



Water & Environment

Background



Under **international law** which calls for “equitable and reasonable” allocation of water among the parties with a claim to shared watercourses, Palestinians should have full sovereignty over all the Eastern Aquifer resources that lie beneath the West Bank, and at least equitable water rights regarding the Western and Northeastern Aquifers, as these are recharged almost entirely from the West Bank. However, disregarding these provisions, Israel has since 1967 almost completely controlled Palestinian water resources and deprived Palestinians of access to their rightful share of water. **Military Order (MO) 92** (15 Aug. 1967) transferred the authority over WBGs **water resources** to the area military commander. MO 158 (19 Nov. 1967) forbade the unlicensed construction of new water infrastructures, and MO 291 (19 Dec. 1968) confiscated all water resources, declaring them state property. In 1982, the Israeli Water Authority Mekorot took control. Palestinian wells were destroyed and supplies dried up by widespread digging and pumping from deeper wells for Israeli use.

In the **Oslo process**, water became an interim issue. The **Palestinian Water Authority (PWA)** assumed responsibility, but Israel maintained control of all water use. While Palestinians had asked for 450 million cubic meter (mcm) water annually, **Oslo II** provided them - as a temporary measure - with only 118 mcm (28.6 mcm for domestic use), while allotting 483 mcm from the same resources to Israel. Any further increase was made subject to usage of new water resources.

Palestinian future needs were estimated at 70-80 mcm/ year (Oslo II, Art. 40) and a Joint Water Committee was established, but Israel regularly vetoed Palestinian water projects.

Since 1995, Palestinians were **not allowed to dig** a single well to use the waters of the Western Aquifer (only the Eastern Aquifer, requiring deep digging for low-quality water at high costs) and in rare cases the North-Eastern Aquifer. In fact, Palestinians have access to **less water per capita** than they did in 1993 and their reliance on purchasing high-priced water from Israel has steadily increased. While Israel confiscates over **82% of Palestinian groundwater** for use inside its borders or in its settlements, thereby extracting water above the level determined by Oslo II, Art. 40, Palestinians must **import** from Israel over 50% of their water (UNCTAD, *Report on UNCTAD’s Assistance to the Palestinian People*, Sept. 2016).

Water Allocation according to Oslo Agreement

Use	Aquifer			Total
	Western	Northeastern	Eastern	
Israel	340	103	40	483
Palestine	22	42	54	118
Additional Quantity for Palestinian Development	-	-	78	78
Basin Total	362	145	172	

Source: PWA, *Status Report of Water Resources in the Occupied State of Palestine*, 2013.



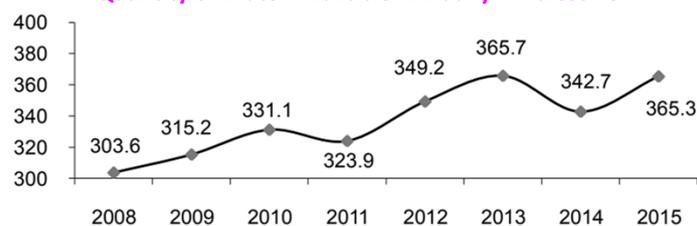
Main Water Indicators

in million m ³ /year	WB	GS	WBGS*
Annual pumped quantity from groundwater wells	64.3**	198.6	262.9
Annual discharge of springs water	39.5	---	39.5
Annual water quantity purchased from Mekorot***	59.3	4.0	63.3
Annual available water quantity	163.1	202.6	365.7
- Annual quantity of water for domestic sector	100.9	104.8	204.7
- Annual quantity of water for agriculture	28.5	95.3	123.8
Annually consumed water	71.9	57.7	128.6
Daily per capita allocation (liter/person/day)	78.8	91.3	
Total losses	29	47.1	

* excl. Israeli-annexed parts of Jerusalem; ** excluding unlicensed wells; *** incl. pumped water from Mekorot wells located in the WBGS. Source: PCBS/PWA, 2014; PCBS, *Press Release on World Environment Day*, 4 June 2015.

- In June 2018, water supply, sewerage, waste management and remediation activities contributed **0.9%** to the **GDP** (excl. East Jerusalem) (WB: 1.1%, GS: 0.2%) (PCBS, *Quarterly National Accounts*, Q2-2018).

Quantity of Water Available Annually in Palestine

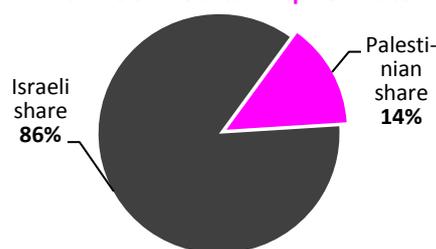


Source: PCBS, *Palestine in Figures 2017*, March 2018

Water Resources

- Palestine's water resources are **surface water** - Jordan River, Dead Sea, and Wadi Gaza - and **groundwater basins**, eight of which exist in Palestine/Israel: four within Israel proper (Tiberias, Western Galilee, Carmel, Negev basins) and four partially or fully in the WBGS (Coastal, North-eastern, Eastern, and Western **Aquifers**). The **Jordan River** is water **shared** by five riparians (Syria, Lebanon, Jordan, Israel and Palestine) though Israel controls and utilizes the vast majority of its discharge, while Palestinians have no share at all since 1967. By regional standards, Palestinians have the **lowest access** to fresh water resources.
- An average of 77.2% of **available water** is from **surface and ground water**. Water **pumped** from the aquifers via **Palestinian wells** in the West Bank in 2016 amounted to **84.4 mcm** (PCBS & PWA, *Press Release on the Occasion of World Water Day*, 22 March 2018).
- In 2017, the **main source of drinking water** for Palestinian households was water piped into the dwelling (WB: 57%, GS: 7.8%), followed by water trucks (WB: 36.8%, GS: 87.9%) (PCBS, *Population, Housing and Establishments Census 2017: Census Final Results Summary*, May 2018).
- Israel **diverts** water from the Sea of Galilee (Jordan River Basin) for use in coastal towns and the Negev via the **National Water Carrier**. As a result, no natural water flows naturally to the lower part of the Jordan River, which has caused the decrease in the water level of the Dead Sea.

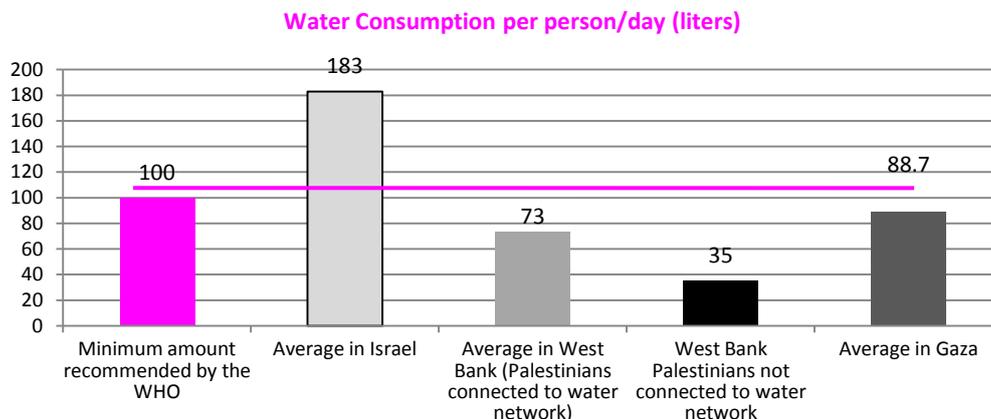
Share of Mountain Aquifer Water



- The **separation barrier** and **settlements** divest Palestinians of their water rights, covering some of its most valuable water resources (PLO - NAD. *Barrier to Peace: Assessment of Israel's Wall Route*, July 2008). In addition, the barrier has cut Palestinian access to many wells, depriving Palestinians of large amounts of water annually (EWASH, *Killer Facts for World Water Day*, March 2016).
- There is a significant shortage of safe drinking water in **Gaza** as the only water source - the **coastal aquifer** - is severely over-extracted: in 2016, 167.2 mcm were extracted for domestic use although its sustainable yield should not exceed 50-60 mcm a year. More than 97% of the water pumped from Gaza's coastal aquifer does not meet the water quality standards of the WHO (PCBS & PWA, Press Release on the Occasion of World Water Day, 22 March 2018).

■ Water Consumption

- Because water data is so highly politicized Israel guards its raw data as a matter of national security, and **consumption** figures vary wildly. According to the World Bank, West Bank Palestinians consume an average of 50 liters of water per day (l/c/d), while the Palestinian Water Authority talks about 73 l/c/d on average and as little as 20 l/c/d in some areas such as the Jordan Valley and southern Hebron Hills. The following table shows the **average daily per capita consumption**, although it must be kept in mind that 97% of the water in Gaza is considered unsafe for drinking and the water consumption of Israelis settlers is estimated at twice the Israeli average (according to PCBS/PWA estimates Israeli daily per capita water consumption is even seven times higher than the Palestinians’):



Sources: B'Tselem, Israeli Water Authority, Palestinian Water Authority.

- Some 25.5% of the total area in Palestine is **cultivated** land, of which 84.5% are **rain-fed** and 15.5% **irrigated**. The latter consumes about 47.5% of the water pumped from underground wells (PCBS & PWA, Press Release on the Occasion of World Water Day, 22 March 2018).
- The **daily per capita allocation** from consumed water for domestic purposes was 83 liter/capita/day in 2016 (WB: 82.3 l/c/d, GS: 84 l/c/d) (*Ibid.*).
- Due to seawater intrusion application of fertilizers and pesticides and the lack of wastewater treatment groundwater quality in **Gaza** is degraded and **does not meet basic standards for human consumption**, forcing residents to purchase water from private sellers. In 2017, only 3.9% (11 of 282 wells) of the domestic groundwater supply and 18.41% of the water supplied from the different sources (3.25% groundwater, 10.97% Mekorot and 4.19% desalinated water) was matching with WHO drinking limits (PWA, *Gaza Water Status Report 2017*, June 2018).

■ Water Supply & Demand

- **Groundwater** represents 95% of Palestinian water supply (PWA).
- While over 93% of WBGs households are **connected to water networks** (PCBS), some areas are not: in **Area C**, over 70% of Palestinian communities are **not connected** and face serious water shortages (UNCTAD, *Report on UNCTAD's Assistance to the Palestinian People*, 2017).

Main Source of Water for Palestinian Households (in %)

Region	Public water network	Water tanks & others	Domestic wells	Mineral Water Gallons	Total
West Bank	93.4	24.3	27.6	6.7	100
Gaza Strip	93.0	65.4	0.0	24.9	100
WBGs	93.3	38.4	18.1	13	100

Source: PCBS, *Statistical Yearbook of Palestine 2016*, December 2016. .

- Only 2% of Gazans receive an **uninterrupted supply of water** (World Bank, *Report to the AHLC*, Sept. 2018).
- While the demand for domestic water supply in **Gaza** was 114 mcm in 2017, only 15.5 mcm of **potable supply** was **produced** from local desalination and import. In the **West Bank**, domestic consumption is 20% below the international standards (Office of the Quartet, *Report to the AHLC*, Sept. 2018).
- With **domestic demand projected** to reach around **145 mcm by 2030**, there is urgent need for increased supply from desalination. Current plans include the Gaza Central Desalination Plant (initially producing 55 mcm, then up to 110 mcm), freshwater imports from Israel, and local Short Term Low Volume seawater desalination plants (World Bank, *Economic Monitoring Report to the AHLC*, March 2018).
- There are some 65 **water or waste water service providers** in Palestine (WB: 39, GS: 25) serving 62% of the West Bank's and 74% of Gaza's population (Water Sector Regulatory Council, *Bridge to Sustainability Water and Wastewater Service Providers Performance Monitoring Report for the Year 2016*, January 2018).
- In 2016, 66.4% of all water sources (amounting to 172,878,880 m³) was **authorized metered** and billed consumption, whereas 33.6% was **unbilled consumption**, including **physical losses** through leakages (10.7%), **commercial losses** due to thefts or inaccurate meters or handling (18.6%), and **free supply** (unbilled authorized consumption, 4.3%) (*Ibid.*).
- With annual population growth at 2.5% in West Bank and 3.3% in Gaza, an **increase in water supply** of 35 mcm will be required over the next 5 years just to maintain the currently inadequate consumption rate of 79.1 l/c/d. Water available for **other uses** (e.g., agriculture, industry, tourism) is already now too limited to help achieve sustainable economic growth (USAID, *West Bank and Gaza Inclusive Growth Diagnostic*, May 2017).
- In August 2018, the EU completed the biggest **photovoltaic solar field** in Gaza. It will provide 0.5 MW of electricity per day to fuel the **Southern Gaza Desalination Plant**, which provides drinking water to 75,000 inhabitants and is hoped to reach 250,000 people by 2020.

Water Supply (mcm/year)

	West Bank		Gaza Strip	
	2016	2030	2016	2030
Supply requirement (Domestic demand) in 2030¹	152	209	100	135
Groundwater/natural resources	48	48	84	30
Desalination	0	0	6	6
Mekorot purchase	69	69	10	20
Water harvesting	0	0	0	0
Subtotal	117	117	100	56
Non-Revenue Water (NRW)	51		38	
Total supply (supply-NRW)	66		62	
Supply gap	80	92	38	79

¹ Assumed population of 1.9 million and 2.8 million in Gaza and 2.9 million and 4.4 million in West Bank and 100 l/c/d for 2016 and 2030, respectively;

Source: World Bank, *Securing Water for Development in West Bank and Gaza*, 2018.

ENVIRONMENT AND SANITATION

Due to limited areas available, solid waste is often dumped uncontrolled and untreated into the open or burnt. Palestinians face environmental health hazards due to unsafe drinking-water and food, and improper solid and water waste management. In addition, Israeli West Bank settlements discharge untreated wastewater, resulting in contamination of groundwater sources and increased risks of diseases. Moreover, while it is nearly impossible for Palestinians to obtain permits to repair, rehabilitate and construct even basic **water infrastructure**, Israeli forces have destroyed numerous humanitarian structures related to water and **sanitation** (e.g., cisterns, latrines and water tanks) in Area C (OCHA Demolition System).



Recent data suggests that 62.4% of Palestinians use **safe drinking water** (WB: 95.1%, GS: 11.4%) 99.7% of Palestinians use **safe sanitation** (piped sewer system, cesspit, and pit) (PCBS, *Population, Housing and Establishments Census 2017*, 2018)

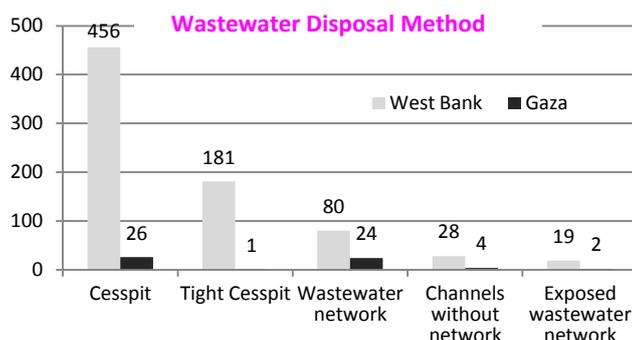
■ Biodiversity / Flora & Fauna

In concurrence with the changing landscape (coast, mountains, hills, valleys, rivers) there is a rich biodiversity in historical Palestine, which is home to some 51,000 living **species** (flora and fauna). In the WBGs, there are an estimated 30,850 **animal** species (30,000 invertebrates, 373 birds, 297 fish, 92 mammals, 81 reptiles and 5 amphibians) and 2,850 species of **plants** from 138 families. Only 1% of the total West Bank territory is **forested area** (PCBS & Environment Quality Authority, *Press Release on World Environment Day*, 5 June 2017).

■ Waste Water & Pollution

- In 2015, **wastewater networks** were only available to 104 (WB: 80, GS: 24) of the 557 Palestinian localities (WB: 524, GS: 33). In 81 of these, local authorities were responsible for the wastewater network (WB: 59, GS: 22) (PCBS, *Local Community Survey, 2015 - Main Findings*, November 2015).

- In 2015, 53.9% of Palestinian **households** lived in housing units connected to the **public sewage system** (WB: 38.4%, GS: 83.5%) and 45.3% used cesspits (WB: 60.4%, GS: 16.5%) (PCBS, *Housing*



Conditions Survey 2015; PCBS, Household Environmental Survey 2015).

- In **Gaza**, groundwater **contamination** with untreated waste-water and increasing **salinity** has been linked to a high incidence of water-related diseases among the population.
- The electricity deficit and the shortage of adequate sanitation infrastructure continue to result in the discharge of **102-111 million liters of poorly treated sewage** discharged daily. **Pollution levels** are nearly four times higher than the international environmental health standard of 60 mg/l BOD (=Biological Oxygen Demand, which reflects the presence of microbes and is the indicator used to measure pollution), varying between 230 and 245 mg/l (OCHA, oPt Humanitarian Bulletin, July 2018). Illness caused by water pollution is a **leading cause of child mortality** in Gaza ("Polluted Water Leading Cause of Child Mortality in Gaza, Study Finds", *Haaretz*, 16 October 2018.)
- The **West Bank** also faces the high **pollution** of the **Jordan River** which runs at a mere 2% of the water it used to carry. Israel diverts about 50% of the water through the National Water Carrier, Jordan and Syria take water of the Yarmouk River, which is the Jordan River's main tributary.
- Only 33% of the West Bank population is **connected to a sewage collection** network; while around 66% of the collected wastewater is **treated**, only 3% of the treated wastewater is currently reused (Office of the Quartet Representative, *Report for the Meeting of the AHLC*, Sept. 2017).



■ Solid Waste

- According to a Ministry of Local Government report 50% of the solid waste in 2017 was **organic materials**, followed by **paper/carton** and **plastic**.
- About 98% of Palestinian households **dispose household waste** by throwing it in the nearest container (99% in urban, 92% in rural areas, and 98% in refugee camps), while 3% of households burn it or throw it randomly (PCBS, *Press Release on the Occasion of Arab Housing Day*, 2 October 2018).
- In 2016, Palestine **emitted** 4,645.500 metric tons **Carbon dioxide equivalent** (CO₂ eq.) from energy (72.8%), agriculture (8%) and solid waste sectors (19.2%). Its **per capita emission** of 0.964 tons CO₂ eq. is significantly lower than that of neighboring countries (PCBS and Environment Quality Authority, *Press Release on World Environment Day*, 4 June 2018).
- According to the Israeli Environmental Protection Ministry, overall rehabilitation of environmental hazards in the West Bank - which include problems originating from Israeli presence in the area and its using it as a cheap and easy **dumping site for Israel's hazardous waste**, as well as from the PA administration in Areas A and B - is likely to cost about NIS 4.25 billion (Berger, Y., "Israel Promoting Plan to Recycle Its Trash in the West Bank," *Haaretz*, 6 August 2018). A recent B'Tselem report revealed in detail how Israel exploits the West Bank to treat its (hazardous) waste (available at: http://www.btselem.org/sites/default/files/publications/201712_made_in_israel_eng.pdf).



Recommended Research Sources:

http://www.pwa.ps	http://www.hwe.org.ps	https://water.fanack.com
http://waterjusticeinpalestine.org	http://www.pengon.org	http://ecopeaceme.org/
http://www.maan-ctr.org	http://www.arij.org	http://www.ecomena.org/
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