

Water and Development in the Palestinian Territory

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1. Introduction

Water is considered as the natural resource that sustains life on earth, it is the main and important element of sustainable development. Water is important for the entrainment for human for enjoying healthy and safe lives.

Historically, water had been regarded as an infinite resource. As population growth and economic expansion accelerated and intensified the use and abuse of water resources over the past few decades, a greater and greater imbalance between water availability and water demand has resulted. The Living Planet Report 2010 reported that that during the 2010 year 71 countries are experiencing some stress on blue water sources. It was estimated that in 1995 about 1.8 billion people were living in areas experiencing severe water stress (UNESCO-WWAP, 2006). By 2025, it is estimated that about two-thirds of the world's population — about 5.5 billion people — will live in areas facing moderate to severe water stress (UNESCO-WWAP, 2006)¹.

Water Crisis affects the sustainable development in the Palestinian Territory (PT). the effects of water crises are observed in the deterioration of water quality and destruction of natural resources. Water crises and scarcity impacts food availability, human health, livelihoods and economic development. The Israeli aggregations against people, environment and water in the PT deepen the water crises in this area.

About the paper:

This paper provides an overview of water issues in the Palestinian Territory as a key issue for sustainable development in the region. Part 2 of this paper show how water resource availability and water-related services have fallen well short of expectations. Part 3 discusses principal causes of the impacts described in Part 2, and finally part 4 put the key areas and policy tools for sustaining water resources.

The paper is prepared based on the Palestinian Central Bureau of Statistics water data, and the World Bank reports concerning water and sanitation sector, beside the reports and data of the Palestinian Water Authority and the Palestinian Hydrology Group and other related agencies.

2. The current situation in the Palestinian water sector

Water availability

Water withdrawals per capita were calculated as 190 lpcd for Palestinians, about 1,000 lpcd for Israelis, and about 870 lpcd for settlers. By 2009, availability had declined, and the Palestinian population had access to only about one quarter of the ration of their Israeli counterparts: Palestinians had about 137 lpcd, and Israelis about 544 lpcd. By regional standards, Palestinians have the lowest access to fresh water resources.

¹ WWF Report 2010. The Living Planet Report 2010. Biodiversity, Biocapacity and Development.

Table 1: Per capita availability of renewable water resources in Jordan basin riparian's (2005)

Region	m3 per capita per annum
West Bank	75
Gaza	125
Jordan	200
Israel	240
Lebanon	1,200
Syria	1,500

Sources: World Bank, 2007 *Making the Most of Scarcity* PWA, 2007; Shuval and Dweik ;14

Water resources

Most of the West Bank's natural water resources lie beneath its soil in three shared aquifers sometimes collectively known as the "Mountain Aquifer". All three of these aquifers derive most of their recharge from rainfall and snowmelt on the Palestinian side of the Green Line. Two of the three aquifers (the Western and North-Eastern) also underlie Israeli territory, with a flow that follows the surface topography, from the West Bank towards Israel. The third aquifer – the Eastern – lies almost completely within the West Bank and discharges towards the Dead Sea. The volume of recharge of the three aquifers is variable, and overall about 4% above the Oslo "estimated potential". Table 2 shows a range of estimates of recharge, together with the planning assumption of "estimated potential" that was adopted at Oslo and the long term average yields recorded by the Hydrological Service of Israel (HSI).

Table 2: Estimated recharge and "estimated potential" of the Palestinian aquifers (MCM/year)

Aquifer	Estimated recharge range	Estimated potential	HSI observed Yield 1988- 2005
Western	335-450	362	405.3
North Eastern	130-200	145	138.6
Eastern	155-237	172	165.3
Coastal	360-420	57	420
Total	980-1,307	736	1,129.2

Sources: "Recharge range" from Tal and Abed-Rabbo: 24. ; "Estimated potential" from Article 40 "HSI observed yield" from HSI Development of Utilization and Status of Water Resources: 211, 296-8

Current water abstractions

Palestinians abstract about 20% of the "estimated potential" of the aquifers lying beneath the West Bank, Israel abstracts the balance, and in addition overdraws on the "estimated potential" by more than 50%. Although reliable numbers are hard to find, evidence is that over the years since Oslo, Palestinian abstractions in the West Bank have been in the range 113 MCM – 138 MCM, or about 17-20% of the "estimated potential". The balance from the aquifers – together with a substantial overdraft - was abstracted by Israel, both within the West Bank and west of the Green Line.

Table 3: Abstractions from the three shared aquifers within West Bank and Israel 1999 (MCM)

Aquifer	Estimated potential	Abstractions			Excess over Article 40 allocation		
		Total Palestinian	Total Israeli	Total Abstracted	Palestinian	Israeli	Total over extraction
Western	362.0	29.4	591.6	621.0	7.4	251.6	259.0
North Eastern	145.0	36.9	147.1	184.0	(5.1)	44.1	39.0
Eastern	172.0	71.9	132.9	204.8	(2.6)	92.9	90.3
Total	679.0	138.2	871.6	1,009.8	(0.3)	388.6	388.3

Sources: "Estimated potential" from Article 40. Other numbers from Table 1, Shuval and Dweik:24 Figure 2.9

Contrary to expectations under Oslo II, the water actually abstracted by Palestinians in the West Bank has dropped from 138 MCM in 1999 to 113 MCM in 2007. The main causes for this reduced abstraction are: (1) a drop in spring discharge; and (2) a drop in well production, both of which are attributed to lowered water table.

Table 4: Palestinian abstractions from the three shared aquifers 1999 and 2007 (MCM)

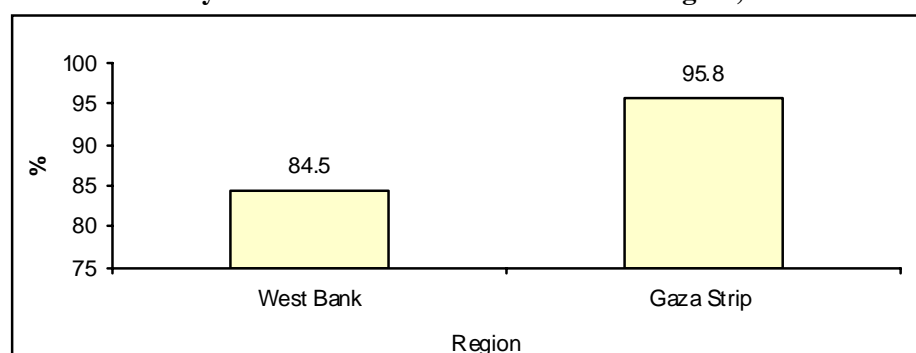
Aquifer	Article 40 allocation	1999	2007
Western	22.0	29.4	27.9
North Eastern	42.0	36.9	26.8
Eastern	74.5	71.9	58.8
Total	138.5	138.2	113.5

Sources: Article 40 allocation from Schedule 10 and Section 7. 1999 numbers from Table 1, Shuval and Dweik:24 Figure 2.9. 2007 numbers from Water Sector Status in West Bank, PWA October 2008.

In Gaza Strip, abstractions in recent years have been running above any estimate of sustainable yield. The overdraft is estimated during 2008 at 100 MCM, almost 200%.

The water supply situation

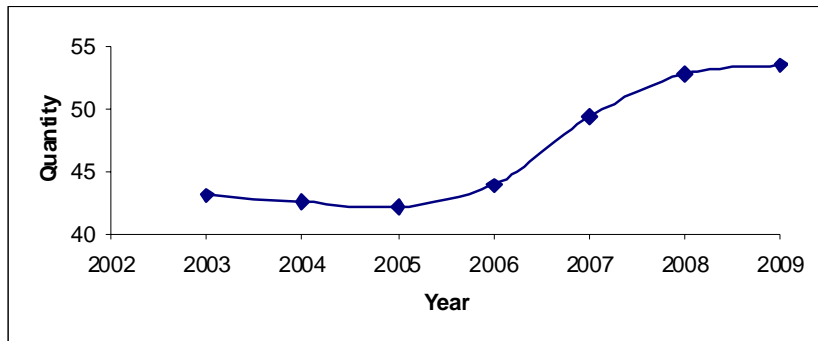
Since Oslo, connection to safe water supply has improved. Since 1994, investment has been made to bring safe network water to households and communities, and by 2009 about 88% of the Palestinian population were connected (Figure 1).

Figure 1: Percentage of Connected Households in the Palestinian Territory to the Public Water Network and Region, 2009

Source: Palestinian Central Bureau of Statistics, 2009. Household Environmental Survey 2009. Main Findings. Ramallah- Palestine

Overall supply has increased, but with increased reliance on purchased water. Municipal and industrial supply quantities have been increasing. Despite the development of new “Palestinian” resources under Oslo, reliance on the Israeli Water Company (Mekorot) has actually increased from 43 MCM in 2003 to 53.5 MCM in 2009 (Figure 2).

Figure 2: Annual Quantity of Water Purchased from (Mekorot) for Domestic Use (MCM/year)



Source: Palestinian Water Authority, 2009. Water Database. Ramallah – Palestine

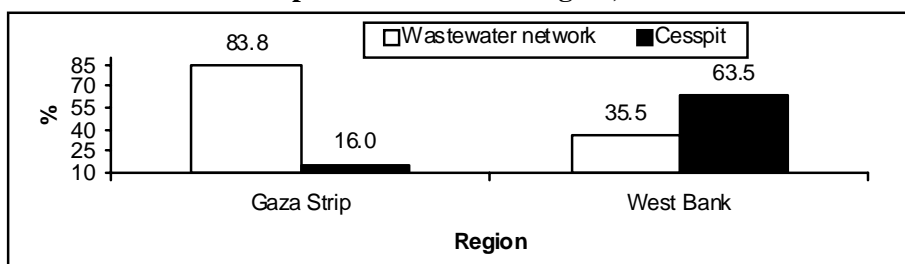
These extremely low levels of consumption place most West Bank communities well below accepted international standards. The average consumptions should indeed be compared with the World Health Organization (WHO) recommended standard of 100 lpd for optimal water supply. While water salinity is a major problem in Gaza, standards are also not met in some areas of the West Bank, including for some Mekorot supplies, with chloride locally in excess of 250 mg/l.

Coping mechanisms for the unconnected households are typically to use springs, wells and tanks. Unconnected communities pay high prices and suffer poor quality - caused in part by M&A restrictions and other Israeli intervention - particularly in Area C.

The sanitation situation

Sewage and wastewater treatment have low coverage and reuse is virtually non-existent. In the West Bank, only ten towns are served by sewerage systems, of which four towns have treatment plants and none has a reuse scheme. According to PCBS surveys about 47% of the Palestinian population still rely on cesspits. Of the remaining 53% of sewage that is collected by sewers, little is adequately treated.

Figure 3: Percentage of Households in the Palestinian Territory by Wastewater Disposal Method and Region, 2009



Source: Palestinian Central Bureau of Statistics, 2009. Household Environmental Survey 2009. Main Findings. Ramallah- Palestine

Existing plants at Hebron, Jenin, Ramallah, Tulkarem and Gaza city are performing well below design capacity: current efficiency is 10-30%, and effluent quality is poor. The failure to develop wastewater systems is the more damaging because under Oslo, water supply quantities – and hence wastewater quantities – have gone up. The environment and groundwater quality have been the major victims. It is estimated that there are 25 MCM of untreated sewage discharged to the environment each year at over 350 locations in the Palestinian Territory.

Water and poverty

Domestic tariffs for network supply are on the whole reasonable – but overall, water is a significant item in household expenditure. However, given the very low income levels, the PCBS 2003 survey found that average expenditure on water from all sources was about 8% of household income – and much more for low income households. This level of water expenditure is double the standard of 3.5% of household expenditure recommended by Unicef/WHO².

It is the poor unconnected consumers who pay the highest costs – up to nearly half of their household budget – and run the biggest health risks. The poorest and most vulnerable communities are those in Area C. They are vulnerable to both access controls and to the high cost and poor quality of water. The PCBS 2003 survey was used to compare average water expenditure share of income for each income group. The poor who are dependent on tanks may pay out almost half their income on water, five times more than the poor who are connected.

The very high cost of water is confirmed by surveys carried out by the Water, Sanitation and Health Monitoring Program (WaSH MP). WaSH MP has carried out research on the costs faced by communities before the M&A restrictions, and after. The survey found in 85 communities that water prices had increased by a minimum of 60%, and a maximum of 300%. In addition, 68 communities had reduced their purchases of water tanks by at least 50%.

Water quality and diseases

Water quality and environmental contamination are of increasing concern in the Palestinian Territory. There is a growing problem with biological contamination, particularly with springs and water tanks.

The health impacts can be gauged by the high incidence of diarrhoea amongst infants, and the health costs of poor water and sanitation services have been estimated at 0.4% of GDP. The 2006 PAPFAM survey found that 12% of children under 5 had suffered from diarrhoea in the two weeks preceding the survey. Diarrheal conditions are strongly associated with water quality, hygiene and sanitation. About 54% of these cases had necessitated a medical consultation³.

In Gaza Strip, water quality is very poor and small scale desalination has emerged as a stop-gap solution. Between 5% and 10% of water supplied through the network meets potable standards. The poor quality is linked to aquifer overdraft, and to pollution

² World Bank, 2009. West Bank and Gaza: Assessment of Restrictions on Palestinian Water Sector Development. Middle East and North Africa Region, Sustainable Development

³ The previous reference

from wastewater seepage and infiltration of agricultural fertilizers. As a coping strategy, the Gaza market has responded by providing private desalination.

With such poor water supply and sanitation conditions in Gaza Strip, health impacts are predictably severe. It is reported that “26% of disease in Gaza is water related” - WHO reports that from the samples they collect from wells, “the proportion of contaminants is growing fast”. A WHO study found a high concentration of nitrates in the water supply from wells in different localities within the Gaza Strip, and this nitrate contamination was found to be the cause of the incidence of “blue-baby syndrome” among infants in the Gaza Strip. Whilst this disease primarily affects young children, nitrate contamination can also affect pregnant women and might increase the risk of certain types of cancer.

3. Causes of the current status

A. Israeli governance of the Palestinian water sector

Israel has de-facto maintained predominance over the allocation and management of West Bank water resources. Under Article 40 water governance was to be managed jointly based on consensus. However, a number of factors give Israel a preponderant say in the management of the Palestinian water resources. Essentially, Article 40 and the operation of the Joint Water Committee (JWC) gives the Israeli authorities ultimate control over the Palestinian water resource, whilst in practice Palestinian Water Authority (PWA) responsibility is reduced to providing water supply and sanitation services to Palestinian communities. As an illustration, the Israel Water Authority has used its role as regulator to prevent Palestinian drilling in the Western Aquifer, despite growing demand from Palestinian towns.

B. Inadequate development of new water resources and dependence on Mekorot

Some eight “master plans” have all been based on the assumption that Palestinians will get the water allocations agreed at Oslo II – but actual outcomes have fallen far short of expectations. Palestinian abstractions have dropped below even the base levels recognized in Oslo. The reason why of this is that most of the Palestinian wells and springs are in the shallow aquifer which is most affected by a drop in the water table, whereas Israeli wells are in the deeper aquifer. The failure to develop new water resources has led to chronic supply shortages. Mekorot water has become an increasingly important substitute for Palestinian controlled water resources.

C. Underinvestment in water supply and sanitation infrastructure

The investment program and disbursements have been well below expectations – and have plummeted recently, with emergency projects becoming the norm. Sanitation projects have been subject to extraordinary delays and constraints, and only one of the seven planned new plants is operational.

D. Poor performance management of service provision in the PT

Part of the problem of water supply is the poor performance of the agencies responsible for supply, many cases illustrate the dependence of the water supply utilities on Israel and their consequent vulnerability.

4. Key areas and policy tools for sustaining water resources

The water situation is becoming more serious in the Palestinian Territory. Water is in critical condition in both quantity and quality. The ongoing intensified use and abuse

of finite and vulnerable water resources will destroy freshwater ecosystems and land resources and will result in water stress even further. The water pollution currently observed widely in the PT exacerbates water scarcity and damages human health.

To cope with diverse and complex water issues, the following points should be noted for realizing sustainable water management:

First Key Area is ending the Israeli occupation to the Palestinian Territory and Establishment of the Palestinian State, which controls the sources of surface water and groundwater and have the ability to build development projects in the field of water.

Second key area is strategic planning and reformulation of the investment program. A start has been made on this, with PWA's recent publication of an Audit of Operations and Projects, together with the Governorates Report. These building blocks could form the basis for a participatory planning process involving all stakeholders, including decentralized actors, donors and NGOs.

Third key area is water supply and sanitation investment implementation, where focus could be on high priority projects that bring real benefits to the Palestinian population, particularly the poor, and notably the rural poor. Development of new sources will be a priority, and reduction of unaccounted-for water could also increase supply considerably. Wastewater projects, too, could be a priority because of their high social and environmental benefit.

And Fourth key area is the focus on the institutional reform, to redefine sector architecture in the light of today's reality and to equip and build capacity in the agencies that have to carry the agenda forward. The challenge is not just at the top, with the PWA, but throughout the system, from the villages leagued in Joint Service Councils and on up through all the small and large service providers.

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