

Water resources at stake: The Mountain Aquifer beneath the occupied West Bank, Palestinian Territories

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Introduction

Co-operation between Israel and the Palestinians in water issues seems often as scarce a commodity as water. Water has been the subject of a number of disputes between them. The Israelis and the Palestinians each blame the other for the violence that is consuming the region with renewed ferocity. Each side sees itself as the victim. The convoluted conflict is created in part by the arid nature of the disputed lands but also by a dispute about water rights and failing water allocation and demand management. Dwindling water resources are increasingly affected by pollution. In addition agricultural and industrial use and population growth have elevated the strategic importance of water in the region

The interim agreement that Israel and the Palestinian Authority signed in 1995 (Oslo II) includes the most updated understanding on water that has been reached. It is more detailed than previous documents and is seen by many water experts as a turning point from which the responsibility for the water sector was given to the Palestinian Authority. In reality, the agreement did not significantly change the scope of the Israeli control over the water resources. After all the agreement explicitly recognizes the Palestinian water rights in the West Bank¹. Although it has not spelled out exactly what these rights are, the provision was essential for the Palestinians, whose rights are being denied during Israel's occupation of the West Bank and the Gaza Strip. Some water experts, not only Israeli, argue that insisting on reallocation of water rights in the region hinders a more practical oriented solution focussing on increasing of water supply to the people in need by utilizing alternative water resources. They refer to the Jordan-Israel-Peace treaty where the question of water rights was solved by using the term "rightful allocation".²

¹ Annex III, Article 40 : "...Israel recognizes the Palestinian water rights in the West Bank. These will be negotiated in the permanent status negotiations and settled in the Permanent Status Agreement relating to the various water resources..." "The Israeli-Palestinian Agreement on the West Bank and the Gaza strip", 28 September 1995, <http://www.mideastweb.org/meosint.htm>

² "The Israel-Jordan-Peace-Treaty", 26 October 1994, <http://www.mideastweb.org/israjordan.htm>

In particular on the side of the Palestinians, there are a lot of reservations since there is no equal basis for negotiations. First, the Palestinians fear that this negotiating approach will be used to negate water rights already clearly established under existing legal standards such as the rightful share of surface waters and other riparian rights, as manifested in the “UN Convention on Law of the non-navigational uses of international watercourses”.³ Second, equal accessing of potential needs, in particular of economic and population growth inclusive a right of return of Palestinian refugees versus right of “Alya” of Jews all over the world on both sides will be very difficult. The present level of water consumption which differs by order of magnitude comparing both sides and the present level of water utilization as foundation for assessing future needs could be very harmful to the Palestinian side and could end up in a false symmetry. Furthermore the provision of Palestinian compensation for exploitation of their resources during time of occupation is feared to be neglected. (See e.g. Kuttab and Ishaq, 2002, Trotter, 1999)

Water allocation of the West Bank Mountain Aquifer⁴

There are two main types of water resources available to Israel and Palestine, as well as their other Arab neighbours: groundwater, contained in aquifers and surface waters in rivers and streams. As far as groundwater is concerned there are two major aquifers: These are the Mountain Aquifer and the Coastal Aquifer. The Mountain Aquifer underlies the West Bank and extends beneath the 1949 Armistice Line – Green Line- into Israel. The Coastal Aquifer underlies the coastal plain of Israel and the Gaza Strip.

The Mountain Aquifer extends from the eastern approaches of the Coastal Aquifer under the hills of the West Bank. It comprises three portions: The Eastern Aquifer Basin (EAB), the Northern Aquifer Basin (NAB) and the Western Aquifer Basin (WAB). The EAB is considered a Palestinian endogenous basin, while the NEAB and the WAB extend behind the Armistice line into Israeli areas.

³ "Convention on the law of the non-navigational uses of international watercourses", 8 July 1997, <http://www.un.org/documents/ga/res/51/ares51-229.htm>

⁴ Many of the Israelis and the Palestinians working in the field of water supply and wastewater treatment are guided either by the logic of power, or by the passion of political partisanship siding with a particular faction. Information pertaining to water is considered sensitive and must presently pass rigorous censorship on both sides before figures are released. Close analysis of the figures often reflects some inconsistencies between publications from different sources on both sides. The willingness to offer data to each other, or to a third party, is low. Each side mainly believes in its own verity. But some exceptions can be found in the group of neutral and objective academics, mostly left wing scientists and members of NGOs and governmental organizations of foreign countries, running scientific or developmental aid projects. Accessing the data given in the paper, one should take into account the source with necessary scientific scepticism.

How complex the situation allocating the water of the Mountain Aquifer is shows the following enumeration:

- Israel drills deep groundwater wells in the West Bank as well as water from water resources inside the Green Line,
- Israel sells water to Palestinian communities from wells under Israeli control in the West Bank as well as from outside of the West Bank,
- Israel serves water to Israeli settlements within the West Bank from water sources within and outside the West Bank,
- Based on various water rights schemes Palestine drills its wells for their own use,
- In some cases Israel prevent the Palestinian from drilling wells for their own use and under their own control,
- From the view of Palestinians Israel is not willing to give up all wells they drilled or confiscated illegally in the West Bank during the occupation

Wells

There are 561 wells, 519 Palestinian wells⁵ and 42 wells under Israeli control⁶ in the West Bank. From these 519 wells under Palestinian control are 353 production wells (in addition: 18 new production wells since 1999) with a total yield of 72.3 MCM/year. All Palestinian domestic wells in the West Bank meet the WHO standard for drinking water regarding the Chloride concentration limits, while only about 70% of these wells meet the WHO standard regarding Nitrate concentration limits.

⁵ Well controlled by Palestinian Water Authority, local municipalities or the West Bank Water Department, farmers or other private users

⁶ Well under control of the National Water Company of Israel MEKOROT

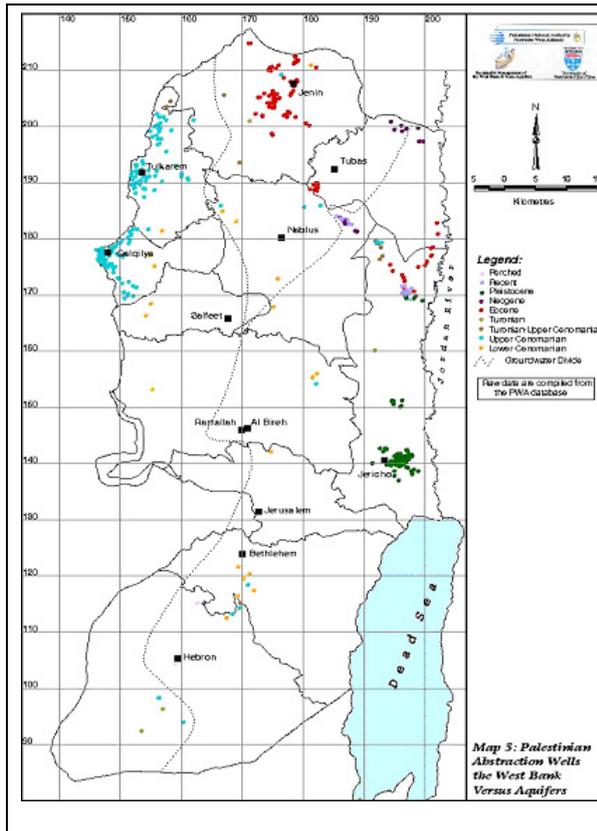


Figure 1: Wells under Palestinian control

Source: PWA, 2000

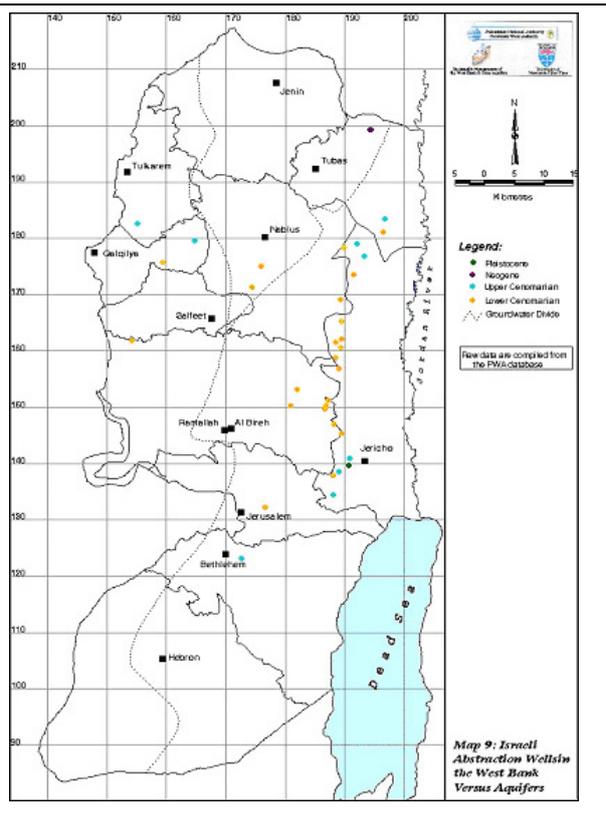


Figure 2: Wells under Israeli control

Source: PWA, 2000

There are 38 Israeli production wells in the West Bank with a total yield of 50 MCM/year. The wells under Israeli control are mainly used to serve water to the Israeli settlements and military camps. About 94% of the Israeli wells meet the WHO standard for drinking water regarding the Chloride concentration limits.

Although the Palestinians control approx. 90% of the total number of wells in the West Bank their production is less than 60% of the total well production. The distribution only partly depends on natural factors like recharge. The Palestinians accuse the Israeli policy of active prevention from Palestinian development in each of the Mountain Aquifer basins since 1967. Table 1 comprises the detailed numbers for wells inside and outside the West Bank. (PWA, 2000)

Table 1: Palestinian and Israeli shares of well use (MCM/year) inside and outside the West Bank⁷

Basin	Palestinian & Israeli Use	Palestinian		Israeli			
		Use	Share	Inside the West Bank	Outside the West Bank	Subtotal	Share
EAB	62.7	26.4	42%	34.3	2	36.3	58%
NEAB	91	19.1	21%	12.9	59.1	72	79%
WAB	571.6	26.8	5%	2.8	542	544.8	95%
Total	725.3	72.3	10%	50	603.1	653.1	90%

Source: (PWA, 2000)

The recharge of the Mountain Aquifer is taking place almost entirely within the West Bank by direct rainfall infiltration. With an estimated 672 MCM/year overall recharge the Mountain Aquifer is the most important factor of renewable groundwater resources in the whole area. The Western Basin stands out with approx. 366 MCM annual recharge what accounts for approx. 54% of the overall recharge of the Mountain Aquifer. Comparing discharge and recharge of the aquifer it comes into view that all basins are already overexploited. The numbers for overexploitation range from 25% (EAB, NEAB) to 70% (WAB) of annually over-exploitation. The Palestinians blame Israel that the dramatic over - exploitation – not exclusively, but predominantly – originates from the Israeli overuse of the WAB. (PWA, 2000)

Springs

In the West Bank there are 146 measurable springs under Palestinian control with a discharge of about 65.9 MCM/year. The Palestinians control another 163 non-measured springs. 11 springs are under Israeli control with a discharge of about 88.3 MCM/year. More than 200 springs with very small water outlets are neither measured nor recorded. The springs are mainly used for agricultural purposes. Most of the Palestinian springs are considered fresh while springs under Israeli control are primarily brackish.

⁷ Data in the table refer to the hydrological year 1998/1999 based on Palestinian sources

An even more drastic picture appears when evaluating the shares of spring use inside and outside of the West Bank emerges from Table 2. Recently mainly springs of the EAB are used due to the over-exploitation by excessive pumping in the WAB where its two major natural outlets became almost entirely dry.

Table 2: Palestinians and Israeli shares of spring use (MCM/year) inside and outside the West Bank ⁸

Basin	Palestinian & Israeli Use	Israeli				Palestinian		
		Inside	Outside the West Bank		Subtotal	Share	Use	Share
		Saline	Fresh	Saline			Fresh	
EAB	142.1	88.3	0.5	7.8	96.6	68%	45.5	32%
NEAB	93	0	75.2		75.2	81%	17.8	19%
WAB	49.4	0	46.8		46.8	95%	2.6	5%
Total	284.5	88.3	130.3		218.6	77%	65.9	23%

Source: (PWA, 2000)

⁸ Data base mainly on averages of the years 1988-99 and on long term averages for the Dead Sea springs

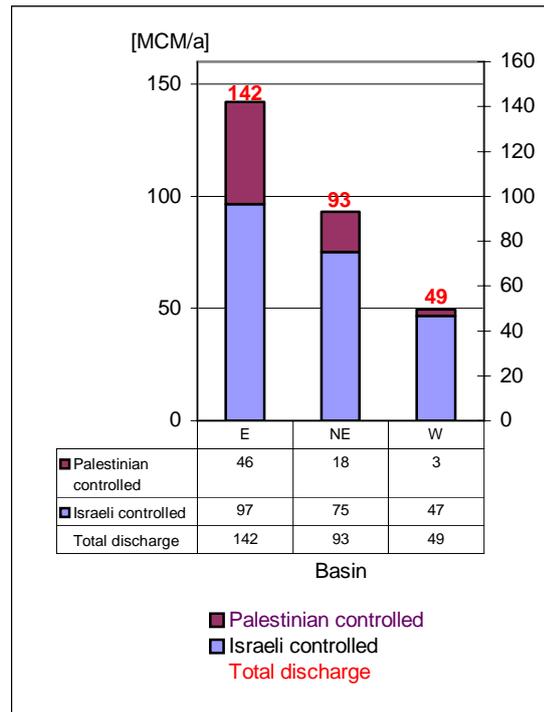
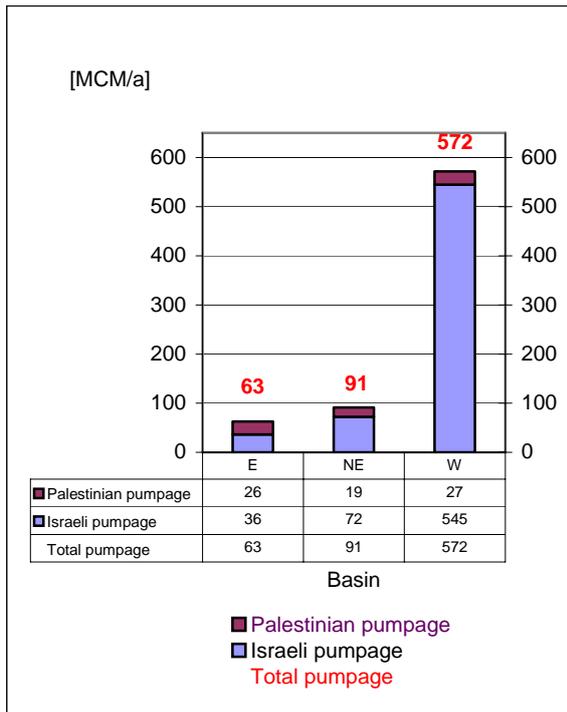


Figure 3: Palestinian and Israeli shares in well utilization from EAB, NEAB and WAB as they extend in Israeli lands

Source: (PWA, 2000)

Figure 4: Control of EAB, NEAB and WAB springs inside and outside the West Bank

Source: (PWA, 2000)

Residential water consumption

Before Intifada has restarted in 2000 Palestinian average per capita consumption was less than one-third of average per capita consumption in Israel. The average yearly water consumption in Israel accounts for approx. 100-120 CM/ person. The estimated average Palestinian per capita consumption is about 35 CM per person per year. (PWA, 2003) The average per capita consumption per day in Israel amounts to about 300 Litre. (WCI, 2005) In the West Bank this level drops sharply to about 50-80 Litre daily in some places; the average consumption accounts for 100 Litre.

Differences in the consumption level of both parties are caused by a lower standard of living of the Palestinians as well as limited supply of water trough municipal networks and often a totally absence of a water distribution system in Palestinian communities.

Box 1: Water supply shortage in Ramallah and Al Bireh cities

In general and especially during summer time, Palestinian communities in the West Bank suffer from shortage in water supply. Demand on water during summer time is always larger and the supplied quantities of water are always limited. This is normally accompanied by reduction in the supplied quantities provided by the Israeli MEKOROT water supply company and reduction in the water pressure that will directly affect the water supply to the related communities.

In Summer 2005 the situation got even worse. The problem reached its optimum level when people in Ramallah, Al Bireh and Betunia cities, which are considered major cities in the Governorate, started to purchase tanked water from different low quality sources. The costs for tanked water were very high and ranged between 15 to 20 NIS per CM (approx. 3 to 4 US\$ per CM).

The water shortage was caused by maintenance work and connection changes on water pipes done by the Israeli water company MEKOROT which is supplying the respective Palestinian communities. The average price of 1 CM water purchased from MEKOROT used in the domestic water sector is 2,50 NIS (approx. 0.50 US\$)

Source: (PHG, 2005)

The role of water in Palestinian economic development

The Palestinian economy has not expanded beyond agriculture, small scale industry, and heavy unemployment. Every economic activity requires Israeli approval.

The living standard varies much within the Palestinian society. The outbreak of the second Intifada has had a strong impact on the economic situation of the Palestinian households. According to a World Bank study which used a poverty line of US\$2 per day, it was estimated, that 21% of the Palestinian population were poor on the eve of the Intifada, a number that almost tripled by December 2002⁹ (WB, 2003). In 2003 due to job creation the World Bank estimated the poverty rate among the Palestinian population to be 47% (WB, 2004). Nevertheless in 2004 still 16% of the Palestinian population lived in subsistence poverty¹⁰, (equivalent to 12% of the Palestinian households). Prospects are that Palestine will

⁹ It should be noted, that depending of the definition of poverty rate and the estimations of the real consumption, the results regarding the poverty rate vary significantly.

¹⁰ Subsistence poverty is defined to be the cost of satisfying the minimum caloric intake, plus an allowance for basic non-food items, such as clothes and shelter. The World Bank estimates the subsistence poverty line for West Bank and Gaza at UD\$ 1,6 per capita and day.

depend on foreign aid in many years to come: In 2003 the foreign aid paid to the Palestinian economy amounted for approx. 2 Billion US\$, while the total Palestinian GDP accounted for 1.8 Billion. (CIA, 2005)

Table 3: Share of Palestinian population below poverty line [2US\$/c*d]

Year	1999	2000	2001	2002	2003
Poverty rate	20.1%	30.7%	45.7%	60.0%	47,0%

Source: WB, 2003 , WB, 2004

Water is a precondition for economic development, especially in Palestine where still 8 %¹¹ of the GDP are contributed by the agricultural sector. Irrigation is a vital component of agricultural production in Palestine due to the climate conditions, but irrigation and therewith extensive agriculture is restricted by the limited water resources available to the Palestinians as outlined above.

Palestinian agricultural activity includes both intensive irrigated farming primarily in Gaza, the Jordan Valley, and the northern districts of the West Bank, and extensive rain-fed farming, primarily in the West Bank highlands. Rain-fed farming is the predominant agricultural pattern in the West Bank, covering 94% of the total cultivated area. Palestinians irrigate roughly 11% of their cultivated lands, while Israel irrigates more than 50% of its cultivated land. The agricultural sector contributes only 2.8% to the Israeli GDP. (CIA, 2005)

As quoted in Attaya, 2005 agriculture plays a very crucial role in ensuring job opportunities and employments. The agriculture’s contribution to employment has risen from 12.7% in 1995 up to 16% in 2004. In addition, agriculture has guaranteed work for more than 39% of those who work in informal sectors. Moreover, it provides resort to more than 17% of the Palestinian families in 2004, which cultivated their lands and raised animals for their survival. (PCBS, 2005c, PCBS, 2005b)

The agricultural sector still plays a central role in achieving food security for Palestinian families as a remarkable number of families still depend on this sector in the provision of their basic food needs. (PCBS, 2005a)

¹¹ GDP composition by sector: agriculture: 9% , industry: 28% , services: 63% , note: includes Gaza Strip (2002 est.)

Furthermore, agriculture in Palestine as water as a resource itself is considered to promote many Palestinian industries such as food, fodders, leather, shoes, soap, furniture, cosmetics and tourist industry.

Role of co – operation and equitable water rights

Effective and comprehensive co-operation in water issues on the basis of a formal accord could only be achieved along with a resolution of other final-status issues including the acceptance of both countries of the creation of a Palestinian state in the vast majority of the West Bank and the Gaza Strip.

Co-operation in water issues is an essential need thinking in ecological terms, but it also includes a great chance for trust - building measures among the conflict partners. As stated above many professionals on Israeli and Palestinian sides have called for a joint management in water issues. These structure oriented co - operation could represent an active contribution to peace policy. The development of common institutions, structures and "cultures" of peaceful water conflict management could therefore contribute to a comprehensive conflict management in the region. Agreements over water issues could reduce the potential for violent conflicts. Improving relations and communication between the parties and overcoming the causes of the conflict are among the fundamentals of conflict resolution. Gaining structure stability in water issues makes also a contribution to sustainable development in the region. By far the most important rule for co - operation in conflict situation is the basic principle: "Do not harm!"

First of all, Israel and Palestine share a common aquifer, which should be jointly managed to assure that the aquifer would not be over-pumped or polluted, but also to guarantee an equal use of the resource. Secondly, transfers of water between the two sides could be the most efficient way to utilize available water sources. Beside the efficient use of existing water resources additional water resources, e.g. desalination of seawater, reuse of treated water) need to be developed.

Principally equity requires equal rights and power as a basic for acceptance and, hence, is a precondition for joint management not only of water resources.

Resources

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