivers for Other Purposes than Navigation. See also M. Arsanjani, International Regulation of Internal Resources (1981); Lipper, supra note 101; Goldie, Equity and the International Management of Transboundary Resources, in Transboundary Resources Law, supra note 3 at 103-137. For the recent International Law Commission debates on the definition of this topic, see Y.B. Int'l L. Comm'n, A/CN.4/Ser. A, at 158-160 (1986); McCaffrey, The Law of International Watercourses: Some Recent Developments and

Unanswered Questions, 17 Den. J. Int'l L. & Pol'y 505 (1989). See also supra note 2. Cf. S. Amin, Marine Pollution in International and Middle Eastern Law (1986); International Environmental Law (L. Teclaff & A. Utton eds. 1974); J. Lammers, Pollution of International Watercourses (1984); O. Schachter, Sharing the World's Resources (1977); Haas, Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control, 43 Int'l Org. 377 (1989); Schwabach, The Sandoz Spill: the Failure of International Law to Protect the Rhine from Pollution, 16 Ecol. L.Q. 443 (1989); Young, The Politics of International Regime Formation: Managing Natural Resources and the Environment, 43 Int'l Org. 349 (1989).

[107] Alheritiere, Settlement of Public International Disputes on Shared Resources: Elements of a Comparative Study of International Instruments, in Transboundary Resources Law, supra note 3 at 139-149.

[108] Water in the Middle East, supra note * at 167.

[109] Saliba, supra note 7 at 23-25, 29-31, 75-81, 94-96, 142-143.

[110] Water in the Middle East, supra note * at 168.

[111] Id. at 167-168.

[112] Id. at 173-174.

[113] Id. at 43-44. Saliba, supra note 7 at 144.

[114] Water in the Middle East, supra note * at 92-95.

[115] Id. at 168. See also Saliba, supra note 7 at 93-94, 99-101, 103-104, 107-112, 142-146.

[116] Water in the Middle East, supra note * at 23.

[117] Id. at 169-170. See generally B. Sloan, Implications under International Law of the United Nations Resolutions on Permanent Sovereignty over Natural Resources on the Occupied Palestinian and other Arab Territories and on the Obligations of Israel Concerning its Conduct in These Territories, The Econ. & Soc. Council, U.N. Doc. A/38/265, E/1983/85 (1983); Gerson, Trustee-Occupant: the Legal Status of Israel's Presence in the West Bank, 14 Harv. J. Int'l L. 1 (1973); Shamgar, The Observation of International Law in the Administered Territories, 1 Israeli Y.B. Int'l L. 262 (1972). Cf. Clagett & Johnson, May Israel as a Belligerent Occupant Lawfully Exploit Previously Unexploited Oil Resources of the Gulf of Suez, 72 Am. J. Int'l L. 556 (1978); Gerson, Offshore Oil Exploration by Belligerent Occupants: the Gulf of Suez Dispute, 71 Am. J. Int'l L. 725 (1977).

[118] See the text supra at notes 37, 52-56, 68-89.

[119] Water in the Middle East, supra note * at 161. Cf. Habeeb, supra note 91.

[120] Water in the Middle East, supra note * at 43-45, 168-169. See Sohn, supra note 35.

[121] Id. at 169.

[122] Israel thus far has refused to consider the possibility of any role for the Palestinians in managing water on the West Bank even when Israel has been willing to consider plans for Palestinian "autonomy." D. Ott, Palestine in Perspective: Politics, Human Rights & the West Bank 15-17 (1980).

[123] Id. at 171-173.

[124] See the authorities cited supra note 106.

[125] See the authorities cited supra note 2. See also Idaho ex rel. Evans v. Oregon, 462 U.S. 1017 (1983) (equitable apportionment of salmon runs denied when the complainant presented no proof of injury).

[126] See generally 2 Water and Water Rights 293-372 (R. Clark ed. 1976); 5 Water and Water Rights, supra at 232-391; 7 Water and Water Rights, supra at 1-248; Dellapenna, Owning Water in the Eastern United States, 6 Eastern Mineral L. Fndtn. Proc. ch. 1 (1986).

[127] Samir Saliba, in a more extensive review of the options briefly addressed here, reached similar conclusions. Saliba, supra note 7 at 113-152.

[128] Ely & Norcutt, Administration, in The Law of International Drainage Basins, supra note 1 at 124-159; Teclaff, supra note 1 at 113-203.

[129] See, e.g., Panel of Experts on Legal & Institutional Aspects of Int'l Water Res. Dev., Management of International Water

Resources (1975); le Marquand, Politics of International River Basin Cooperation and Management, in Water in a Developing World, supra note 105, at 147-165; Rodgers & Utton, supra note 3; Utton, International Groundwater Management: the Case of the U.S.-Mexican Frontier, in International Groundwater Law, supra note 3 at 157-188.

[130] Teclaff, supra note 1 at 28-32, 42-47.

[131] See the text supra at notes 1-7.

[132] See Schramm, Human-Institutional Factors, in Water in a Developing World, supra note 104, at 187-201.