

The role of groundwater in the water conflict and resolution between Israelis and Palestinians

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ABSTRACT

In arid areas such as the Middle East, and in the absence of abundant surface water resources, groundwater is a major source for meeting the basic water requirements. Consequently, control over water resources has become a nascent source of conflict between Israel and its neighbors especially Palestinians. Israel is currently utilizing more than 80 % of the Palestinian groundwater resources and denying Palestinians their rightful utilization of the Jordan River. Palestinians are currently allocated 140 MCM per year for domestic and industrial use leaving the per capita consumption under suppressed demand at an average of 38 m³/year, which is far below the required standards of water supply. For agriculture, Palestinians have access to 155 MCM per year which they are using to irrigate around 11 % of their cultivated lands while Israel is enjoying abundant water to irrigate 62 % of its cultivated land. The current water allocations came about as a result of fete compli arrangements reflecting the balance of power rather than internationally formulated agreements

According to the Oslo agreement, Israel recognized the Palestinian water rights, but these are to be negotiated in the permanent status negotiations. However, so far, no negotiations have taken place to enumerate the Palestinian water rights. The issue of Palestinian water rights will be one of the most difficult issues in the final status negotiations. The Oslo agreement included arrangements for delivering an additional 28.6 MCM for the Palestinians to meet their immediate needs for domestic water use during the interim period. Regrettably, this additional water was not enough to meet the growing needs of the population which is still experiencing suppressed water demand.

Israelis and Palestinians should immediately and forcefully adopt a holistic approach in addressing their water conflict. The interdependency between water management and environmental protection, social progress and economic growth is clear and necessitates joint water management schemes which will ensure equity in water accessibility to both Palestinians and Israelis. Unless these issues are addressed immediately and properly according to international norms that will translate into actual water in their

pipes, Palestinians will remain the thirsty partner in the Middle East with a severe water crisis that will impact the sustainability of the peace process. The paper will address the Israeli-Palestinian water conflict and propose ways and means of resolving it.

1. INTRODUCTION

The Madrid peace conference in 1991 offered a special opportunity for all nations in the Middle East to abandon the existing states of belligerency, confrontation, non-cooperation and polarization. The ultimate objective of the peace process is to arrive at a comprehensive, just and lasting peace in the whole region where all the peoples of the area can together develop the area and promote progress and prosperity in the region. Water is a particularly sensitive and critical issue for all parties to the conflict and thus, will be a major issue that can catalyze the peace process or inhibit it. After more than 14 years of meetings and negotiations, the gap in the positions among regional parties is still as wide as ever. The region's hydrologists and politicians are still talking at different wavelengths. Finding a common understanding of water issues in the Middle East would go far to enhance the possibilities of achieving stability in the region. Conversely, failure to reach these common grounds will, most definitely, obstruct any efforts to attain this goal. There is no alternative to an honest and forthright discussion of the water issues and to exposing the current unsustainable reality of mismanagement, inequities, the outright denial of the Palestinians' inalienable right to their resources.

2. WATER RESOURCES IN MANDATE PALESTINE

Water does not recognize political boundaries and as such, it is quite difficult to delineate Israeli and Palestinian surface and ground water resources. Nevertheless, we shall outline here the water resources in mandate Palestine which comprises Israel as well as Occupied Palestinian Territory (the West Bank including East Jerusalem and the Gaza strip).

2.1 Surface Water

Surface water is that which flows permanently in the form of rivers and wadis or that which is held in seasonal reservoirs. The only permanent river which can be used as a source of surface water in Palestine is the Jordan River which originates from three main springs: Banias in the occupied Golan Heights, Dan in Israel and Hasbani in Lebanon. The water of the river flows southward through Lake Hula towards Lake Tiberias after which it is joined by the Yarmouk and Zerka tributaries as it continues to flow southward until it spills into the Dead Sea at approximately 400 m below sea level. The entire length of the Jordan River is 360 km with a surface catchment area of about 18,300 km². The riparians of the Jordan River are Lebanon, Syria, Palestine and Jordan. Until the 1950's, the Jordan River had an annual flow of 1300 MCM discharging in the Dead Sea. Due to Israel's unilateral diversion of the Jordan river waters to the Negev and other diversion projects, the annual flow of the Jordan river now is less than 100 MCM of high salinity and deteriorated quality water.

Flood Water Flow

Surface flood runoff in the West Bank is mostly intermittent and probably occurs when the rainfall exceeds 50 mm in one day or 70 mm on two consecutive days. The overall flood water flow in mandate Palestine is estimated at 90 MCM per annum.

2.2 Ground water resources

Groundwater is the major source of fresh water supply in the mandate Palestine. There are eleven ground water basins in mandate Palestine, of which four are located in the West Bank and Gaza Strip either partially or totally (Figure 1). About 1345 MCM/yr emerges from groundwater basins through more than 4000 wells (Figure 2).

In the West Bank, the aquifer system is comprised of several rock formations from the Lower Cretaceous to the Holocene geologic age. Most of the formations are composed of carbonate rocks (mainly limestone, dolomite, chalk, marl, and clay). The aquifer system is recharged from rainfall in the West Bank. The main recharge areas are along the upper mountain slopes and ridges. The annual rainfall in the West Bank is estimated at 3407.5 MCM (PWA, 2005). Around 600-650 MCM of this rain is estimated to infiltrate the soil to replenish the aquifers annually. (Figure 1) also shows the distribution of groundwater basins and aquifers in the West Bank, which can be divided into three main groundwater basins, each of which can be subdivided into sub-basins.

The West Bank aquifers

The West Bank aquifer system is classified according to flow direction into:

1. *The Western Aquifer System*, which is the largest, has a safe yield of 365 MCM per year (of which 40 MCM brackish). Eighty percent of the recharge area of this basin is located within the West Bank boundaries, whereas 80% of the storage area is located within Israeli borders. Groundwater flow is towards the coastal plain in the west, making this a shared basin between Israelis and Palestinians. The groundwater being mainly of good quality, this source is largely used for municipal supply. Israelis exploit the aquifers of this basin through 300 deep groundwater wells to the west of the Green Line, as well as through Mekorot (the Israeli water company) deep wells within the West Bank boundary. Palestinians, on the other hand, consume only about 7.5% of its safe yield. They extract their water from 138 groundwater wells tapping the Western Aquifer System (120 for irrigation and 18 for domestic use) in Qalqilya, Tulkarm, and West Nablus. There are 35 springs with an average flow discharge exceeding 0.1 L/s located in this aquifer system.
2. *The Northeastern Aquifer System* has an annual safe yield of 145 MCM (of which 70 MCM brackish). Palestinians consume only about 18% of the safe yield of their aquifers in the Jenin district and East Nablus (Wadi Al Far'a, Wadi El Bathan, as well as Aqrabaniya and Nassariya) for both irrigation and domestic purposes. There are 86 Palestinian wells in this aquifer system (78 irrigation wells and 8 domestic wells). The general groundwater flow is towards the Bisan natural springs in the north and northeast.

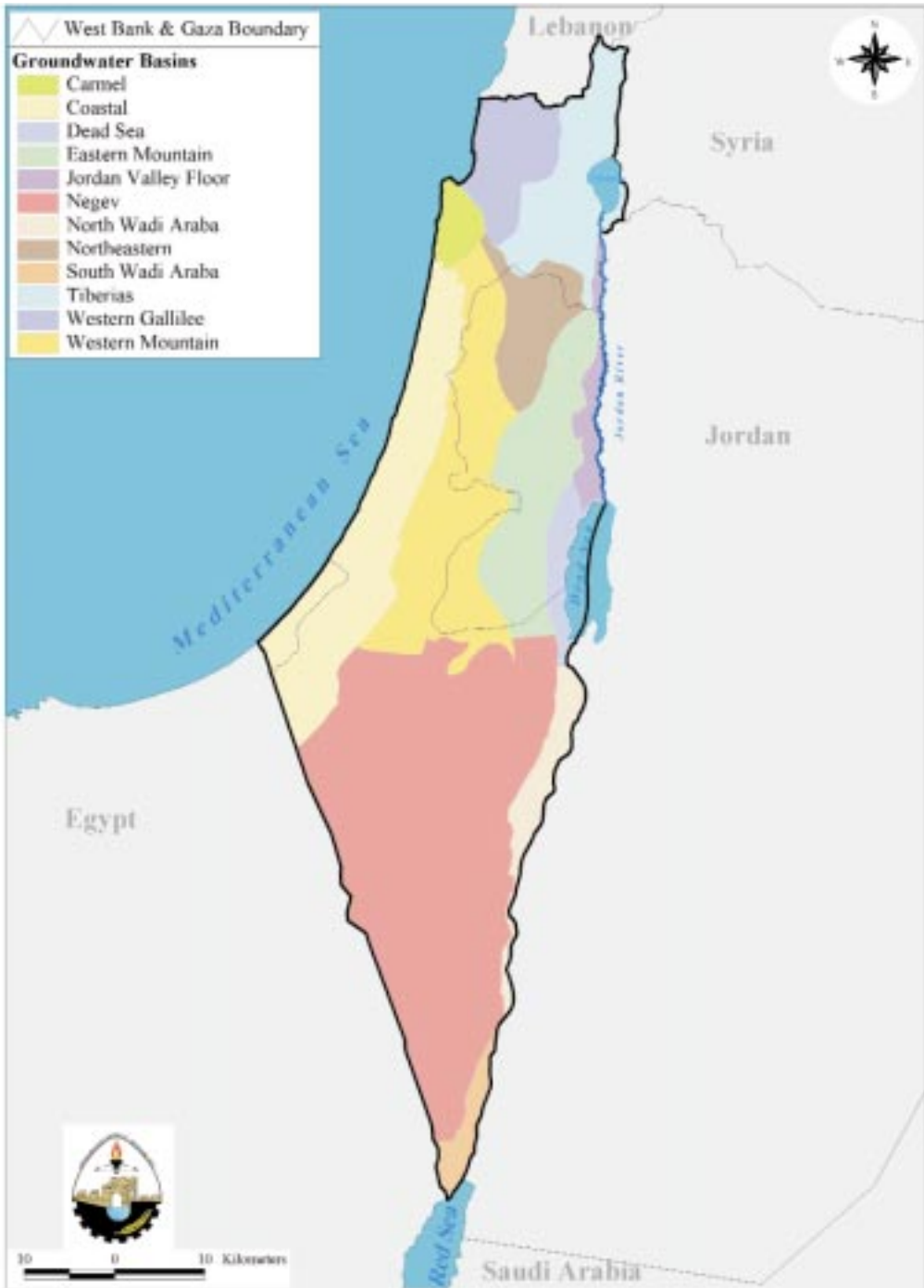


Figure 1. Groundwater Aquifers in mandate Palestine



Figure 2. The distribution of groundwater wells in mandate Palestine

3. *The Eastern Aquifer System* has a safe yield of 175 MCM per year (of which 70 MCM brackish). It lies entirely within the West Bank territory and was used exclusively by Palestinian villagers and farmers until 1967. After 1967, Israel expanded its control over this aquifer and began to tap it, mainly to supply Israeli settlements implanted in the area. The most important springs in the West Bank are in this basin. Seventy-nine springs with an average discharge greater than 0.1 L/s provide 90% of the total annual spring discharge in the West Bank. There are 122 Palestinian groundwater wells in this aquifer system (109 for irrigation and 13 for domestic use).

The Gaza Coastal Aquifer

The main Gaza Coastal Aquifer is a continuation of the shallow sandy/sandstone coastal aquifer of Israel which is of the Pliocene-Pleistocene geological age. About 2200 wells tap this aquifer with depths mostly ranging between 25 and 30 meters. Its annual safe yield is 55 MCM, but the aquifer had been over-pumped at the rate of more than 120 MCM annually resulting in a lowering of the groundwater table below sea level and saline water intrusion in many areas. The main sources of salinity are deep saline water intrusion from deeper saline strata, sea water intrusion, and return flows from very intensive irrigation activities in Gaza and the Negev.

Table 1. Available water resources in mandate Palestine

Source	Total annual recharge (MCM)	Water use (MCM)		
		Palestinian	Israeli	Israeli settlements
Renewable Aquifers				
Eastern aquifer	175	55.3	40	40
North eastern aquifer	145	27.9	103	4
Western aquifer	365	22.1	340	2
Coastal Plain Aquifer	240	0		
Gaza Coastal Aquifer	55	110		5-8
Western Galilee	120	0		
Sub-Basins	0-40	0		
Other aquifers	205	0		
Surface Water				
Jordan River basin	1300	0	685	10-20
Surface runoff	90			

3. WATER CONSUMPTION IN ISRAEL AND PALESTINE

Israel has been restricting Palestinian water usage and exploiting Palestinian water resources. Presently, more than 85% of the Palestinian water from the West Bank aquifers is taken by Israel, accounting for 25.3% of Israel's water needs. Palestinians are also denied their right to utilize water resources from the Jordan River which they were utilizing partially until 1967.

As a result of Israeli policies, Palestinians are permitted to utilize 259 MCM of the water resources to supply 3,647,845 Palestinians in both West Bank and Gaza strip with their domestic, industrial and agricultural needs. For comparison, 6,716,000 Israelis are utilizing 1831 MCM. On a per capita basis, water consumption by Palestinians is 81 m³/yr compared to 254 m³ for Israelis. It should be added here that the 450,000 Jewish settlers consume about 100 MCM of water annually. While Palestinians are struggling to connect the remaining 25% of the Palestinian population to household water-distribution systems. Jewish settlers receive continuous water supply, largely from groundwater wells in the Occupied Palestinian Territory.

As a result, there is a wide variation in water consumption for domestic purposes between Palestinian and Israelis, as the per capita water use is 38 m³ for domestic and industrial purposes for Palestinians in comparison to 102 m³ for Israelis for domestic purposes. During summer months, most Palestinian communities experience extended water shortages that last for weeks. Irrigated area in the Occupied Palestinian Territory covers approximately 201,358 dunums while the irrigated area in Israel is 2,177,500 dunums. While the agricultural sector in Palestine contributes between 15 and 20 % of the GDP, it contributes only 1.6% to the GDP in Israel. The next table shows a comparison of water consumption between Israelis and Palestinians.

Table 2. Comparison between water consumption among Israelis and Palestinians

	Palestinians	Israelis
Total population	3,647,845	6,716,000
Consumption, MCM		
Domestic	140*	688
Industrial		122
Agriculture	155	1021
Total consumption	295	1831
Consumption per capita, m³		
Irrigation	43	152.0
Domestic	38	102.4
Total	81	254.4

4. ROOTS OF THE WATER CONFLICT

To come up with a solution to the water conflict, it is extremely important to look at its roots, which go back to the end of the past century when the Zionist movement started its plans for creating a Jewish homeland. In 1875, it was proposed that such a homeland should encompass Palestine, the Negev and parts of Jordan with their water resources so it can absorb 15 million Jews. After the declaration of the British Mandate in 1922, the Jewish Agency formed a special technical committee to conduct studies of the utilization of water and irrigation of unarable and desert land. Most of the studies conducted were used to evaluate water plans designed by both the Jewish Agency and the United Nations Partition Plan of Palestine. The Arabs found it imperative to protect their water resources and, thus, began designing their own plans. Rising political tension in the region and the lack of a solution acceptable to all parties exacerbated the situation, which eventually exploded into several rounds of wars between Arabs and Jews.

Two important water-related events characterize the British Mandate period from 1922 to 1948, namely the Rutenberg Concession and the Ionides Plan. In 1926, the British High Commissioner granted the Jewish-owned Palestine Electricity Corporation, founded by Pinhas Rutenberg, a 70-year concession to utilize the water of the Jordan and Yarmouk Rivers to generate electricity. The concession denied Arab farmers the right to use the water of the Yarmouk and Jordan Rivers upstream of their junction for any reason whatsoever, unless permission was granted by the Palestine Electricity Corporation. In 1937, the government of Great Britain assigned M. Ionides, a hydrologist, to serve as the Director of Development for the East Jordan Government. His actual task was to conduct a study of the water resources and irrigation potentials of the Jordan Valley Basin. This study served as the main reference in the preparation of the proposed United Nations Partition Plan of Palestine. Published in 1939, the Ionides Plan made three recommendations. Firstly, Yarmouk flood waters were to be stored in Lake Tiberias. Secondly, the stored waters in Lake Tiberias plus a block quote quantity of 1.76 CM/s of the Yarmouk River water, diverted through the East Ghor canal, were to be used to irrigate 300,000 dunums of land east of the Jordan River. And finally, the secured irrigation water of the Jordan River System, estimated at a potential of 742 MCM, was to be used primarily within the Jordan Valley Basin. The Jewish agency was not satisfied with the findings and recommendations of Ionides.

Following the 1948 war, Israel launched a Seven Year-Plan aimed at diverting the Jordan River water south toward the Negev desert. In September 1953, the construction of the National Water Carrier began. The diversion originated at the Banat Yacoub Bridge in the demilitarized zone between Israel and Syria. After Arab objection to the excavation process, a temporary freeze on the work was announced and the United States presented a plan as yet another attempt to solve the region's water dispute. The Johnston plan, which was prepared under the supervision of the Tennessee Valley Authority included water distribution quotas for the Jordan Valley Basin, estimated at 1287 MCM annually, among the riparian states as shown in table 3.

Table 3. Water allocation according to Johnston's Plan of 1955

	First Johnston plan	Revised Johnston	Present use (90's)
Syria	50	132	153
Lebanon	-	35	5-10
Jordan	829	720	255-290
Total Arab	879	887	413-453
Israel	426	375-475	675-700*

* including water of the West Bank

The failure to reach a regional agreement reinforced each country's inclination to proceed independently. In 1958, Israel reinitiated the National Water Carrier project but with some technical changes; also, the Seven-Year Plan was replaced by a Ten-Year Plan. Arab reaction to Israel's National Water Carrier was to build dams on tributaries of the Jordan and Yarmouk Rivers, thus reducing the water flow to Israel. In 1965, Syria began building dams to divert water from the Banias and Dan Rivers in the Golan Heights. Israel sent its fighter planes to destroy the work sites. No regional water plans were devised after the Johnston Plan of 1954, which allocated the water between the riparians based on the irrigable areas within the watershed line. A West Ghor canal was included in his plan to provide Palestinians with Jordan River water that translates into 250 MCM per year. This project was never implemented..

Controlling Groundwater Resources

Following the 1967 war, Israel secured its control over the headwaters of the Jordan River. Before 1967, the Palestinians had 217 groundwater wells for agricultural and domestic purposes. Soon after the occupation, Israel imposed a number of military orders to control Palestinian water resources. On August 15, 1967, the Israeli military commander issued Order No. 92, in which water was considered as a strategic resource. This order was followed by numerous other orders aimed at making basic changes in the water laws and regulations in force in the West Bank. Under Military Order No. 158 of 1967, it is not permissible for any person to set up or to assemble or to possess or to operate a water installation unless a license has been obtained from the area commander. This order applies to all wells and irrigation installations. The area commander can refuse to grant any license without the need for justification. These orders were followed by numerous military orders- No. 291, No. 457 of 1972, 484 of 1972, 494 of 1972, 715 of 1977 and 1376 of 1991- to achieve complete control over Palestinian water resources. Immediately after the end of the war, Israel destroyed 140 Palestinian water pumps in the Jordan Valley and made it difficult to obtain permits for new wells. Despite the rapid increase in population and demand on water, Israel, since 1967, has granted Palestinians of the West Bank only few permits for new water wells. All were to be used exclusively for domestic purposes. New water wells for agricultural purposes in the West Bank were also restricted to three permits. In addition, Israel policy of metering all Palestinian wells was another mean of restricting quotas on Palestinian water utilization.

Moreover, and far from Military actions, Israel's water company Mekorot had a significant role in controlling the West Bank water resources especially after 1982. In the shadow of the Begin's second government and the - then- Defense Minister Ariel Sharon, Mekorot transferred the ownership of all water supplies in the territories for a very ridiculous price of **just one shekel** when the estimated value of these assets is \$5 million. So, from this point and on, abstraction from the West Bank's deep wells was controlled only by the Israelis. Although it was Mekorot which owned the West Bank's wells, it was the Palestinians of the Water Department who were responsible for liaising with Palestinians as well as the Israeli settlers in the West Bank. The department was not allowed to close supply valves feeding Israeli settlers at the time when Palestinians had only rationalized supplies.

After all, Mekorot is still controlling groundwater resources in the West Bank and is selling the Palestinians their own water – via the networks that it built since the early 1980s- at a very high price (\$1.2/m³ for both domestic and agricultural purposes) relatively to the low prices settlers pay (\$0.40/m³ for domestic and 0.16/m³ for agricultural purposes). This, anyway, shows the direct purposes of the Israeli control of the Palestinian good quality groundwater either by confiscating existing Palestinian wells and springs or by building settlements on strategic locations to access groundwater.

5. WATER AND THE PEACE PROCESS

It is now 14 years since the initial peace conference at Madrid was inaugurated. Upon Israel's insistence, the peace process was divided into two tracks namely the bilateral negotiations and the multilateral talks. The bilateral were intended to lead to peace treaties between Israel on the one hand and each of the regional parties, namely Jordan, Lebanon, Palestine and Syria on the other. The multilateral track was

intended to complement and support the bilateral track by promoting regional cooperation. A special working group was established for water resources in the multilateral negotiations.

On the Israeli-Palestinian track, water was one of the major sticking points in the negotiations leading to the signing of the interim Agreement (Oslo II) in Washington on September 28, 1995. Water is referred to under article 40 of Annex 3 "Protocol concerning Civil Affairs". The main issues agreed upon can be summarized as follows:

- Israel recognizes the Palestinian water rights in the West Bank. These rights will be negotiated in the permanent status negotiations and settled in the Permanent Status Agreement relating to the various water resources.
- The Israelis shall transfer authority to the Palestinians to assume powers and responsibilities in the sphere of water and sewage in the West Bank related solely to Palestinians, that are currently held by the military government and its Civil Administration, except for the issues that will be negotiated in the permanent status negotiations.
- The issue of ownership of water and sewage related infrastructure in the West Bank will be addressed in the permanent status negotiations.
- The future needs of the Palestinians in the West Bank are estimated to be between 70 - 80 MCM/yr.
- The immediate needs of the Palestinians in fresh water for domestic use during the interim period is about 28.6 MCM/yr. The remainder of the estimated quantity of the Palestinian future needs (41.4-51.4 MCM/yr), shall be developed by the Palestinians from the Eastern Aquifer and other agreed upon sources in the West Bank. The Palestinians will have the right to utilize this amount for their domestic and agricultural purposes.

While the recognition of Israel to the Palestinian water rights in the Oslo II agreement is a very important step forward, the agreement attempts to undermine the significance of this issue by talking about maintaining existing utilization and recognizing the necessity to develop new resources, tacitly accepting that more water is needed to satisfy the needs of both populations. It ignores the issue of *equitable and reasonable* distribution of the available water resources.

The agreement states that the future needs of the Palestinians in the West Bank are estimated to be between 70 - 80 MCM/yr. This statement is ambiguous and may be interpreted differently by different people. In reality, this amount merely expresses the immediate needs of the Palestinians to satisfy domestic demand during the interim agreement period, without considering future development of other sectors such as agriculture, industry or tourism.

Palestinian Water specialists criticized the agreement because it did not deal with the Palestinian water share in the Jordan River, and the shared Western and Northeastern Basins of the West Bank Aquifer System, as well as a reduction in the Israeli water consumption from the Palestinian water resources or the quantities provided to the illegal Israeli settlers in the West Bank or Gaza Strip. The agreement indicates that the Palestinians can increase their water supply from the Eastern Aquifer Basin of which an additional 78 MCM of water can be exploited. Most experts agree that the Eastern Basin could not yield this additional amount claimed by Israeli experts. However, for political reasons, their opinion was not seriously considered. The drop of the water level in the Palestinian wells in the Eastern Basin is raising alarm about its sustainable yield. It is believed that the maximum additional amount that could be extracted is 15 MCM

which would not be enough to meet the needs of the Palestinian population.

In the preparatory talks about the final status negotiations, Israel is refusing to discuss Palestinian water rights and is insisting on dealing with some additional water quantities that may be granted to Palestinians from other non-conventional sources such as desalination or imports from the region. The Israeli negotiators are adamant in rejecting Palestinian demands of their water rights in the Jordan River. They are proposing desalination to overcome Palestinian water shortages. The high cost of desalination per m³ of water is not affordable by Palestinians, whose GNP per capita is less than US \$1,500 compared to Israelis who enjoy a GNP of more than US \$16,000. Certainly, Israel can easily adopt desalination and grant Palestinians their water rights. Palestinians are completely convinced that any proposal regarding the issue of water shortage in the region will not be practical unless they get their water rights first.

6. THE SEGREGATION PLAN

Since 2002, Israel has been implementing its unilateral segregation plan. When complete, the plan will isolate 576 km² of Palestinian land in the West Bank (approximately 10% of the total area) in the Western Segregation Zone between the wall and the Green Line. Israel also maintains an Eastern Segregation Zone by erecting several checkpoints and roadblocks that block the Palestinian movement to and from the Jordan Valley. The Eastern Segregation Zone stretches over 1,555 km² (27% of the West Bank) along the Jordan Valley and the western shores of the Dead Sea. In total, the Segregation Plan appropriates at least 37% of the West Bank. 55 Palestinian communities, including more than 90,000 people, will be isolated in the Western Segregation Zone and 42 Palestinian communities, including more than 42,000 people, will be isolated in the Eastern Segregation Zone. Map. Indicating the Israeli aims for not only isolating Palestinians but also for controlling their water resources, Prime Minister Ariel Sharon was quoted in 2001 saying " *Is it possible today to concede control of the mountain aquifer, which supplies a third of our water? ... You know, it's not by accident that the settlements are located where they are ...*"

In the northern part of the West Bank, 31 artesian wells have been isolated to the West of the Wall. These wells are tapping the Western Basin of the West Bank aquifer with an annual discharge of 3.6 MCM representing around 16% of the Palestinian share in the Western Aquifer. There are another 53 wells with an annual discharge of 8.8 MCM that have been enclosed by the Segregation Wall in addition to 12 wells that are threatened by the Wall and have an annual discharge of 3.1 MCM. Concerning the springs, around 25 springs have been isolated by the wall and another 16 springs have been enclosed by the Wall and have an annual discharge of 62.0 and 0.2 MCM, respectively. In the Eastern Security Slice, there are 105 artesian wells and 30 springs that are used by Palestinians living in localities located within this slice. The annual discharge from these wells and springs reaches around 40.5 and 22.9 MCM, respectively, (Figure 3) shows the Palestinian groundwater wells and spring that are threatened by the Wall. This will result in cutting the Palestinians off from their water supply wells or at least imposing more restrictions on the use of such wells and exacerbating the water problem in the Palestinian localities. Israel intends to hold large areas of the West Bank in order to create "security zones" and to make sure that Israelis water resources are not exposed to dangers. In 1998, the –then- Minister Sharon was quoted saying: "My view of Judea and Samaria is well known, the absolute necessity of protecting our water in this region is central to our security. It is a non-negotiable item".

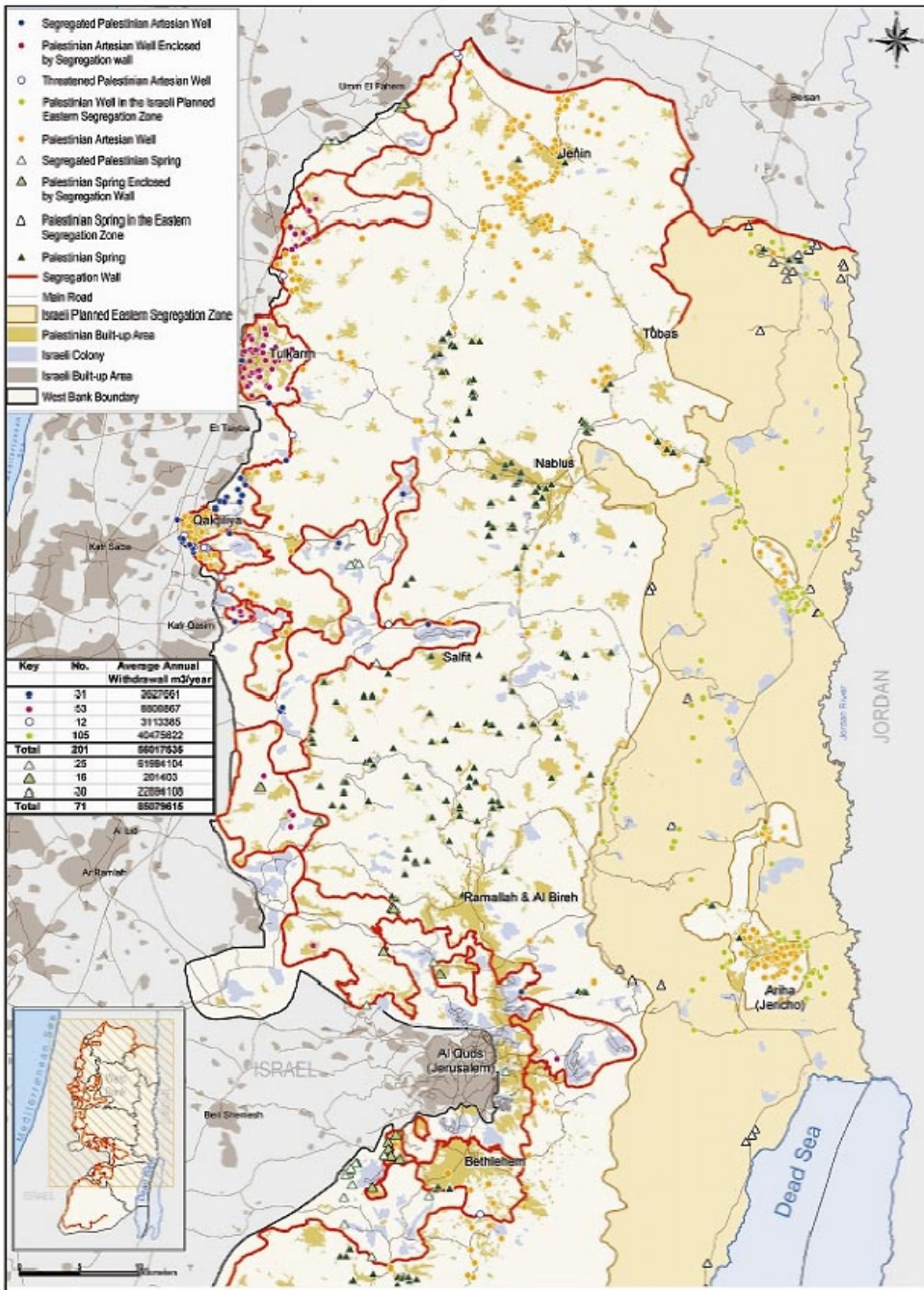


Figure 3. Palestinian groundwater wells and springs that are threatened by the Segregation Plan

In one of his meetings with the Palestinian negotiators, the Israeli water commissioner Ben-Meir said: "I recognize needs, not rights." We are prepared to connect Arab villages to Israel as well, but I want to retain sovereignty on hand". Such statements confirm Palestinian fears of a dry peace and question Israel's genuine aspirations for peace.

7. TOWARDS A SOLUTION

The resolution of the Palestinian-Israeli allocation and water rights disputes need to be governed by the principles of international law which outlines the factors that should be considered in the resolution of a riparian dispute. These include:

- (a) The geography of the basin, including in particular the extent of the drainage area in the territory of each basin State;
- (b) The hydrology of the basin, including in particular the contribution of water by each basin State;
- (c) The climate affecting the basin;
- (d) The past utilization of the waters of the basin, including in particular existing utilization;
- (e) The economic and social needs of each basin State;
- (f) The population dependent on the waters of the basin in each basin State;
- (g) The comparative costs of alternative means of satisfying the economic and social needs of each basin State;
- (h) The availability of other resources;
- (i) The avoidance of unnecessary waste in the utilization of waters of the basin;
- (j) The practicability of compensation to one or more of the co-basin States as a means of adjusting conflicts among uses; and
- (k) The degree to which the needs of a basin State may be satisfied, without causing substantial injury to a co-basin State.

Given this list of relevant factors, it is hardly surprising that each riparian is able to invoke principles which substantiate its perceptions of "legitimate national rights". Rights over particular water resources cannot be legitimately grounded in individual relevant factors, however. The relevant factors should be viewed as a totality, and the rights of parties in a riparian dispute should be interpreted, not absolutely, but relatively, in terms of the extent to which the relevant factors are applicable to the various parties.

The Palestinian water rights can be summarized in the following:

- Equitable water rights in the West Bank ground water aquifers, as these aquifers are recharged almost entirely from the West Bank;
- Equitable water rights in the Jordan River System: as a downstream riparian nation to the Jordan River System, Palestine is legally entitled an equitable share of the system's water resources. In this context, the Johnston Plan for Middle East water allocation, which was developed in the mid-1950s, called for, among other things, a West Ghour canal to supply the West Bank with 120 MCM to meet the needs of Palestinians. While the plan of the West Ghour canal was never implemented solely

because of the political conflict, the Palestinian water rights in the Jordan River System are and should remain.

- Water and fishing rights in the Lake Tiberias as this natural reservoir is an integral part of the Jordan River System, to which Palestine is a legally a riparian nation with the privilege to equitably utilize all of its available resources.
- Full compensation for damages to Palestine's water resources caused by Israel and reimbursement for water that has been utilized by Israel for years.

8. A MODEST PROPOSAL

Negotiations over allocations and water rights should be conducted with an eye on justice rather than might, and independent arbitration may be necessary. Most water resources in the world are shared and the Middle East is no exception. Managing shared water resources should be integrated and involve all the parties involved. Management does not only include allocation of water quantities, but most importantly, it involves the protection and sustainable utilization of the resource. In recent years, the world has been moving from hydrosovereignty to hydrosolidarity. The Middle East should start such an approach. Now with conflicting parties finally negotiating a lasting and sustainable political solution, this issue assumes an ever more urgency. While in principle, the resolution of the Middle East water allocations and disputes (hydrosovereignty) will be based on the principles of international law, there is no mechanism for this issue to be institutionalized under the current circumstances. It is clear that the question of controlling the region's waters is basically related to various perspectives of different parties to their 'legitimate national rights'. Each party will invoke a variety of legal principles to establish its claims: first-in-use first-in-right, customary or equitable utilization, absolute sovereignty, beneficial use, basic justice and fairness, good neighborliness, prior use, etc. In making its claims, each party is merely selective and chooses the legal principles that buttress its claims. Since the ultimate goal is to arrive at a just and sustainable peace in the region, the political settlement should involve an agreement on the use and distribution of the region's waters as well as institutions and structure that will guarantee the sustainable utilization of the scarce water resources.

It is argued here that "equal utilisation" and joint management of the water resources between Israelis and Palestinians offer a just and sustainable basis for resolving the historic water conflicts.

This discrepancy of water allocation between Israelis and Palestinians, among many other issues, creates a feeling of unjustness among Palestinians. Certainly, such a discrepancy cannot continue in the future. A comprehensive and sustainable peace should be based on justice and fairness. Both parties have agreed on the principle of "equitable utilization" of the resources, but quantifying this term will have to be agreed upon. It is proposed here that "equity" be used as a simple and straight forward interpretation and quantification for the term "equitable utilization". In other words, the distribution of water in Israel and Palestine be shared equally between Palestinians and Israelis based on the population figures. Thus, the 2126 MCM of water available today within mandate Palestine would be shared so that Palestinians get 708 MCM instead of 295 MCM which is currently used. The Israeli share should be 1417 MCM instead of 1831 which is currently consumed by the Israelis. The above distribution of water rights between the two

sides is built on the population figures. The per capita consumption for both the Palestinians and Israelis will be 215 m³/a.

A joint management structure will have to be agreed upon to address the monitoring and compliance with the quotas and to ensure the protection of the aquifers as well as the periodic reallocation based on climatic and demographic changes. Such an approach has the following merits:

- It is based on the values of equity and justice, which are essentials for sustaining peace.
- It provides a quick and simple way for resolving the water rights issue that otherwise, will drag the final status negotiations.
- It introduces for the first time in the region, an integrated water management scheme which will certainly be of great value for resolving the water conflicts between Syria, Lebanon, Israel, Jordan and Palestine.
- It demonstrates to the opponents of the peace process that Israel is genuine in its peace aspirations and that negotiations are the ultimate means for resolving conflicts.
- It will allow for efficient utilization of current water networks and conveyance systems between districts.
- It addresses the issue of demographic and climatic changes
- It allows for potential water trades between districts and regions.
- It provides a basic tool for environmental protection of the water resources.
- It will catalyze Israeli and Palestinian as well as regional cooperation in the field of water and other areas.

Resolving the water conflict between Israelis and Palestinians as outlined here is of paramount importance. First, it will introduce for the first time in the region, an integrated water management scheme is adopted and will certainly be of great value for resolving the water conflicts between Syria, Lebanon, Israel, Jordan and Palestine. Second, it will show the opponents of the peace process that negotiations are possible. For the politicians, it would lessen the chances of conflict; for industrialists and agriculturalists, it would foster stable growth; for every citizen, it would result in guaranteed regular supplies of household water.

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