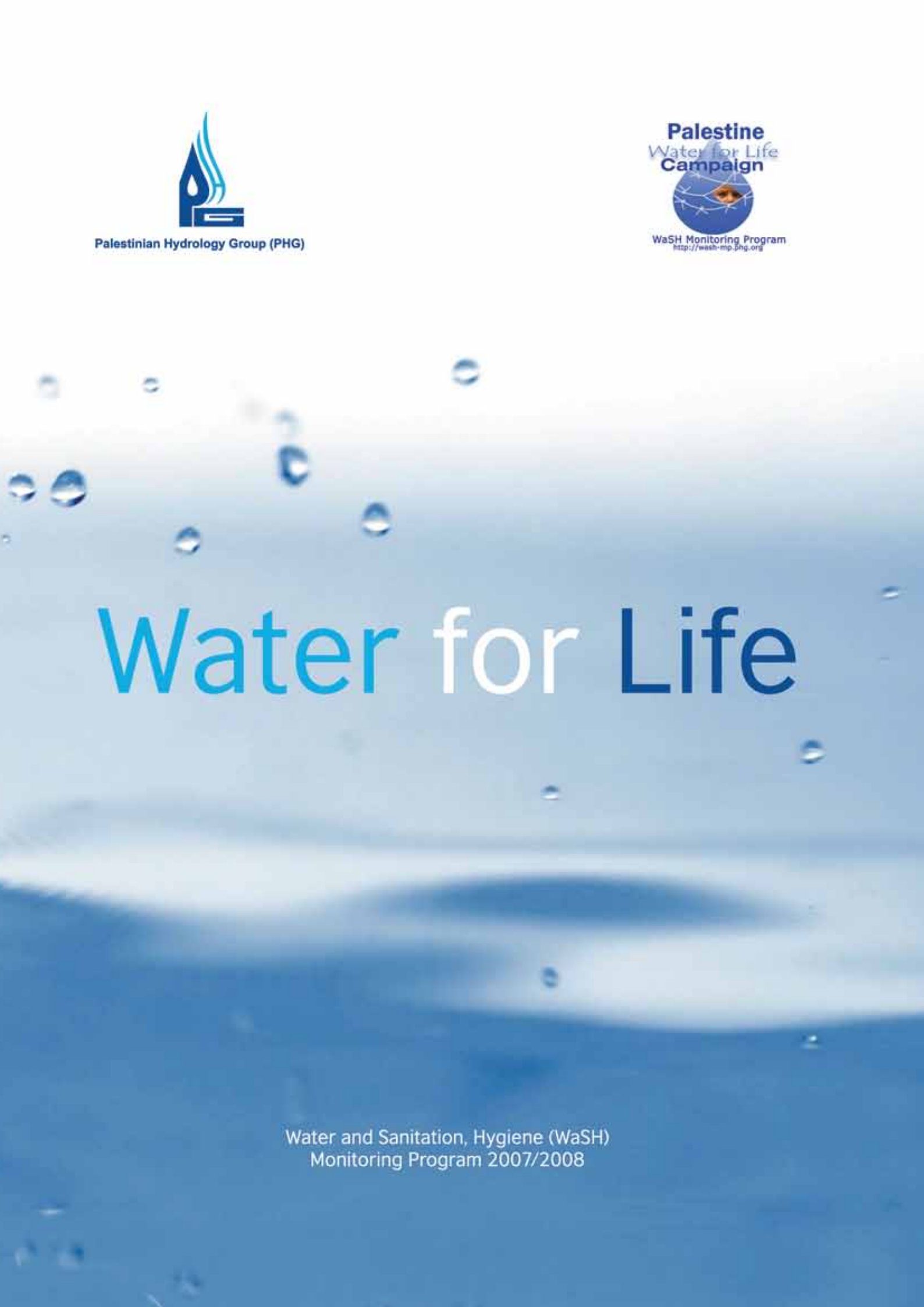
Palestinian Hydrology Group (PHG)
Palestine
Water for Life
Campaign
WaSH Monitoring Program
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Water for Life
Water and Sanitation, Hygiene (WaSH)
Monitoring Program 2007/2008

Water for Life

Water, Sanitation and Hygiene
Monitoring Program (WaSH MP) 2007/2008

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ACKNOWLEDGEMENTS

We would like to thank PHG – WaSH MP staff involved in this project. They worked tirelessly in collecting the data throughout the project period.

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About the Palestinian Hydrology Group (PHG)

PHG is a Palestinian non-government non-profit organization striving to promote the role of women and civil societies in managing local water and its related environmental resources to ensure transparency, good water governance and just and equal provision of water and sanitation services to the rural and marginalized communities in the West Bank and Gaza Strip.

PHG is also striving to promote water research capacity and infrastructure in Palestine. PHG is seeking local and international networking and partnerships to participate actively in promoting the sustainability and the rights-based approach for a just allocation of water resources at the local, regional and global levels.

PHG was established in 1987 with offices throughout Palestine, including Gaza, Hebron, Jerusalem, Nablus and Ramallah. PHG's role and functions specific to the Palestinian water sector include:

- Water resources and infrastructure development
- Service delivery to public institutions and communities
- Public education on water and the environment to encourage community participation, particularly women, in water management
- Policy oriented and field research
- Empowerment of Local Authorities
- Rural development
- Training and Development / Capacity Building of Human Resources
- Lobbying and Advocacy
- Local, national and international networking and the development of partnerships

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Or visit the WaSH MP website at: http://www.wash-mp.phg.org

Acronyms

CA	Civil Administration
CM	Cubic Meters (m^3)
CMWU	Coastal Municipalities Water Utility
EPA	United States Environmental Protection Agency
GS	Gaza Strip
GDP	Gross National Income
HIS	Hydrological Service of Israel
ICJ	International Court of Justice
ICRC	International Committee of the Red Cross
INGOs	International Non-governmental Organizations
JWC	Joint Water Committee
JWU	Jerusalem Water Undertaking
L/c/d	Liters per capita per day
M&A	Movement and Access
MAS	Palestinian Economic Policy Research Institute
MCM	Million Cubic Meters
MDG	Millennium Development Goals
MoA	Ministry of Agriculture
MoH	Ministry of Health
NGO	Non-governmental Organization
NIS	New Israeli Shekel
NSU	Negotiations Support Unit
NWC	National Water Council
OCHA	Office for the Coordination of Humanitarian Affairs
oPt	occupied Palestinian territory
PA or PNA	Palestinian National Authority
PASSIA	The Palestinian Academic Society for the Study of International Affairs
PCBS	Palestinian Central Bureau of Statistics
PHG	Palestinian Hydrology Group
PWA	Palestinian Water Authority
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
UNRWA	United Nations Relief and Works Agency
USAID	United States Agency for International Development
WaSH	Water, Sanitation, and Hygiene
WaSH MP	Water, Sanitation, and Hygiene Monitoring Program
WBGS	West Bank and Gaza Strip
WBWD	West Bank Water Department
WHO	World Health Organization

Executive Summary

WaSH MP 2007/2008 Monitoring Period:

During this monitoring period, a new "60 community framework" has been adopted. This incorporated the selection of 60 representative Palestinian communities that were later surveyed on a monthly basis with the aim of projecting the general WaSH situation in the oPt. The framework proved effective in many ways, however it will be reevaluated and modified for the 2009 monitoring period in order to raise the level of representation. Additionally, the new community sample group will be built on statistical criteria that allow it to account for the 10 WaSH indicators (See Appendix-A).

The Arab-Israeli Water Conflict:

Since 1947, the chief disputed water resource between Israel and the Arab states has been the Jordan River Basin which transcends through the boundaries of Jordan, Syria, Lebanon, Israel, and the oPt. Following the six day war in 1967, Israel managed to abduct the bulk of the Jordan River as well as its tributaries in neighboring countries. The current water usage patterns in the basin are distributed as follows: Israel 58.3%, Jordan 25.76%, Syria 12.12%, Lebanon 0.38%, Palestine 0%, and 4% remaining. (NWC, 2005)

Israeli Water Policies in the oPt Following 1967:

Since 1967, Israel has applied strict water policies in the oPt that have prevented any Palestinian control over water resources. The first days of the occupation witnessed the confiscation of numerous Palestinian wells in the Jordan Valley. Israel also replaced pre-war Jordanian laws concerning the management of water resources with new Israeli ones. Through the implementation of military orders, Israel handed all Jordanian water law to an area commander, suspended the drilling or maintenance of any wells in the oPt without an Israeli approval (given on rare occasions), and the designation of all water resources in the oPt as state property in conformity with Israeli law.

Oslo II Interim Agreement (Article 40):

- The Oslo Interim Agreement was initially aimed at transforming water responsibilities in the oPt from Israel to the PA. In reality, the PA was not granted any 'real' authority over the control and management of water resources. All Palestinian water and sanitation projects have to be approved by the Joint Water Committee (JWC), which rarely approves these projects. The World Bank Assessment Report (2009) states that "records show that 106 water and 12 large scale wastewater projects are awaiting JWC approval, some of them since 1999…Out of $121 million projects presented to JWC in the 2001-2008 period, 50% by value ($60.4 million) have been approved, and one third have been implemented or begun implementation."[1]

- The PA is territorially obstructed through its inability to access Zone C areas, which impedes the delivery of water and sanitation services. Additionally, many of the communities in the West Bank are further obstructed by settlements and military bases.

- Aside from Israeli violations of the agreement, a final status negotiation has not yet taken place. This has left Palestinians with a suboptimal yield and a forced reliance on water purchased from the Israeli company "Mekorot".

1 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009), P.IX.

The Inequitable Abstraction, Allocation and Consumption of Water Resources in the oPt:

Throughout the years of occupation, Israel has maintained it control over water resources in the oPt. This has resulted in large disparities among Palestinians and Israelis regarding the abstraction, allocation and consumption of water resources. Israel currently abstracts approximately 84% of groundwater in the West Bank, constituting over five times the amount allocated to Palestinian communities (World Bank Report, 2009). Furthermore, the average per capita consumption in Israel is 350 L/c/d compared to 76 L/c/d, which is almost a 4.5 ratio.

The Wall:

The Separation Wall illegally isolates over 28 groundwater wells in the oPt, 19 of which from the governorate of Qalqilya which is currently completely surrounded by the Wall. It is affirmed that the Wall also isolates 17 springs in Bethlehem. The total yield of the isolated wells reaches 4 Mcm/year, which constitutes more than 30% of Palestinians' share in the Western Aquifer at the time of the interim agreement.

A Forced Reliance on Mekorot:

Due to a severe deficit in the water supply, Palestinians have been forced to purchase almost 52% of their water in the WB from Israel's National Water Company "Mekorot".[2] Many Palestinian communities currently receive a large portion of their supply from Mekorot, which subjugates these communities to severe water cuts especially throughout the summer season.

Water Services:

According to the surveyed communities in the 07-08 monitoring period, the water network does not cover more than 65% of the oPt. Additionally, the system lacks an equitable distribution among the different communities and governorates with a distinct split among rural and urban communities. Moreover, coverage in the central region of the WB appears noticeably higher than both the northern and southern regions as it predominantly consists of zone A and B areas allowing for larger PNA jurisdiction. The southern and northern governorates in the WB have lower water network coverage rates due to the following factors: The large rural base, the demographic distribution of these communities (often cut by settlement and military zones), and the elevated exposure to Israeli military operations. On the contrary, The Gaza Strip's small area and high density population has allowed it to have a better water network system than the WB as well as a higher dependence on Palestinian sources mainly supplied by CMWU. However, this has been deeply affected by the Israeli siege as well as the economic embargo posed on the PNA. Simultaneously, the water network in the oPt suffers from high loss rates exceeding 40% in many cases. Illegal connections, worn out pipe networks and utility dysfunction are the three main causes of such high loss rates in the water supply.

Finally, the Palestinian average per capita consumption rate does not exceed 66 L/c/d (according to surveyed communities), which is a value far below the standard 100 L/c/d recommended by the World Health Organization (WHO). However, the per capita consumption rate is expected to be even lower in reality, especially in un-served communities. Earlier surveys conducted by PHG have shown that many communities have per capita consumption rate of 20-30 L/c/d.

2 Aquds Newspaper, July 12, 2009.

Sanitation Services:

According to the surveyed communities, the wastewater network in the oPt covers 47% of the Palestinian population. Coverage in the West Bank reaches 15.3%, while in the Gaza Strip it is substantially higher through a 78.9% coverage rate. The installation of the wastewater network in Gaza was prompted by the urgent needs of the population living in dire humanitarian conditions for extensive periods of time. On the national level, the majority of Palestinian households remain unconnected to a wastewater system, but rather rely on the use of cesspits and septic

Wastewater from Hebron City and the Settlement of Kiryat Arba Flowing through Yatta (Hebron)

but the problem resides in insuring enough sanitary solid waste landfills to accommodate for all solid waste. This has left many Palestinian communities with no option but to dispose solid waste in the outskirts of towns and in wadis, which may cause immense health effects. Moreover, the shortage of the water supply in the oPt also contributed to the deterioration of health and hygiene circumstances.

The Expenditure of Water and Sanitation Services:

According to the surveyed communities in 2007/2008, residents of the West Bank paid an average 6.1% of their income on water, while their fellow nationals in Gaza paid 11.6% of their incomes. Due to both the severe water cuts by Mekorot and the limited coverage of the water network, many Palestinian communities have resorted to buying expensive water delivered by water tankers. In 2007/2008, the average expenditure of tanker water was around 11 NIS/m^3

tanks. However, high cesspit and septic tank coverage has not necessarily secured the basic needs of the Palestinian communities for sanitation. Cesspits are particularly problematic as they are not regularly serviced in many cases, which results in the infiltration of wastewater into the ground hence causing pollution to the water resources.

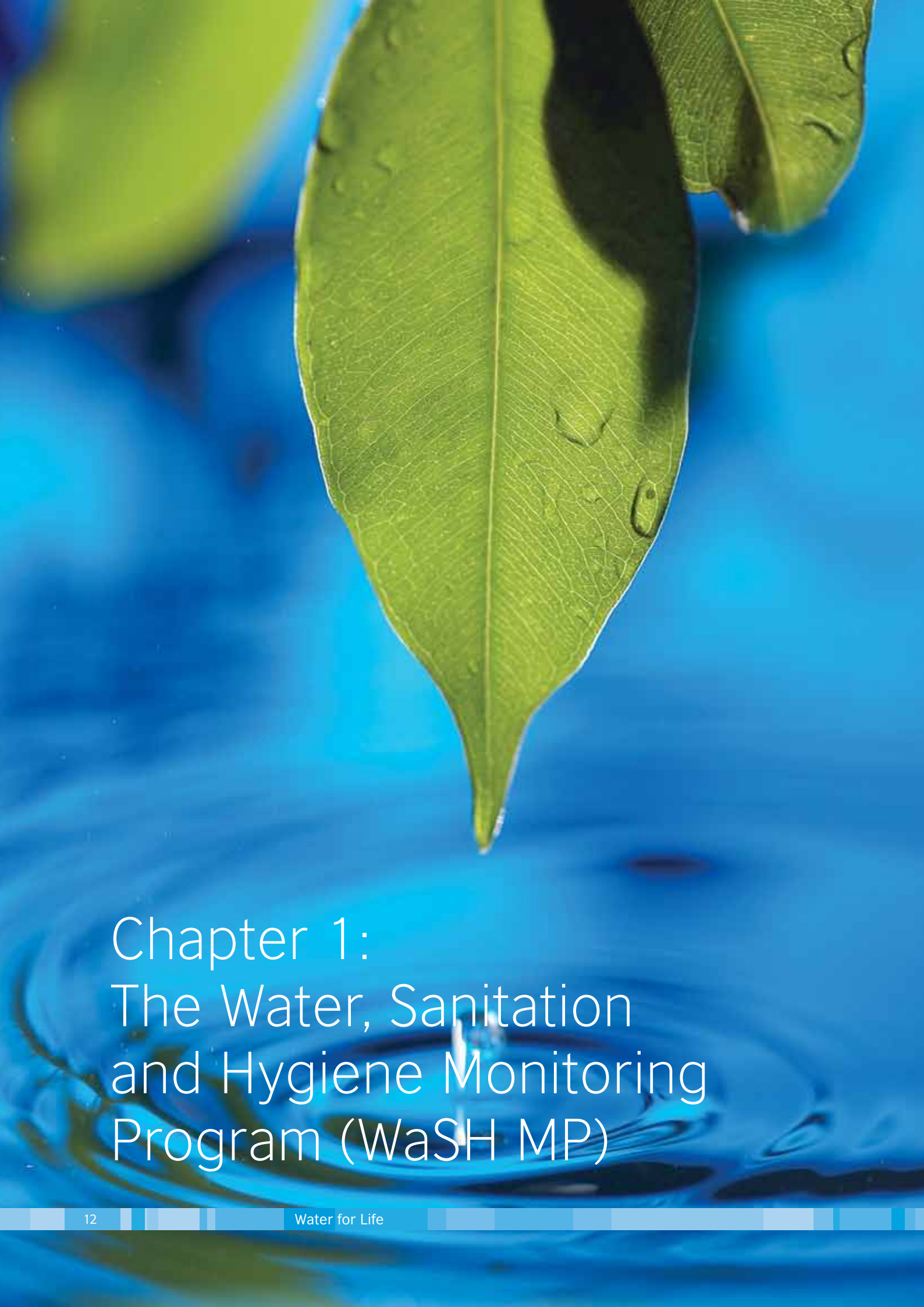
Health and Hygiene:

The underdevelopment of water and sanitation services in the oPt has allowed for the spread of water related diseases causing prominent effects on the general health of the Palestinian population. The improper treatment of sewage and wastewater remains the single most detrimental factor behind the spread of infectious and parasitic diseases in many communities in the oPt. WaSH MP identified a number of waterborne diseases in the oPt; amongst the most common ones are Amoebas, Hepatitis A, and blue baby syndrome. Other diseases revealed through epidemiological studies are throat infection, Diarrhea, Rhinitis, skin diseases, Asthma, Dysentery, Jaundice and cancer. Furthermore, Solid waste disposal is widespread in the oPt

Unsanitary wastewater disposal around residential areas in Kharbatha al Misbah (Ramallah)

in the WB and 34 NIS/m^3 in Gaza. In spite of the harsh economic circumstances following the Palestinian elections of 2006, Palestinian communities pay percentages of their household incomes on water and sanitation that surpass the standards recommended by UNICEF and WHO.

Sanitation on the other hand, costs Palestinian communities around 4% of their income in the past monitoring period. This high expenditure exposes the limited coverage of wastewater services, which results in the high cost of servicing cesspits.



Chapter 1: The Water, Sanitation and Hygiene Monitoring Program (WaSH MP)

1.1 Background:

The Palestinian Hydrology Group (PHG) initiated the WaSH MP in June 2002 in response to the urgent need for increased information, resources and action related to the water crisis in Palestine as a result of the Israeli reoccupation of major Palestinian cities and towns during the second Intifada. The need for quantitative data to support ongoing advocacy and programming by NGOs working for the protection and implementation of human rights has been a primary force behind the initiation and development of the WaSH MP.

The main objective of the WaSH MP is to facilitate timely and effective responses to grave WaSH related problems arising from the Israeli occupation through the collection and dissemination of up-to-date information.

Amidst excruciating WaSH conditions in the oPt, The WaSH MP operates with the understanding that the Israeli occupation is at the core cause of the water and sanitation crisis in Palestine. While it is clear that a final solution can only lie in the end of Israeli occupation, the WaSH MP has identified the following goals to be central to PHG's mission, in light of the current reality on the ground:

- To promote awareness around the condition of water, sanitation and hygiene in the 1967 oPt through the collection and dissemination of accurate and timely information nationally and internationally.

- To promote mobilization, lobbying/advocacy and communication in response to the WaSH crisis in the 1967 oPt.

- To identify and challenge conditions of the Israeli occupation which directly affects the WaSH situation in the 1967 oPt.

In March 2003, the WaSH MP disseminated the first report based on the data collected from surveyed Palestinian communities during the first year of the project, and by the middle of 2004 a more comprehensive report that was based on the data collected through the two years of the project. The "Water for Life: Israeli Assault on Palestinian Water, Sanitation and Hygiene During the Intifada" report tackled major issues in all Palestinian communities in the West Bank and Gaza Strip and covered the period from June 2002 to April 2004. The Water for Life 2004 report sheds light on the history of available water resources in the area. The report also presented and analyzed the water situation and Israeli control of Palestinian water resources. Major focus was placed on the period of the second Intifada and the direct Israeli assault on Palestinian communities. Several detailed case studies from the affected Palestinian communities in the West Bank and Gaza Strip were presented in the report.

The following year, another annual report was produced under the title of "Water for Life 2005: Continued Israeli Assault on Palestinian Water, Sanitation and Hygiene during the Intifada". This report further documented evidence on the effects of Israeli closures and the siege policy on Palestinian communities and the severe restrictions placed on movement which consequently affects all sectors, including the water sector and more specifically access to water and sanitation services. Israeli incursions, destructions, and settler violence which targeted destruction of water infrastructure were also presented in the report with detailed case studies. Implication of the current situation on the state of health and medical care were also tackled and presented. Finally, the effect of the Wall accompanied with the large scale confiscation and destruction of water resources and infrastructure were addressed.

The last WaSH MP report published in 2007, took a unique approach of identifying the current WaSH misfortunes through the lenses of international humanitarian law. Titled "Water for Life...The Dilemma Of Development Under Occupation: The Obstacles To Achieving The Millennium Development Goals And Water Rights In the Occupied Palestinian Territory", the report emphasized the importance of international recognition and implementation of "water

as a fundamental human right" and the challenges faced in this regard in the oPt. The report presented data and information collected from January 2006 through December 2006 in 660 of the 708 Palestinian communities. Furthermore, it shed light on the status of the WaSH situation in the oPt during that monitoring period in order to examine whether progress is being made towards achieving the UN Millennium Development Goals (MDG's) related to water, sanitation and hygiene (UN MDG 7 – Target 10: www.un.org/millenniumgoals/). Most importantly, the report concludes with the identification of the main constraints facing the realization of this goal, and in addressing water issues and crises afflicted on Palestinian communities throughout the oPt where reliable water- related data collection remains of paramount importance.

The WaSH MP for 2007/2008 has taken a different approach to the monitoring process. Instead of attempting to cover almost all the communities in the oPt, a group of 60 communities were surveyed on a monthly basis as a representative sample for the WaSH situation in the oPt. In spite of the inaccurate representation, the current report demonstrates the results reached on the territorial, governorate, and community levels. The report puts special emphasis on the inequitable abstraction, allocation and management of water resources in the oPt as the primary obstacle to developing a sustainable Palestinian water, sanitation and hygiene infrastructure. Israel's tactic to monopolize water resources in the oPt and the region as a whole will be shown through a brief historical background on the Arab-Israeli water conflict. On the political level, the central conclusion is the immediate need to end the occupation. This includes the fundamental demand for Palestinians to control their water resources, in addition to the full removal of the Wall. These paramount issues are at the heart of any sustainable solution to address the WaSH related problems in the 1967 oPt.

It is hoped that the information in this report will be used by any and all related organizations and institutions in aiding efforts for advocacy and actions that not only demand an end to the occupation, but strive for the implementation of water as a fundamental human right for all. More information can be found at the WaSH MP website. (www.wash-mp.phg.org)

PHG Team Monitoring the WaSH Situation of Bedouin Communities

1.2 Methodology

In previous years, WaSH MP conducted a comprehensive monitoring plan that covers all the Palestinian Communities in the oPt. The goal was to survey the greatest possible number of communities in order to display the status of WaSH conditions on a wider scale. This was applied through distributing questionnaires to all these communities, where in most cases they were filled by the local councils and municipalities. The need for a representative community sample emerged as the comprehensive survey conducted in previous years required extensive time and effort. In this regard, the 60 community sample approach is a quick assessment of WaSH conditions in oPt that could account for seasonal fluctuations. This year-round monitoring of the selected communities was accomplished through a monthly survey of its WaSH conditions. The questionnaire used in this approach is shown in Appendix-B. Furthermore, this approach significantly improved the quality of data compiled from the selected communities as a direct result of the frequent visits to the local councils and the cooperation that was needed to attain the goals of the monitoring program. Although the new approach primarily focused on the selected community group, the PHG team sustained following up on other communities that suffer excruciating WaSH circumstances. The situation in such communities was made public through ongoing flash reports and alerts.

The new methodology is based on selecting 60 communities to represent the WaSH situation in the oPt. These communities were selected in accordance with a number of factors such as the type of community (rural vs. urban), population, and the connectivity to a water network at the governorate level. Furthermore, a set of indicators were defined and then the questionnaire was modified to collect the needed information on the indicators. Table 1 shows the indicators developed for this survey.

Table 1: List of Indicators used in the evaluation of WaSH status in the oPt for the 2007/2008 Monitoring period

Indicator	Unit
Water supplied per capita per day	liter
Wastewater Network Coverage	%
Connection to Cesspits or Septic Tank	%
Availability of Solid waste Collection System	%
Cost Recovery for Water Supply Services	%
Water supply services provided by the local council	m^3
Unaccounted for Water within the Water Supply System	%
Monthly Household Income Spent on Sanitation	%
Monthly Household, Income Spent on Water Supply	%
Major Community Problems and Needs	

All in all, surveying these communities on a monthly basis allowed for the generation of a year round diagnosis of the WaSH situation while accounting for exceptional cases and seasonal

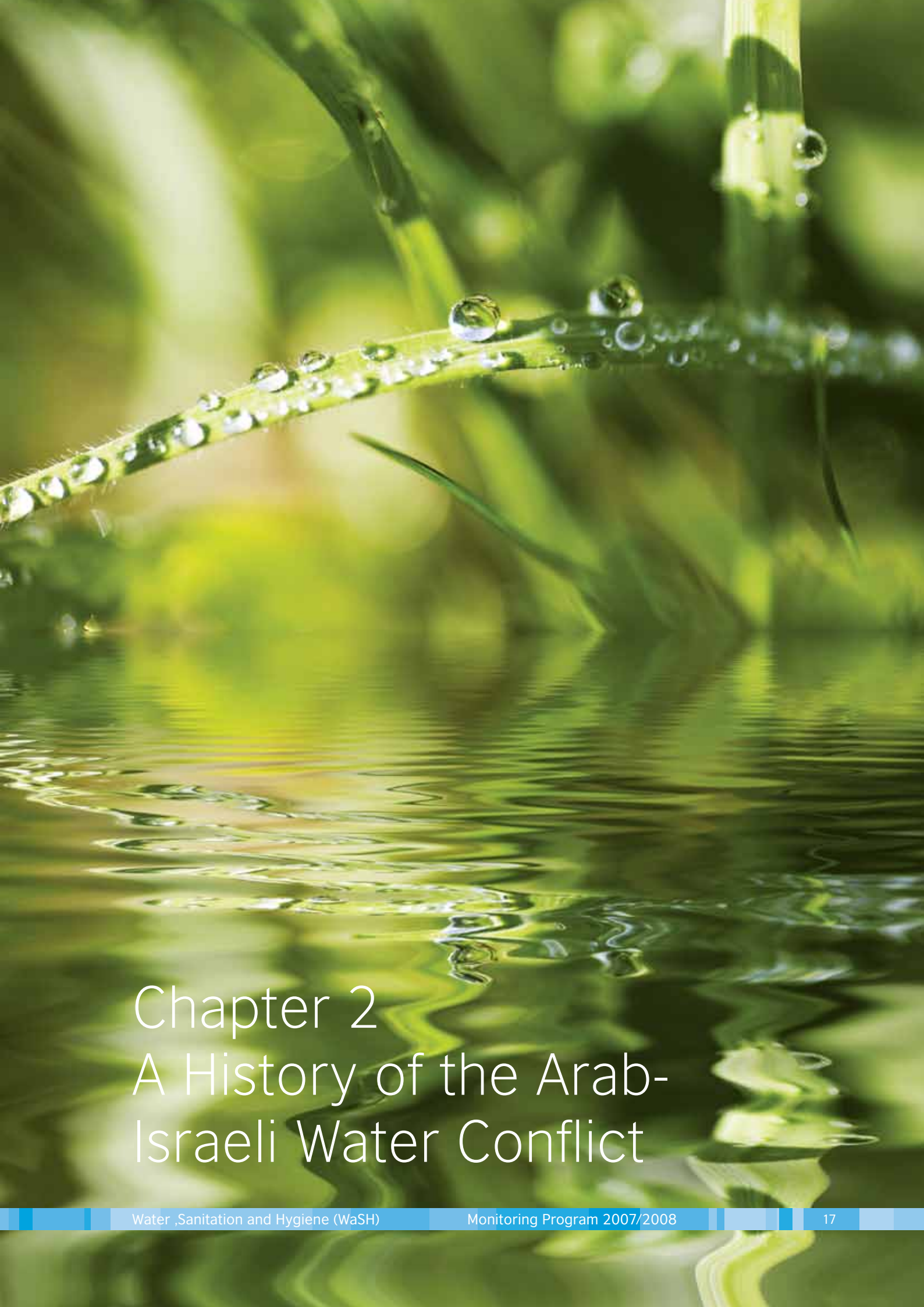
alterations (Water supply in summer vs. winter). However, due to accuracy related concerns (the representation of the 60 communities) PHG has reevaluated and modified the selected sample of communities for a better representation in the coming years. After the data collection was completed through filling the questionnaires, data analysis, processing and dissimination were conducted as follows:

1. After all quality assurance and control procedures are completed the collected data analyzed and stored in the project's DB.

2. Workshops and training sessions had been organized for local councils on governorate level throughout the project period. These workshops are also serving as a mean for disseminating information as well as for gathering relevant information on the real needs of the related communities.

3. Flash alerts, needs assessment reports and a final report had been prepared based on results of analysis of collected data and information. These reports have been disseminated through the WaSH MP mailing list in addition to putting it on the website of the project.

Finally, this report will also have a more general approach to the water situation in Palestine. This will be fulfilled by providing a historical background of the conflict over water (includes a detailed timeline of events) as well as a description of the current inequitable allocation of water and the policies that stand behind it. However, chapter 4 will fulfill the main purpose of this UNICEF funded program by providing a summary of the data collected throughout the monitoring period, which will illustrate the WaSH conditions in 2007/2008.



Chapter 2
A History of the Arab-Israeli Water Conflict

2.1 The Conflict over Water:

The conflict over water resources has been among the most imperative problems in the Middle East, often left unaddressed and therefore unresolved. As water resources run freely through political boundaries, political confrontation swells causing an accelerating conflict in a non-resting Middle East. Due to the arid nature of the region, water is considered an inadequate natural commodity that will inevitably constitute a challenge to future generations. Israel currently consumes water at a greater rate than any bordering Arab country, a pattern determined by the outcomes of wars with Arab countries. Since its establishment in 1948, Israel's policies in the region have maintained a de-facto presence vis-à-vis water resources. This monopoly over natural resources, especially in the territory occupied in 1967, was met with strong opposition from Israel's Arab neighbors and caused several confrontations. However, despite the several Arab and International criticism to Israeli water policies, Israel persists to obtain the larger share of water in the region.

Dating back to the first days of Zionist settlement in Palestine, water became a source of conflict. In the 1950's both Israel and Jordan announced plans to obtain water from the Jordan Valley. On the one hand, Israelis had plans to drain Lake Huleh and its surrounding marshes turning the landscape into agricultural lands irrigated by the lake's waters, a project that was accomplished notwithstanding an American opposition. On the other hand, Jordan and UNRWA planned to divert part of the Yarmuk River for the purpose of resettling the large number of Palestinian Refugees. The Jordanian Plan had US backing, but the Israeli lobby in Washington managed to halt American funding causing the plan to collapse.[3] In 1953 Israel announced the diversion of the upper Jordan River to the Negev within a demilitarized zone with Syria, which opened doors to Syrian frustration and complaints to the UN.

Following the events of the early 1950's, the Johnston Negotiations were launched in an attempt to resolve the Arab-Israeli fight over water, yet the treaty faced failure. In 1956 Israel announced its ten year project of building the National Water Carrier, which would divert water from Tiberias and would reallocate the water according to Israel's needs. As Israel publicly announced its plan to build a National Water Carrier in 1957, it "dismissed the similarity of its unilateral action to that of Jordan, once again contending that the demilitarized zone was fully under her sovereignty thus giving her the right to carry out any non-militant operations in the zone that she wishes."[4] With the completion of the National Water project in 1964, the Arab League stroke back by declaring a plan to abstract water from the Banias (Syria) and avert it to be saved in Tiberias. Israel announced that such plans would deviate 35% of its share in the Jordan River, which was granted to it by the Johnston Plan.[5] A couple of months following the commencement of construction, Israel militarily vetoed the plan by bombarding the strategic locations of the project.

Later on that year, Israel expanded its control over the Jordan River headwaters through the seizure of River Dan and the surrounding springs. In 1965, Syria launched the construction of dams on the Banias and Dan. Finally, the rise of tensions and the quarrel over the Jordan valley freshwater amounted to the emergence of the 1967 six day war, which culminated with complete Israeli control over all water resources in the Golan Heights, the Al-Hamma territory, and the WBG. The control area included the seizure of the Yarmouk, the Banias, the East Ghor Canal, the aquifers of the WBGS, and later on the Hasbani. It was reported that in 1987, Israel acquired at least 35% of its annual supply from the Golan Heights alone.[6]

The Israeli invasions of southern Lebanon in 1978 and 1982, guaranteed its control over the

3 Rouyer, Alwyn R., Turning Water Into Politics (The Water Issue in the Palestinian-Israeli Conflict), p.112.

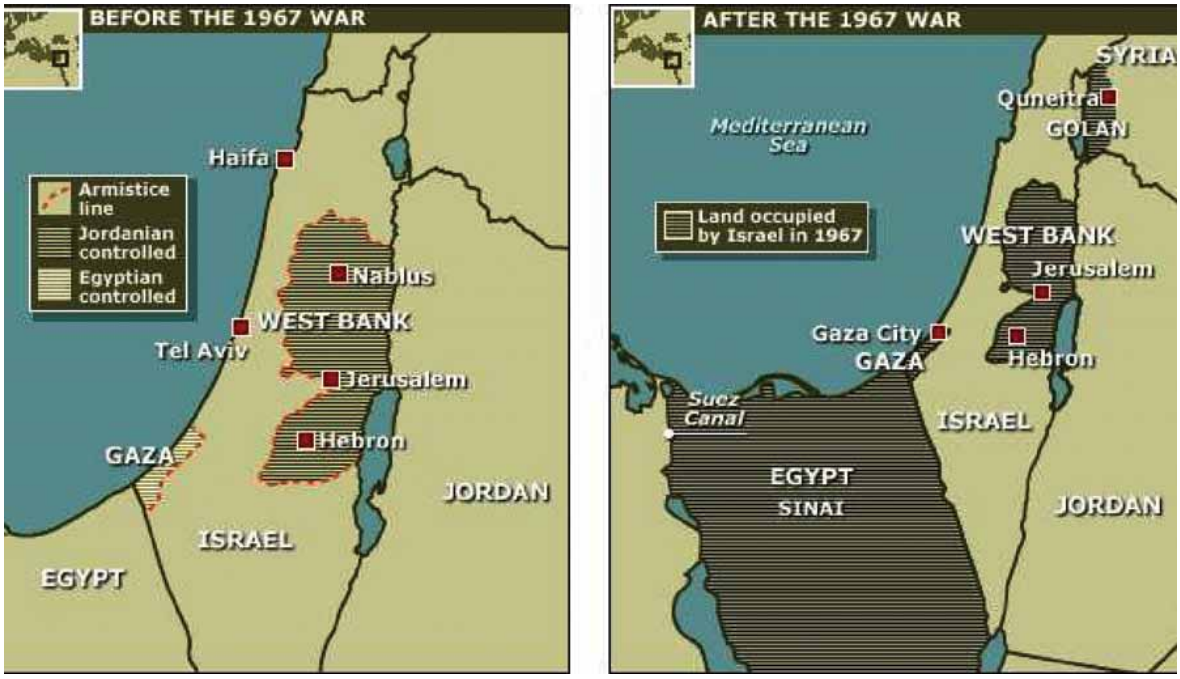
4 Rouyer, Alwyn R., Turning Water Into Politics (The Water Issue in the Palestinian-Israeli Conflict), p.112

5 Trottier, Julie, Hydropolitics in the West Bank and Gaza Strip, (Ramallah: (PASSIA Publications, December 1999), p.59.

6 Same.

Litani and Wazzani Rivers further widening its domination over regional waters.[7] Zionist interests in the Litani date back to the Paris Peace Conference in 1919; Chaim Weitzman wrote to the British Minister at the time explaining that the new Jewish homeland in Palestine must include the Litany River to gratify the state's water needs.[8] Although Israel never admitted using the natural resources in southern Lebanon, the military zone captured an ideal geopolitical area with a syncline running beneath the Litani valley to the Hasbani thought to yield 100 Mcm of freshwater annually.[9]

Finally, while an Israeli-Jordanian treaty in 1995 was conducted to resolve water disputes among the two parties, Israel's domination over regional water was maintained; Syria and Lebanon have limited shares in the Jordan Valley and the Palestinians lack any control over water resources in the OPT. At the end of this chapter, a table made by the Negotiations Support Unit (NSU) is provided to give a historical timeline of events that took place in the Arab-Israeli conflict over the Jordan River Basin.



2.1: Israeli Expansion and Seizure of Regional Water Resources Following the Six Day War in 1967[10]

7 The Litani and Wazzani are important tributaries of the Jordan River.

8 Ronald Bleier, Israeli's Appropriation of Arab Water: An Obstacle to Peace, http://desip.igc.org/TheftOfWater.html/ Israel's Appropriation of Arab Water: An Obstacle to Peace by Middle East (Spring 1994)

9 Trottier, Julie, Hydropolitics in the West Bank and Gaza Strip, (Ramallah: PASSIA Publications, December 1999), p.61.

10 Source: http://www.theocracywatch.org/christian_zionism_1967_war.htm.

2.2 Israeli Water Policies in the oPt Following 1967:

2.2.1 General Background:

The Israeli occupation of the WBGS has not been confined to a territorial expansion of the state, but has also included the capturing of water resources in the oPt. The WB is a strategic territory for controlling groundwater resources because it contains most of the recharge area for the three WB aquifers.[11] Additionally, it is a host for surface water flow of the Jordan River and its associated springs and wadis. On the first few days of the occupation, Israel "drilled deep groundwater wells and installed powerful pumps in all the areas of the West Bank, but particularly in the Jordan Valley, where the Israeli agricultural colonies are completely dependent on this water for their domestic irrigation purposes."[12] Following the six day war in 1967, Palestinians in the WBGS found themselves under Israeli military rule, which imposed harsh and unjust water policies that facilitated the exploitation of groundwater aquifers. These Israeli policies are deemed discriminatory towards the Palestinian population through comparing the allocated water resources between Palestinians and the surrounding Israeli settlements. While Palestinians in the WB receive minimal amounts of water supply, the Israeli settlers living nearby enjoy a suburban lifestyle with per capita consumption rates surpassing those in many European countries. As noted by former United States President Jimmy Carter:

"Access to water was a persistent issue. Each Israeli settler uses five times as much water as a Palestinian neighbor, who must pay four times as much per gallon. They [Palestinians] showed us photographs of Israeli swimming pools adjacent to Palestinian villages where drinking water had to be hauled in on tanker trucks and dispensed by the bucketful. Most of the hilltop settlements are on small areas of land, so untreated sewage is discharge into the surrounding fields and villages."[13]
The inequality between Israelis and Palestinians concerning water rights will be illustrated with further detail in the following chapter.

As Israel took over what came to be known as the occupied Palestinian territory, it immediately replaced pre-war Jordanian laws concerning the management of water resources with new Israeli ones. Israeli Military order No.92 of August 1967 handed all Jordanian law concerning water to an Israeli Area Commander, who had complete discretionary authority in all water applications such as building new wells and repairing old ones as well as determining the quantity and expenditure of abstracted water.[14] In 1968, Military Order 158 suspended the drilling of any new wells in the oPt and introduced new license-based water laws, basically forbidding any Palestinian usage of WB water without the approval of the military commander.[15] Furthermore, the military authorities imposed "Military Order No.291 of December 1968 suspending Jordanian law with regard to private ownership of wells, declaring all water resources in the territory to be state property in conformity with Israeli water law".[16] These new military orders allowed Israel to attain a grip over all water resources and transactions in the oPt. Additionally, the military government required all Palestinian well owners to implement meters on their wells in order to monitor the abstracted amounts and determine whether it exceeded the set quotas. These insufficient abstraction quotas finalized in 1975 were subject to a 10% reduction in 1986.[17]

Israeli water policies further aggravated the situation by rejecting most plans to fix and/or replace any parts of pre-1967 wells. A decade following the occupation, it was reported that wells were in need for casing, screens and bore holes constituting the vital parts of a pumping

11 Western, Easter, and Northeaster Aquifers.
12 Aruri Naseer, Occupation (Israel Over Palestine), p.208.
13 Carter, Jimmy, Palestine Peace Not Apartheid, p.121.
14 Rouyer, Alwyn R., Turning Water Into Politics (The Water Issue in the Palestinian-Israeli Conflict), p. 47.
15 Same.
16 Same.
17 WaSH MP, 2004.

well. On another note, Israel exhausted the productivity of water aquifers in the territory by pumping quantities that sky-rocketed the annual safe yield. Hydro-geologists assure that the over-pumping of aquifers causes a rapid drop in the water table (groundwater level) of most aquifers, which carries the potential for long term environmental impacts.[18] The drop in the water table caused many Palestinian wells to dry out because they were no longer able to abstract water at such depths, especially that most wells were old and shallow.

During the first Intifada, Israel intensified its oppressive policies in the oPt, which included more restrictions on water resources. Occasionally, water was even used as a means of collective punishment such as the case in Jelazoun camp when a 43 day curfew was posed, during which the army commander issued orders to interrupt the water supply along with electricity and telephone services.[19] Furthermore, Palestinians have been exposed to this policy a great deal in recent years especially during the summer season, compelling people to rely on pricy yet unhealthy tanker water.

2.2.2 The Oslo II Interim Agreement

The Oslo II Interim Agreements in 1995 provided provisions for the abstraction and management of water resources in the oPt. The agreement recognized Palestinian water rights and handed the PA a certain level of jurisdiction over the management of water and sanitation services for Palestinians in the oPt. The ultimate objective of this agreement was achieving mutual management of water resources through the initiation of new Israeli-Palestinian relations based on cooperation. Allocation of water resources among the two parties was set for "final status negotiations" within a five year interim period. Both sides recognized the necessity to develop additional water resources and promised to coordinate a mutual management of water and sewage services during the interim period.[20] Regardless of whether the Oslo II agreement truly aspired to resolve water issues between Israelis and the Palestinians, many flaws are found in the structure of this agreement. All in all, the agreement failed to grant Palestinians real authority over water resources or its management in the oPt. The major problems are illustrated as follows:

1) Palestinians were not allocated their share of water resources:

The problem of inequitable use of WB water resources was not resolved through this agreement. In reality, the agreement did not distribute the available water resources among the two parties. Although misperceived by many, the quantities shown in the agreement script are not quantities set for allocation but rather "existing extraction, utilization and estimated potential of the Eastern, North-Eastern, and Western Aquifers".[21] Thus, the agreement indirectly maintained Israeli domination over water resources and handled the issue of water deficit in the oPt as a matter of humanitarian need rather than a right. Through this approach, Israel addressed the problem with short term decisions such as allocating Palestinians with 28.6 Mcm as "immediate needs" during the interim period. Furthermore, Palestinians were allowed additional undeveloped water from the Eastern Aquifer through the development of unaccounted for resources, which turned out to be an over-estimation of the aquifer's safe yield.[22]

18 The Water Table is the surface level of groundwater and constitutes the elevation by which water can be withdrawn.

19 Rouyer, Alwyn R., Turning Water Into Politics :The Water Issue in the Palestinian-Israeli Conflict,p.51

20 Israeli-Palestinian Agreement, Washington, 28 September 1995, Article 40.

21 Same.

22 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009),p.7.

2) The PA did not obtain 'real' authority over water management in the oPt:

The interim agreement indirectly placed restrictions on the PA's ability to develop the water and sanitation sectors by establishing the Joint Water Committee (JWC) which had to approve all proposed projects before implementation. Article VII Paragraph 3 declares that "Israel may request that the legislation subcommittee decide whether such legislation exceeds the jurisdiction of the PA or is otherwise inconsistent with the provisions of this Agreement".[23] Although membership in JWC was split equally between Palestinians and Israelis, all water and sanitation projects in the oPt had to be approved through consensus. This proved to be problematic since Israeli members of the committee could practically veto any Palestinian project, while Israel –by virtue of its military dominance- has been able to implement all its projects without the approval of JWC. Thus, the PA was stripped from its right to control and manage water resources and was rather left to administrate the basic day to day water and sanitation services. Even these responsibilities were restricted by Israeli military action in many cases.

The JWC became extremely dysfunctional and thus posed restrains on the development of water and sanitation projects in the oPt. In the early years of the agreement, the JWC was able to function properly through the approval and implementation of projects that contributed to the improvement of the water and sanitation infrastructure in the oPt. Soon after the five year interim period and with the start of the second intifada, JWC and the other subcommittees lost consistency through reduced and intermittent meeting times. Since 2002, the frequency of JWC meetings has dropped to three times per year, with just one meeting in 2008.[24]Additionally, the committee once created for the purpose of joint governance and cooperation in the development of the water and sanitation sectors became a unilateral organization pending or rejecting most Palestinian projects. On the other hand, Israeli projects are usually approved or implemented through de facto policies. The world bank assessment report (2009) states that "records show that 106 water and 12 large scale wastewater projects are awaiting JWC approval, some of them since 1999…Out of $121 million projects presented to JWC in the 2001-2008 period, 50% by value ($60.4 million) have been approved, and one third have been implemented or begun implementation."[25]

Table 2.1 was published by the World Bank in its latest report (2009):

Status	Number of Projects	% of total
Approved	236	57%
Not Approved	22	5%
Pending	143	34%
Approved by JWC/ not approved by C.A	7	2%
Approved / no possible for execution	7	2%
Withdrawn by Palestinian side	3	1%
Total Submitted	417	100%

Table 2.1: Status of Palestinian Projects Submitted to JWC[26]

23 Trottier, Julie, Hydropolitics in the West Bank and Gaza Strip, (Ramallah: PASSIA Publications, December 1999), p.64.

24 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009), p.47.

25 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009), p.IX.

26 Source: "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009), P.49

3) The PA was territorially obstructed:

The PA was restricted from practicing its full authority in the oPt through its inability to access certain areas especially those labeled zone C. Additionally, many Palestinian communities were disconnected by military bases and settlements, which complicated the delivery of water and sanitation services even further. This resulted in intermittent Palestinian services in the water and sanitation sectors, with tremendous difficulties faced in extending wastewater and water supply infrastructure.

4) A final status negotiation has not yet taken place:

Final status negotiations haven't yet taken place, a reality that has left the Palestinians with virtually no jurisdiction over oPt water resources as well as a huge water deficit. Israel has cunningly taken advantage of the situation by increasing the level of control over water resources. This tactic has resulted in deteriorating WaSH conditions in the oPt, depicted by a deficiency in the availability of water supply and a swelling dependency on purchasing water supplied by Mekorot.

5) Ambiguous terminology in the manuscript:

Many of the terms and concepts used in the agreement appear ambiguous and eluding from important issues that needed to be tackled such as the Palestinian share of water resources or the factual potential of groundwater aquifers. An example worth mentioning is the phrasing of "future [water] needs" for Palestinians, which was set at 70-80 Mcm without a clear indication of the timeframe of this "future" although many in the PA perceived this to mean the 5 year interim period. In any case, 14 years have passed since the signing of the interim agreement and Palestinians have still not been handed this quantity.[27] Moreover, over 30% of the existing Palestinian abstraction from the Western Aquifer prior to the agreement has been captured through the construction of the Separation Wall even though the agreement emphasized the principle of "maintaining existing quantities of utilization from the resources..."[28]

27 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009), p.8.

28 Israeli-Palestinian Agreement, Washington, 28 September 1995, Article 40.

Table published by the Negotiations Support Unit (NSU)[29]:

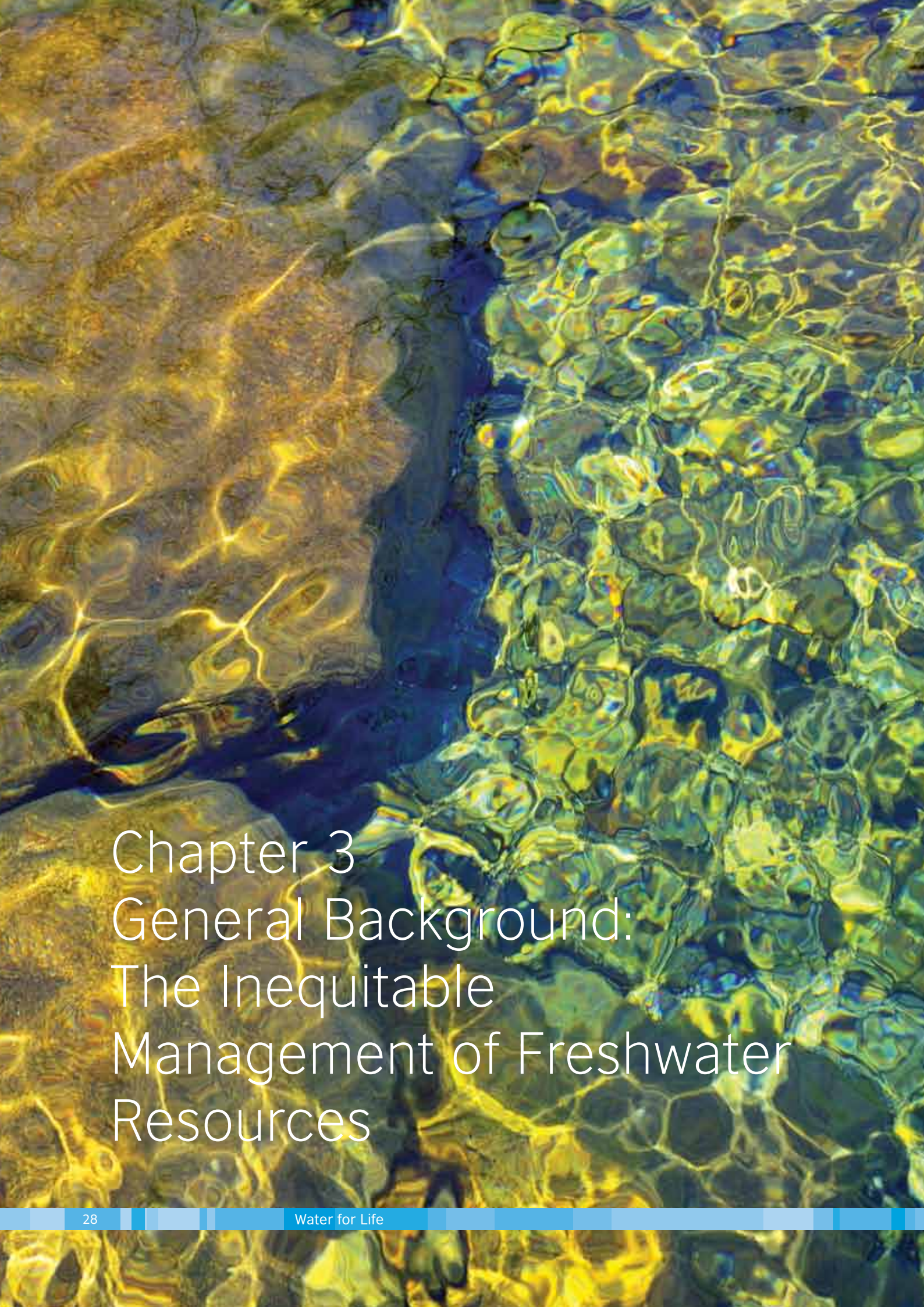
Historical Developmental Plans of the Jordan River Basin			
Year	Plan	Commission	Main Aspects
1947-1948	Hays (The World Zionist Organization)	Zionist	• Use of the water resources in Jordan River Basin, ignoring Arab water rights • Diversion of Yarmouk River flows into Lake Tiberias to replace water diverted from upper Jordan River
1947	United Nations Partition Plan	UN General Assembly	• Palestine to be divided into two States, one Jewish and one Arab • Jews owns less than 7% of the land; make up 30% of the population • Jews are to receive 55% of the land • The State of Israel will receive the upper Jordan in the north and thereby the opportunity to carry out the basic concepts of the Lowdermilk-Hays project.
1948	End of the British Mandate		
	Jews launched the 1948 war; Israel was created		
1948	James B. Hays	Israeli	TVA on the Jordan; proposals for irrigation and hydro-electric development in Palestine
1949	Armistice Agreements with Egypt, Lebanon, Jordan and Syria		
1950	Murdoch MacDonald	Jordan/ UNRWA	Use of the Jordan River for irrigation (435,000 dunums on the east side; 60,000 dunums in Syria) Storage of Yarmouk waters in Lake Tiberias Constructing canals on both banks of the lower Jordan River
1951	21 January: The Jewish National Fund of the World Zionist Organization agrees to help finance a $250 million development project that includes drainage of the 15,000 acre Huleh Marshes. The drainage channels would impinge on Syrian territory within the central demilitarized zone Israel closes the gates of an existing dam south of Tiberias Lake and begins draining the Huleh Swamp. An attempt commences to divert the river to irrigate the Negev desert and the coastal area 18 May: UN Security Council Resolution 92 calls on Israel to stop draining the marshes of Lake Huleh and allow the return of the Palestinians; Israel prevents all but 350 from returning Jordan announces a plan to irrigate the East Ghor area of the Jordan Valley by tapping the Yarmouk June: Syria and Jordan agree to share the Yarmouk, but Israel protests that its riparian rights were not recognized		

29 Source: Dr. Shaddad Attili, Dr. David Phillips, Eng. Adla Khalaf , History of water politics and plans of the Jordan River Basin, http://www.nad-plo.org/nego/permanent/water/related/Howb.pdf.

1952	Bunger	UNRWA/Jordan/Syria	Storage dam along the Yarmouk River at Maqarin (480 m3) Diversion dam at Addasiya: direct gravity flow along the East Ghor of the Jordan Valley Jordan agrees that Syria will receive 2/3 of the hydropower (28,300 kw/hr) in exchange for Jordan receiving 7/8 of the natural flow of the river offering resettlement for 100,000 refugees
1953	Israel launches, on an urgent basis, a diversion project on a nine mile channel mid-way between the Huleh Marshes and Lake Tiberias in the central demilitarized zone. The plan was to divert enough water to help irrigate the coastal Sharon Plain and eventually the Negev desert. Syria claimed it would dry up 12,000 acres of Syrian land. The UNTSO Chief of Staff Major General Vagn Bennike of Denmark noted that the project was denying water to two Palestinian water mills; was drying up Palestinian farm land; and was of substantial military benefit to Israel against Syria. The US cut off aid to Israel. The Israeli response was to increase work		
	UN Security Council Resolution 100 required Israel to stop work pending an investigation. Israel finally relented and for the next three years the US kept its economic sanctions in effect by insisting on tying aid to Israel's actions		
1953	Main Plan	USA	• The Tennessee Valley Authority drafted the "Unified Development of the Water Resources of the Jordan Valley Region"
1953	Israeli Seven Year Plan	Israeli	• Drainage of Huleh Lake • Northern Galilee schemes • Jordan Valley schemes • Western Galilee schemes • Auja (Yarkon)-Western Negev scheme • Auja (Yarkon)-Eastern Negev scheme
1953	Johnston Plan (commencement)	USA	• Based initially on the Main Plan • Proposed construction of a dam on the Hasbani River to irrigate Galilee lands • Drainage of Huleh Lake • Proposed construction of two dams on the Banias and Dan Rivers • Proposed construction of the Maqarin dam on the Yarmouk River • Proposed construction of a diversion dam near Addasiya • Proposed dam construction at the outlet of Lake Tiberias to increase storage
1954	Arab League Plan	Arab	• Water usage for irrigation of Arab lands and generating electrical power • Objection to Israel transferring Jordan River flows outside the Jordan Basin • All riparian states have the right to irrigate their land inside their borders
1954	Cotton Plan	Israeli	• Comprehensive plan for all water resources in the Basin • Irrigation of 260,000 dunums • Included Litani River

1955	Baker-Harza Plan	Jordan	• Master plan for the development of the Jordan Valley • Based on the use of the lateralvalley flows and about 155 MCM from the upper Jordan to develop the Jordan Valley
1955	Johnston Plan (final)	USA	• 19 February: Preliminary understanding concerning major elements of the proposed plan with Jordan, Lebanon, Syria and Egypt. Tentative agreement reached on a 300 MCM dam at Maqarin on the Yarmouk River and diversion at Addasiya. • 10 March: Discussion with Israel on the agreement. Johnston reassures Israel about its main concern, the nature of the neutral authority which would be established to oversee the allocations of water • 14 March: Meeting between Assistant Secretary of State Allen and Ambassador Eban of Israel. Eban reports that Allen threatened to withhold aid from Israel if the Israelis did not come to terms with Johnston • June: Israel agrees to the basic elements of the Johnston Plan • August: Johnston returns to Middle East for talks with representatives from the Arab States • August: Lebanon expresses concern over allocation of the Hasbani flows • August: Jordan states that it would accept the Johnston proposals on economic grounds given certain modifications, but that a political decision would have to be taken by a subcommittee of Arab states • October: Johnston Plan fails to win approval by the Arab League
1956	Ten Year Plan	Israeli	• Diversion point for the National Water Carrier shifted to Eshed Kinort at the northwest corner of Lak • Allegedly designed in accordance with Israel's water allocation in the Johnston Plan
1957	Soviet-Syrian Aid Agreement	Soviet Union/Syria	Provisions for a hydroelectric project in the Yarmouk Basin
1958	Israeli National Water Carrier	Israeli	Israel begins construction of the National Water Carrier

1964	• The Arab leaders gathered in Cairo to issue a final communique. The National Water Carrier was considered an aggressive plan to divert the course of the River Jordan, endangering the riparian rights of the Arab nations. The Israelis completed the project on May 1964 • In retaliation for Israeli projects the Arabs vowed to draw water from the Banias in Syria and send the water east through Syria and Jordan to the south of Lake Tiberias. They began construction, but the Israelis destroyed their equipment by artillery fire • The concept of a dam on the Yarmouk River was reaffirmed at the First Arab Summit in Cairo, and again at subsequent summits. Construction begun on a lower dam at Mukheiba • Israel laid claim to the River Dan, a reservoir, and all the springs in the area (the headwaters of the Jordan River) • Syria claimed several of the springs and part of the reservoir, and pointed out that the road Israel had built to patrol the area intruded on Syrian territory		
1965	Syrian diversion of Jordan River headwaters	Syria	Construction of dams to divert water from the Banias and Dan Rivers Threatened reduction in Israel's ability to access Jordan River waters
1966	• UN Security Council Draft Resolution (S/757/Rev.1) supported by the USA requesting Syria "to strengthen its measures for preventing incidents that constitute a violation of the General Armistice Agreement" and "inviting" Israel to cooperate fully with the Israeli-Syrian Mixed Armistice Commission. The Soviets vetoed the Resolution on 4 November 1966 because it equated the actions of Syria to those of Israel		
1967	June 1967 War; UN Security Council Resolution 242		
1973	UN Security Council Resolution 338		
1974	• Separation of Forces Agreement between Israel and Egypt		
1975	Jordanian Seven Year Plan	Jordan	• A dam at Maqarin with a storage capacity of 486 MCM which would generate 20MW of power
1978	• Israel's invasion of Lebanon, giving Israel temporary control of the Wazzani spring/stream feeding the Jordan		
1980	• In the absence of an agreement, Syria begins construction of a series of small impoundment dams on the headwaters of the Yarmouk within Syrian territory. By August 1988, 20 dams were in place with a combined storage capacity of 156 MCM. That capacity has since grown to 27 dams with a combined capacity of approximately 250 MCM, and is projected to grow to a total storage of 366 MCM by 2010. Israel, meanwhile, increases its Yarmouk withdrawals from the 25 MCM allocated in the Johnston negotiations to 70-100 MCM/yr		
1987	• Syria and Jordan reaffirmed their mutual commitment to a dam at Maqarin in 1987, whereby Jordan would receive 75% of the water stored in the proposed reservoir and Syria would receive all of the hydropower generated		
1988	• Agreement signed by Jordan and Syria - Jordan will receive 75% of the stored water, while Syria will receive 25% of the flow and all 46 MW of hydropower to be generated. The World Bank insists that all riparians agree to project before funding is provided; Israel refuses		
1993	• Declaration of Principles on Interim Self-Government Arrangements (Israel/Palestine)		



Chapter 3
General Background: The Inequitable Management of Freshwater Resources

3.1 Water Resources in the oPt:

The occupied Palestinian territory hosts a considerable amount of fresh water resources in both the West Bank and Gaza Strip, found in the form of surface water and groundwater. The bulk of surface water is found in the Jordan River, while the rest is distributed amongst numerous wadis and springs. Groundwater resources are supplied by two major aquifers: The Coastal Aquifer in Gaza and the Mountain Aquifer in the West Bank, the later consisting of three main groundwater basins (Western, Eastern, and North-Eastern).

Control over these resources has fully been held by Israel following its occupation of the WBGS in 1967. The entirety of water extracted by Palestinians in the oPt is capped by Israeli quotas that cannot be exceeded even though these amounts have been insufficient. For the past forty years, Israel's handling of the available water resources has undermined Palestinian water rights in the oPt as well as the need for a proper management that resolves the problem of water scarcity in the region. Unfortunately, WBGS water resources have been over-exploited, polluted, and distributed with great inequity among Israelis and Palestinians. Following is a description of the available water resources and its current status.

3.1.1 The Jordan River (Surface Water):

The Jordan River is a vital natural resource in the region that extends over 300 kilometers from its headwaters at the Golan Heights all the way down to the Dead Sea. The Jordan River is the embodiment of a large web of tributaries originating in Lebanon and Syria. It descends southward pouring water into Lake Hula (drained by Israel and used as agricultural land while part of it is now being revived to its old form after failing to keep it as agricultural land), Lake Tiberias, and finally the Dead Sea. Today, the recession of the Dead Sea attests to the human caused ecological catastrophe inflicted on the Jordan River due to the over-exploitation of its waters. Israel, Jordan, Lebanon and Syria have contributed to the current water level decrease by the extensive abstraction and/or the diversion of flow from Tiberias, Yarmouk River, Hasbani, and Banias respectively through the installation of dams and catchment reservoirs. However, Israel's excessive exploitation of the Jordan Basin is unquestionably the chief cause of its current depletion and pollution. Despite the fact that over 90% of the Jordan Basin falls within the borders of neighboring Arab countries, Israel currently abstracts around 58.33% of its water, while Jordan, Syria, Lebanon, and Palestine have the following abstraction rates: 25.76%, 12.12%, 0.38%, and 0% respectively. (NWC, 2005) Figure 3.2 shows riparian abstraction from the Jordan River Basin

With the occupation of the WBGS, Palestinians lost all shares in the Jordan River even though the whole of the eastern aquifer falls within the borders of the WB. It is estimated that only 3% of the Jordan River's Basin falls within Israel's pre-1967 borders.[30] Prior to this Israeli seizure of the basin waters, Palestinian farmers relied on it in supplying their agricultural needs. The Applied Research Institute- Jerusalem (ARIJ) estimates that the annual consumption prior to the occupation reached 30 Mcm through the pumping of 150 wells, which were immediately destroyed or taken over in the first days of the occupation.
On a different note, surface water in the oPt could be found in a variety of other forms such as wadis, seasonal lakes, and natural springs. Seasonal lakes depend on annual rainfall and are known to especially occur in the Marj Sanur area of Jenin. Wadis also depend on seasonal rain especially in the winter and form in different areas of the WB. The four major WB wadis are known to flow from the mountains towards the Jordan Valley in the east. Unfortunately, wadis have

30 Walid Sabbah and Jad Issac, "Towards a Palestinian Water Policy", (Amman: Apploed Research Institute Jerusalem, 1995).

been subjugated to extensive contamination caused by the unregulated wastewater dumping in the oPt. Finally, springs are naturally activated once groundwater levels rise to the surface of the earth, discharging millions of cubic meters of freshwater. There are approximately 400 springs in the WB, amongst which 114 are major springs producing a total estimated discharge of 60 Mcm (PWA,2002)[31]

3.1.2 The Mountain Aquifer (Groundwater):

The Mountain Aquifer is the main supplier of groundwater in the oPt. This aquifer is divided into three sub-basins or aquifers that are classified according to their different flow directions into three aquifers in the West Bank: The Western Aquifer, the Eastern Aquifer, and the Northeastern Aquifer (figure 3.2.) These aquifers share similar geologic features by mainly consisting of Karstic Limstone and dolomite as well residing in average depths beyond 200 meters. As mentioned earlier, despite the fact that the replenishment zones for these aquifers predominantly fall within the borders of the West Bank, Israel controls these aquifers granting Palestinians minimal allocation.

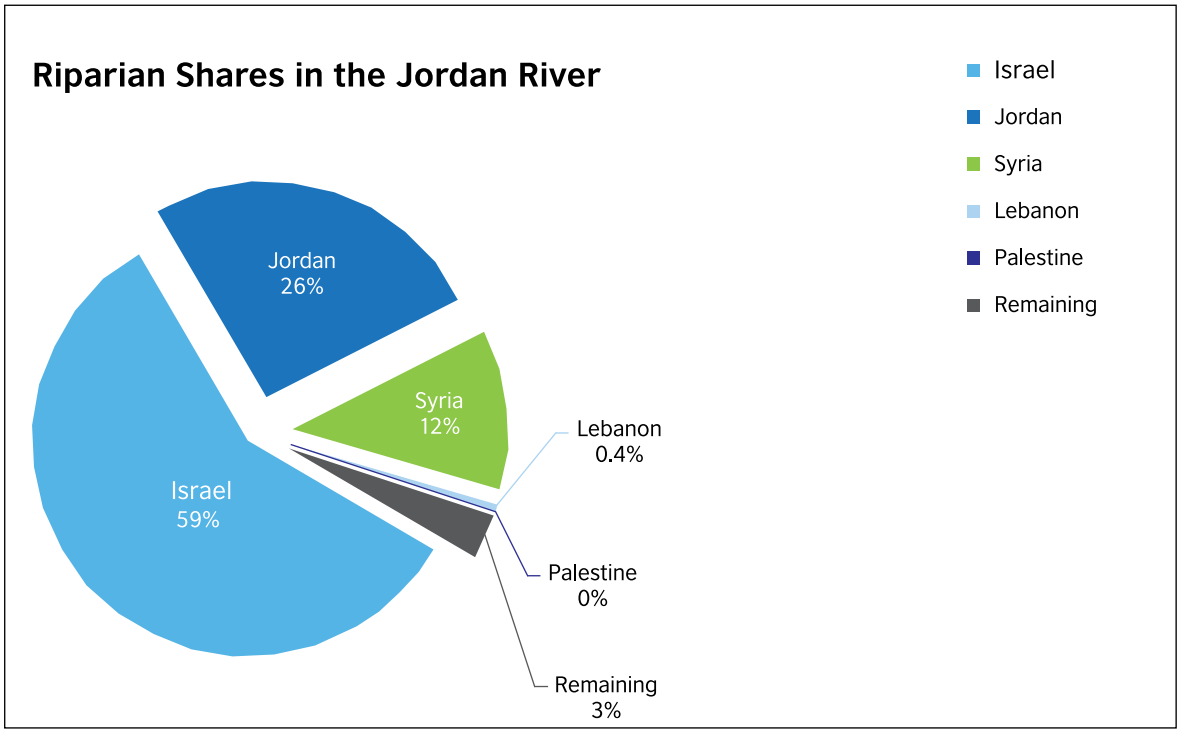


Figure 3.2: Riparian Abstraction from the Jordan River Basin (PWA 2005)

A) The Western Aquifer Basin:

The Western Aquifer Basin is the most important aquifer in the West Bank. It's annual replenishment capacity is estimated at 362 Mcm. Almost 70% of the recharge area of the aquifer is located in the West Bank. Palestinians are only using small portion of the aquifers water through wells drilled mainly before the 1967 occupation. The total quantity that Palestinian wells are abstracting is estimated at 20 Mcm. It is worth mentioning that after 1967, Palestinians were not allowed to drill any groundwater well in the Western Basin.

31 WaSH MP 2004.

B) The North-Eastern Aquifer:

According to the Oslo Interim Agreement, this aquifer's replenishment capacity is estimated at 145 Mcm, of which Palestinians consume less than 37 Mcm (World Bank Report, 2009). The exact yield of this aquifer is not fully known, however it is estimated that Palestinians consume no more than 17-20% of the aquifer's water supply. (NWC, 2005/ World Bank, 2009).

C) The Eastern Aquifer:

The Eastern Aquifer is a groundwater natural resource in the WB that constitutes the eastern portion of the Mountain Aquifer as water flows eastward toward the Jordan Valley. This aquifer is an active donor to surface water; it is thought to account for 90% of the total annual discharge of springs in the WB.[32] Unlike the Western aquifer, the Eastern Aquifer is almost completely situated within the borders of the WB. In spite of this geographical location, Israel currently abstracts over two-thirds of the water supply from the aquifer. Moreover, Israeli settlers in the WB exploit this aquifer by installing deep wells in the high hills of settlements to pump its water to their benefit. By 2004, Israel had managed to install over 32 deep wells in the Eastern Aquifer. (PWC, 2005)

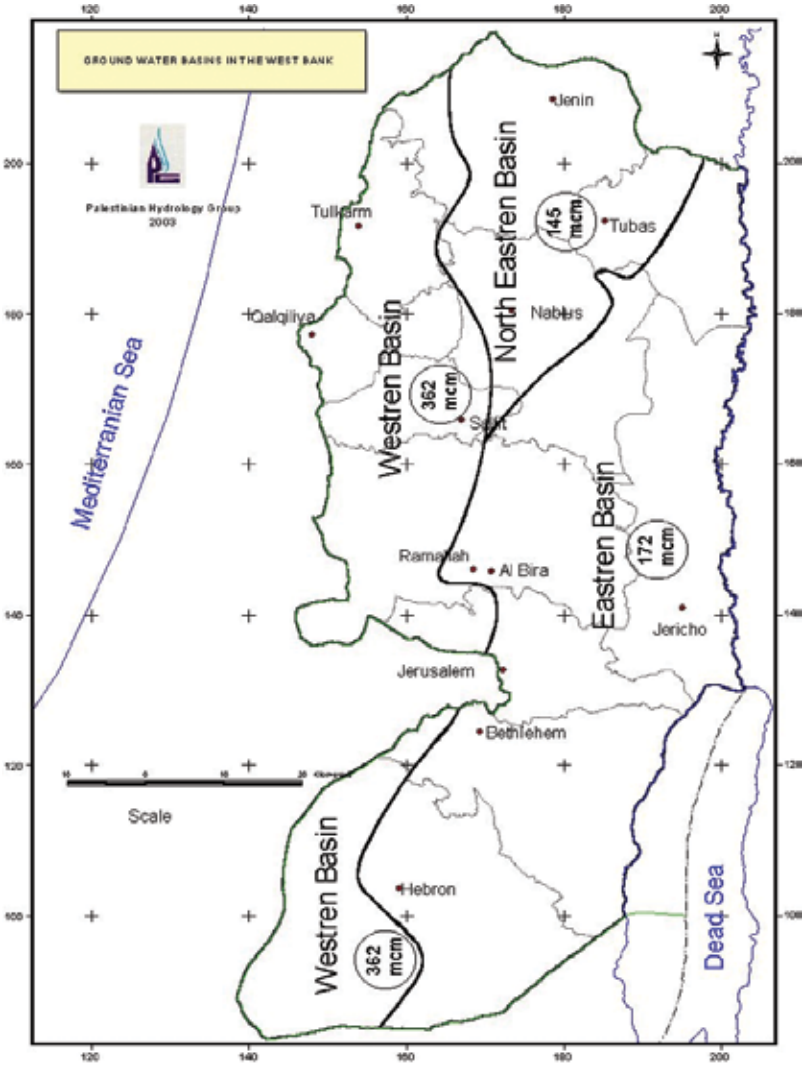


Figure 3.2: Map Showing Groundwater Aquifers in the .

32 Walid Sabbah and Jad Issac, "Towards a Palestinian Water Policy", (Amman: Apploed Research Institute Jerusalem, 1995), p.6

3.1.3 The Gaza Coastal Aquifer:

The Gaza Coastal Aquifer is a shallow aquifer extending along the shores of the Mediterranean Sea from Haifa all the way down to the Sinai. The over-exploitation of the aquifer has caused its depletion and deterioration. This has also caused salt water intrusion, which is a common hydro-geological phenomenon in coastal aquifers that occurs when replenishment rates cannot compensate for the abstracted quantities. Subsequently, the water level drops causing the introduction of saline sea water into the freshwater reservoir. Furthermore, salt water intrusion causes an increase in total dissolved solids (TDS) of the freshwater, which results in a deteriorated water quality.

Apart from the fact that the Gaza Coastal Aquifer receives insufficient rainwater quantities for recharge, Israeli water policies have aimed at further reducing the aquifer's renewable yield through the impediment of surface and ground water from flowing westwards towards the coastal aquifer from the West Bank and Israel. This water embargo was applied by surrounding the borders of the Gaza Strip with a large number of deep wells as well as the diversion of Wadi Ghaza waters (around 30 Mcm/Yr) to agricultural fields prior to its arrival to Gaza. Figure 3.3 shows the Israeli wells abstracting groundwater before entering Gaza.

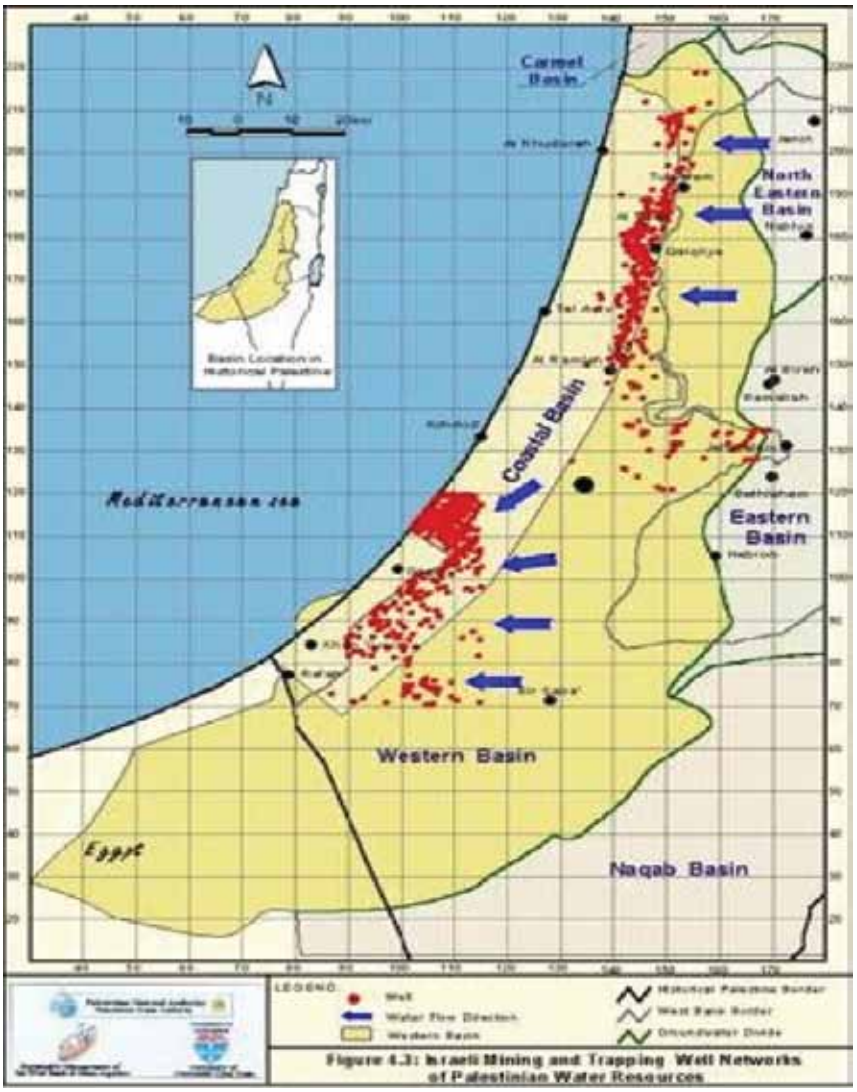


Figure 3.3: Map Showing Israeli wells Impeding Groundwater flow into the Gaza Strip.[33]

33 Source: NWC (2005), p.75. (more details in bibliography)

The exhaustion of the Gaza Coastal Aquifer is not solely attributed to Israeli policies, but also to the unregulated pumping of Palestinian wells. The NWC estimates an average annual deficit of 70 Mcm in the coastal aquifer water budget, with a total annual replenishment of 85 Mcm and abstraction of 155 Mcm.[34] In recent years, the extensive abstraction of this aquifer has increased to almost 165Mcm/Yr, which is raising the risks of its depletion and causing irreversible environmental damage. Furthermore, over 4000 private agricultural and domestic wells are pumping water from the coastal aquifer. It is revealed by the monitoring wells installed by the Ministry of Agriculture (MOA), Ministry of Health (MOH), and Coastal Municipalities Water Utility (CMWU) that the concentrations of chloride ions are exceeding the 250 mg/l maximum concentration level set by the WHO. The concentration levels range from 250 mg/l to 10,000 mg/l in the aquifer.[35] Similarly, the concentration levels of nitrate are rising above the WHO standard of 50mg/l, which is mainly due to the excessive use of pesticides and the spilling of wastewater from cesspits and septic tanks. According to EPA's national primary drinking water standards in the U.S, the maximum contamination level of nitrate should not exceed (10 mg/l)[2].[36] The situation in Gaza calls for solutions to halt the depletion of this aquifer and to address the health risks arising from its contamination.

3.2 The Inequitable Abstraction, Allocation, and Consumption of oPt Freshwater:

The disparity in the share of water resources remains the most fundamental obstacle for the development of efficient water and sanitation institutions in the oPt. As illustrated in previous sections of this report, Israel's water policies have succeeded in capturing the entirety of water resources in the oPt. Although the Oslo agreement handed the PA certain jurisdictions over water management in the oPt, they ultimately never granted them entitlement over the natural resources. Technically, even before the collapse of the Oslo II Interim Agreement, Israel had been in full control of the abstraction, distribution, and usage of all ground and surface water. This section will demonstrate the creation of vast disparities in the abstraction, allocation and consumption of water resources among Palestinians and Israelis resulting from Israeli discriminatory water policies.

3.2.1 Israeli Control over Groundwater Resources in the oPt (Shared and non-shared aquifers):

As mentioned in previous sections, groundwater aquifers both nourished or stored in the West Bank and Gaza Strip have been under absolute Israeli control since 1967. Both the Western and Northeastern Aquifers are mainly replenished in WB mountains, yet Israel consumes over 90% of their yield. Furthermore, the Eastern Aquifer almost fully resides and thrives in the WB, yet Israel currently utilizes over 70% of its waters. The two following figures are based upon recent data provided by the World Bank Report conducted in cooperation with PWA "Assessment of Restrictions on Palestinian Water Sector Development" (2009).

34 NWC (2005), p.55. (more details in bibliography)
35 CMWU 2008
36 www.epa.gov/safewater

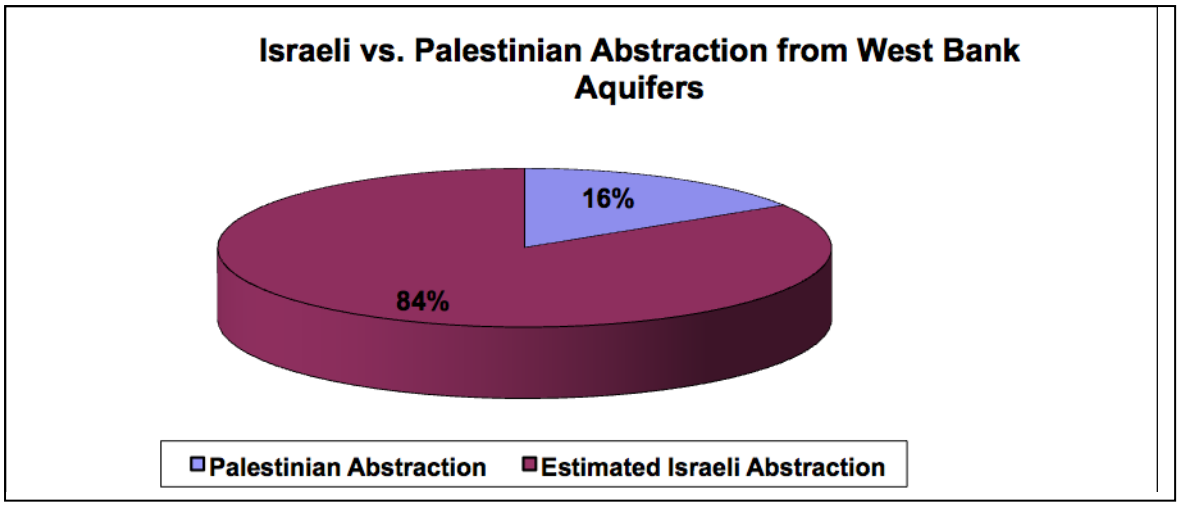


Figure 3.4: Disparity in Abstraction Rates of WB Aquifers between Israel and Palestine

As shown in the figure 3.4, the Israeli abstraction of WB aquifers is more than five times that allowed for Palestinians. As a result, Palestinians suffer chronic water shortages and can barely meet 50% of their water needs through the amounts allocated to them by Israel. In recent years, Palestinian groundwater abstraction has been reduced through restrictions on drilling, deepening, and maintenance of wells in the oPt. These restrictions are combined with the problem of a dropping water table (a drop in the groundwater level), which is causing many Palestinian wells to lose its productivity and/or completely dry out. The following figure illustrates the abstraction amounts from the three WB aquifers.

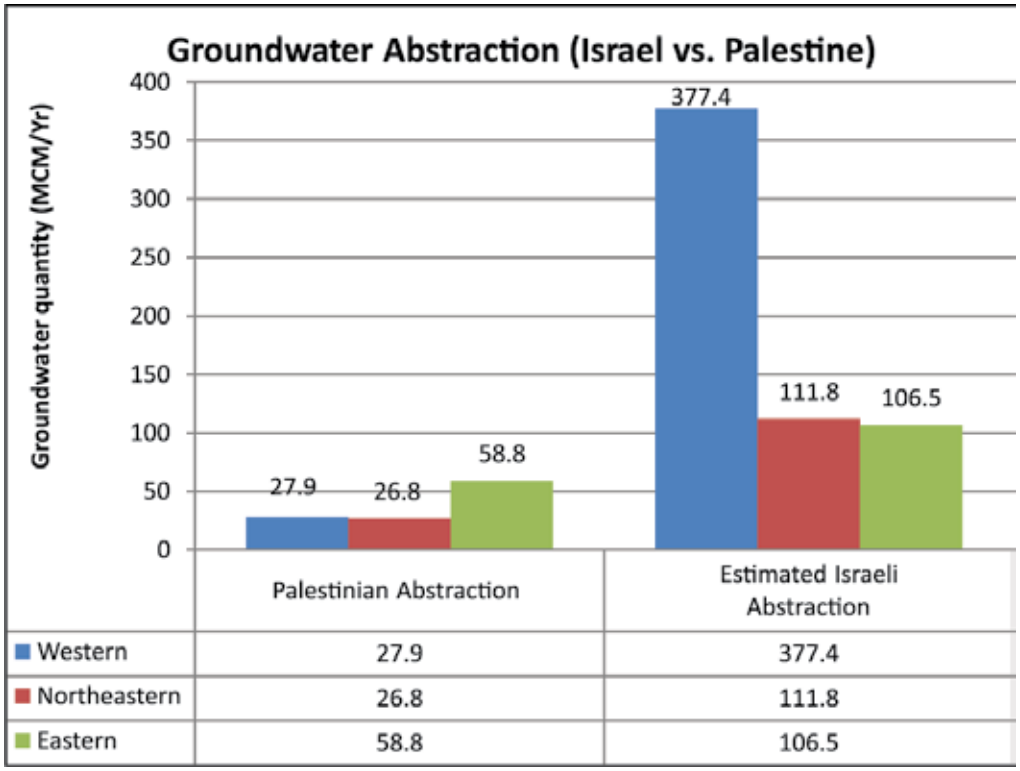


Figure 3.5: Abstraction quantities from WB Aquifers (Mcm)[37]

37 Source: West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009).

The discrepancy in abstraction rates is a staggering reality that has caused Palestinians to suffer for decades. Today, Israel's exploitation of WB water resources has surpassed the admitted abstraction rates in the Interim Agreement by nearly 80%. More specifically, Israel has extracted an estimated 389 Mcm (80%) more than the identified 483 MCM during the agreement.[38] Furthermore, Israeli exploitation of WB resources has amplified in recent years through the implementation of 'facts on the ground' that have cultivated settlement expansion, both territorially and population wise, further allowing settler communities to consume a massively disproportionate water supply in comparison to the Palestinians. As will be shown in section 3.3, the completion of the Separation Wall has allowed for further appropriation of Western Aquifer water and will continue to do so.

Regarding transboundary water resources, PWA recently announced in a presentation at the 5th World Water Forum in Istanbul that Israel seizes approximately 90% of all trousboudary water resources, which includes shared groundwater (Western, Eastern and Northeastern Aquifers) and surface water (Wadi Gaza and the Jordan River Basin). The graph below illustrates the inequitable allocation of transboudary resources through comparing the total number of population for both Israel and Palestine.

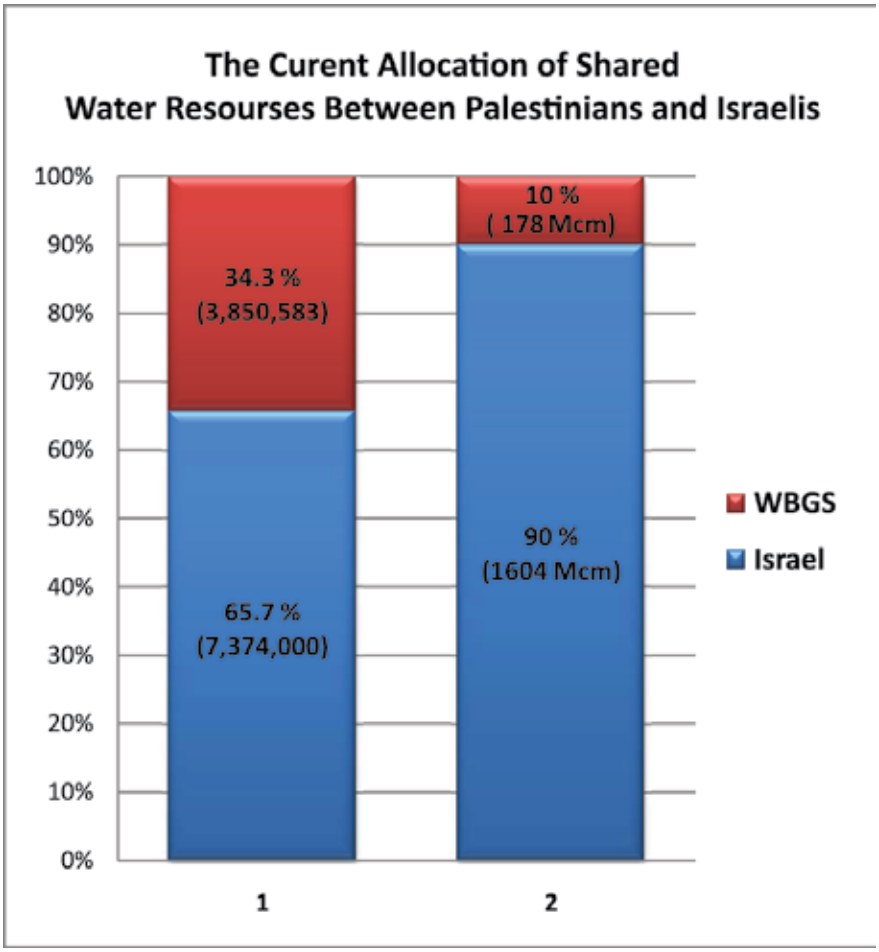


Figure 3.6: Comparing the allocation of transboundary resources between Israel and Palestine

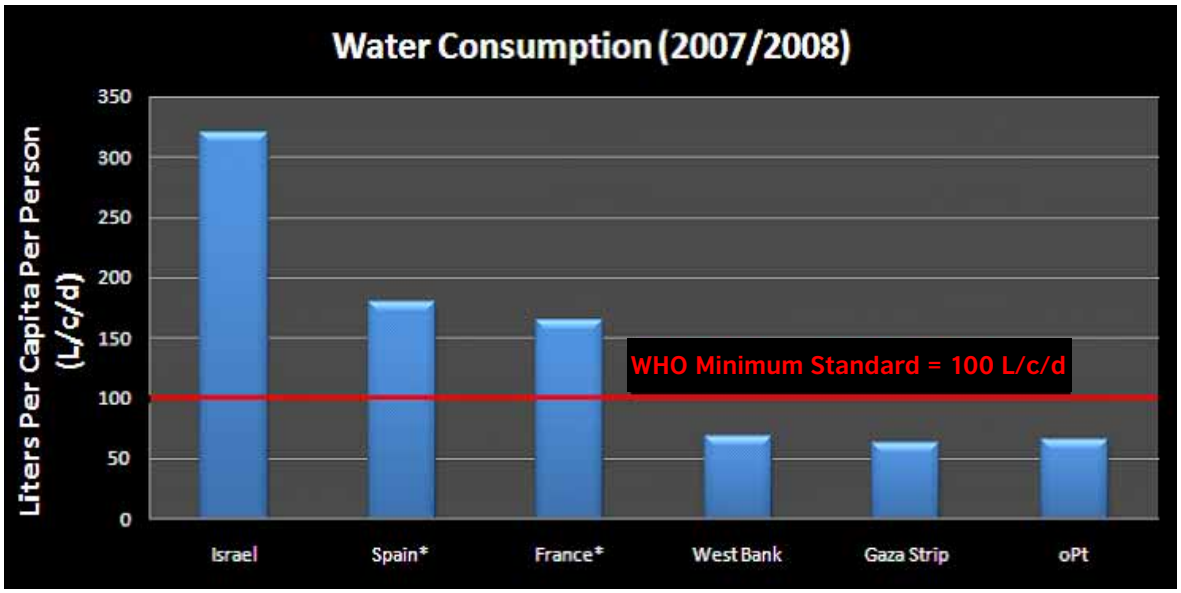
38 Same.

It is revealed that even though Palestinians living in the WBGS constitute over 35% of the general population of historical Palestine (Israel and WBGS), they are granted less than 10% of the shared water resources. These proportions, however, are only a representation of the abstractions from the shared resources and do not account for the supplementary resources that Israel benefits from within its current borders such as Lake Tiberias. It is worth noting that the population statistics for Palestine were gathered from a 2007 census (PCBS), while the Israeli ones were attained from fourth quarter of 2008 (ICBS).

3.2.2 Comparing Israeli vs. Palestinian Per Capita Water Use

The dissimilarity of water rights between Israelis and Palestinians is further illustrates through comparing the rates of per capita consumption among the two populations. According to the WHO, 100 liters per day constitutes the minimum water amount needed for a balanced and healthy person. The current Israeli consumption averages 350 L/c/d, while the average consumption of Palestinians does not exceed 66 L/c/d. In 2005, Israel's Gross National Income (GNI) per capita was almost eighteen times the Palestinian GNI per capita. The allocated water supply for both peoples also represents a non-proportional distribution. Figure 3.7 shows the large disproportion in freshwater supplies between Israelis and Palestinians, a measure foreseen through comparing the consumption rates of both populations (urban and domestic uses). Additionally, Israel appears to have a consumption rate higher than most European countries, which is an odd phenomenon once considering that Israel's situated in an arid region like the Middle East.
The per capita consumption rates in liters/capita/day is a measure of the average water use in a specific country, however it is also considered an indicator for the availability of water supply. For instance, the Palestinian communities that are short of water networks or those that undergo water cuts by Mekorot have both reflected low consumption rates.

In the figure below, the Palestinian per capita consumption rates were obtained from the results of the current monitoring period. The apparent disparity in the quantities of water used by Israelis and Palestinians is actually wider in reality because the L/c/d for Palestine includes non-domestic water use. This results from difficulties in sorting out the water consumption of each sector, which in many cases results in the integration of industrial use with the domestic.



*The consumption rates for Spain and France were taken from the B'Tselem website.

Figure 3.7: Comparing Israeli, European and Palestinian Water Consumption for Domestic and Urban Purposes (L/c/d)

3.3 The Wall:

The Separation Wall is by far the largest project for the swift confiscation of Palestinian land and its natural resources since the occupation in 1967. Although doomed illegal by the International Court of Justice (ICJ) of The Hague in July 2004, the Wall completes its path in the West Bank further confiscating the land and water on a massive scale. It has managed to take possession of over 10% of WB territory, even though Israel already detains almost 60% of it. Furthermore, the Wall has had tremendous consequences on the Palestinian agricultural sector; this has been done through uprooting tens of thousands of trees, isolating hundreds of dunums of agricultural land containing numerous greenhouses, and confiscating almost 28 wells. Due to the extremely fertile nature of the lands isolated by the Wall, the Ministry of Agriculture has estimated a 75% loss in the agricultural sector's input to the Gross National Product (2003).[39]

Regarding water resources, the Wall isolates around 28 groundwater wells scattered in the northern area and 17 springs in the central area of the West Bank as shown in Figure 3.8.
Aside from being completely surrounded by the Separation Wall, Qalqiliya has to this point lost 19 of its groundwater wells. The total yield of the isolated wells reaches 4 Mcm/year, which constitutes more than 30% of the current Palestinian abstraction in the Western Aquifer as stated by the interim agreement. Thus, Palestinian access to 22 Mcm of the Western Aquifer water has been reduced to a mere 18Mcm, while Israeli abstraction of the same aquifer reaches 592 Mcm which is 230 Mcm (63.5%) over the "estimated aquifer potential"[40]. The reduced water quantity from those wells has long been used by Palestinians for their domestic and industrial needs, but more extensively for supplying the large agricultural sector in that area (8Mcm for agriculture)[41]. The loss of this water has heavily affected the surrounding villages and forced them to seek alternative water sources, which is usually costly such as the case with buying expensive and unhealthy tanker water.

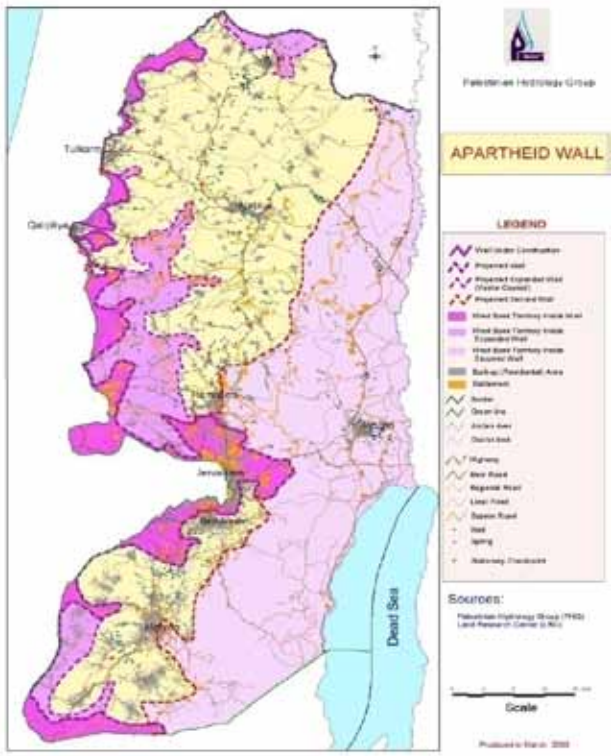


Figure 3.8: Groundwater Wells and Springs Isolated by the Wall.

39 WaSH MP (2005)
40 "estimated potential": the aquifer's safe yield of water estimated through the Oslo II Interim Agreement.
41 NWC (2005), p.78. (more details in bibliography)

3.4 Palestinian Water Supply: A Forced Reliance on Mekorot

As illustrated throughout this report, Israeli domination over water resources in the oPt has left Palestinians with a water budget suffering from extensive deficits. In order to substitute for this deficit, Palestinians have been forced to purchase water from Israel's National Water Company "Mekorot". In a recent article in Alquds Newspaper, it was revealed that 52% of the domestic Palestinian water supply in the West Bank is actually purchased from Mekorot. This transaction is practically the purchasing of water from an Israeli company by a Palestinian governmental body (The West Bank Water Department), when this water should have legally been allocated to Palestinians by virtue of their riparian share in the abstracted aquifer water. Today, approximately 57Mcm/year of the water sold by Mekorot to the Palestinian communities is abstracted from 38 wells within the WB (PWA, 2005). Figure 3.9 shows the quantities of water purchased from Mekorot during 2001 - 2007.

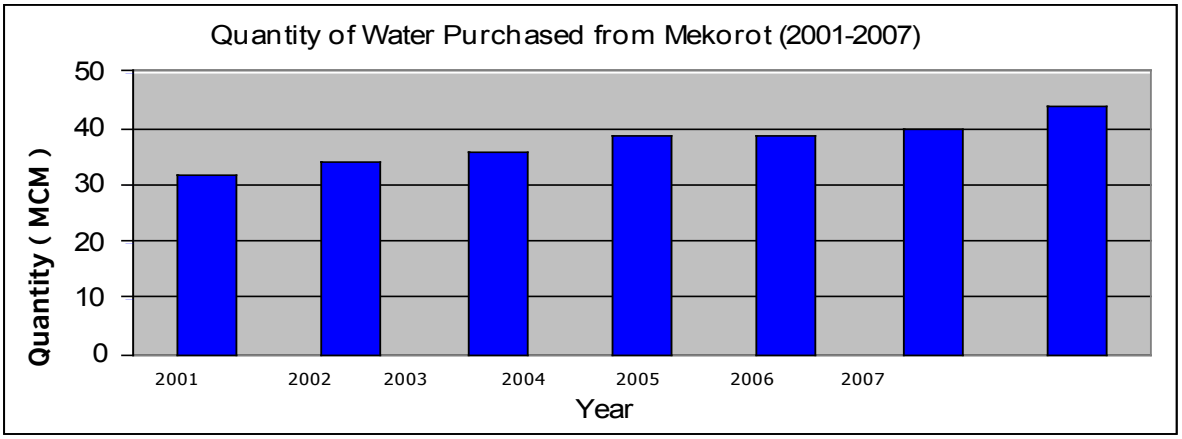


Figure 3.9: Quantity of Water Purchased from Mekorot[42] (PNC 2005)

In spite of Mekorot's severe cuts and reductions in the water quantities supplied to Palestinian communities, Israeli policies in the oPt have forced Palestinians to become reliant on Mekorot's water supply. The confiscation of wells by the Wall accounting for almost 30% of the current Palestinian abstraction from the Western Aquifer has caused the national deficit to increase pushing for further reliance on Mekorot.

Mekorot water cuts as well other Israeli water policies in the oPt are perceived by many as discriminatory measures towards the Palestinian population. The unjust water rights among the two populations is uttered through the disparity between water quantities supplied to Palestinians and that to the 249, 600 settlers in the WB. The availability of water supply is revealed through the average consumption rate for an individual (L/c/d), which is 5.3 times more for an Israeli settler than for a Palestinian. In summer, water supply to Palestinians is reduced or cut-off in order to serve the Israeli settler communities with sufficient water resources to supplement their luxurious lifestyles.

Figure 3.10 shows the total water supply for the West Bank during the months of March and August, 2007. Although the figure will demonstrate the seasonal fluctuation of water supply quantities by all sources, it is taken for granted that any reductions in the supply especially during the summer season are the result of Mekorot water cuts. The Y Axis represents the water amount in cubic meter (m3).

42 Graph source: NWC (2005). (more details in bibliography)

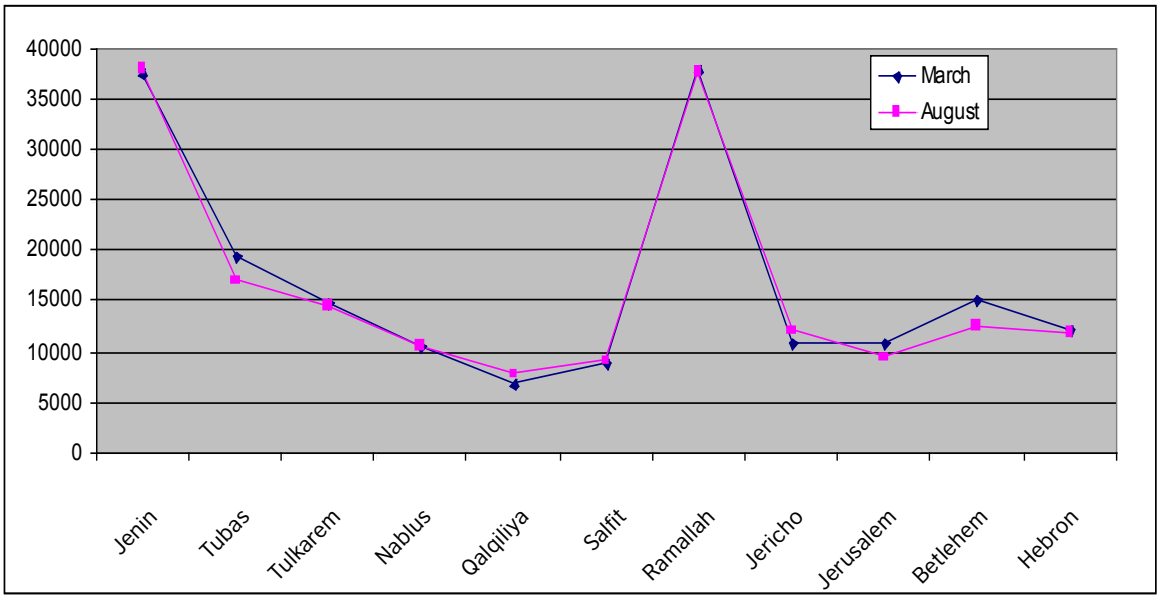


Figure 3.10: West Bank Water Supply by All Sources (M3/month) for **March/ August 2007**.

This figure is an embodiment of the phenomenon of the severity of water cuts by Mekorot especially during the hot dry summer season, which is when a larger amount of water supply is needed for a healthy standard of living. Shockingly, the total water supply appears lower during summer time (August) in Tubas, Jerusalem and Bethlehem.

On a different note, although the quantity provided to Jenin appear to be substantially higher than the other communities supplied by Mekorot, WaSH MP field visits assert its increasing need for supplementary quantities for domestic needs. It is worth mentioning that the water network in many communities in the governorate of Jenin (example: Ya'bad, Ash Shuhada, az Zababida, and Arraba) encounters high water loss rates reaching up to 40% of the general supply in many cases. Furthermore, all the rest of the northern governorates shown above are in desperate need for increased amounts of water supply from Mekorot, as it has been decreasing the past two years. This appears to be the case in most of the communities supplied through a Mekorot connection in the oPt.

For the past sixty two years, Israeli water policies in the oPt have managed to push for a Palestinian dependency on purchased water from Mekorot. The following table illustrates this reliance through demonstrating the main supplier of water for each of the governorates in the oPt.

Table 3.1: main water sources by governorate

District	Main Supplier (Source)
Jenin	Mekorot through West Bank Water Department (WBWD) & Cisterns
Tubas	Cisterns
Tulkarem	Private Agriculture Wells, Municipality or Local Council & Cisterns
Nablus	Cisterns, Mekorot Connection Through Water Network

Qalqiliya	Mekorot Connection Through Water Network, Private Agriculture Wells, Cisterns
Salfit	Mekorot Connection Through Water Network, Cisterns
Ramallah	Jerusalem Water Undertaking (JWU), West Bank Water Department (WBWD)
Jericho	West Bank Water Department (WBWD), Mekorot Connection Through Water Network Jiericho Municipality
Jerusalem	Mekorot through West Bank Water Department (WBWD), Neighbor Locality JWU and Jerusalem Municipality
Bethlehem	Mekorot , WBWD , Private Water Tankers
Hebron	Mekorot, WBWD , Private Water Tankers
North Gaza	Municipality or Local Council (Through CMWU)
Gaza	Municipality or Local Council (Through CMWU)
Deir Al-Balah	Municipality or Local Council (Through CMWU)
Khan Yunis	Municipality or Local Council, Public Domestic Wells (Through CMWU)
Rafah	Municipality or Local Council (Through CMWU)

As opposed to the WB, it is apparent that the Gaza Strip purchases limited amounts of water from Mekorot. This is due to the following factors: the Israeli withdrawal in 2005, the utilization of the Coastal Aquifer waters, and the water supplied by small brackish water desalination plants.

As a consequence of water shortages and the unbearable reliance on Mekorot for water supply, many communities have resorted to alternative sources for satisfying their water needs. Among the alternative methods are the purchasing of tanker water as well as rain water harvesting through cisterns. The latter constitutes a healthier and inexpensive method of raising the annual household supply of water. In recent years, numerous Palestinian communities have adopted this technique in confronting the challenges of water shortages caused mainly by the occupation.

The Current WaSH Situation in the oPt

This chapter will display the data obtained throughout the 2007/2008 monitoring period concerning the current water, sanitation, and hygiene situation in the oPt. During this monitoring period, a new approach has been adopted in the evaluation of WASH conditions and services. This method has included a change in the collection of data from 608 communities to a selected sample group of 60 representative communities from all governorates. These communities were surveyed on a monthly basis in order to obtain a year round observation of WaSH conditions. This 60 representative sample was chosen according to the following criteria: geographical distribution, population, type of community (rural or urban), and connectivity to a water network. Thus, the goal was to survey 60 communities that would produce information representative of the WaSH situation in all Palestinian communities. The results of this new approach have proven an accepted degree of success, however the selected sample of 60 communities will be modified for the upcoming 2009 monitoring period in order to improve the level of representation. The PHG team has already conducted a reevaluation of this sample group and has embarked on the monthly surveying of these communities using the amended questionnaires. For the purpose of this report, the information will be handled on the basis that it chiefly represents the 60 selected surveyed communities, yet to a large degree representative of the general WaSH situation in the oPt. Finally, the different sections of this report will include the makeup of each set of data and the level of representation it possesses. The list of 60 communities is provided in Appendix C.

4.1 Water Services:

Water supply management in the oPt falls within the responsibility of water utilities, local municipal and village councils as well as the West Bank Water Department (WBWD) in the WB and the Coastal Municipalities Water Utility (CMWU) in Gaza. These institutions also take charge of coordinating the Palestinian water needs, which in most cases requires purchasing extra amounts from Mekorot. Furthermore, all water management operations are conducted under the supervision of the Palestinian Water Authority (PWA), which has the mandate over water and sanitation management in the oPt.[43] The PWA was established following the Oslo II Interim Agreement and has been charged with the responsibility of "ensuring equitable use, sustainable management and development of Palestinian water resources".[44]

4.1.1 Water Supply Network Coverage:

Recent surveys and studies have revealed that the water network covers 65-90% of communities in the oPt. In spite of satisfactory coverage rates in regards to the general population, the system lacks an equitable distribution among the different communities and governorates in the oPt with a distinct split among rural and urban communities. Figure 4.1 shows the water network coverage distribution among the different governorates in the oPt. It is worth noting that the attained coverage percentage for each governorate was based upon the network coverage of a selected sample of communities lying within it.

43 However, this authority is marginalized by the "real water authority" in the OPT embodied by the JWC as well as Israeli military control.

44 Wash MP (2004).

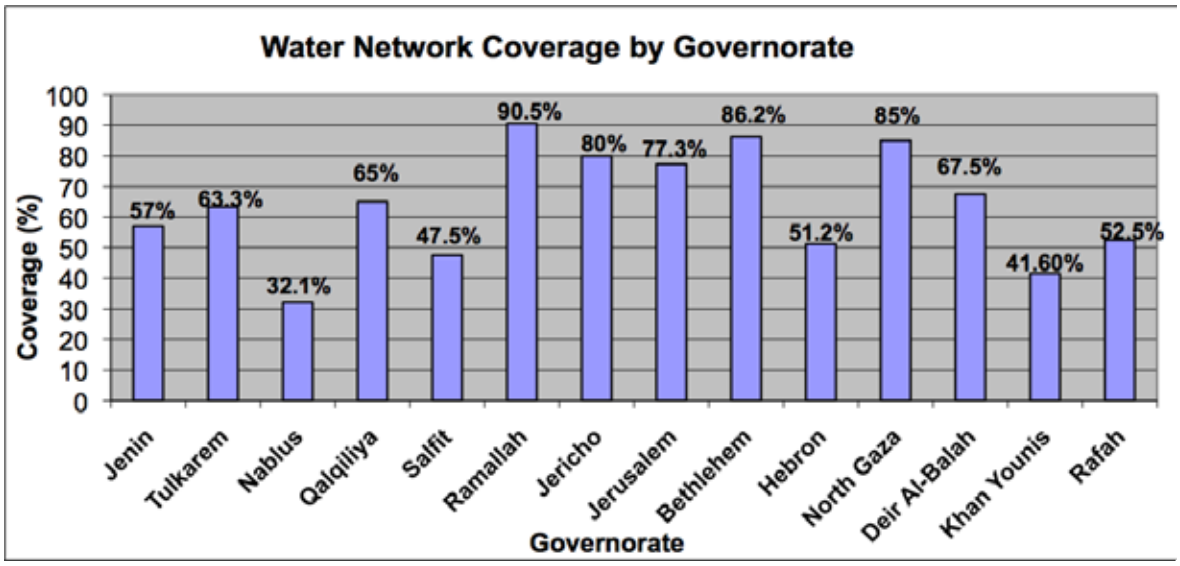


Figure 4.1: Water Network Coverage by Governorate (According to surveyed communities)

As it is evident from the figure above, there are broad dissimilarities among the different governorates in the oPt. despite an inaccuracy in the representation of the "60 community monitoring plan", the newly adopted plan does however maintain the general trend of percentile fluctuation among the different governorates concerning water network coverage. For instance, coverage in the central region of the WB appears noticeably higher than both the northern and southern regions. According to the selected communities within the central area, coverage rates reach a high 83.5%, which is mainly attributed to the type of governorates comprising this area: Jericho, Ramallah, and some parts of Jerusalem, which are predominantly zone A areas. Within these areas, the PA is allowed to practice a much larger responsibility in the management of water and sanitation services.

These relatively high rates are encountered by a much lower coverage in both the northern and southern areas. The northern governorates of Jenin, Tubas, Tulkarem, Nablus, Qalqilya, and Salfit suffer from extremely low coverage rates of 53%. Although this percentage may be a bit of an underestimation due the inaccuracy in statistical representation of the selected sample, this area has generally dealt with excruciating circumstances regarding the water network coverage. The obstacles facing this region in the development of its water network coverage is an issue that has been tackled in the WaSH MP 2006 report and could be illustrated as follows:

- Demographically, this area contains large number of rural communities within its borders. Rural communities are generally poorer and do not fully benefit from public services such as water, sanitation, and Hygiene.
- The communities within these governorates are characterized as being much more spread out amongst each other, making it harder to expand any piped network.
- Often times these communities are interrupted by settlements, military zones, and/or areas C. These three types of areas fall past the jurisdiction of the PA as assigned by the Oslo interim agreement in 1995, which impedes the ability to develop an efficient water and sanitation infrastructure.
- Finally, these areas are more frequently targeted by Israeli military operations such as destruction of infrastructure, restrictions on movement, excursions, and many other policies inflicted by the occupation.

Throughout the 2007/2008 monitoring period, the data compiled from the surveying of the 60 communities generated the following graph (Figure 4.2) for the coverage of the water network. It shows some low percentages attained for the northern area, especially for Nablus,

Salfit, and Tubas. A major factor that played a role in the reduction of coverage percentages was the absence of water networks in many of the surveyed communities such as those in Jenin (Khirbet ashSheikh Sa'eed, Meithalun, and Raba), Nablus (Beit Dajan, Burin, Beit Furik, and Qusra), as well as Tammun in Tubas. Tubas was actually excluded from the governorate graph due to the lack of a network system in Tammun, since it was the community selected to represent the governorate. Additionally, some communities like An Nassariya, Yatma, Deir Al Ghusun, Jinsafut, and Deir Ballut are in need for extensive rehabilitation of their water supply networks mainly due to high loss rates reaching over 40% in certain cases. An example would be Deir Ballut (Salfit), where a large portion of the water network consists of plastic piping that need to be replaced.

Similarly, the southern governorate of Hebron experiences low water network coverage of merely 51.2% of its communities (according to the 11 communities selected to represent this governorate). Thus, this percentage resulted from the unpleasant water network circumstances within these 11 communities, with three of the communities in need of new water networks, one community in need of network expansion, and 4 communities in need of both expansion and rehabilitation of their water network.

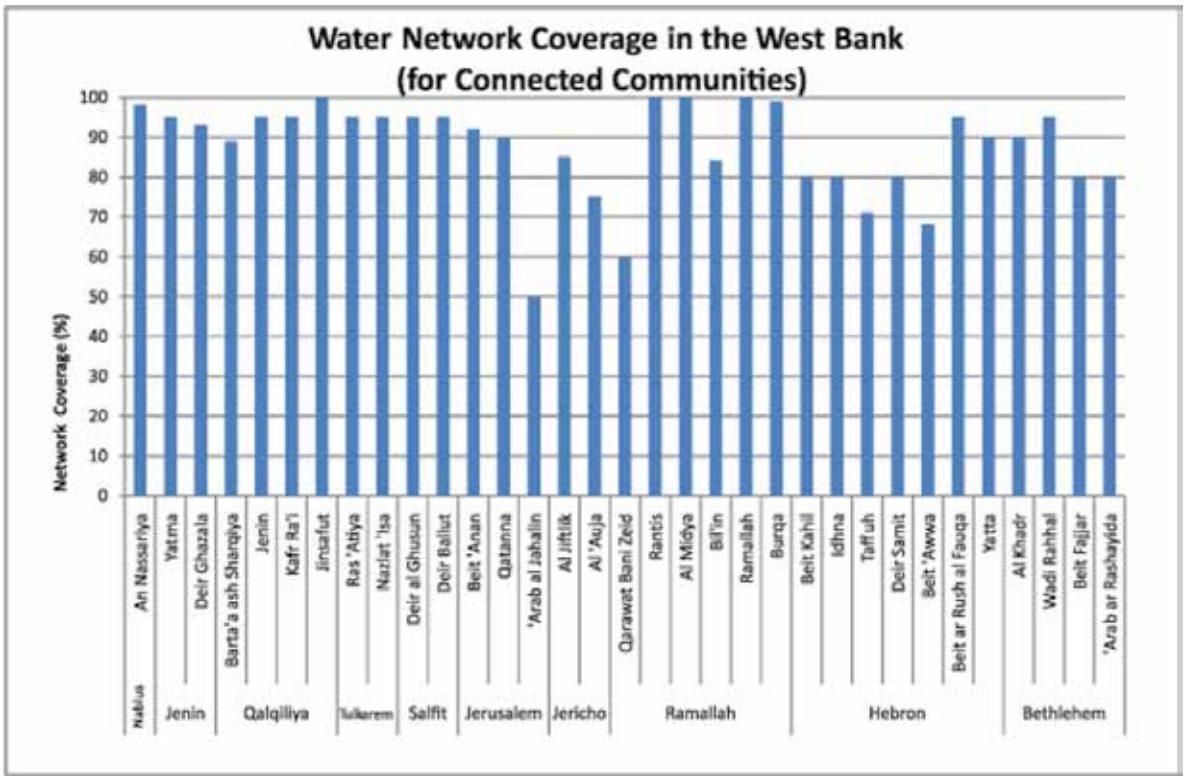


Figure 4.2: Water Network Coverage in the WB for Connected Communities (According to surveyed communities)

According to the chosen sample communities, the Wash monitoring period 2007/2008 reveals extremely low water supply in the geographically driest governorate in Palestine. Moreover, Hebron has had a long history of deteriorating water and sanitation services largely due to restrictions posed by the occupation; although the city of Hebron and the surrounding towns and villages are connected, Israeli restrictions such as checkpoints, the wall, intermittent zones C, and settlements have harmed the water network coverage in many parts of the governorate.

In a different way, The Gaza Strip's small area and high density population has allowed it to have a better water network coverage than the WB as shown in Figure 4.3. In addition, it has higher dependence on Palestinian sources mainly supplied by CMWU. The failure to supply people with sufficient water resources could largely be attributed to the instable political conditions

during the past two years. As emphasized in the WaSH MP 2006 annual report, the economic embargo placed upon the PA following Hamas' electoral victory has had immense implications on the funding of projects concerning water and sanitation services. In August 2007, the siege policies have contributed to cutting the fuel supply needed to run the Gaza Power Station. This directly affected the distribution of drinking water supply as well as numerous wastewater pumping stations. Furthermore, the Israeli seizure of the Gaza Strip not only interrupted the management of local institutions, but hindered the undertakings of ICRC, UN Agencies and INGOs.

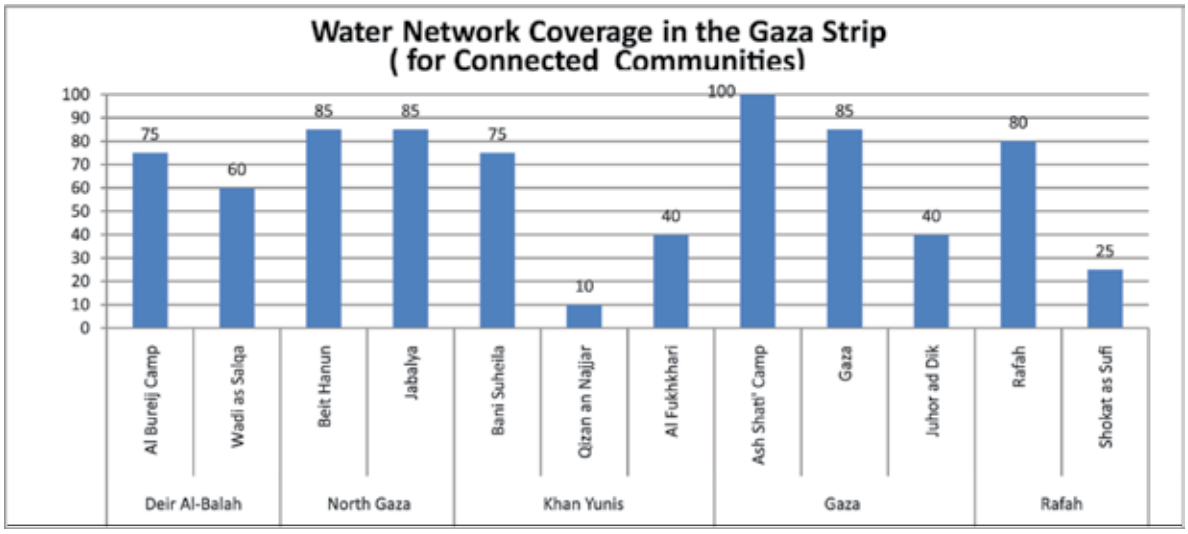


Figure 4.3: Water Network Coverage Rates in the Gaza Strip for Connected Communities (According to surveyed communities)

4.1.2 Loss in the Water Supply Network

In the oPt, the water supply network suffers from high loss rates during the process of distribution. In 2005, the PWA proclaimed that approximately 39% of the total oPt water supply is lost annually. This constitutes a major obstacle to the development of efficient water and sanitation services in the oPt. Additionally, especially since the Palestinian people receive a miniscule quantity of water, the phenomenon of high loss rate in the water supply cannot be tolerated. According to the data announced in 2005, PWA showed the rates of water loss in the different governorates as follows: 28% in Ramallah, 41% in Bethlehem and Hebron, and finally a lofty 53% in Tulkarem and Qalqilya.[45]

In the mean time, the population weighted average of water loss rates for the different governorates in the oPt for the communities connected to a water supply network and according to the 60 surveyed communities are shown in Figure 4.4. These values show the effects of water loss on the household level rather than the whole community and reflect the general problem of high water loss rates faced by the Palestinian water sector.

It is thought that the potential three main causes of such water loss are as follows: Illegal connections, worn out pipe systems (networks), and utility dysfunction. World Bank report 2009 notes that the average consumption in the Gaza Strip reaches a mere 60% of the water supply levels, which is primarily caused by the large web of illegal connections pirating the pipeline system. The PA's rule over water management in Gaza since the interim agreement

45 Wash MP (2006).

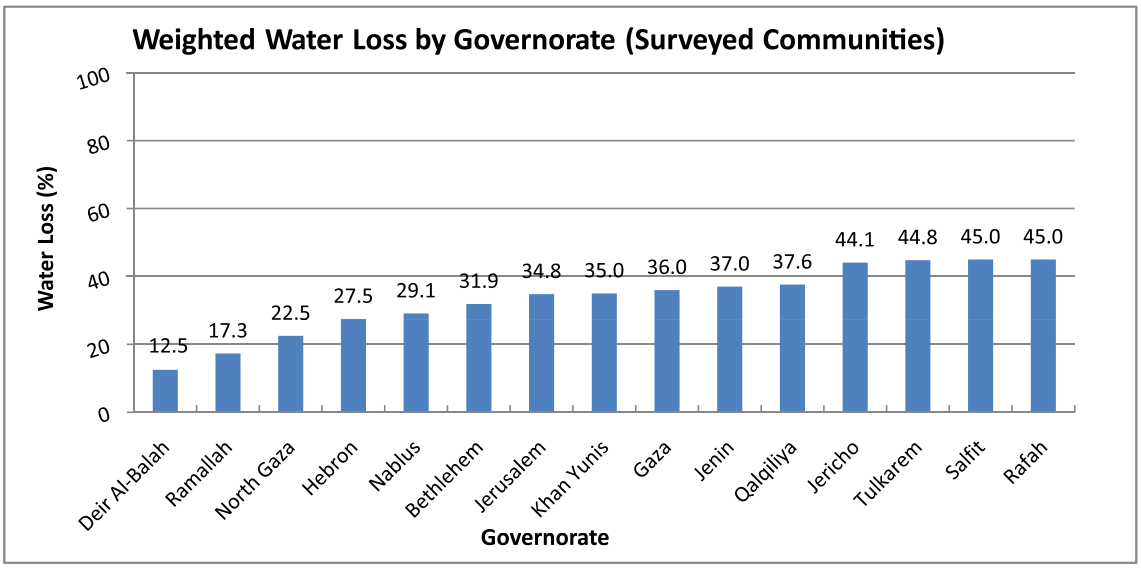


Figure 4.4: Weighted Water Losses in Network (According to surveyed communities)

has not prevented the illegal abstraction of water through different methods, among which unlicensed wells. This however is the direct consequence of the absence of a solution to the water shortages faced in the Strip, which is worsening with the deterioration of the Coastal Aquifer. Taking into consideration the dire shortage in water supply in a strip of 365Km2 holding over 1.5 million inhabitants, people find themselves resorting to illegal means to obtain their household needs.

Furthermore, the conditions of water supply utilities suffer from grave deficiencies causing high leakage rates and a weak water pulse in the system. This is considered a major problem stemming from both institutional weakness and the restrictions posed by the occupation on the development of the water and sanitation sectors. For instance, the siege on Gaza has proven that once put under excruciating circumstances, it is difficult to manage water and sanitation services. The closures managed to restrain the PA's ability to provide the proper maintenance services to the water networks, which along side the incursions and airstrikes has caused great damages to the water and sanitation infrastructure. Today's institutional bodies in charge of managing water resources in the oPt simply do not have the capacity to deal with such deep-rooted problems within these sectors. However, the Jerusalem Water Undertaking (JWU) has proven that within the right conditions, Palestinian operators can be efficient and provide the proper services to people.[46]

Finally, the problem of water loss contributes negatively to the already insufficient water supply in the oPt, which causes an amplified reliance on purchased water from Mekerot. The unfortunate extent of this problem on the national level is shown in Figure 4.5. This situation calls for further development of the water infrastructure through governmental and non-governmental projects and plans that attest to the a coordination amongst the different parties.

46 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009), pvii.

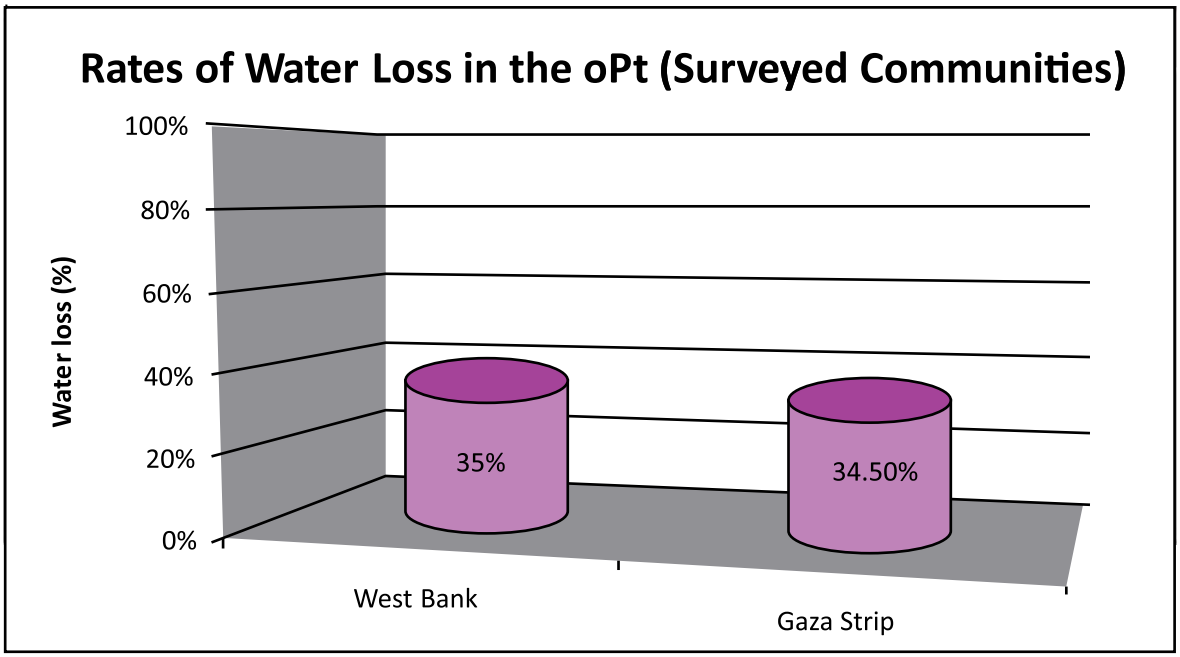
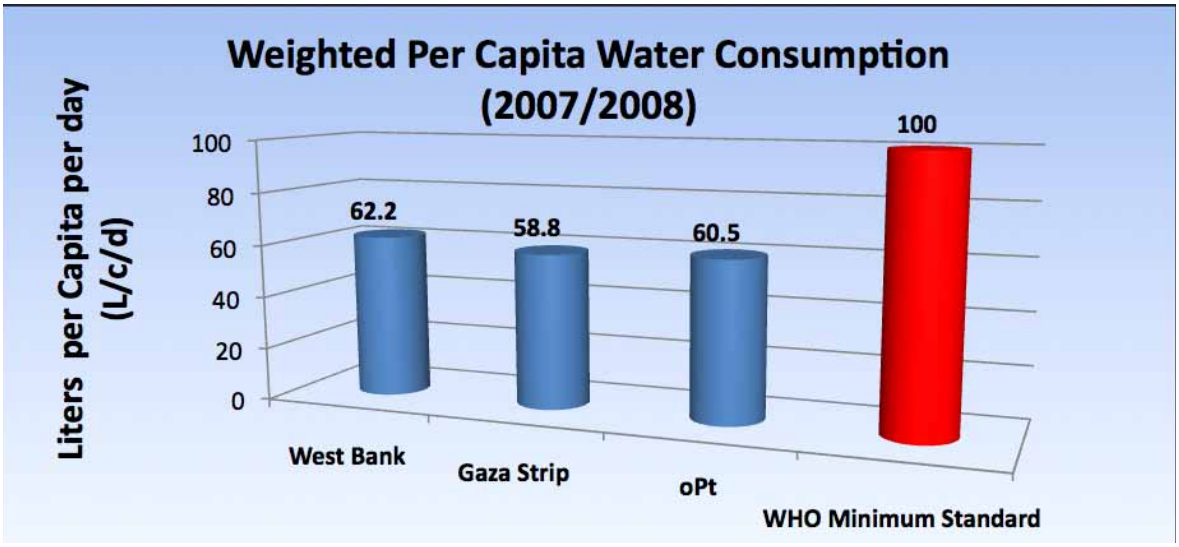


Figure 4.5: Water Loss Rates in WBGS for Connected Communities (According to surveyed communities)

4.1.3 Average Per Capita Consumption in the oPt:

According to the group of communities surveyed in 2007/2008, the weighted average domestic per capita water use in the West Bank was 69 L/c/d, while for Gaza it was no more than 63 L/c/d as shown in Figure 4.6. These consumption rates may appear irregular once compared with previous WaSH MP reports that demonstrated relatively higher per capita water consumption rates. From a technical stand point, this change may have resulted from two main reasons; the first is that throughout this monitoring period, the per capita consumption was evaluated on the basis of population (weighted) rather than the usual analysis that were formulated according to the community. This is an understandable approach since it accounts for the constant high population growth in the oPt. The second reason may be attributed to the approach taken by WaSH MP 07/08 regarding surveying a selected group of 60 communities as opposed to a comprehensive survey of all oPt communities. Regardless of the factors contributing to such a shift in regional proportionality, it certainly remains the case that the average per capita consumption in the oPt resides far below the WHO minimum level.

The extremely low per capita water consumption in the oPt has been a source of concern to many international humanitarian organizations and agencies. In accordance with recommendations given by both the World Health Organization (WHO) and the United States Agency for International Development (USAID), it is internationally recognized that the minimum per capita consumption for all people should not go below a daily minimum of 100 liters per capita (L/c/d). In reality, the average per capita consumption in the oPt has long resided below the minimum acceptable standard of 100 L/c/d line. This catastrophic phenomenon is thought to have adverse effects on the general health and hygiene of the Palestinian population, especially those living in less developed areas namely refugee camps and rural communities.



4.6: Weighted Per Capita Water Use in the OPt (According to surveyed communities)

In addition, the siege imposed on the Gaza Strip has extensively stifled the delivery of water supply, thus depriving a population of 1.5 million from a decent consumption rate. Firstly, the cutting of the fuel and power disrupted the operation of many water utilities, such as those dealing with the abstraction, treatment and distribution of water. Secondly, Israeli incursions and military maneuvers have not refrained from targeting water servicing institutions, treatment utilities, water networks, roof tanks, and wells. Thirdly, the decline in donor funding following the parliamentary elections in 2006 has caused the PA's budget for water and sanitation services to shrink. Consequently, this has resulted in the lowering of both the water supply as well as the per capita consumption rates of Palestinians in the oPt.

In 2007/2008, the average per capita consumption rates throughout the oPt ranged from a low 28.5 L/c/d in Hebron to a high 133.3 L/c/d in Ramallah as shown in Figure 4.7. The consumption in Ramallah is suspected of being an over-estimation of the actual rate due to potential data inaccuracy that may have resulted from combining the household with industrial consumption.[47] While the low consumption rates in Hebron are attributed to a combination of factors such as the arid nature of the area, the low accessibility to a water network, water supply reductions by Mekorot, and high loss rates in the water network of connected communities. Although normally comprising the highest per capita consumption in the oPt, Jericho appears to encompass a mere 46.8 Liters of daily per capita domestic consumption. This might be due to the average domestic consumption of the two communities selected for it under the "60 community framework" (Al Jiftlik and Al 'Auja). The low per capita consumption in these two communities (52 and 42 L/c/d) is a direct result of both the incomplete coverage of water networks as well as water cuts implemented by Mekorot. Furthermore, because Jericho is located in the Jordan Valley, it encompasses large quantities of water (mainly groundwater resources). However, Jericho is currently allocated lesser quantities of water, which reduces the per capita consumption rate especially that heavy contamination of the shallow aquifer prevents people from pumping an additional supply.

47 In the past decade, Ramallah has developed a large industrial sector.

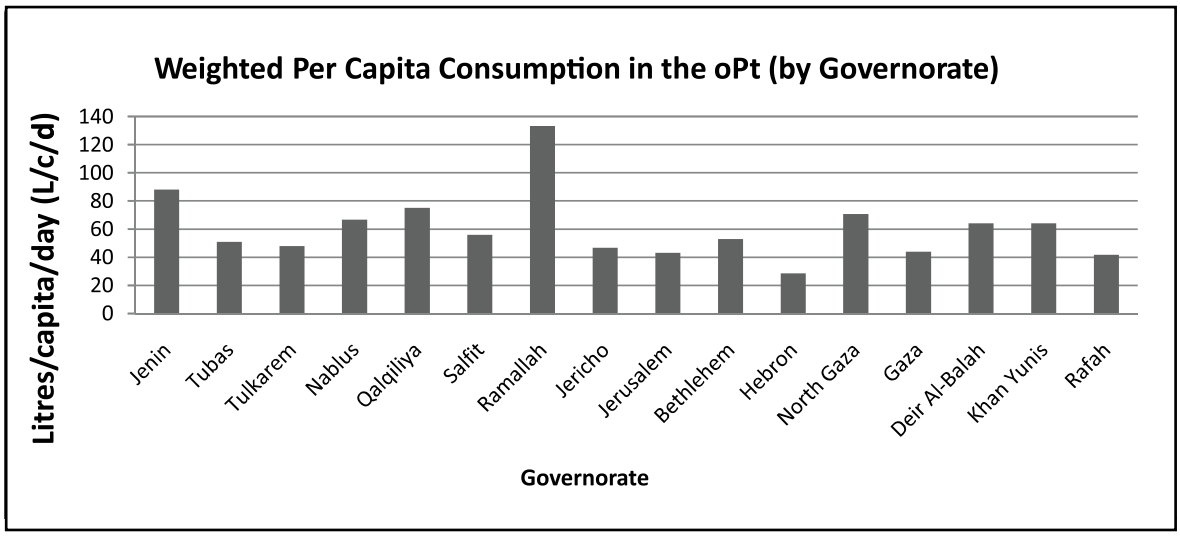


Figure 4.7: Weighted Per Capita Domestic Consumption by Governorate (According to surveyed communities)

The Northern WB governorates still suffer from chronic shortages in the water supply as revealed in the cases of Tubas (51 L/c/d) and Tulkarem (48 L/c/d). Moreover, the Northern area of the WB suffers from the following two major problems: the high rates of water loss and the routine Israeli water cuts. Finally, the northern portion of the Gaza Strip bears a much higher average domestic consumption than other areas because it falls within a geographical location where the Gaza Coastal Aquifer has not been as extensively over-pumped.

4.2 Sanitation Services:

4.2.1 The Wastewater Situation in the West Bank

The wastewater situation in the oPt is rather appalling; over 60-75 Mcm of sewage and wastewater is produced annually with insignificant quantities being treated or reused. Although the past decade has allowed for the expansion of the water supply network, this has not been met with analogous development of the wastewater network which currently only covers around 30-40% of oPt communities.

B'Tselem affirms that settlers produce over 38% of the total wastewater in the West Bank, with only 81 settlements having wastewater treatment plants. These plants treat a very small portion of settlement wastewater in addition to deploying old treatment technologies that are largely inefficient and suffer constant technical difficulties. Excluding East Jerusalem, WB settlements mainly located on hilltops dump 17.5 Mcm annually over to nearby Palestinian towns and villages falling downstream (B'Tselem, 09). This has resulted in the pollution of agricultural lands and natural water reservoirs as well as having immense health effects on the surrounding Palestinian communities. On the long run, this unregulated dumping is expected to instigate an environmental crisis especially with the pollution of the single largest provider of groundwater in the oPt (the Western Aquifer).

Palestinians have been prohibited from developing wastewater treatment plant that could potentially contain the environmental catastrophe currently occurring in the WB. To illustrate this catastrophe, we present a case from Hebron governorate, where the effluent have caused contamination to the groundwater Well serving Arrihiye and leading to sever health problems.

See the details in the case study box. In the mean time, Palestinians only have one properly functioning treatment plant in Al-Bireh and three other poorly functioning in Hebron, Jenin, and Tulkarem,while the Ramallah treatment plant is moderately efficient. World Bank report (09) indicates that the efficiency rates of most of the wastewater treatment plants in the West Bank do not surpass 10-30%. Furthermore, this situation has been caused by several Israeli policies restricting the development of a Palestinian sanitation infrastructure. B'Tselem illustrated many of these polices, which are summarized as follows:

- Delays on Palestinian projects by the Civil Administration, in many cases extending for over a decade.
- Israel requires Palestinians to deploy high tech. treatment plants that are not yet utilized in Israel itself and go far beyond the standards set by WHO. This runs up the costs for any potential project.
- Approved treatment plants are in most cases required to serve nearby settlements, which is highly problematic due to the large quantities of sewage produced by these settlements and the elevated operational costs. The expenditure would increase substantially if settlements are served.
- As a result of Israeli delays, many funders have cut off their funding of numerous Palestinian projects.

Case Example: Al -Reheyya Well Contamination by the Sewage Effluent

This is a groundwater well of a depth around 450 m. below surface, located to the west of Yatta and southwest of Al-Reheyya village. Its productivity is 50 CM/ hr and it mainly served the two communities of Al-Rehhyya (4500) and Beit Imra (3000) in addition to 2000 people through the Yatta Municipality.

The problem arised when West Bank Water Department tested the water quality of the well. The test results revealed that the well is highly polluted with fecal coliform bacteria (FC) and total coliforms bacteria (TC) before and after the chlorination process. The analysis showed that the bacteria is continuously increasing when the water abstraction from the well ceased. These samples were examined and analyzed in 4 Labs (WBWD, Bethlehem Water & Waste Water Utility (BWWU), Ministry of Health, and Bethlehem University) all the results of that labs confirmed pollution due to sewage contamination, from wastewater stream of **Qaryat Arba' settlement** and Hebron city which passes at 250 m alongside the well Figures 1 &2.

It is imperative to mention that water from (wadi al-Samn) is running since years parallel to this well, the wadi discharges not less than 8000 CM per day of mixed domestic and industrial wastewater. The total path length of the wadi inside the West Bank extending from source to the district border is some 38 kms and has allowed pollution of not less than 50 sq.kms of land.

An important risk which is expected to be taking place now is contamination from heavy metals, the question is: Does the well water already contain some concentration of heavy (toxic) metals especially that some heavy metals are expected to be discharged from tannery industry?

Lastly we note that this situation has occurred previously in al-Fawwar camp (in 2001) when the two ground water wells were contaminated from the area's sewage stream also al-Arroub camp was susceptible to similar conditions.

The question is: **Aren't we in a real need to make protection zones for our groundwater wells!?**

Otherwise we are afraid to shut off these wells for long period or we may lose these vital water supply sources especially for the Southern area of the West Bank which has very harsh water availability conditions.
Consequently, Palestinians rely on old methods in handling the overflow of sewage and wastewater such as septic tanks and cesspits. While septic tanks are self serviced, cesspits require regular emptying and transportation to their final disposal location. Finally, the reuse of wastewater for agricultural purposes following treatment is almost completely absent in the oPt even though 8 -10% of Palestine GDP comes from agricultural.

4.2.2 Wastewater Network Coverage

According to the 60 surveyed communities, the wastewater network was found to cover 47% of the population in the oPt. Coverage in the Gaza Strip appears substantially higher than its national with a 78.9% weighted coverage rate as opposed to 15.3% in the WB as Shown in Figure4.8.

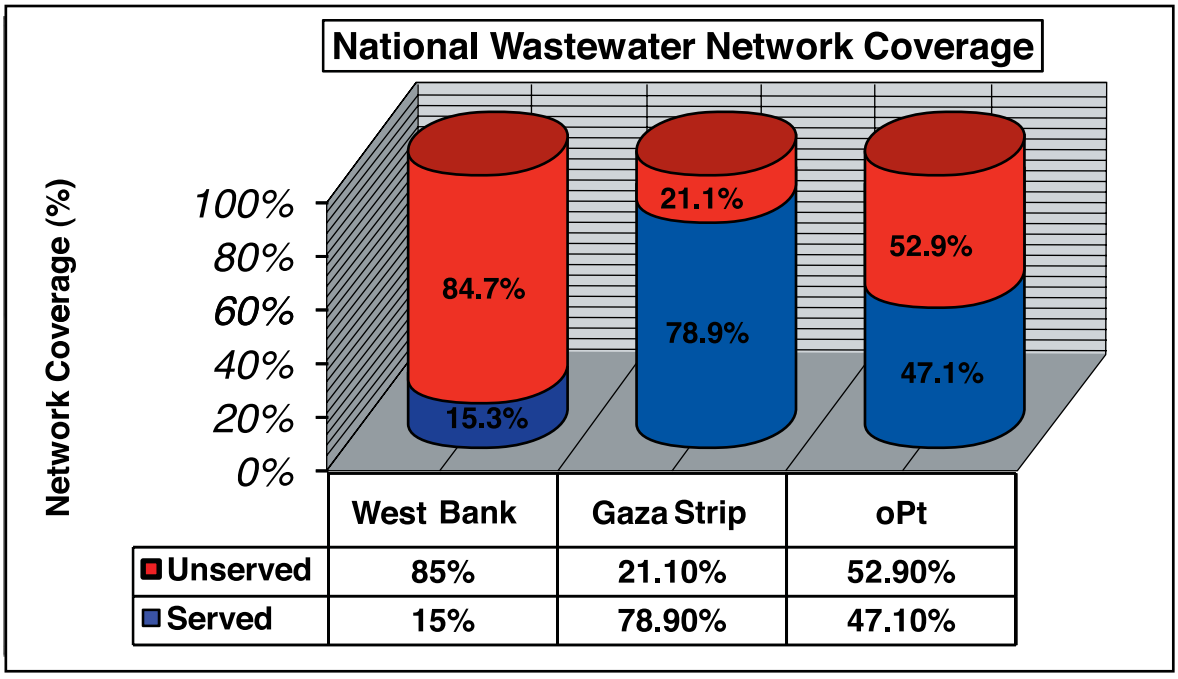


Figure 4.8: Weighted – Wastewater network coverage by region (According to Surveyed Communities)

As can be seen, approximately 53% of the Palestinian population still lacks access to a wastewater network. In this regard, the majority of communities in the oPt remain reliant on more basic disposal methods such as septic tanks and cesspits. However, cesspits require regular cleanups, which is a process many families simply cannot afford. For that reason, many cesspits are left to overflow and infiltrate the ground causing severe damage to underlying groundwater aquifers.

To further indicate the coverage of wastewater systems in the West Bank, some governorates were selected from within the 60 surveyed communities to indicate the variation in the wastewater system coverage in these governorates. Figure 4.9 below gives the highest coverage rate to Ramallah followed by Bethlehem and Jenin. As for Hebron, because the city of Hebron was not part of the selected communities, the coverage appears minimal, while in reality the city has more than 60% coverage of collection system. It remains the case that major urban centers have the paramount coverage rates in the oPt. Other governorates like Jericho, Salfit, and Tubas have had lower network coverage mainly due to the lack of permits from the Israeli Authorities to construct such systems as well as the lack of funds.[48]

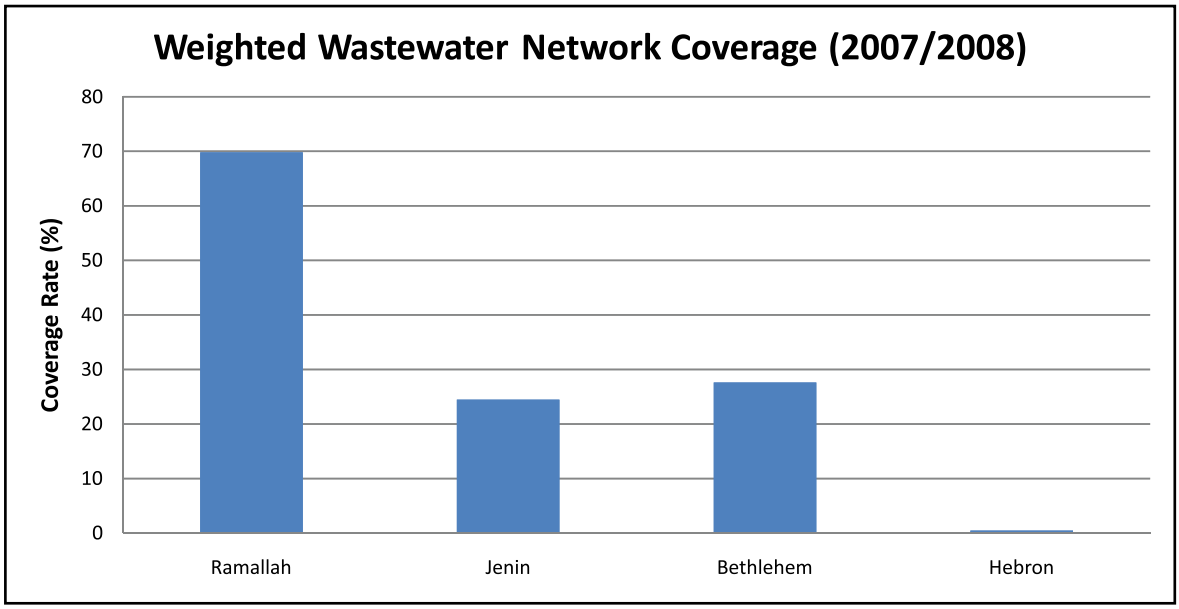


Figure 4.9: Weighted Wastewater Network Coverage in the WB by Governorate (According to WaSH MP 07/08 surveyed communities)

As mentioned earlier, the Gaza Strip enjoys considerably higher wastewater network coverage than its fellow national in the WB. The installation of this network was mainly prompted by the urgent humanitarian needs in the Strip, among which sanitation services were given a top priority. For a more graphical image, the Gaza Strip is a small geographic territory holding over 1.5 million people living on top of a heavily contaminated aquifer that would not be able to withstand any further wastewater flow. In 2005, the Israeli withdrawal from the Strip enabled further expansion of its water and sanitation networks.

On the national level, the wastewater network falls short of insuring the basic sanitation needs of most communities in the oPt, especially in rural WB areas. Consequently, the predominant majority of Palestinian communities rely on cesspits and septic tanks. Furthermore, high cesspit and septic tank coverage has not necessarily secured the basic needs of the Palestinian

48 Once observing this graph, it is imperative to understand that communities that are not presented might contain some sort of wastewater network. These governorates have attained a 0% coverage rate strictly through the information gathered from the sample communities initially selected to represent them (“60 community framework”).

communities for sanitation. Cesspits are particularly problematic because they are not serviced as regularly as aspired, which causes the pits to fill up spilling wastewater that contaminates underlying water resources as it infiltrates the ground. The wastewater may also contaminate nearby cisterns and crops, both phenomena incorporate serious health risks.

4.3 Health and Hygiene in the oPt:

The underdevelopment of the water and sanitation sectors in the oPt has allowed for the spread of water related diseases that jeopardize the general health and hygiene status of the Palestinian population. The improper treatment of sewage and wastewater remains the single most detrimental factor behind the spread of infectious and parasitic diseases. WaSH MP continues to proclaim a number of waterborne diseases that were identified in the oPt; amongst the most prevailing ones are Amoebas, Hepatitis A, and blue baby syndrome. Other diseases revealed through epidemiological studies are throat infection, Diarrhea, Rhinitis, skin diseases, Asthma, Dysentery, Jaundice and cancer.

Water quality and wastewater disposal or/and treatment constitute the two main obstacles standing in the way of improving the current health conditions in the oPt. Considered one of the main inducers of the many health problems in the oPt, the quantity and quality of water supplied to households. As shown earlier in this report, the water supply network is incapable of serving all communities in the oPt, which leaves many communities with per capita consumption rates far below the recommended limits. Generally, reduced per capita consumption rates resulting from shortages in the water supply limit the extent to which people are able to use water for hygiene practices. Even the communities that enjoy full water network coverage may suffer from severe water cuts by Mekorot. These cuts may extend for long period of time especially throughout the summer season. Alongside the poor maintenance of pipelines, these water cuts may cause pipelines series damage such as rusting, which deteriorates the water quality.

The water deficit, especially in non-urban areas, forced many of the Palestinian communities to turn to alternative water sources thought to be plagued with waterborne diseases. Cisterns, for example may be unsafe if implanted next to cesspits or if not maintained properly. Furthermore, tanker water may be contaminated depending on its source, but it has been common to abstract this water from biologically contaminated springs. Unfortunately, these very same springs, are the main source for crop irrigation in many rural communities. All in all, improving WaSH conditions in the oPt must take the issue regarding the water quality into consideration, as reported by the USAID “the provision of reliable, piped, treated water as the single most important intervention for increasing health and quality of life in the West Bank”.[49]

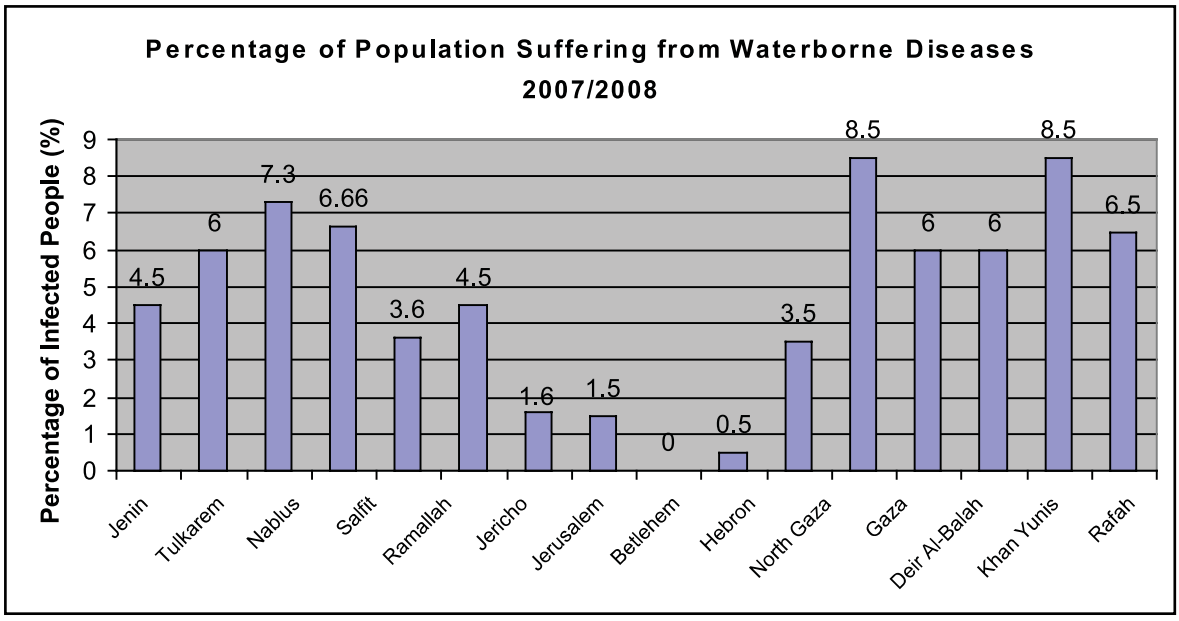
On the other hand, the unregulated wastewater disposal by both WB settlers and Palestinians has provoked many of the current health problems. Most of the wastewater produced in the WB is dumped in open spaces and allowed to flow downstream contaminating the land and water as well passing through Palestinian communities causing severe health tribulations. With the limited quality and coverage of health care services in the oPt, it could generally be regarded a difficult task to identify and monitor the occurrence of waterborne diseases, except for incidents of large scale infection in a certain community. An example of such incidents is Burin (Nablus), where over 450 people were diagnosed with Hepatitis A due to the free flow of untreated wastewater. Alternatively, many humanitarian organizations measure the health impacts of such diseases through observing the rate of diarrhea amongst infants.

The many wells dug by people in the oPt also hold the potential of being contaminated due to groundwater pollution from wastewater or salt water intrusion. This scenario has appeared catastrophic in the Gaza Strip, where the coastal aquifer is highly contaminated due to over-

49 “West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development”, (The World Bank: April 2009), p.23.

pumping, the use of agrochemicals, and the infiltration of wastewater. Today, people are rarely able to extract healthy water because the saline aquifer in the Strip suffers from due to high concentration of chloride and nitrates, the latter being the cause of Blue Baby Syndrome.

Based on the WaSH MP 07/08 surveyed communities, the percentage of population suffering from waterborne diseases in each governorate is revealed in Figure 4.10. It is shown that 3.6% of the WB population and over 7% of people in Gaza suffer from water-induced epidemic diseases, giving a high percentage of 5.8% in the oPt. In March 2007, a large wastewater lake in a Beit Lahia treatment plant flooded instantly causing the death of five people and injuring 25 others (OCHA, 2007). Some of the most persistent epidemic diseases resulting from this event were Scabies and skin diseases (WHO, 2007).



4.10 Percentage of people suffering from waterborne diseases in the oPt 2007/2008 (According to surveyed communities)

On a different note, the solid waste collection system expands throughout most of the oPt and functions efficiently according to services provided by municipalities and local councils. However, the major problem with this system resides in insuring enough sanitary solid waste landfills to accommodate for all that's being produced. This is primarily due to Israeli licensing regulations, which have so far denied Palestinians permits to construct these landfills. In many cases, municipalities and local councils are left with no choice but to dump the solid waste in open areas away from their communities. Another problem is the high cost of transporting the solid waste from place to another.

4.4 Expenditure of Water and Sanitation Services:

The political and economic instability following the 2006 elections has had prominent effects on the delivery of water and sanitation services. The economic embargo placed on the PNA hindered its ability to pay the salaries of workers in the water and sanitation sectors for long periods of time, which led to protests and strikes that have affected the operation of many services in the oPt. These economic circumstances were exacerbated by Israeli economic and political sanctions, which have aimed at primarily weakening the newly elected Palestinian government as well as aggravating the daily hardships in the oPt in expression of its refusal to choices made by the Palestinian people. The outcomes of such economic and political conditions throughout 2007/2008 have caused a substantial increase in the expenditure of

water and sanitation services for the average Palestinian. In 2006 alone, over 2.272 million Palestinians were below the poverty line[50], constituting around 57% of the general population (PCBS). With a 21% increase since 2007, the unemployment rate reached 27.9% in the last quarter of 2008 making it yet harder for Palestinian households to afford the costs of water and sanitation services.[51] Alternatively, in 2008 the national GDP increased by 2.3% in comparison to previous years, however the per capita GDP formed only 80% of its value in 1999.[52]

Regionally, high population density and Israeli siege policies have contributed to elevated unemployment rates in the Gaza Strip comprising approximately 80% of its population in 2006, in contrast to 22.6% in the West Bank that same year.[53] However, the Gaza Strip does enjoy better water and wastewater network coverage, thus the communities paying the highest costs for access to water and sanitation are those rural C zone areas (mainly in the WB) with some lacking a connection to either of the networks. In many cases, this has forced these communities to rely on costly tanker water for supplying their water needs and having to attend to private services for emptying their cesspits, which is also a costly process. Households living in such circumstances are thought to pay nearly half of their household budget on water and sanitation services, while being exposed to scores of health risks.[54]

4.4.1 Cost of Water

The costs of accessing a water supply in the oPt are exceptionally high for most households, especially taking into consideration the high unemployment rates and low average incomes. The following figure shows the monthly household budget spent on water, which far exceeds the 3.5% standards recommended by UNICEF and WHO. The cost of tanker water has increased by more than 50% of its value prior to the second Intifada.

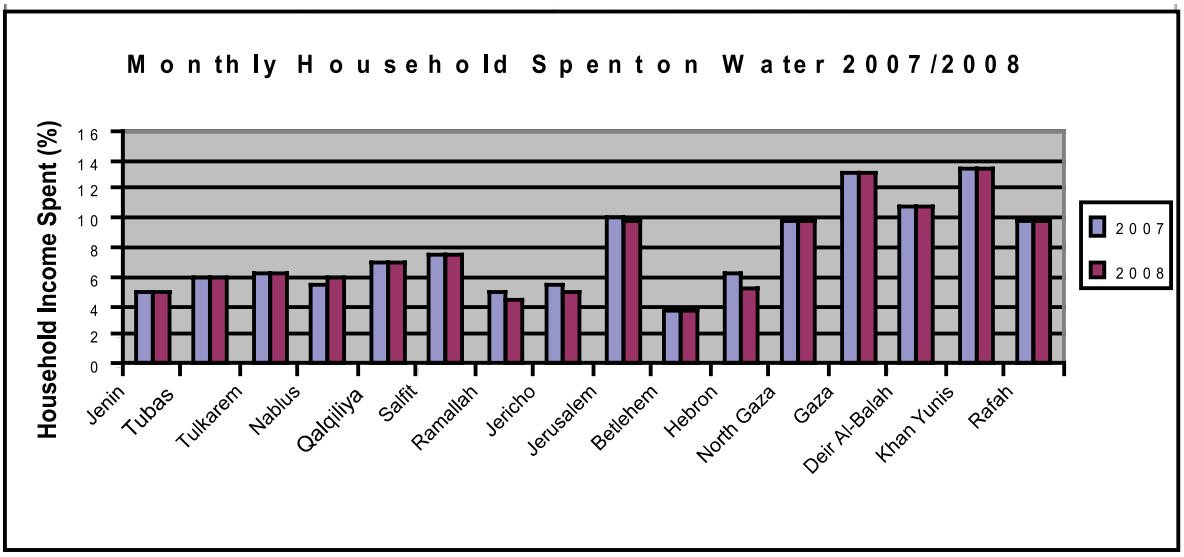


Figure 4.12 Monthly Household Percentage of Income spent on Water (According to surveyed Communities)

50 The poverty line is established at having a monthly income less than 2300 NIS.

51 Poverty in the Palestinian Territory (PECDAR)

52 Economic and Social Monitor (details shown in bibliography).

53 Poverty in the Palestinian Territories, (Ramallah: PECDAR, 2008).

54 "West Bank and Gaza Assessment of restrictions on Palestinian Water Sector Development", (The World Bank: April 2009).

In 2007/2008, residents of the West Bank and Gaza Strip have respectively paid an average 6.1% and 11.6 of their income on water. The highest expenditure appears in the governorate of khan Yunis due to tariffs posed on the municipality as well as the fact that the south central region of Gaza contains the worst quality water in the Strip due to high contamination of the Coastal Aquifer. The reason for the proliferation of expenditure rates in other governorates in the Strip is attributed to the political instabilities forcing people to alternate to more costly services such as tanker water. In the WB, Jerusalem had the highest rates due to poor socio-economic conditions of its residents as well as the restriction posed by the occupation to separate Jerusalem from the rest of the WB.[55]

The poor water services, water cuts by Mekorot, and the lack of a water network in some areas have left many communities with no option but to purchase tanker water. In many cases, this water is abstracted from contaminated springs and wells, which poses eminent risks to the health of its consumers. The expenditure of tanker water has usually been substantially higher than that of network water, yet with the Israeli restrictions on M&A the costs of this supply have amplified in recent years. In a poorly regulated market, private vendors of tanker water control the water prices depending on the particular situation of each community. In many cases of severe water shortages, tanker water providers have taken advantage of the high demand on water supply by raising the prices. Figure 4.13, shows the variation of the water prices supplied by tankers in the oPt.

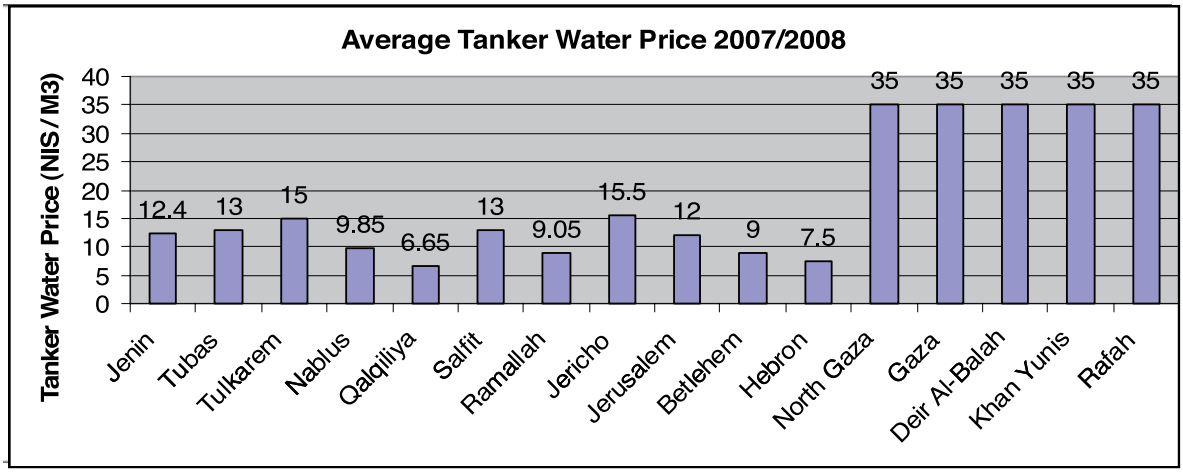


Figure 4.13 The Average Costs of Tanker Water in 07/08 by Governorate (New Israeli Shekels/ Cubic meter) [According to surveyed communities]

Although the WB is more dependent on tanker water, the political situation the past two years alongside the depletion and deterioration of the Coastal Aquifer have both contributed to a noticeable rise in the use and expenditure of tanker water in the Gaza Strip. Additionally, transportation difficulties prompted by Israeli incursions and restriction on M&A are significant factors in the increase of the tanker water costs in the oPt. In the WB, the highest expenditures falls within the northern governorates, which is ascribed to the following causes: geographical distribution, the large rural base, the entrapment of many communities within zone C areas, the distance of tanker water sources, the effects of the Separation Wall, and the prominence of checkpoints.

55 These restrictions are articulated through the use of the Separation Wall and checkpoints to impede the accessibility of water services to east Jerusalem. This has affected to the delivery and quality of water services.

Water Tankers at a Filling Point in Beit Ar Rush At Tahta (Hebron) Supplying 7 Nearby Communities.

Finally, Figure 4.14 shows the percentage of households that pay water bills in the oPt according to the 60 surveyed communities. The low percentage of people paying water bills in the Gaza Strip and some areas in northern WB are attributed to an increased reliance on tanker water as well as the inability to afford paying bills.

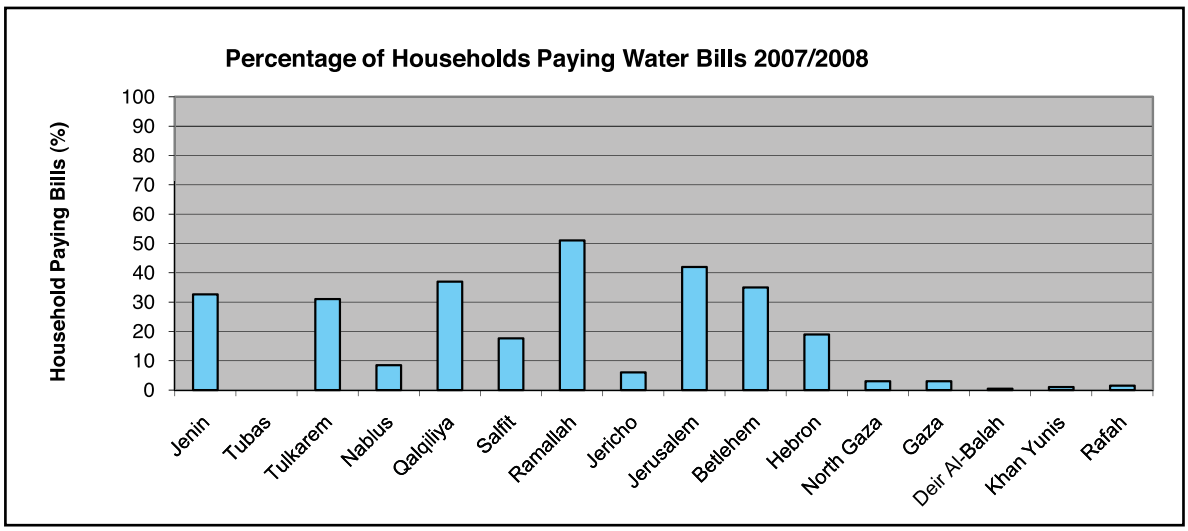


Figure 4.14: Percentage of Households Paying Water Bills in the OPt 2007/2008 (According to surveyed communities)

3.4.2 Costs of Sanitation Services

The data collected throughout the 2007/2008 WaSH MP has shown that the overall percentage of household income spent on sanitation in the oPt was around 4%. Figure 4.15, shows the variation in the percentage of income spent on sanitation services across the different surveyed communities in the oPt.

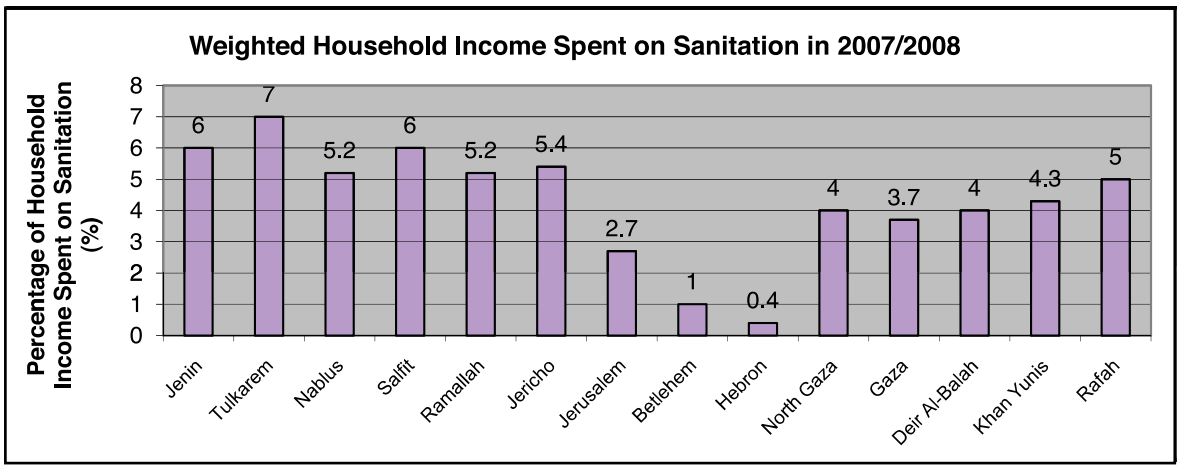


Figure 4.15: Weighted Percentage of Household Income Spent on Sanitation Services (According to surveyed communities)

The figure shows high percentages of household incomes spent on sanitation in the Gaza Strip as well as in most governorates in the WB. As shown in previous sections, certain areas in Gaza rely heavily on cesspits and septic tanks as opposed to a wastewater network. Khan Yunis and Rafah in particular, heavily rely on cesspits, which raises the costs of accessing sanitation services due to the costly process of cesspit waste removal, rehabilitation and upgrading. Similarly, the high rates in northern WB communities are due to low wastewater coverage rates and predominant dependency on cesspits and septic tanks.

Chapter 5: Conclusions and Recommendations

Throughout 2007/2008, the deteriorated WaSH conditions in the oPt have been aggravated. This was primarily the direct result of Israeli policies concerning water and sanitation issues. On the one hand, Israeli tactics are revealed through the inequitable abstraction, allocation, and consumption of water resources in the West Bank. Israeli domination over water resources and its management has been a reality encountered by Palestinians since the occupation of the oPt in 1967. Unfortunately, this reality continues to persist today with even stricter policies in spite of the Oslo II Interim agreement, which supposedly allocated Palestinian the right to abstract WBGS aquifers and manage its distribution. Furthermore, Palestinians still suffer from water deficits as well as from high expenditure and water quality problems. On the other hand, Israel has also imposed restrictions on the development of sanitation services mainly through the pending Palestinian projects aimed at tackling sanitation problems occurring as a result of unregulated treatment of wastewater and sewage or the lack of in most communities. To further complicate the problem, Israel requires any approved treatment plant projects to account for the extensive amounts of untreated effluent from nearby settlements, while necessitating the application of high treatment standards that are not even implemented in Israel. This, in addition to physical restriction on the expansion of a wastewater network have allowed for the production of over 65 Mcm of wastewater and sewage annually. Consequently, discharging such large quantities of untreated water has had immense effects on the environment as well as the health, hygiene, and general well being of people in the oPt. Some of the most prevailing diseases occurring are Amoebas, Hepatitis A, and blue baby syndrome. Other diseases revealed through epidemiological studies are throat infection, Diarrhea, Rhinitis, skin diseases, Asthma, Dysentery, Jaundice and cancer.

The economic situation in the oPt since Hamas' electoral victory in 2006 has also contributed to impeding the delivery of many governmental services, among which water and sanitation are of utmost importance. The PNA's inability to cover the salaries of workers in these sectors resulted in a series of demonstrations and strikes that have obstructed the operation of many services. As a result, many Palestinian communities resorted to alternative methods for satisfying their water and sanitation needs, in most cases costing much more than the services provided by the PNA. For instance, water shortages or the absence of a water network forced many people to purchase expensive tanker water that encompasses a high potential for contamination. The price of tanker water was increased following Israeli incursions and restriction on M&A, which simply could not be afforded by many households. Also, many communities lacking a wastewater network have utilized cesspits that require regular servicing which is a costly process yet one that is needed for the prevention of wastewater overflow. However, the rise in expenditure of water and sanitation services was met with the unfortunate deterioration of economic circumstances. In 2006 alone, over 2.272 million Palestinians were below the poverty line[56], constituting around 57% of the general population (PCBS). With a 21% increase since 2007, the unemployment rate reached 27.9% in the last quarter of 2008 making it yet harder for Palestinian households to afford the costs of water and sanitation services.[57] Alternatively, in 2008 the national GDP increased by 2.3% in comparison to previous years, however the per capita GDP formed only 80% of its value in 1999.[58]

The Palestinian people are constrained from enjoying some of their most basic rights in regards to water and sanitation. Furthermore, the WaSH MP 2007/2008 emphasizes the importance of finding long-term solutions to the general WaSH situation in the oPt without marginalizing the vital role of urgent humanitarian aid that comes as a response to dire needs of certain communities. The per capita consumption level in the oPt remains far below the standard minimum recommended by WHO. Also, the percentage of income spent of water and sanitation far exceeds the value set by UNICEF and WHO. Once more, progress of any kind can only be achieved through ending the occupation in the oPt and allowing for the autonomous development of all sectors in the Palestinian territory.

56 The poverty line is established at having a monthly income less than 2300 NIS. (PECDAR, 2008)

57 Poverty in the Palestinian Territories, (Ramallah: PECDAR, 2008).

58 Economic and Social Monitor.

On a different note, the WaSH MP 2007/2008 adopted a new approach to data collection and analysis articulated by the selection of 60 communities from the WBGS to represent the general WaSH situation in the oPt. This year-round monitoring of the selected communities was accomplished through a monthly survey of its WaSH conditions. The questionnaire used in this approach is shown in Appendix-B. Furthermore, this approach significantly improved the quality of data compiled from the selected communities as a direct result of the frequent visits to the local councils and the cooperation that was needed to attain the goals of the monitoring program.

Following are some recommendations:

1. The region suffers from diminishing water resources that require immediate cooperation among riparian states for the management of water resources and their equitable allocation and distribution. Additionally, new water resources should be developed in order to subsidize the needs of people in the region. Israeli control over the bulk of water resources negatively affects any joint efforts with its riparian states.

2. Israel's domination over West Bank aquifers constitutes the chief obstacle for the development of the Palestinian water sector. The inequitable abstraction, allocation, and consumption of water are violations of international initiatives as well as the Oslo II Interim Agreement. Furthermore, Israel's control over water resources has been extended with the construction of the Separation Wall, which takes over 35 Palestinian wells installed to pump the Western Aquifer waters. Israel is required by international law to withdraw from all areas of the WBGS and allocate Palestinians the quantities their rightful shares in the water resources.

3. Israel's unilateral water policies in the oPt have caused a wide deficit in the Palestinian water budget. This has resulted in a forced dependency on the water supplied by the Israeli National Water Company "Mekorot", with approximately 52% of Palestinian domestic water use in the WB being purchased from Mekorot. It should become a political priority on the Palestinian agenda to reclaim Palestinian rights to abstract water from West Bank Aquifers and the Jordan River Basin.

4. Water bodies in charge of providing water and sanitation services in the oPt suffer from grave institutional weaknesses that could possibly be overcome with the creation of a central water authority that unifies both governmental and non-governmental organizations and agencies in the confrontation of the water supply challenges. This authority should enact laws allowing for the preeminent management and planning within the current circumstances. Additionally, this authority would help create alternative and sustainable solutions for the water deficit.

5. The deteriorating WaSH conditions in the oPt require the enhancement of data collection programs in order to examine and identify the problems that need to be addressed. This would help in identifying excruciating circumstances in certain community and path the way for humanitarian relief. Additionally, data collection would enable Palestinians to conduct long term planning. For instance, knowing the "real yield" for the Western Aquifer would help quantify the safe abstraction levels or would increase the preparedness for a next round of negotiations.

6. **There are many environmental concerns in the oPt that need immediate response. Some of these matters that are not being addressed adequately are as follows:**

- The contamination and increased salinity (due to Saltwater Intrusion) of the Gaza Coastal Aquifer.
- The discharging of large amounts of wastewater and sewage in the WB that is causing severe contamination to the groundwater aquifers and agricultural fields. Additionally, it has immense health effects on many of the communities exposed to such effluent flow.
- The over-exploitation of the Jordan River tributaries is causing the depletion of the Jordan

River and a large recession in the Dead Sea.

7. For improved water and sanitation services, it is imperative for the water and wastewater networks to expand its coverage in the oPt in order to cover all the Palestinian communities in need, especially those in rural areas or those that are located with zone C boundaries. Providing such services for Palestinian communities would render them from pursing expensive alternatives such as buying tanker water or using cesspits that need to be emptied regularly. Thus, these services would also benefit the Palestinian customer by reducing the expenditure of water and sanitation services, especially with the current economic circumstances.

8. In regard to improving the current deteriorated WaSH conditions in the oPt, international funding remains an important means for the general development of the water, sanitation and hygiene services. This enables the PNA and other non-governmental organizations to offer immediate help to communities in dire need to find solutions to improve their WaSH status as well as building up a strategic planning capacity. Moreover, increasing international funding may help to approach targets set by the Millennium Development Goals.

Short term future solutions for the current WaSH situation reside in micro-level projects as well as overcoming institutional weaknesses through improved management of water, sanitation and hygiene services. Water management in particular, requires the creation of a central water authority capable of unifying the different water bodies, which are currently functioning separately for the most part and practicing minimal cooperation with other organizations and agencies. Some micro-level projects to resolve the water supply deficit are exemplified with the intensification of rainwater harvesting and desalinating projects. Both these methods are vital techniques in confronting the water and sanitation challenges caused by Israeli occupation. However, long term solutions for improved WaSH condition can only be attained through attaining the Palestinian water rights and the halting of all obstacles in the way of developing these sectors. This also involves the termination of its monopoly over shared resources but rather adopting policies that allow for their equitable sharing. Moreover, the water crisis in the region requires cooperation to achieve mutual goals through better management and planning of water resources. The chances of achieving such aspirations in the near future appear minimal once taking into consideration Israel's unilateral policies aiming at creating "facts on the ground" concerning the status of water and sanitation in the oPt. However, Palestinians remain hopeful for a new political environment that allows them to enjoy their natural rights in their resources.

The WaSH MP 2009 will continue to adopt the sample of selected community framework, however for the purpose of a more representative community sample group the list will be modified and expanded. The reevaluation of the 07/08 monitoring period as a whole has enabled the PHG team to develop a comprehensive work plan that will aim at surveying the new selected communities several times annually. This will allow for a precise measurement of the fluctuation of WaSH indicators throughout the year. Surveying the selected communities will aim at collecting data that corresponds with the following ten WaSH indicators: Water supplied per capita per day (liter), Wastewater Network Coverage (%), Connection to Cesspits or Septic Tank (%), Availability of Solid waste Collection System (%), Cost Recovery for Water Supply Services (%), Water supply services provided by the local council, Unaccounted for Water within the Water Supply System (%), Monthly Household, Income Spent on Water Supply (%), Monthly Household Income Spent on Sanitation (%), Major Community Problems and Needs. Finally, we will also conduct an annual comprehensive survey of all WBGS communities in hopes that the general WaSH situation in Palestine is properly addressed in the near future.

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Appendices:

Appendix-A

WaSH Situation Indicators used for Community Surveys

Key indicators that reflect the difficulties that Palestinian communities face with regard to water supply and sanitation services include:

1. Water supplied per capita per day (liter): estimated quantity of water supplied per person per day.

2. Wastewater Network Coverage (%): percentage of households connected to a wastewater network.

3. Connection to Cesspits or Septic Tank (%): percentage of households connected to cesspits or septic tanks.

4. Availability of Solid waste Collection System (%): percentage of coverage of the wastewater collection system.

5. Cost Recovery for Water Supply Services (%): percentage of financial coverage of the wastewater collection system.

6. Water supply services provided by the local council. This is reflected in the collection of the cost of water supply through payment of water bills by households.

7. Unaccounted for Water within the Water Supply System (%): percentage of quantity of water lost before reaching the consumer.

8. Monthly Household Income Spent on Water Supply (%): estimated percentage from the household income spent on water supply.

9. Monthly Household Income Spent on Sanitation (%): estimated percentage from the household income spent on sanitation services, including cost of wastewater vacuum tankers.

10. Major Community Problems and Needs: a summary of the current problems and needs of the community as identified by the local council.

Appendix-B

Questionnaire Template used for Monthly Surveys

PALESTINIAN HYDROLOGY GROUP

Water, Sanitation, and Hygiene (WaSH) Monitoring Project (Monthly Questionnaire)

B- SANITATION AND HYGIENE INFORMATION

a) Percentage of households with access to a sanitation facility in the community:
Wastewater network : .....% ii)Connection to cesspits or septic tank.....%
Availability of solid waste collection system.....%
b) Percentage of monthly household income spent on Sanitation services (wastewater and solid waste).....%

C- WATER INFORMATION

	Water Source	Water Supply For Domestic Uses (*) (m^3/month)	Put X in front of the Main Source
1	Mekerot Connection through Water Network		
2	Mekerot Filling Point		
3	West Bank Water Department (WBWD)		
4	Jerusalem Water Utility (JWU)		
5	Bethlehem Water & Waste Water Utility (BWWU)		
6	Municipality or Local Council		
7	Public Domestic Wells		
8	Private Domestic Wells		
9	Public Agriculture Wells		
10	Private Agriculture Wells		
11	Springs		
12	Private Water Tankers		
13	Cisterns		
14	Neighbor Locality		
SUM of Water Supply Quantities through all Sources (m^3/month)			

- Including domestic agriculture, domestic livestock, and all loses, but not wide scale agriculture

Percentage of total losses for domestic water supply in the community: ..... %
Water network coverage: ..... %
Water tankers price now: ..... NIS / m3
Percentage of household that pay water bills .....%
Percentage of monthly household income spent on water supply services: .....%:

D- COMMUNITY NEEDS and COMMENTS

1- NEEDS:

New w network	Expansion of w network	Rehabilitation of w network
New wells	Rehabilitation of wells	Rehabilitation of springs
New reservoirs	Rehabilitation of reservoirs	Replacement of roof tanks
New water tankers	Reconnect with Mekorot	New water source
New cisterns	Rehabilitation of cisterns	New clinic
New ww network	Rehabilitation of ww network	New vacuum tankers
Removing pollution sources	Water Treatment	Solid waste system
Solid waste containers	Support of local council in water bills payments	
Other Needs:		

2- COMMENTS: .....
.....
.....

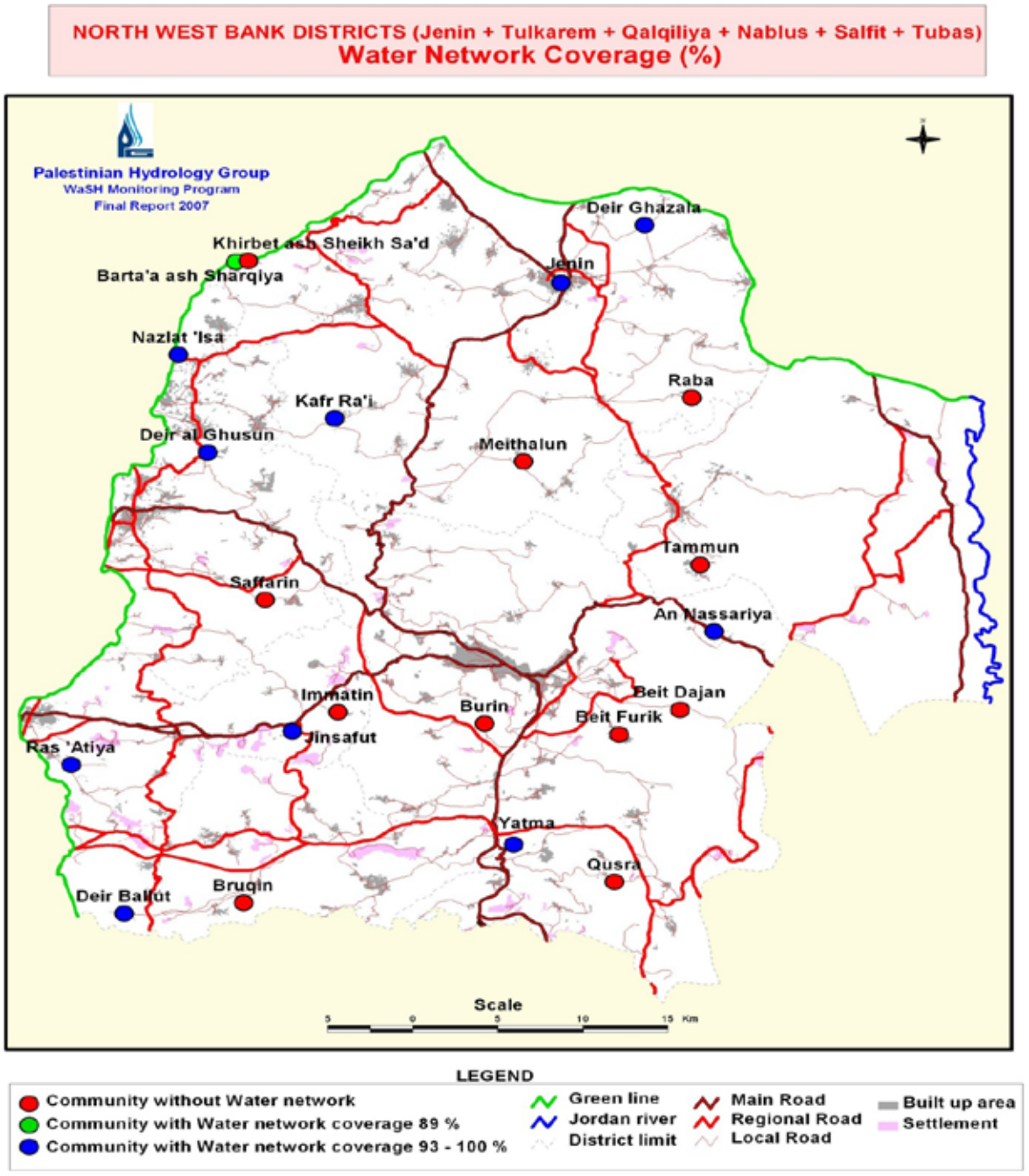
Appendix-C
List of Surveyed Communities (60 Community Sample Group)

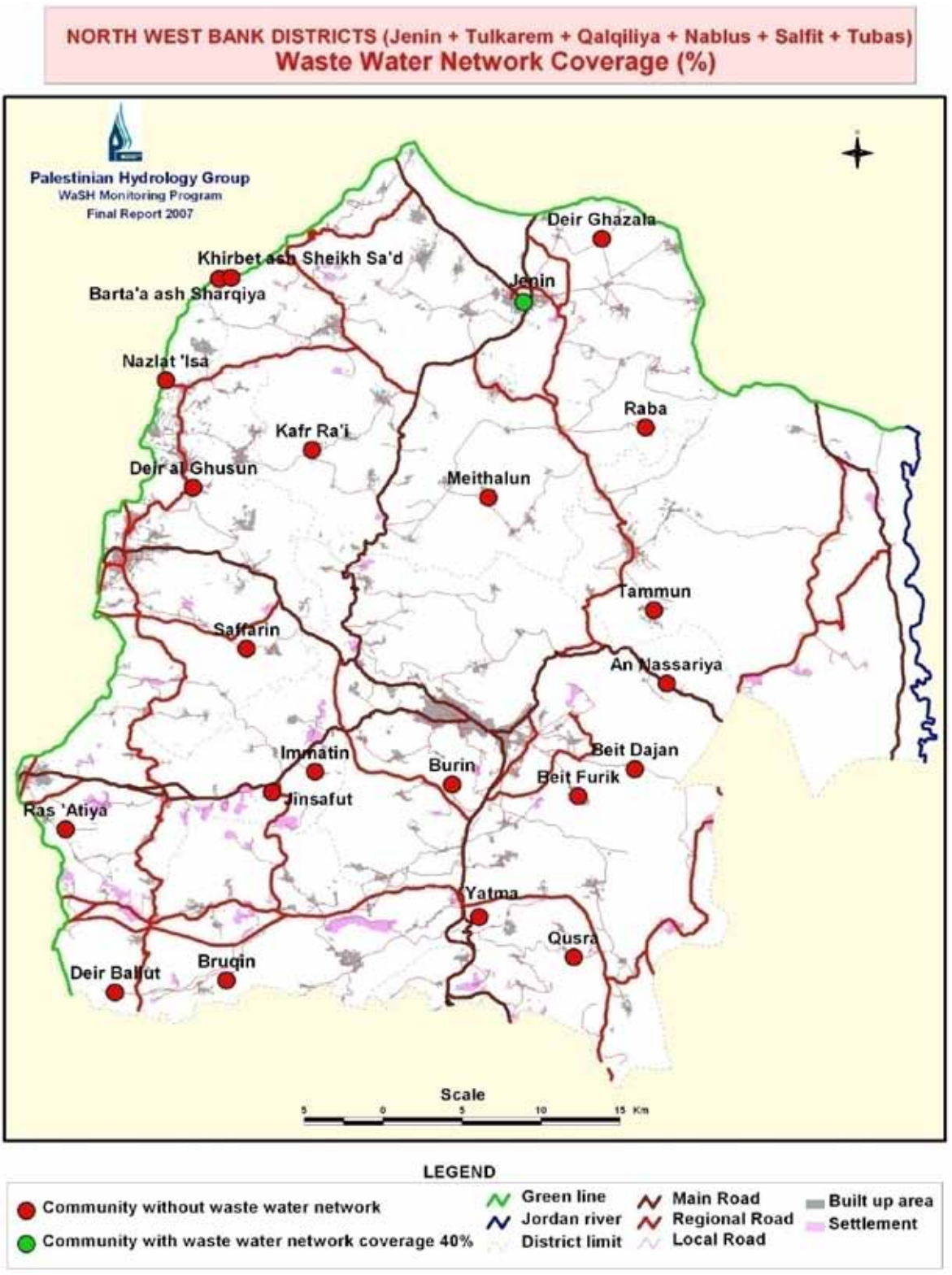
	Community ID	Governorate	Community Name	Community Type	Population
1	10055	Jenin	Deir Ghazala	Rural	962
2	10120		Barta'a ash Sharqiya	Rural	4058
3	10130		Khirbet ash Sheikh Sa'eed	Rural	246
4	10180		Jenin	Urban	40276
5	10405		Raba	Rural	3422
6	10465		Kafr Ra'i	Rural	8807
7	10520		Meithalun	Rural	7890
8	50755	Tubas	Tammun	Rural	11783
9	100330	Tulkarem	Nazlat 'Isa	Rural	2816
10	100530		Deir al Ghusun	Urban	10645
11	100795		Saffarin	Rural	1167

12	150825	Nablus	An Nassariya	Rural	1524
13	151000		Beit Dajan	Rural	4039
14	151080		Burin	Rural	2896
15	151090		Beit Furik	Rural	11708
16	151325		Yatma	Rural	3356
17	151365		Qusra	Rural	4999
18	201020	Qalqiliya	Immatin	Rural	2772
19	201085		Jinsafut	Rural	2580
20	201155		Ras ‘Atiya	Rural	1809
21	251400	Salfit	Bruqin	Rural	4123
22	251430		Deir Ballut	Rural	4156
23	301455	Ramallah	Qarawat Bani Zeid	Rural	3133
24	301515		Rantis	Rural	3276
25	301745		Al Midya	Rural	1477
26	301760		Bil’in	Rural	1988
27	301810		Ramallah	Urban	28833
28	301815		Burqa	Rural	2623
29	351140	Jericho	Al Jiftlik	Rural	4966
30	351690		Al ‘Auja	Rural	4525
31	401950	Jerusalem	Beit ‘Anan	Rural	4806
32	402015		Qatanna	Rural	8449
33	402125		‘Arab al Jahalin	Rural	1358
34	452270	Betlehem	Al Khadr	Rural	10472
35	452400		Wadi Rahhal	Rural	643
36	452525		Beit Fajjar	Rural	12305
37	452660		‘Arab ar Rashayida	Rural	1210
38	502655	Hebron	Beit Kahil	Rural	6630
39	502685		Idhna	Urban	21305
40	502750		Taffuh	Rural	11098
41	502810		Deir Samit	Rural	6482
42	502835		Beit ‘Awwa	Rural	9445
43	502850		At Tabaqa		1624
44	502950		As Sura	Rural	2020

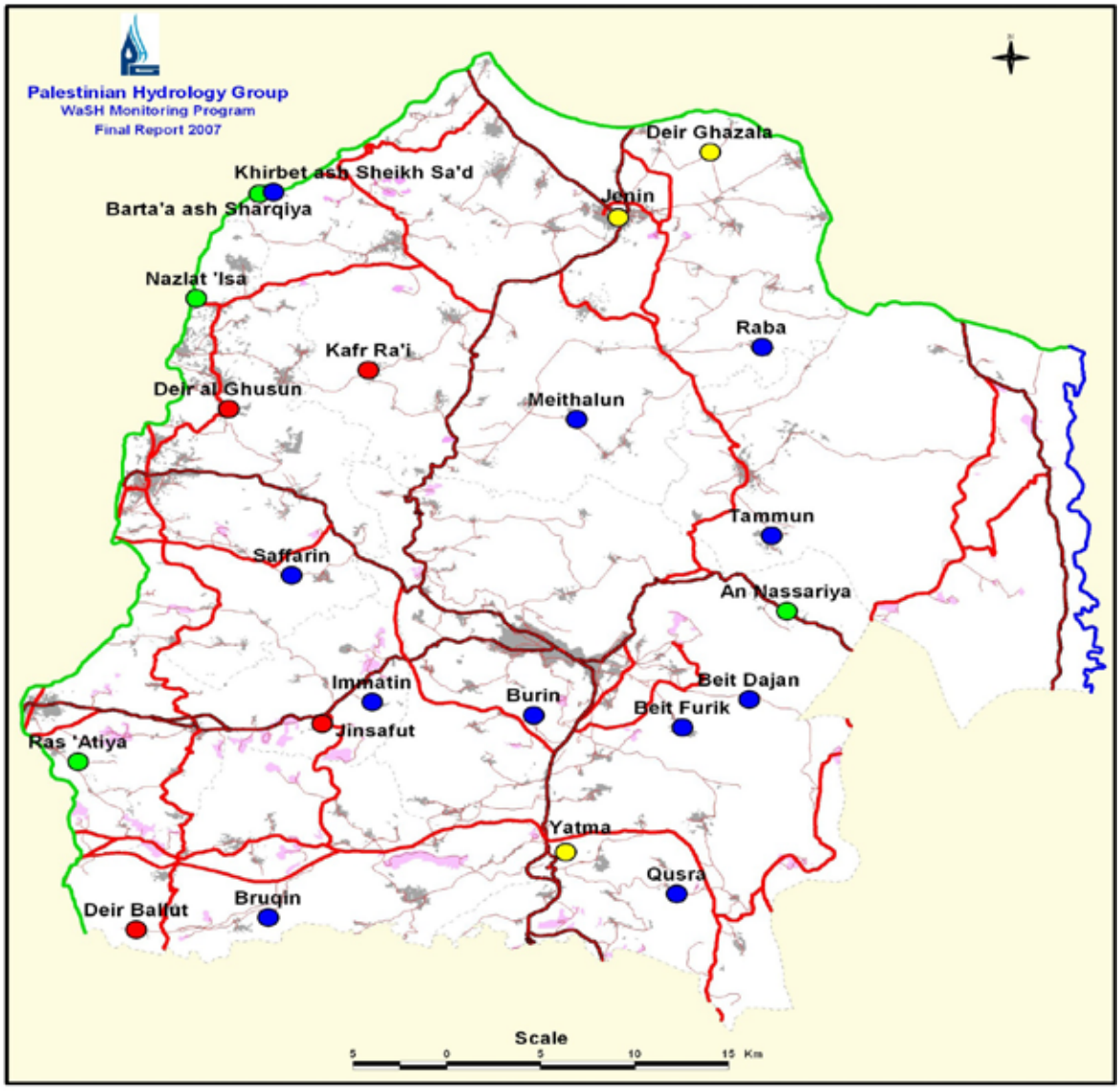
45	503090	Hebron	Beit ar Rush al Fauqa	Rural	1092
46	503115		Khallet al Maiyya	Rural	1435
47	503120		Yatta	Urban	48496
48	503215		Al Karmil	Rural	3320
49	552740	North Gaza	Beit Hanun	Urban	36761
50	552790		Jabalya	Urban	94656
51	602775	Gaza	Ash Shati' Camp	Camp	98657
52	602825		Gaza	Urban	463728
53	603045		Juhor ad Dik	Rural	3621
54	653140	Deir Al-Balah	Al Bureij Camp	Camp	41100
55	653275		Wadi as Salqa	Rural	5280
56	703425	Khan Yunis	Bani Suheila	Urban	37151
57	703450		Qizan an Najjar	Rural	4409
58	703485		Al Fukhkhari	Rural	4212
59	753490	Rafah	Rafah	Urban	80401
60	753505		Shokat as Sufi	Rural	9165

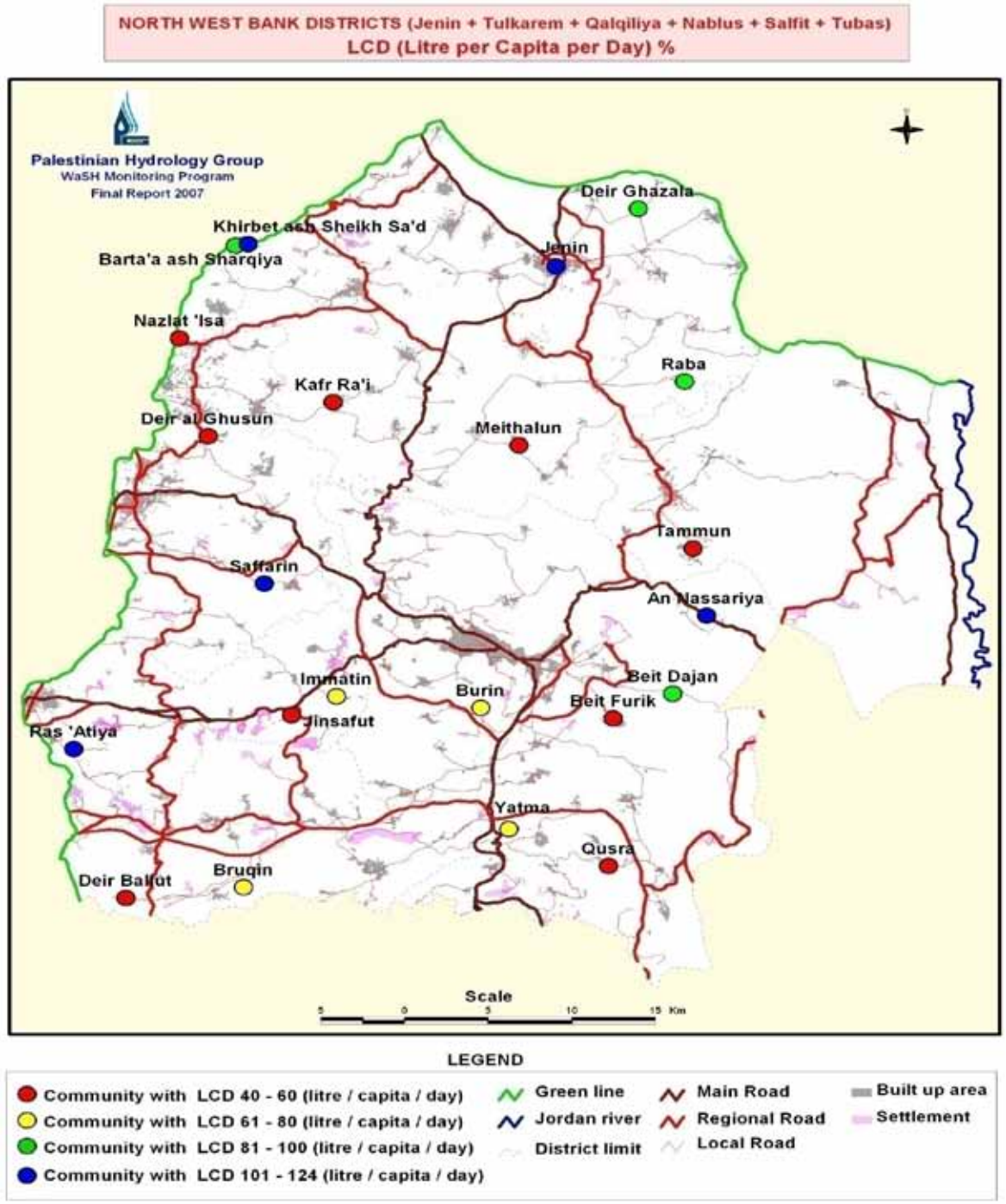
Appendix- D
WaSH MP 2007/2008 Maps



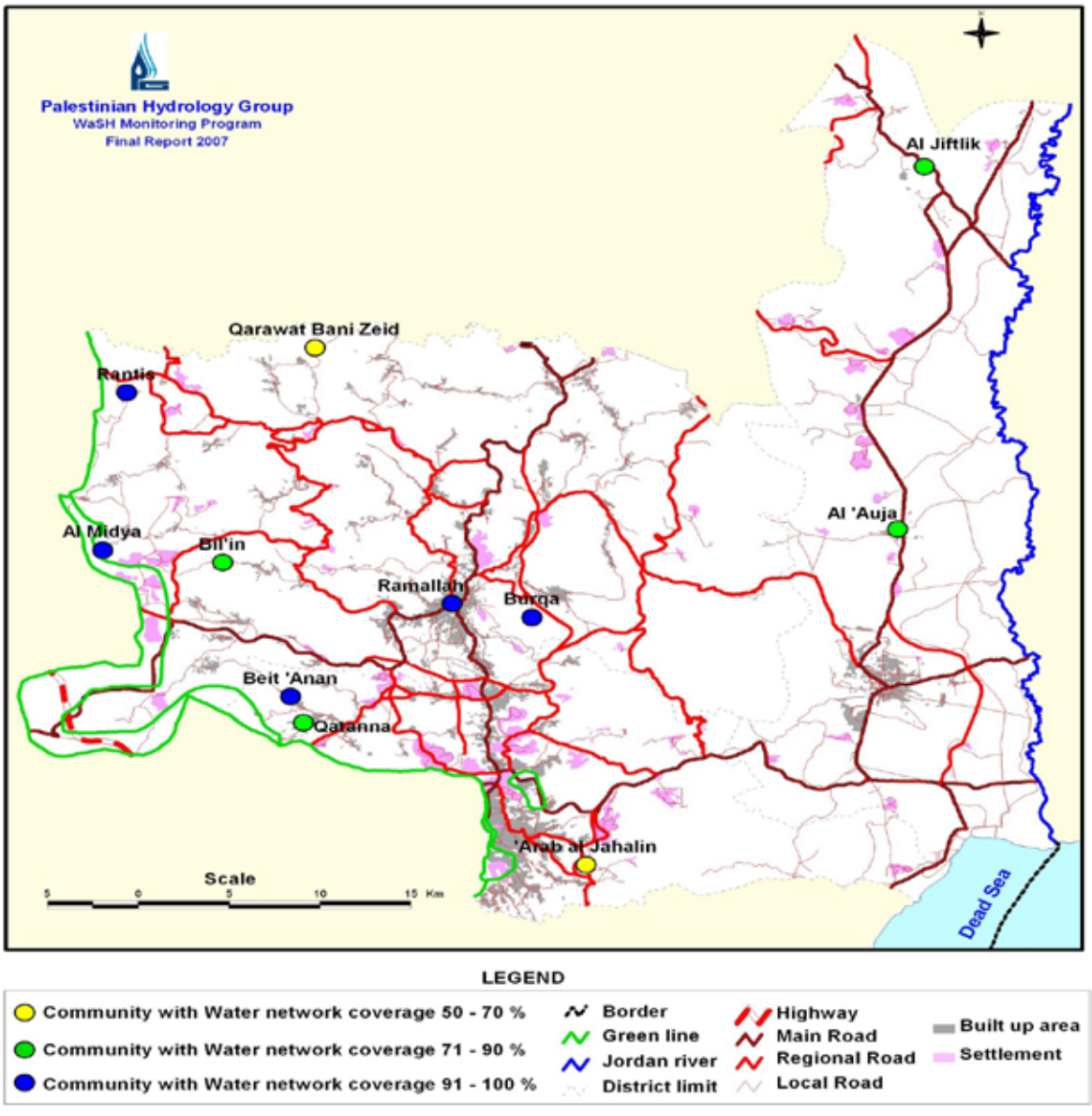

NORTH WEST BANK DISTRICTS (Jenin + Tulkarem + Qalqiliya + Nablus + Salfit + Tubas)
Waste Water Network Coverage (%)
Palestinian Hydrology Group
WaSH Monitoring Program
Final Report 2007
Deir Ghazala
Khirbet ash Sheikh Sa'd
Barta'a ash Sharqiya
Jenin
Nazlat 'Isa
Raba
Kafr Ra'i
Deir al Ghusun
Meithalun
Tammun
Saffarin
An Nassariya
Immatin
Burin
Beit Dajan
Beit Furik
Jinsafut
Ras 'Atiya
Yatma
Qusra
Deir Ballut
Bruqin
Scale
5 0 5 10 15 Km
LEGEND
Community without waste water network
Community with waste water network coverage 40%
Green line
Jordan river
District limit
Main Road
Regional Road
Local Road
Built up area
Settlement

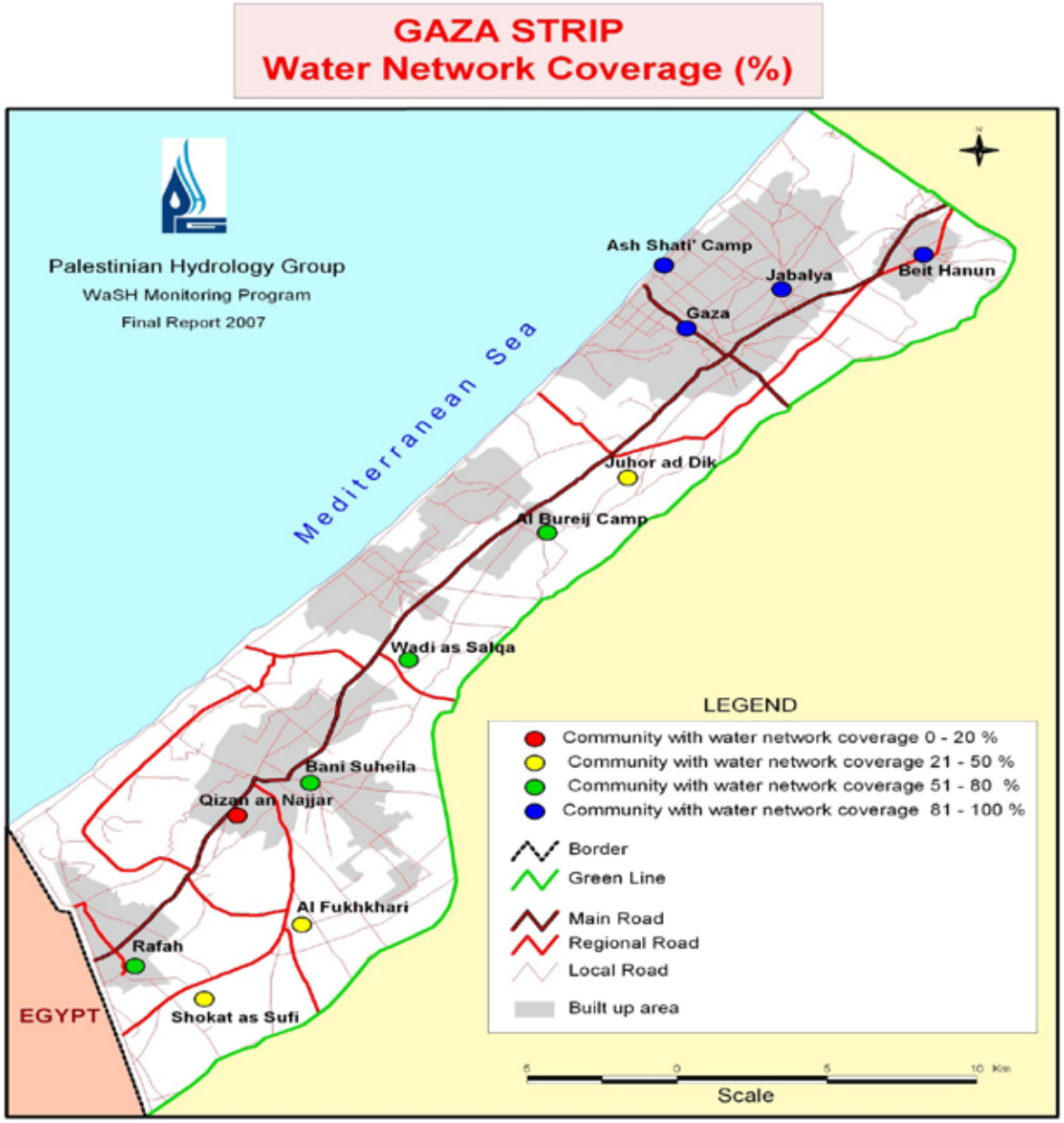
NORTH WEST BANK DISTRICTS (Jenin + Tulkarem + Qalqiliya + Nablus + Salfit + Tubas)
Water Losses (%)



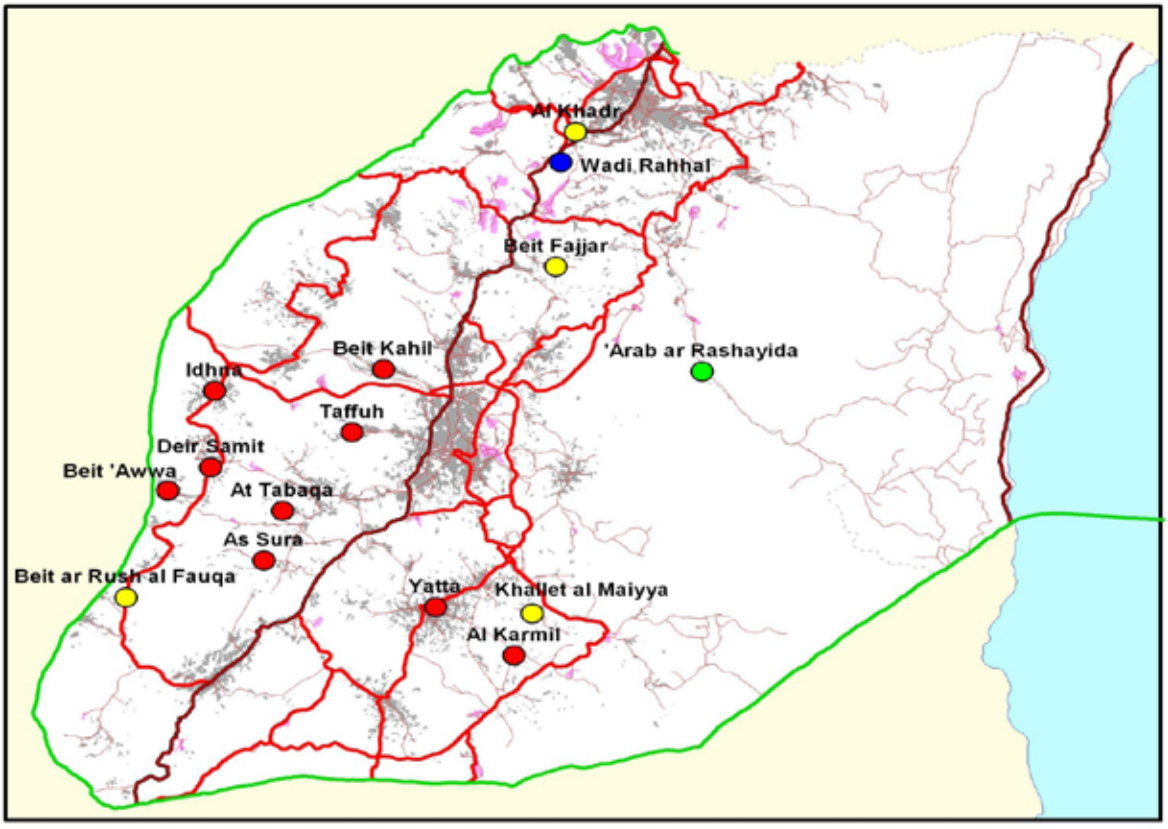

NORTH WEST BANK DISTRICTS (Jenin + Tulkarem + Qalqiliya + Nablus + Salfit + Tubas)
LCD (Litre per Capita per Day) %
Palestinian Hydrology Group
WaSH Monitoring Program
Final Report 2007
Deir Ghazala
Khirbet ash Sheikh Sa'd
Barta'a ash Sharqiya
Jenin
Nazlat 'Isa
Raba
Kafr Ra'i
Deir al Ghusun
Meithalun
Tammun
Saffarin
An Nassariya
Immatin
Burin
Beit Dajan
Beit Furik
Jinsafut
Ras 'Atiya
Yatma
Qusra
Deir Balut
Bruqin
Scale
5 0 5 10 15 Km
LEGEND
Community with LCD 40 - 60 (litre / capita / day)
Community with LCD 61 - 80 (litre / capita / day)
Community with LCD 81 - 100 (litre / capita / day)
Community with LCD 101 - 124 (litre / capita / day)
Green line
Jordan river
District limit
Main Road
Regional Road
Local Road
Built up area
Settlement

MIDDLE WEST BANK DISTRICTS (Jerusalem + Ramallah + Jericho)
Water Network Coverage (%)




GAZA STRIP
Water Network Coverage (%)
Palestinian Hydrology Group
WaSH Monitoring Program
Final Report 2007
Mediterranean Sea
Ash Shati' Camp
Jabalya
Beit Hanun
Gaza
Juhor ad Dik
Al Bureij Camp
Wadi as Salqa
Bani Suheila
Qizan an Najjar
Al Fukhkhari
Rafah
Shokat as Sufi
EGYPT
LEGEND
Community with water network coverage 0 - 20 %
Community with water network coverage 21 - 50 %
Community with water network coverage 51 - 80 %
Community with water network coverage 81 - 100 %
Border
Green Line
Main Road
Regional Road
Local Road
Built up area
5 0 5 10 Km
Scale

SOUTH WEST BANK DISTRICTS (Bethlehem + Hebron)
LCD (Litre per Capita per Day) %



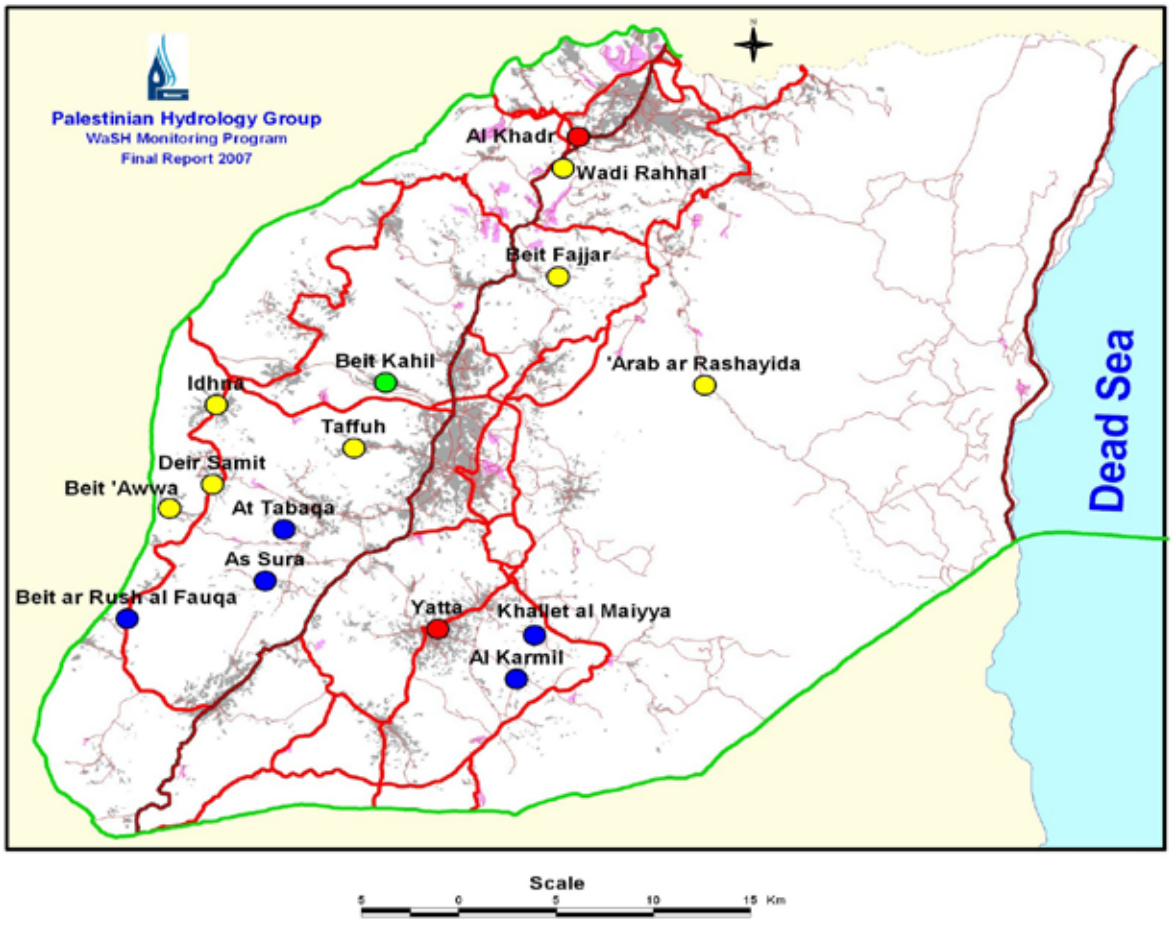
Scale

5 0 5 10 15 Km

LEGEND

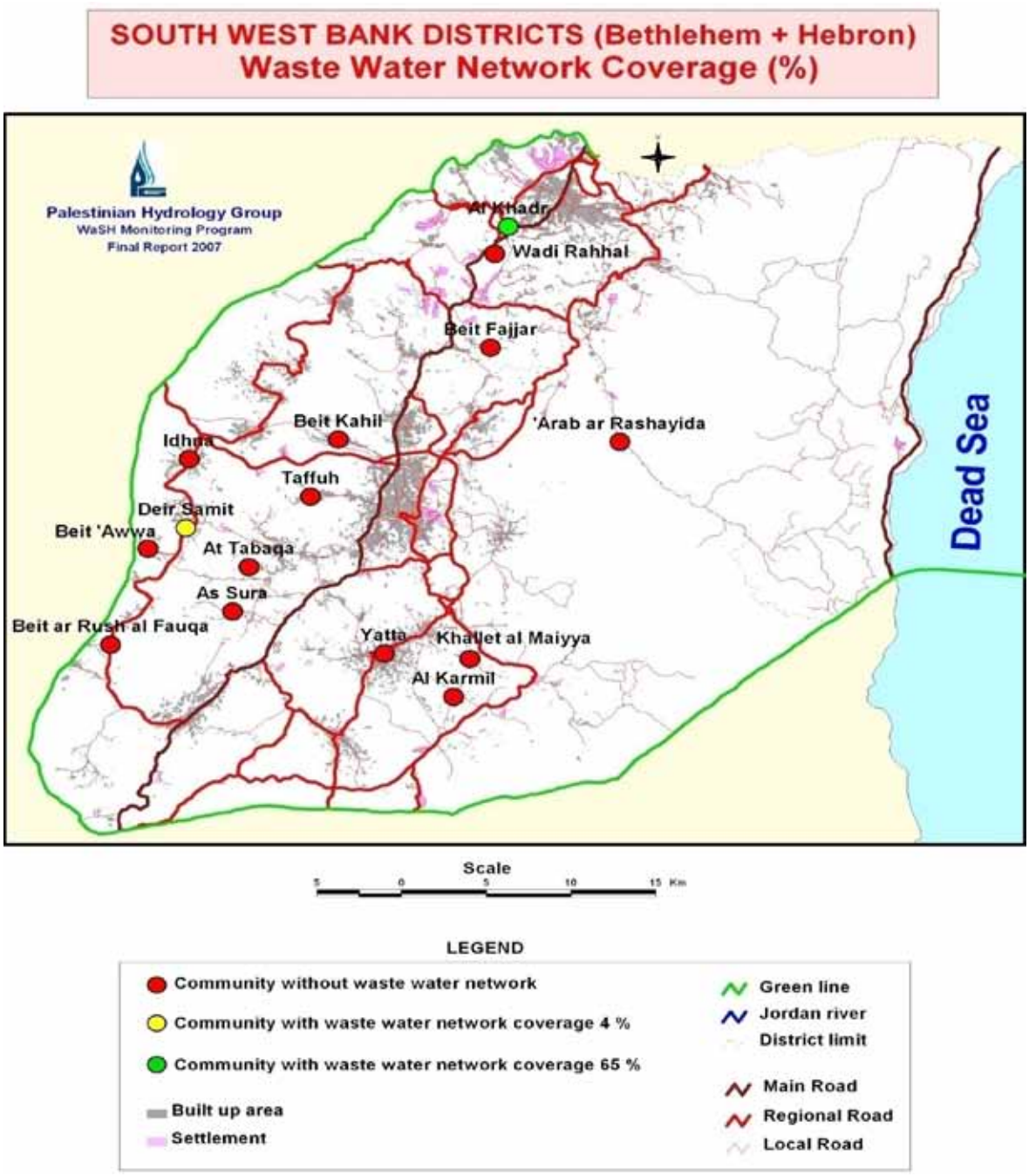
- Community with LCD 21- 40 (litre / capita / day)
- Community with LCD 41- 54 (litre / capita / day)
- Community with LCD 63 (litre / capita / day)
- Community with LCD 134 (litre / capita / day)
- Built up area
- Settlement
- Green line
- Jordan river
- District limit
- Main Road
- Regional Road
- Local Road

SOUTH WEST BANK DISTRICTS (Bethlehem + Hebron)
Water Losses (%)

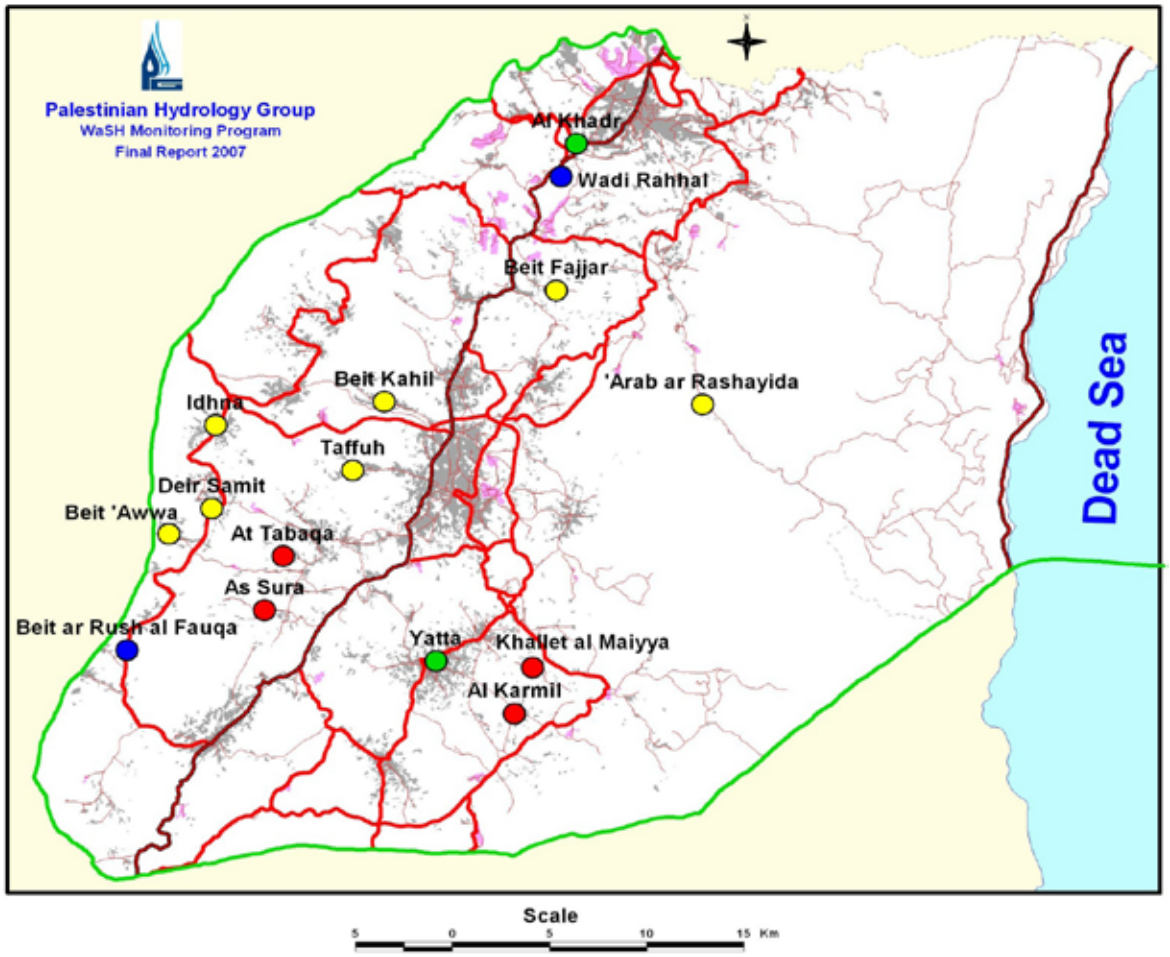


LEGEND

- Community with water losses 31 - 37 %
- Community with water losses 21 - 30%
- Community with water losses 18 - 20 %
- Community without water losses
- Built up area
- Settlement
- Green line
- Jordan river
- District limit
- Main Road
- Regional Road
- Local Road


SOUTH WEST BANK DISTRICTS (Bethlehem + Hebron)
Waste Water Network Coverage (%)
Palestinian Hydrology Group
WaSH Monitoring Program
Final Report 2007
Al Khadr
Wadi Rahhal
Beit Fajjar
Beit Kahil
'Arab ar Rashayida
Idhna
Taffuh
Deir Samit
Beit 'Awwa
At Tabaqa
As Sura
Beit ar Rush al Fauqa
Yatta
Khallet al Maiyya
Al Karmil
Dead Sea
Scale
5 0 5 10 15 Km
LEGEND
Community without waste water network
Community with waste water network coverage 4 %
Community with waste water network coverage 65 %
Built up area
Settlement
Green line
Jordan river
District limit
Main Road
Regional Road
Local Road

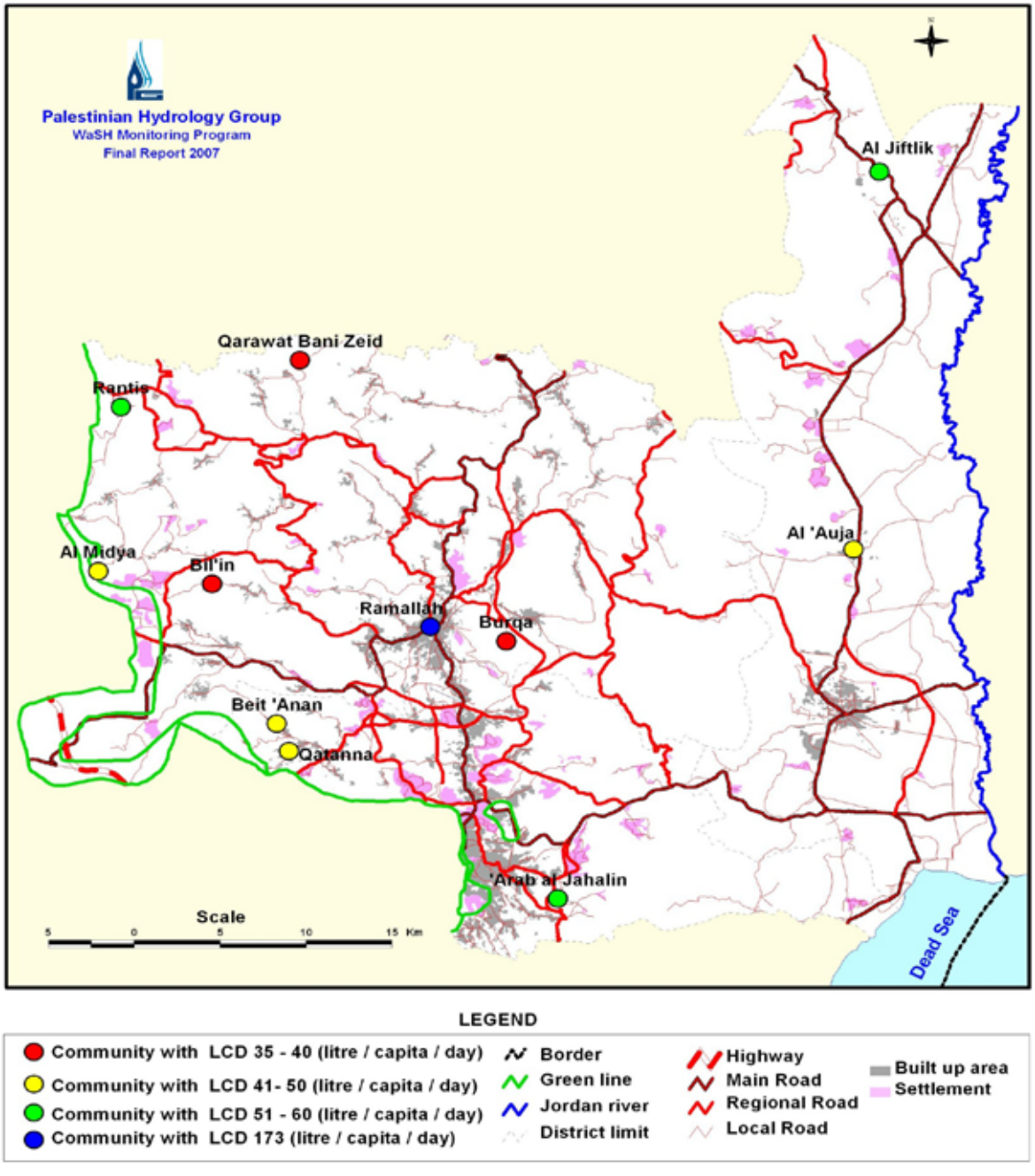
SOUTH WEST BANK DISTRICTS (Bethlehem + Hebron)
Water Network Coverage (%)



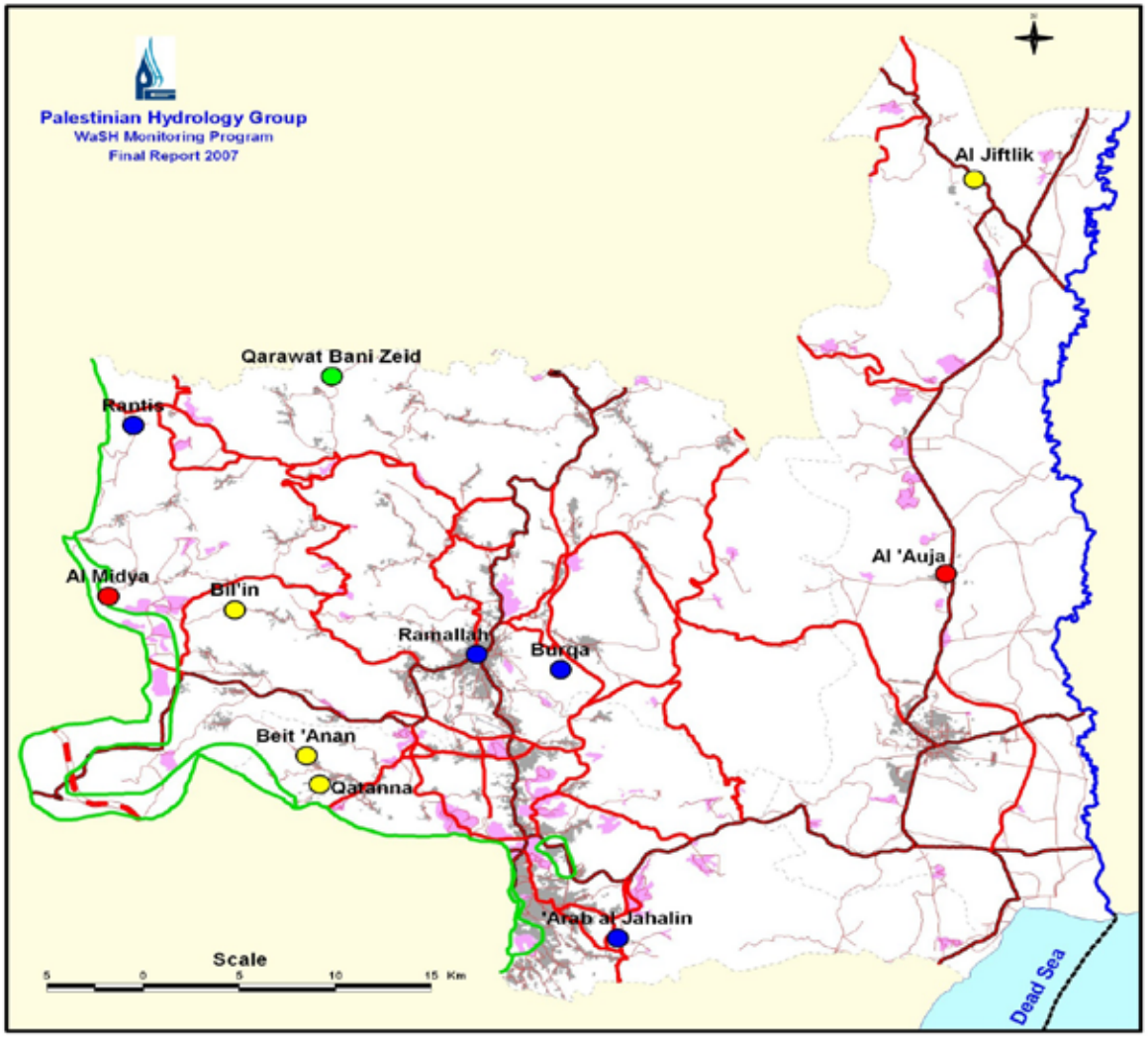
LEGEND

- Community without water network
- Community with Water network coverage 68- 80%
- Community with Water network coverage 81 - 90 %
- Community with Water network coverage 91 - 95 %
- Built up area
- Settlement
- Green line
- Jordan river
- District limit
- Main Road
- Regional Road
- Local Road

MIDDLE WEST BANK DISTRICTS (Jerusalem + Ramallah + Jericho)
LCD (Litre per Capita per Day)



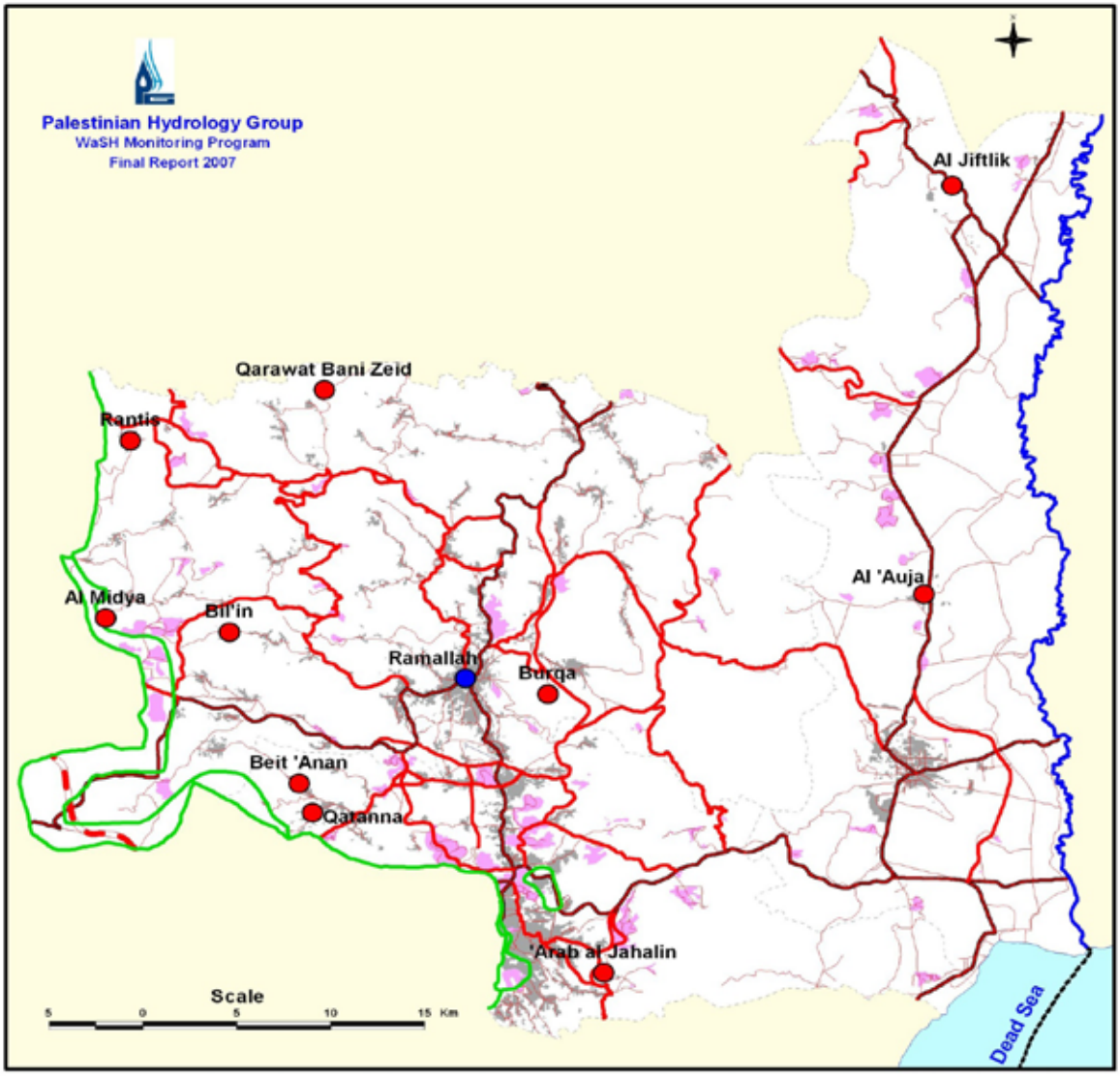
MIDDLE WEST BANK DISTRICTS (Jerusalem + Ramallah + Jericho)
Water Losses(%)



LEGEND

- Community with water losses 41 - 53 %
- Community with water losses 31 - 40 %
- Community with water losses 21- 30 %
- Community with water losses 5 - 20 %
- Border
- Green line
- Jordan river
- District limit
- Highway
- Main Road
- Regional Road
- Local Road
- Built up area
- Settlement

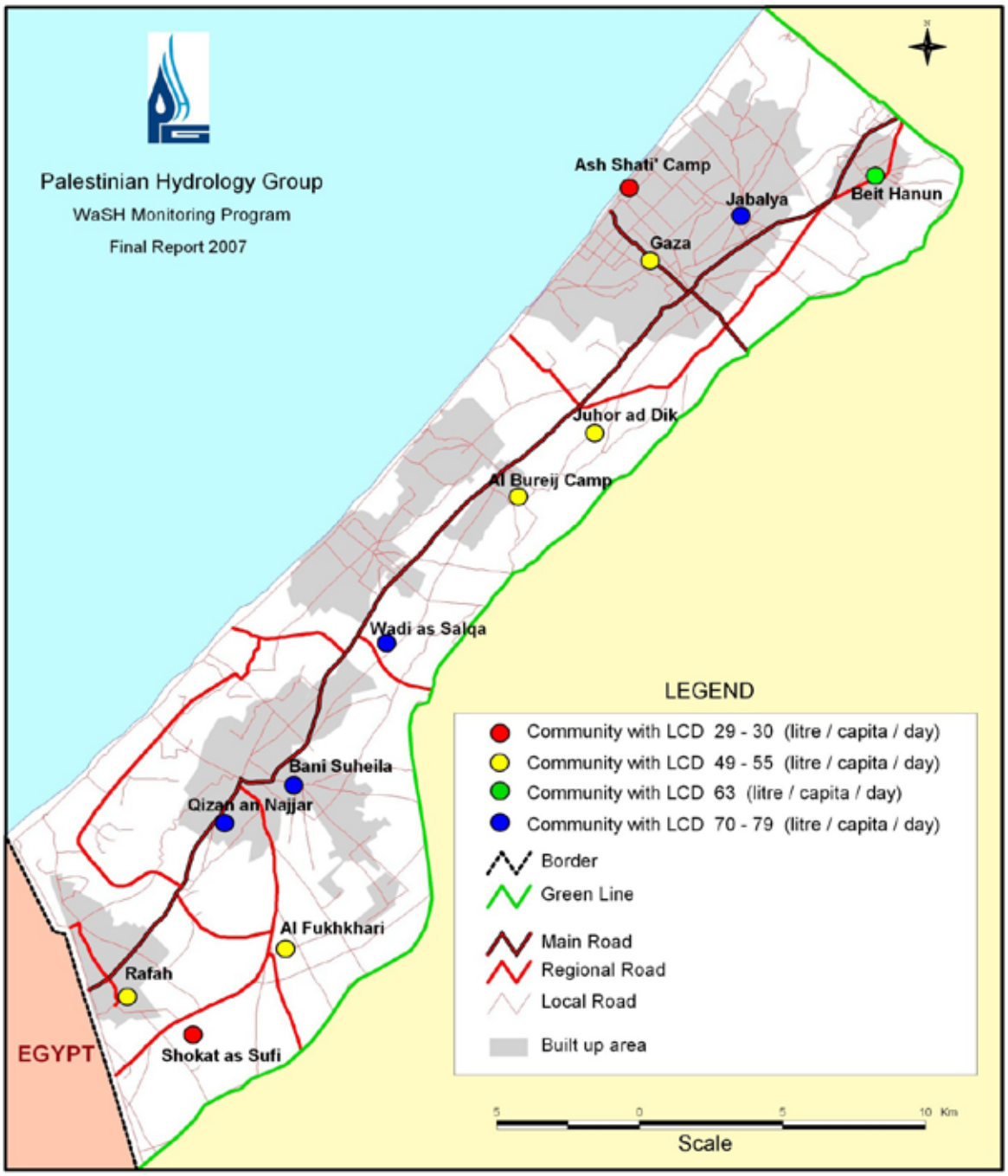
MIDDLE WEST BANK DISTRICTS (Jerusalem + Ramallah + Jericho)
Waste Water Network Coverage (%)

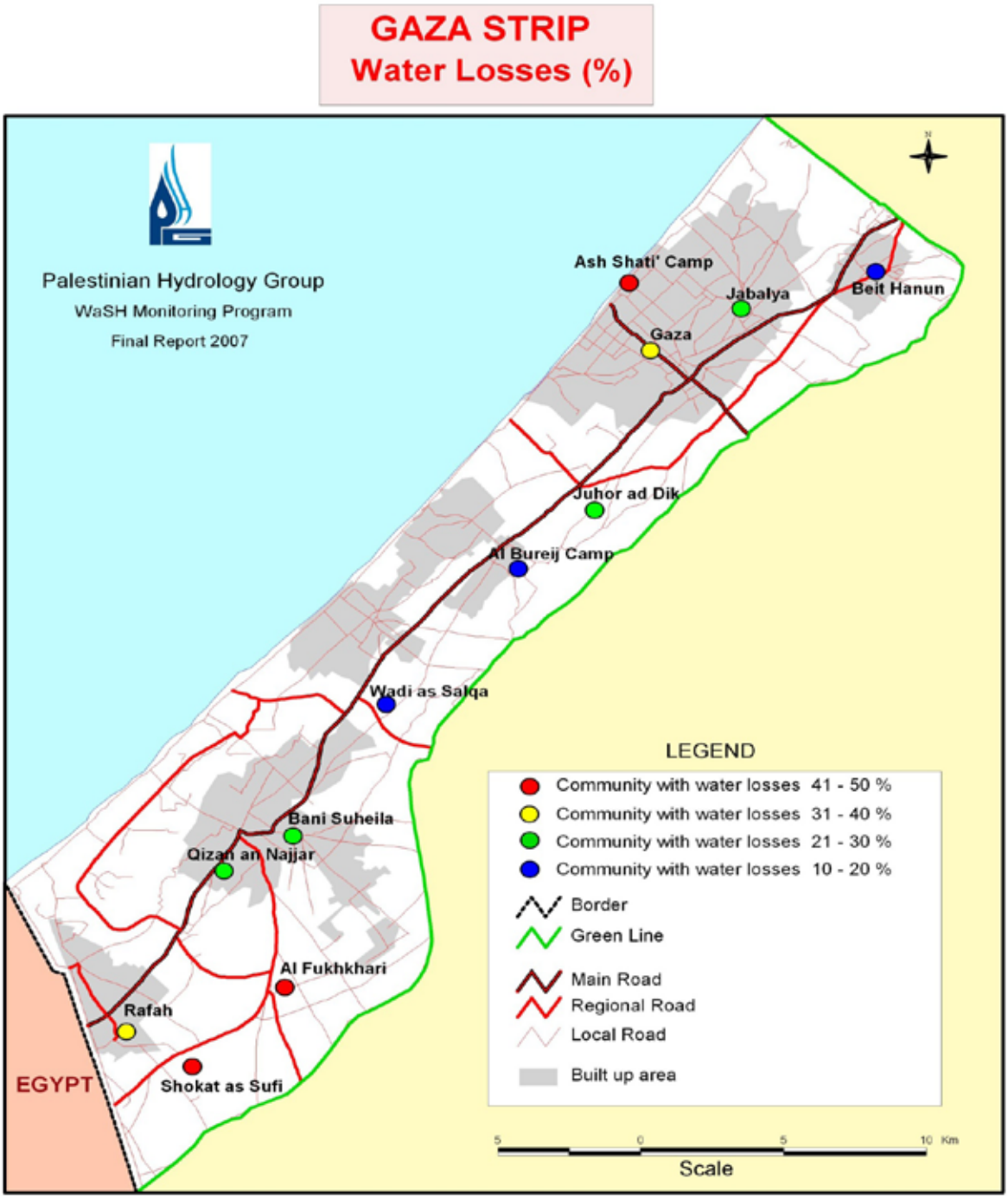


LEGEND

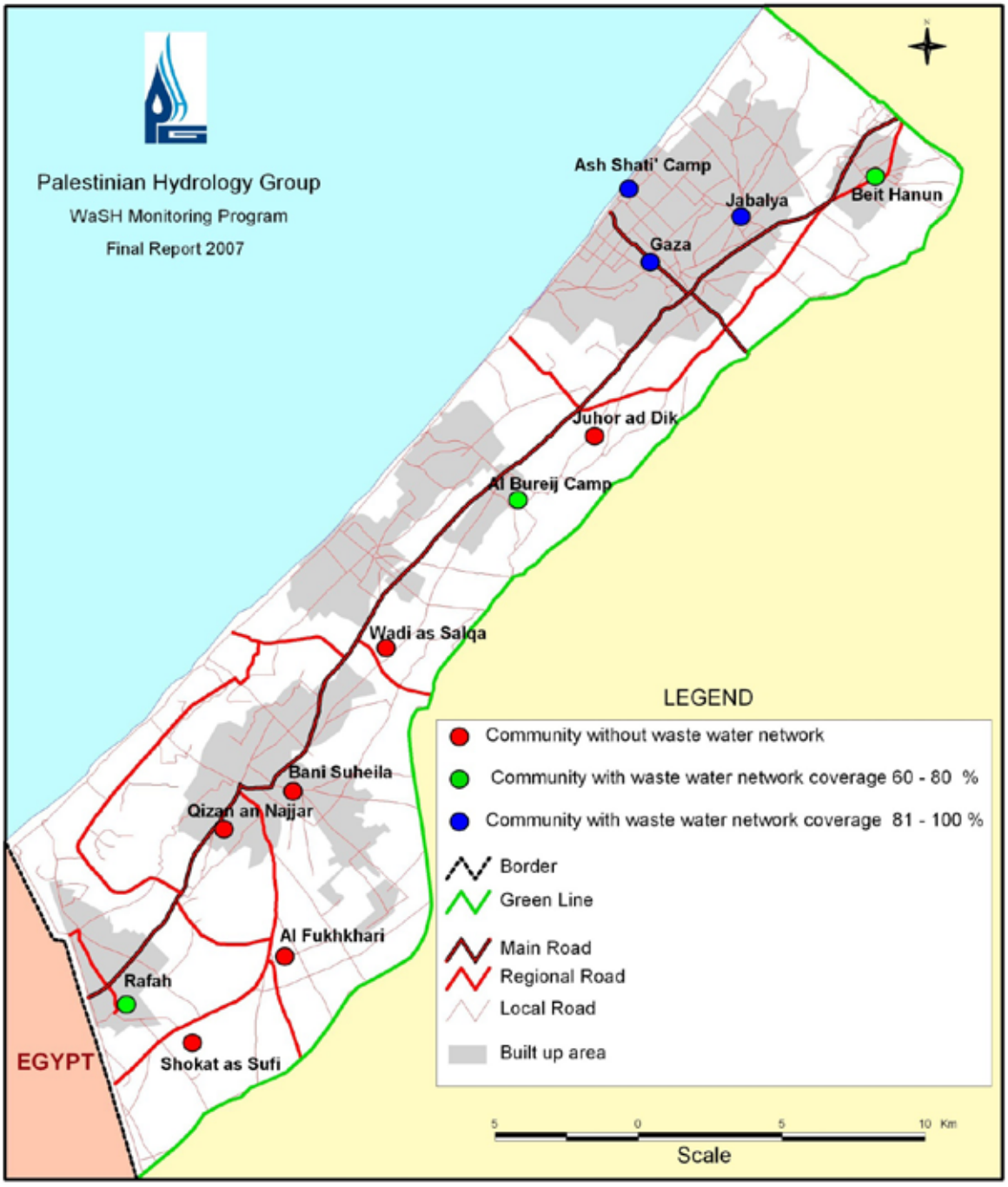
- Community without waste water network
- Community with waste water network coverage 100 %
- Built up area
- Settlement
- Border
- Green line
- Jordan river
- District limit
- Highway
- Main Road
- Regional Road
- Local Road

GAZA STRIP
LCD (Litre per Capita per Day)




GAZA STRIP
Water Losses (%)
Palestinian Hydrology Group
WaSH Monitoring Program
Final Report 2007
Ash Shati' Camp
Jabalya
Beit Hanun
Gaza
Juhor ad Dik
Al Bureij Camp
Wadi as Salqa
Bani Suheila
Qizan an Najjar
Al Fukhkhari
Rafah
Shokat as Sufi
EGYPT
LEGEND
Community with water losses 41 - 50 %
Community with water losses 31 - 40 %
Community with water losses 21 - 30 %
Community with water losses 10 - 20 %
Border
Green Line
Main Road
Regional Road
Local Road
Built up area
5 0 5 10 Km
Scale

GAZA STRIP
Waste Water Network Coverage (%)



Appendix-E

The Water Supply and Consumption Rates Monitoring Graphs (Extra)

Figure 1: Water consumption - 2007 February, July, and November

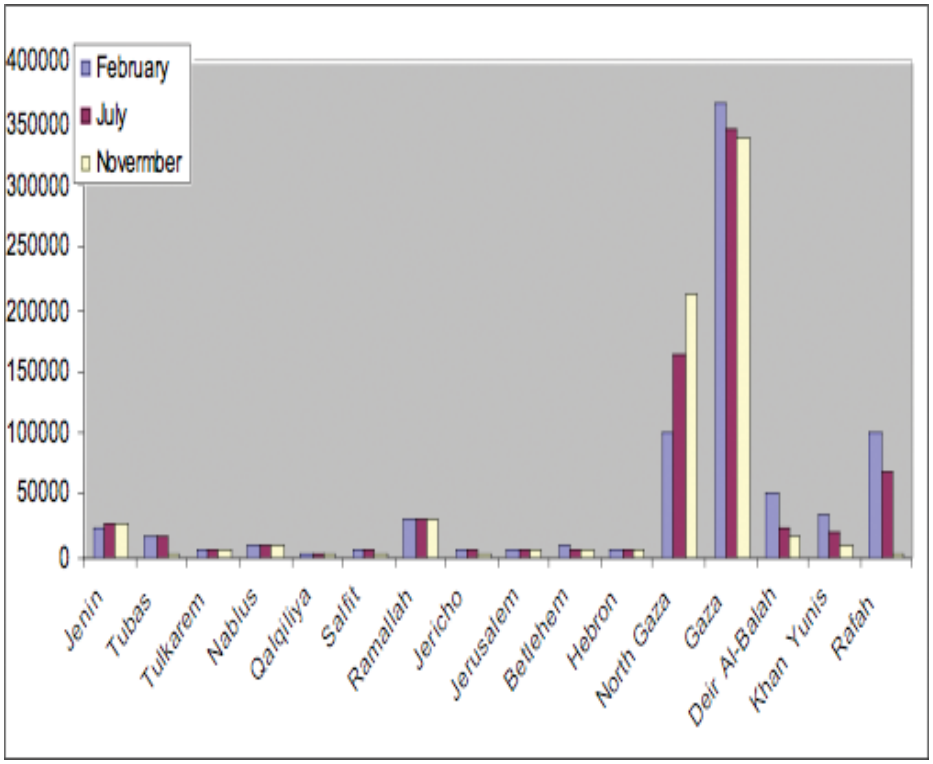


Table 1: Water consumption – 2007 all months – governorates

	water consumption per month										
	January	February	March	April	May	June	July	August	September	October	Novermber
Jenin	21781	26965	27072	27192	27322	27463	27591	27716	27834	27952	28070
Tubas	18000	19000	19500	19700	20000	17500	17500	17000	16000	15500	2920
Tulkarem	6192	8215	8224	8248	8270	8333	8329	8340	8353	8371	8387

Rafah	Khan Yunis	Deir Al-Balah	Gaza	North Gaza	Hebron	Betlehem	Jerusalem	Jericho	Ramallah	Salfit	Qalqiliya	Nablus
50706	27082	40845	317071	136037	8358	8981	6488	5545	23551	6253	4274	8263
103033	36411	52327	366128	103192	9270	11031	7744	7118	31940	7982	4867	9821
94035	33324	47088	362356	115208	9240	10508	7515	7038	31921	7680	4942	9861
85162	29965	41778	358351	127796	9198	10068	7254	7205	31912	7376	4996	9907
75830	27041	36338	354427	141029	9130	9660	7134	7695	31887	7061	5061	9960
64040	24015	30220	350177	151563	9115	9354	6887	7417	31868	6737	5151	10008
70588	20663	26309	347090	164854	9104	9049	6731	7016	31843	6414	5224	10054
40167	17409	21787	344275	179496	9031	8828	6576	6615	31837	6090	5283	10099
29083	13731	17167	341546	194308	8943	8565	6472	6235	31837	5766	5327	10148
20125	11011	14900	339503	210475	8865	8344	6345	5855	31839	5442	5370	10198
5000	11779	16600	339389	213092	9413	8171	7086	5830	31919	4884	5392	10159

Figure 2: Water Supply by all Sources (m3 / month) 2007 – January, June (West Bank)

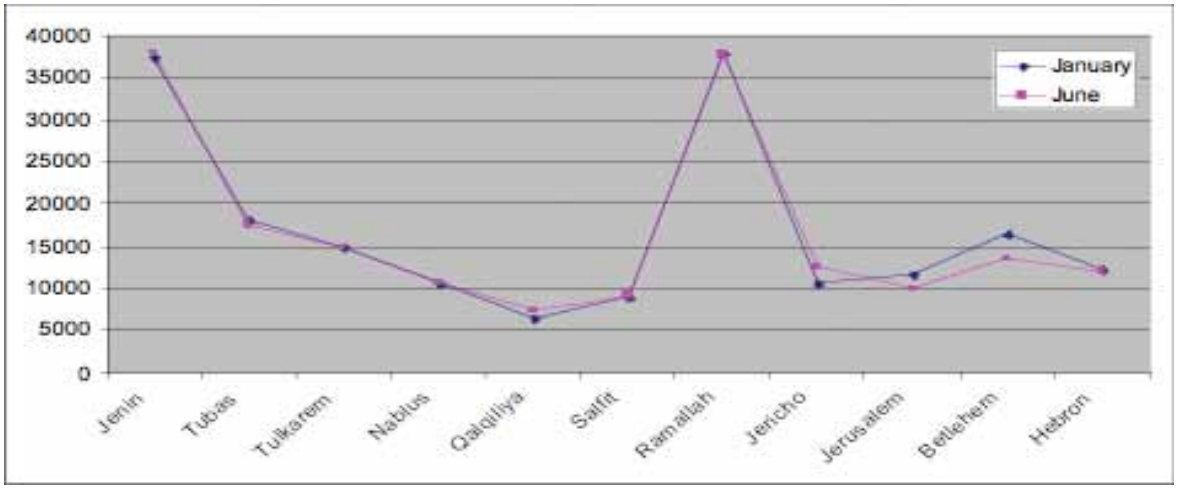


Figure 3: Water Supply by all Sources (m3 / month) 2007. March, August (West Bank)

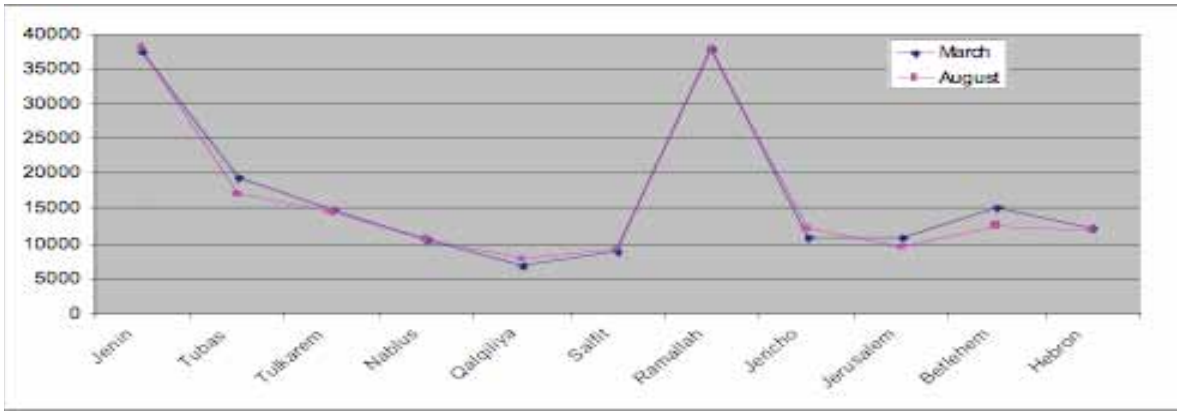


Figure 4: Water Supply by all Sources (m3 / month) 2007. May, November (West Bank)

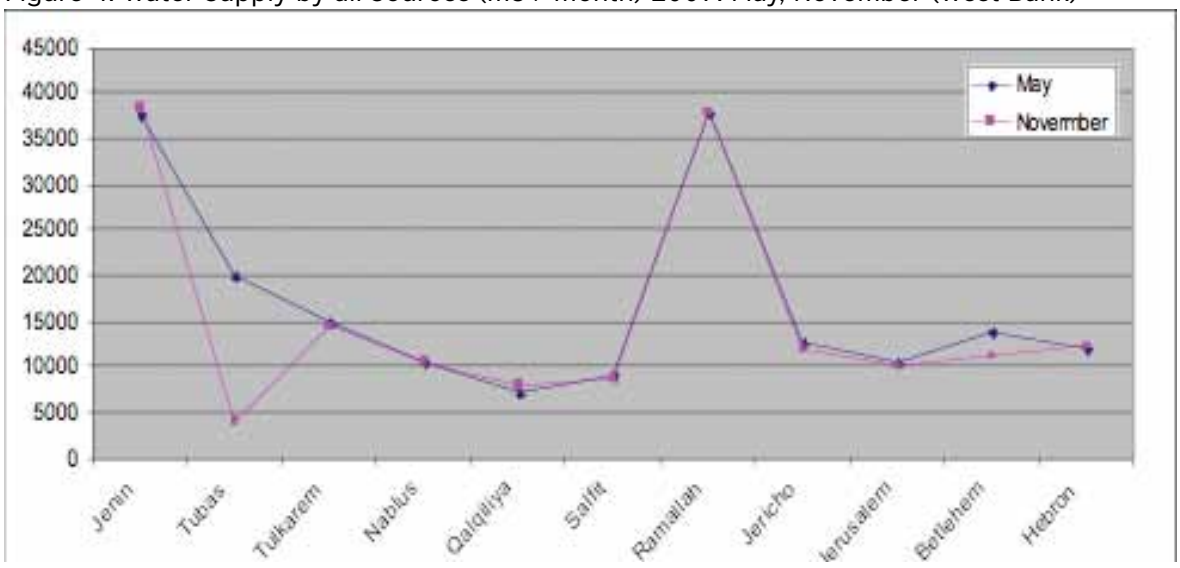


Table 2: Water supply by all the sources 2007 – all months – West Bank districts

District	January	February	March	April	May	June	July	August	September	October	November
Jenin	37380	37471	37559	37660	37769	37886	37987	38083	38171	38259	38347
Tubas	18000	19000	19500	19700	20000	17500	17500	17000	16000	15500	4000
Tulkarem	14970	14943	14887	14843	14787	14770	14674	14604	14539	14478	14483
Nablus	10560	10579	10590	10604	10624	10637	10646	10654	10667	10681	10608
Qalqiliya	6426	6596	6761	6913	7087	7296	7513	7709	7883	8057	8066
Salfit	8908	8967	8996	9029	9071	9096	9121	9146	9171	9196	8696
Ramallah	37901	37883	37858	37846	37809	37778	37731	37705	37688	37674	37805
Jericho	10625	10500	10833	11458	12625	12542	12333	12125	11958	11792	12050
Jerusalem	11636	11356	10949	6913	10340	9969	9717	9487	9310	9094	10095
Betlehem	16501	15898	15163	14545	13960	13445	12931	12490	11975	11534	11069
Hebron	12240	12219	12189	12126	12029	12001	11975	11868	11742	11631	12262

Figure 5: Water Supply by all Sources (m3 / month) 2007. February, June - Gaza

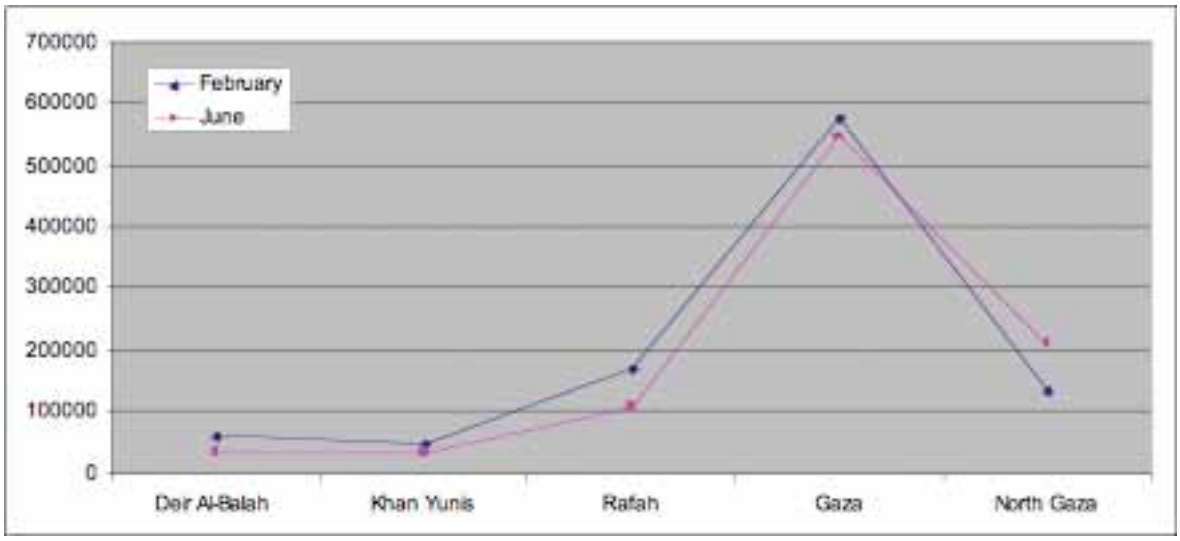


Figure 6: Water Supply by all Sources (m3 / month) 2007. March, October - Gaza

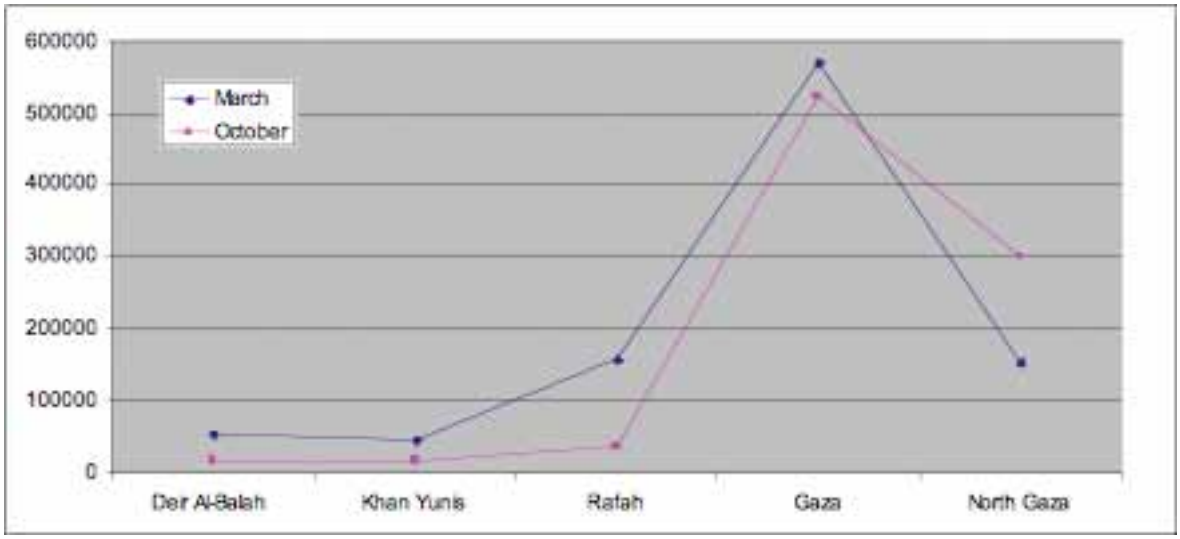


Table 3: Water supply by all the sources 2007 – all months – Gaza Strip

District	January	February	March	April	May	June	July	August	September	October	November
Deir Al-Balah	67538	61403	55183	48879	42417	35154	30483	25088	19583	16833	19767
Khan Yunis	53121	49330	45352	41026	37308	33473	29204	25065	20404	17095	19516
Rafah	172166	172166	157350	142783	127467	108067	88000	68833	50667	36083	10000
Gaza	585936	577672	569898	561694	553628	544976	538628	532846	527324	523150	520331
North Gaza	115674	134417	153083	172583	193167	210000	230417	252583	275083	299250	309150

Table 4: Water supply -Communities connected to Mekorot connection - from the 60 sampled communities

Community Name	District	Sum of Mekerot & WBWD	Mekerot & WBWD supply (L/C/D)
Jenin	Jenin	1693400	126
Kafr Ra'i	Jenin	85000	29
Yatma	Nablus	82300	73
Jinsafut	Qalqiliya	75050	87

Deir Ballut	Salfit	99350	72
Rantis	Ramallah	66414	61
Al Midya	Ramallah	36900	75
Bil'in	Ramallah	21124	32
Al Jiftlik	Jericho	81000	49
Al 'Auja	Jericho	119500	79
Beit 'Anan	Jerusalem	69808	43
Qatanna	Jerusalem	158350	56
Wadi Rahhal	Betlehem	36500	170
Beit Fajjar	Betlehem	284895	69
'Arab ar Rashayida	Betlehem	33550	83
Beit Kahil	Hebron	95300	43
Idhna	Hebron	156930	22
Taffuh	Hebron	107303	29
Deir Samit	Hebron	93245	43
Beit 'Awwa	Hebron	83940	27
Beit ar Rush al Fauqa	Hebron	4540	12
Yatta	Hebron	603180	37
Al Karmil	Hebron	450	0
Bani Suheila	Khan Yunis	291400	23

Appendix-F

List of WaSH Conditions and Needs of Surveyed Communities

ID	100330	50755	10520	10465	10405	10180	10130	10120	10055
Community Name	Nazlat 'Isa	Tammun	Meithalun	Kafr Ra'i	Raba	Jenin	Khirbet ash Sheikh Sa'eed	Barta'a ash Sharqiya	Deir Ghazala
District	Tulkarem	Tubas	Jenin	Jenin	Jenin	Jenin	Jenin	Jenin	Jenin
New W Network		Yes	Yes		Yes		Yes		
Expansion of W Network				Yes		Yes		Yes	Yes
Rehabilitation of W Network				Yes					Yes
New Wells		Yes	Yes	Yes	Yes	Yes			
Rehabilitation of Wells		Yes				Yes			Yes
Rehabilitation of Springs							Yes	Yes	
New Reservoirs				Yes	Yes	Yes	Yes		Yes
Rehabilitation of Reservoirs								Yes	
Replacement of Roof Tanks									
New Water Tankers		Yes	Yes		Yes	Yes			
Reconnect with Mekerot									
New Water Source				Yes	Yes				
New Cisterns			Yes	Yes	Yes	Yes			
New Clinic			Yes	Yes	Yes				Yes
New WW Network		Yes	Yes		Yes		Yes	Yes	Yes
Rehabilitation of WW Network						Yes			
New Vacuum Tankers		Yes		Yes	Yes				
Removing Pollution Sources			Yes			Yes		Yes	
Water Treatment						Yes		Yes	
Solid Waste Containers		Yes	Yes	Yes	Yes	Yes		Yes	
Aid from Local Council (Water Bills)				Yes		Yes		Yes	Yes
Other Needs	Volumetric water meters								
Comments				New water source is a priority. A water source from Zeita is a suggestion and it needs a fund also					The needs are according to Local Council

100530	Deir al Ghusun	Tulkarem			Yes																	Yes			Chlorination unit	
100795	Saffarin	Tulkarem	Yes						Yes				Yes			Yes					Yes				1) 10 m^3 water tanker 2) Fund for transfering main water line bringing water from Tulkarem city knowing that water network is under construction	Huge cistern pollution by cesspits (12 cisterns were closed due to pollution)
150825	An Nassariya	Nablus			Yes												Yes						Yes			
151000	Beit Dajan	Nablus												Yes	Yes							Yes			1- Fund for water network expansion (it is under construction)	
151080	Burin	Nablus						Yes	Yes						Yes					Yes	Yes					The existing two springs need rehabilitation and collecting water in a reservoir and chlorinate it and then reflow water in the water network
151090	Beit Furik	Nablus						Yes	Yes						Yes	Yes	Yes		Yes						Helping community by finding fund of 559000$ to complete the water network project	
151325	Yatma	Nablus			Yes			Yes	Yes			Yes			Yes										Volumetric water meters	The needed reservoir is 1000 m^3
151365	Qusra	Nablus	Yes					Yes	Yes		Yes				Yes		Yes		Yes						Plastic roof tanks (5 m^3)	
201020	Immatin	Qalqiliya	Yes						Yes						Yes											There is a Mekerot filling point and a transfer water line but a water network is needed
201085	Jinsafut	Qalqiliya			Yes				Yes						Yes										Connecting some houses to the water network	1-There are areas planned to be destroyed included agriculture pool constructed by PHG 2- The part of the water network which needs rehabilitation is 20 % of the water network
201155	Ras 'Atiya	Qalqiliya				Yes											Yes					Yes				1- No. of needed solid waste containers is 330 units 2- Rehabilitation of village well is now under planning by PHG

402015	401950	351690	351140	301815	301810	301760	301745	301515	301455	251430	251400		
Qatanna	Beit 'Anan	Al 'Auja	Al Jiftlik	Burqa	Ramallah	Bil'in	Al Midya	Rantis	Qarawat Bani Zeid	Deir Ballut	Bruqin		
Jerusalem	Jerusalem	Jericho	Jericho	Ramallah	Ramallah	Ramallah	Ramallah	Ramallah	Ramallah	Salfit	Salfit		
		Yes											
Yes	Yes	Yes	Yes			Yes	Yes		Yes				
Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes			
		Yes	Yes										
		Yes	Yes										
		Yes											
Yes	Yes	Yes	Yes			Yes		Yes		Yes	Yes		
Yes	Yes	Yes				Yes		Yes		Yes			
Yes	Yes	Yes	Yes			Yes							
Yes	Yes	Yes				Yes							
Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes			
Yes	Yes	Yes	Yes					Yes					
Yes	Yes	Yes	Yes										
Yes	Yes	Yes											
Yes	Yes	Yes	Yes		Yes	Yes		Yes					
Yes	Yes	Yes				Yes		Yes			Yes		
Yes	Yes	Yes						Yes					
Yes	Yes	Yes											
Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes				
							Yes	Yes					
			Agriculture projects							Replacing the plastic pipes by water lines	Doing a flow path in the wadi for waste water coming from Areil settlement (The water network is under construction)		
										There are houses connected by Plastic pipes and they need water lines	Cisterns were polluted (Pollution is coming from Ariel settlement)		
During this time the village is suffering from water shortage and water scarcity													

502950	502850	502835	502810	502750	502685	502655	452660	452525	452400	452270	402125
As Sura	At Tabaqa	Beit 'Awwa	Deir Samit	Taffuh	Idhna	Beit Kahil	'Arab ar Rashayida	Beit Fajjar	Wadi Rahhal	Al Khadr	'Arab al Jahalin
Hebron	Hebron	Hebron	Hebron	Hebron	Hebron	Hebron	Bethlehem	Bethlehem	Bethlehem	Bethlehem	Jerusalem
Yes											
		Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Yes		Yes	Yes	Yes	Yes	Yes			Yes		
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
											Yes
						Yes					
Yes											
							Yes				Yes
											Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
								Yes		Yes	
										Yes	
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
		Yes	Yes		Yes						Yes

703425	653275	653140	603045	602825	602775	552790	552740	503215	503120	503115	503090
Bani Suheila	Wadi as Salqa	Al Bureij Camp	Juhor ad Dik	Gaza	Ash Shati' Camp	Jabalya	Beit Hanun	Al Karmil	Yatta	Khallet al Maiyya	Beit ar Rush al Fauqa
Khan Yunis	Deir Al-Balah	Deir Al-Balah	Gaza	Gaza	Gaza	North Gaza	North Gaza	Hebron	Hebron	Hebron	Hebron
								Yes		Yes	
Yes	Yes	Yes	Yes	Yes		Yes	Yes				
Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes		
		Yes						Yes		Yes	
								Yes	Yes	Yes	Yes
											Yes
										Yes	Yes
								Yes	Yes	Yes	Yes
		Yes									
	Yes		Yes					Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		
		PHG & GVC are managing to install RO unit on one of the main municipal wells		L/C/D is very low due to fuel shortage and electricity problems	UNRWA responsibility						The water doesn't reach their network due to the weakness of flow

753505	753490	703485	703450
Shokat as Sufi	Rafah	Al Fukhkhari	Qizan an Najjar
Rafah	Rafah	Khan Yunis	Khan Yunis
Yes	Yes	Yes	Yes
Yes	Yes	Yes	
Yes			
Yes			
Yes		Yes	
Yes	Yes		
Yes		Yes	Yes
Yes			
Yes	Yes	Yes	Yes
Yes	Yes	Yes	

Water for Life

Water, Sanitation and Hygiene
Monitoring Program (WaSH MP) 2007/2008