Reform and challenges in water management of Palestine

Policy paper

Summary

Introduction and structure of the document

The current policy paper is produced as part of the main deliverables committed under the EU - ENPI CBC MED funded SWMED Project. It summarizes the main water related problems, challenges and potential solutions to some of these problems as defined by SWMED project in Palestine and discussed during the water tables which were organized in full participation of the relevant stakeholders.

In total more than 240 people have participated in the organized water tables including representatives from national organizations working in the water sector management, local authorities, environmental groups, civil society organization, water user associations, etc. The **first water table** participants have discussed innovative tools to review public policies and technical solutions for **sustainable water management and to develop strategies to protect the environment. Major points considered were to focus on water savings, water reuse and cost reductions of water supply especially operation and maintenance cost**. **In the second water table** stakeholders discussed the Palestinian water strategy with special focus on the expected challenges facing water and wastewater sector in Palestine and what options to adopt to face these challenges. Finally, **in the third water table** stakeholders discussed the main issues related to water governance, regulations and the proposed new water law and recommended some policy objectives and strategies that can be implemented to improve water and wastewater management in Palestine.

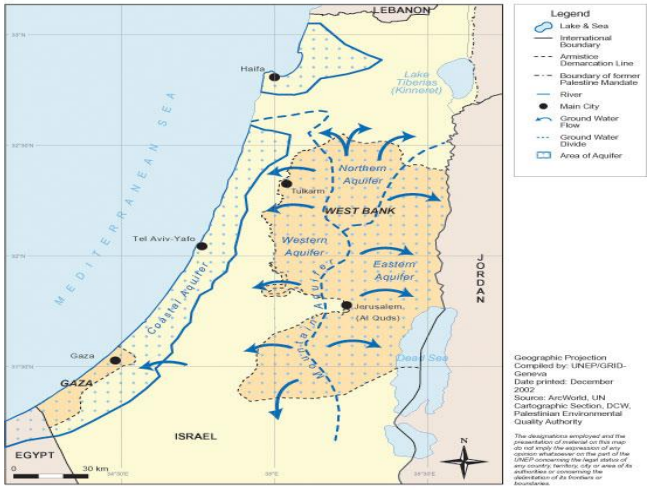
Based on the outcomes of the water tables, this policy paper is organized under four main themes. The first part covers the water and wastewater resources and their management; the second part covers the main challenges and problems facing the resources and access to services; the third part covers the existing water governance as well as the proposed reform to improve water governance; and finally the fourth part addresses the proposed policy objectives and the main potential strategies to overcome part of the problems identified.

I. Water and waste water resources management

I.1 Water resources

Currently groundwater is the main source of water for Palestinians. The magnitude of renewable groundwater resources in the Occupied Palestinian Territories (oPt) varies from 729 Mcm/year (679 Mcm/year in the West Bank and 50 Mcm/year in Gaza). However, the official estimates, especially those of the West Bank, are those stated in the Oslo interim agreement, which is 679 Mcm/year, mainly as renewable groundwater resources, distributed in three major aquifer basins in the West Bank: Western, North-eastern and Eastern, with replenishment capacities of 362 Mcm, 145 Mcm and 172 Mcm per year, respectively and the coastal aquifer in Gaza (Figure 1). In addition, surface water, represented mainly by the Jordan River, is not yet accessible to the Palestinians due to Israeli control and restrictions.

Mountain and Coastal Aquifers



I.2 Water access, use and demand

The total domestic water quantities supplied to the various communities in the oPt (West Bank and Gaza) is estimated at nearly 184 MCM/year. Moreover, total water use in agriculture is nearly 150 MCM/ year as shown in Table 1. It is good to mention that most of the water supplied to Gaza is secured from groundwater wells where 95% of it is brackish.

Table (1): Current Water Supply in the West Bank and Gaza

Main Category	Supplied Quantity (MCM/Year)
Domestic and Industry	184
Agriculture	150
Total	334

The average Palestinian per capita domestic water use vary from 80 l/c/d to 15l/c/d in the urban areas connected to water supply and rural and marginal communities which are not connected to water supply respectively. Currently there are 38 Palestinian communities with 20.000 people are still not connected to water network (PWA report, 2011). Some of them use local springs and some collect rain water at household level while some others purchase water by trucks.
The water demand is much higher than current supply where domestic water demand will reach nearly 445 MCM/year toward the year 2040 as shown in Table 2.

Table (2): Projected water demand in the West Bank and Gaza until the year 2040.

Year	Population (Million)	Projected Water Demand		
		Domestic and Industry (mcm/year)	Agriculture (mcm/year)	Total (mcm/year)
2010	4.05	192[1]	301.5[2]	493.5
2020	5.23	254[1]	340.7[3]	594.7
2040	9.4	445[1]	587.3[2]	1032.3

Source:
1. Calculated based on 100 l/c/d + 30% losses based on population growth rates of 2.6% in West Bank and 3.2% in Gaza.
2. Population projections are taken from the PCBS census of 2007 and the water demand projections are adjusted from the GTZ (1998).
3. Calculated based on 75000 dunum/1 million people (adopted from GTZ 1998)

It can be concluded that current water supply is much below the demand level and therefore, serious efforts is needed to bridge this gap through exploring all options including to gain Palestinian Water rights in their water resources and exploring further sustainable water management options.

Water price and tariff vary substantially across Palestinian communities, it varies from 0.2Euro/ m3 in some connected urban areas to 6 euros/m3 in the areas not connected to water supply in the marginal and rural areas.

I.3 Wastewater generation and treatment

The percentage of population connected to sewer networks in Palestine counts for approximately 50% distributed as nearly 65 % in Gaza Strip and about 35 % in the West Bank, PWA (2010). These percentages represent mainly the collected wastewater in the major cities through the West Bank and Gaza Strip.
People who are not served by sewage network system in both West Bank and Gaza disposes raw wastewater into cesspits, open drains and vaults. Most of the rural communities and some major towns in the West Bank and Gaza are not served. Among those towns that are not served in Gaza is Kan Younis town in the southern part of Gaza and Jericho as well as Qalqilia towns in the West Bank.
It is estimated that the collected wastewater quantity in the West Bank and Gaza through main sewage collection systems is nearly 71 MCM / Year, out of which 30 MCM in the West Bank and the rest in Gaza, PWA (2010). The collected wastewater in Gaza is diverted into four main treatment plants with the capacity of nearly 31 MCM / Year. The treatment plants provide partial treatment before it is either being recharged into the ground or being discharged into Wadi Gaza or to the Sea. The situation, however, is different in the West Bank where there are 7 treatment plants but the only proper treatment plant is that of Albireh wich treats nearly 2 MCM /Year currently, PWA (2010), as shown in Figure 2.

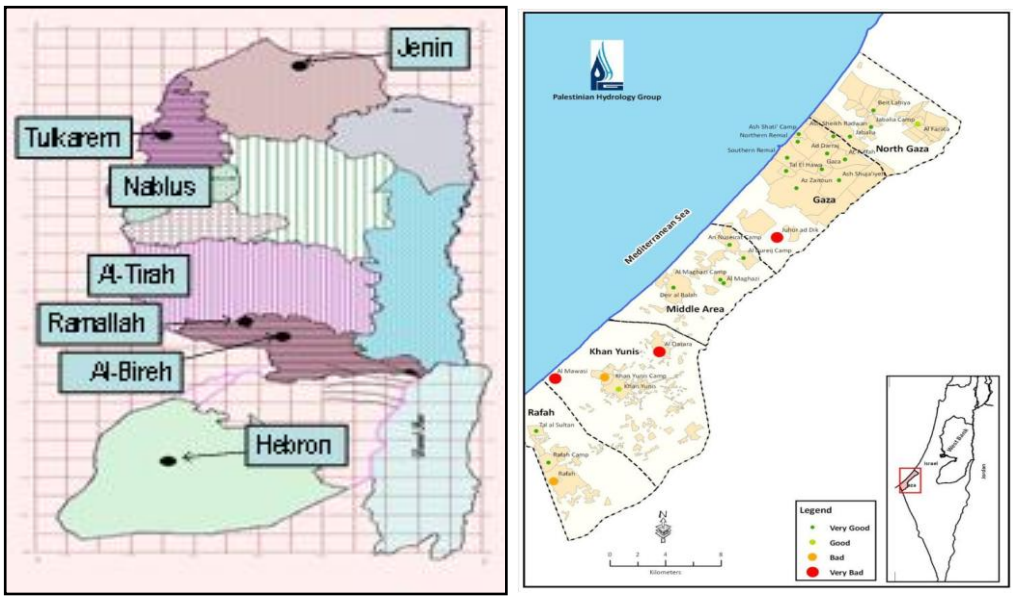


Figure 2: Location of Wastewater Treatment Plants in West Bank and Gaza.

I.4 Treated wastewater disposal and reuse

Most of the collected wastewater through central sewerage systems is not reused and is being discharged either into the sea in Gaza or into valleys in the West Bank. However, there is some indirect reuse of the effluent produced from the Northern Gaza treatment plant at Beit Lahia through artificial recharge to the aquifer in the north and east of Gaza. The estimated quantity that is being recharged is nearly 8.4 MCM / Year and accounts for nearly 12% of the total collected wastewater through central collection system in the West Bank and Gaza. Moreover, there is limited reuse in agriculture in some parts of Gaza. In total, this would account for 0.5 MCM / Year.

II. Problems and challenges facing water and wastewater management

Unequal water accessibility and distribution

Water allocation and distribution can be used both as a turning point or a strong means of oppression. Water and its access for Palestinians are part of a daily existence **"Exist is to resist":** this statement has become the key word for Palestinians to express their daily struggle to have access to water and land. Although the Oslo II agreement and Art. 40 state the recognition by Israel of the right to water for Palestinians in the West Bank and Gaza, **the current water situation as reported by international and local NGOs and organizations remained unchanged (Amnesty International, 2009). The unequal water allocation and restricted access of Palestinians to Water and Sanitation services is still one of the major problems facing proper management of the sector.**

None Revenue Water (NRW)

Non-revenue water including: technical losses (leakage), not billed water, illegal connections, poor water meter performance and inaccurate readings. The NRW has substantial impact on both resources and water supply providers. The extent and delineation by type of NRW in Gaza and West Bank is not accurately measured. However, it is estimated that average NRW is nearly 37% of total supply as shown in Table 3.

Table3: Water losses or NWR in West Bank and Gaza

Palestine	Supplied Water Volume (m^3/year)	Billed Water Volume (m3/year)	Water losses
West Bank	85.000.000	60.300.000	29%
Gaza Strip	96.300.000	53.100.000	45%

Over pumping - Insufficient regulation of groundwater pumping

In Palestine the most critical situation about the **water quality is in Gaza, where the groundwater is seriously compromised by over-pumping**. Massive over-pumping has led to increased seawater intrusion to the coastal aquifer causing serious water quality deterioration.

The situation is relatively better in the West Bank, but there are some unregulated groundwater pumping in some areas that causes some negative impact on the local aquifers and affecting some major springs.

Weak role of the tariff in the efficient and aware use of water

In Palestine the estimated costs include the differential cost. Neither the distribution cost nor the storage cost are included since they will be needed regardless of what alternative is selected and the

difference in the storage and the distribution costs is minimal under the considered alternatives. In this, the associated capital costs of the solution are recommended to be included.

Poor sanitation service and low coverage

In Palestine, despite that **85% of urban communities are connected to sewer networks**, nearly all rural and marginal **communities suffering from poor sanitation. Most communities in the rural area in the West Bank lack adequate sewage systems to dispose of their wastewater**. **In some villages and refugee camps black wastewater is collected in cesspits, while grey wastewater is discharged via open channels**, **then discharged into nearby wadis without any kind of treatment.**

Pollution and vulnerability.

Several contaminants pose great pollution threat to the main water resources in the West Bank and Gaza. The main pollution sources are the untreated or poorly treated wastewater effluent originating from Israeli Settlements in the West Bank especially the industrial settlements in addition to the wastewater disposal from some Palestinian communities.

It was realized that the level of Chloride, Sodium and TDS is high in the Eastern aquifer. This might be related to gynogenic effect. Moreover, the increase in the level of **Nitrate and bacterial (Fecal and Total) in the Western aquifer were related to anthropogenic impact. However, the coastal aquifer in Gaza suffers from seawater intrusion, pollution through infiltration of sewage and agrichemicals. United Nations estimated that if the** present rate of deterioration continues, the portion of coastal aquifer on which Gaza Strip relies for all its water **needs will be unusable by 2016, and irreversibly damaged by 2020.**

The major risks encountered with polluting the major aquifers in the West Bank and Gaza can be summarized as follows: i) Deteriorated water **quality of the aquifers will reduce fresh water availability and cause several public health problems for Palestinians; ii) The cost of producing and treating potable water from the aquifers will increase and this in turn will increase the economic burden over the people especially the poor ones.**

Social acceptability of reusing treated effluent

Reusing of treated effluent is not yet socially acceptable in the Palestinian society. The main reason for this is either religious or public health concern. However, public show more acceptability and interest to reuse treated grey water instead.

III. Water governance and reform

Fragmentation of the governance

Palestinian Water Authority (PWA) was mandated as the regulatory body according to water law number 3 and the new law number 24 of 2014, yet water management setup is still not fully organized where many actors are still involved in the management. The local municipalities and village councils are the primary body for managing local water supplies and wastewater service. These councils are legally part of Ministry of Local Governments and therefore, they don't feel obliged to follow PWA instructions or policies. However, it is done voluntarily and in coordination with the Ministry in some cases. Tariff is still decided by these councils in coordination with the Ministry of Local Governments. In the mean time PWA is working to develop a unified tariff policy that should be followed by all water supply management bodies. The same applies for wastewater services. The un clarity in some roles of other ministries when it comes to water resources

management including pollution control, makes the issue even more complicated. The roles of various ministries and authorities mainly Ministry of Agriculture, Ministry of Local Governments and Environment Quality Authority should be well defined and coordinated to ensure better water governance.

No Proper mechanism for stakeholder participation

The current institutional structure and regulations in place doesn't include an institutionalized stakeholder participation mechanism in decision making in water management. This leads to create a large gap between various levels of stakeholders including civil society and water user groups. It also leads to low adaptation of decisions.

Water sector reform

PWA is currently undertaking a water sector reform process which aims at improving the current water governance and ensures better sector regulation. The reform includes the modification of water law and changes the current structure of water management and sets more clear responsibilities for the various bodies and more importantly sets clear role division and separates authorities.

IV. Recommended policy objectives and strategies

The main recommendations that have emerged from the water tables to address the problems facing water and wastewater management in Palestine can be categorized as follows:

Policy level:

It is important to properly inform policy makers about the water related problems and challenges and that Politicians should keep the water issue high in the political agenda and they should consider obtaining Palestinian Water Rights in their resources as first priority, this include to assume full sovereignty over these resources.

Governance and regulatory level

Implementing the new water law # 4 and develop all related regulations including water resources protection, pollution prevention, water tariff, water resources development and monitoring, etc.

Ensure separation of authorities among various governmental bodies and ministries to ensure a more coordinated and integrated water management approach.

Develop a clear regulation for stakeholder participation in decision making related to water management and institutionalize such regulation.

Technical and technology level

Water saving devices and tools need to be promoted and national campaign needs to be carried out to provide all public buildings with these devices. In addition an incentive program must be launched to encourage people to adopt and install theses devices to rationalize water use.

Decentralized wastewater treatment plants for rural and pre urban areas to be promoted with focus on natural and biological treatment technologies with improved wetlands as proposed by SWMED project solutions for settlement typologies.

Grey water treatment and reuse at household and group of household level needs to be encouraged this can also be coupled with modified percolation pit to ensure localized sanitation solutions.

Guidelines and manuals needs to be produced to assist people in better understanding and better managing the technological solution and to enable them from operating and maintaining them properly.

Social and cultural level

National strategy on public awareness need to be implemented and national campaign needs to be started to improve public knowledge about the advantages of the Water saving practice and installation of devices.

Moreover; organize information sessions and arrange visits for pilot locations to change public perception on the reuse of treated effluent.

Using local media to disseminate and communicate the main messages of encouraging people to engage in national campaigns for water savings or to highlight various issues related to wrong perceptions and practices related to water and wastewater treatment, reuse and disposal.

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