

Local Water Supply, Sanitation and Sewage

Country Report

Palestine

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MEDA Water



SOGESID
SOCIETÀ GESTIONE IMPIANTI IDRICI



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Table of Contents

1.	SUMMARY.....	4
2.	GENERAL CONTEXT.....	7
2.1.	Geography.....	7
2.2.	Climate	7
2.3.	Social Context	7
2.4.	Private Sector Involvement	11
3.	LEGAL FRAMEWORK.....	12
4.	WATER STRATEGY.....	14
4.1.	Policy Principles	14
4.2.	Water Management Strategy	14
5.	WATER ASSESSMENT	16
5.1.	Water Resources.....	16
5.2.	Water Supply.....	18
5.2.1.	Water Supply Methods	20
5.3.	Sanitation and Sewage Services	21
6.	TARIFFS	24
7.	REFERENCES.....	26

1. SUMMARY

LOCAL WATER SUPPLY, SANITATION AND SEWAGE PALESTINE

GENERAL CONTEXT

- Average Rainfall: 500 mm /yr
- Area:
 - West Bank: 5,860 sq km¹
 - Gaza: 360 sq km²
- Population : 3.8 million (2005)³
- Population Growth rate per year: average 3,45% (estimated 2005) ⁴
- Population Distribution:
 - Urban: 50%
 - Rural: 28,5%
 - Camps: 15%
- Currency: 1 NIS = 0.18018 €(Oct 2005)

INSTITUTIONAL SETTINGS

Policy Setting: Cabinet of Ministries, National Water Council

Executive / Regulatory Level: Palestinian Water Authority

User Level:

- Bulk Water Utility: to manage the development of all inter-regional water supply and the transfer of water and wastewater for re-use when this becomes necessary.
- Water departments within the municipalities and village councils operate and maintain the water systems within their service areas

PWA Strategy of creating four integrated Regional water and wastewater utilities divided geographically

Private Sector Involvement⁵:

- Gaza – Suez Management Contract - manage the water and wastewater system in the Gaza Strip
- Bethlehem and Hebron – Vivendi contract - to manage the supply of drinking water, from well to tap, for an estimated 600,000 inhabitants
- Jerusalem Water Undertaking - Important Integrated Water services managed by private utility.

WATER STRATEGY

- National Water Policy
- Water Management Strategy based on guiding principles of the National Water Policy
- National Water Plan of 2000 - strategic plan for the water sector sets the direction to year 2020

WATER RESOURCES

- Average Annual renewable Water resources km³: 1 ⁶
- Renewable Water per Capita: 262.11 m³ (2005) ⁷
- Total annual water withdrawal: _____Mm³
- Total Annual Water withdrawals for domestic supply and sources: _____Mm³
 - Groundwater: %
 - Surface Water: %

¹ The World Factbook – CIA - 2005

² The World Factbook – CIA - 2005

³ The World Factbook – CIA - 2005

⁴ The World Factbook - CIA - 2005

⁵ Source: Water in Middle East and North Africa (MENA) - Trends in investment and privatisation, Public Services International, October 2002

- Other: %
- West Bank: 65.106.100 m³/yr (2003)
 - Wells: 32.5%
 - Springs: 6.9%
 - Purchased: 60.7%

WATER SUPPLY

- Population served by public networks: 89,4% (2003)⁸:
 - Urban: 95,7 %
 - Rural: 73,0 %
 - Camps: 98,5 %
- Estimated Rate of population with access to improved drinking water:⁹
 - Urban: 97% (2002)
 - Rural: 86% (2002)
- Total Potable Water Supplied whole territory (Bulkwater): _____ Mm³
- Potable Water Supplied per capita and day: _____ m³/cap/day
Overall supply rate for urban domestic purposes¹⁰
 - West Bank: Between 53 l/c/day (Tubas) and 134 l/cap/d (Jericho) including losses.
 - Gaza: Supply estimated to be in average 134 l/cap/d. Consumption in average per capita domestic only 80 l/c/d
- Potable Water Consumed per capita: 70 l/cap/day(2002)¹¹
- Total Billed Consumption: _____ Mm³
- Unaccounted for water (UFW): 45% (estimated average 2004)
 - West Bank: UFW rate estimated to vary between 25% (Ramallah) and 65% (in Jericho) with an average of 44% of total supply (2004)¹²
 - Gaza: UFW is estimated to be 45% (5% is unregistered connections and meter losses) (2004)¹³
- Service Continuity: Discontinuation of water access (twice a week in an average): 62,8%¹⁴

SANITATION & SEWAGE

- Rate of Population connected to public sanitation network: 50,8 % (2003)¹⁵ (sewerage connection)
- Urban: 62,3 %
 - Rural: 11,5 %
 - Camps: 83,9 %
- Rate of Population connected to Cesspit¹⁶: 48,1 %
- Urban: 36,8 %
 - Rural: 87,1 %
 - Camps: 14,4 %

⁶ PAI: Resources: People in the Balance (2004 Update) – People in Action

⁷ PAI: Resources: People in the Balance (2004 Update) – People in Action

⁸ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

⁹ WHO / UNICEF - Joint Monitoring Programme for Water Supply and Sanitation Coverage Estimates, updated 2004

¹⁰ Source: Palestine - Water as a human right: The understanding of water in Palestine, Global Issues Papers, Heinrich Boell Stiftung, September 2004

¹¹ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

¹² Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

¹³ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

¹⁴ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Percentage of household with changes in water supply and wastewater over the last five years, 2003

¹⁵ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

¹⁶ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

Estimated Rate of population with access to improved sanitation (MDG):¹⁷

- Urban: 78% (2002)
- Rural: 70% (2002)

Wastewater

- Total Volume of Wastewater: 72 Mm³ (2002)¹⁸.
- Rate of Wastewater undergoing treatment: _____%
- Wastewater undergoing treatment: _____ Mm³
 - Physical: %
 - Biological: %
 - Advanced: %

TARIFFS

Tariffs system:¹⁹

- Progressive Block Tariffs with no differentiation in prices for water consumption for various purposes.
- Rate of O&M costs covered through tariffs:
- Medium Tariff for 1m³ of water: _____
- Average Cost per month for water supply: 88,0 NIS / month²⁰
 - West Bank: 101,1 NIS
 - Gaza: 40,0 NIS
- Metering reading interval: Billing cycles and meter reading vary between different areas.

Responsible institution for setting and supervising tariffs:

- Palestinian Water Authority

¹⁷ WHO / UNICEF - Joint Monitoring Programme for Water Supply and Sanitation Coverage Estimates, updated 2004

¹⁸ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

¹⁹ Source: Concerning Price Discrepancy for Water in the Palestinian National Authority Areas - Special Report Series (20) March, 2003

²⁰ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Monthly Cost of Wastewater Disposal, 2003

2. GENERAL CONTEXT

2.1. Geography

The West Bank with an area of 5572 sq km (approximately 155 km in length and 60 km in width) is mainly a mountainous region but it contains the western bank of the Jordan River between the Beisan Valley in the north and the Dead Sea in the south as well as small areas in the semi-coastal plain in Tulkarm and Qalqilia. The Gaza Strip with an area of 367 sq km (approximately 45 km in length and 7 to 12 km in width) is situated in the southern part of the coastal plain.

2.2. Climate

The climate of Palestine is of the Mediterranean type. There are two clearly defined climatic seasons, a wet winter which starts in October and ends in May and a dry hot summer.²¹

The average annual precipitation is 450 - 500 mm, decreasing from north to south and from high to low altitude. Rain tends to fall in intense storms. The northern Gaza Strip receives 400 mm, the south 200 mm per year, and the Dead Sea less than 100 mm.²²

2.3. Social Context

- **Total population**

West Bank (July 2004 est.)²³: 2,385,615
(note: in addition, there are about 187,000 Israeli settlers in the West Bank and fewer than 177,000 in East Jerusalem)

Gaza Strip (July 2005 est.)²⁴: 1,376,289
(note: in addition, there are more than 5,000 Israeli settlers in the Gaza Strip)

In Palestine as a whole more than 50% of the population lives in urban areas, 28,5% in rural areas and 15 % in camps.²⁵

- **Population Growth Rate**

Average Annual Growth rate: 3,45%

West Bank: 3.13% (2005 est.)

Gaza Strip: 3.77% (2005 est.)

- **Urban Population**

Approximately 65 % of the population live in urban areas (UNFPA, 2001).

- **Population below poverty line**

59% (2004 est.)

- **Currency**

Currency: 1 NIS = 0.19761 € (July 2003)²⁶

²¹ Source: EMWIS – Palestine – Institutions

²² Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

²³ Source: The World Factbook - CIA - 2005

²⁴ Source: The World Factbook - CIA - 2005

²⁵ Source: Palestine - Water as a human right: The understanding of water in Palestine, Global Issues Papers, Heinrich Boell Stiftung, September 2004

²⁶ Source: External relations -The EU's relations with West Bank and Gaza Strip - Basic Data (Updated 2004)

3. INSTITUTIONAL SETTINGS

The recently proposed organisation of the Palestinian Water Sector (PWA, 2000) envisages clear separation between regulatory and delivery functions and emphasises that PWA is the key regulator and guardian of Palestinian water resources.²⁷

The institutional reforms within the water sector have adopted some principles for water policy, and 3 important principles are :

- 1-The water sector should be regulated by one responsible body, with the separation of the institutional responsibility for policy and regulatory functions from those of services delivery,
- 2- It is intended to establish four regional utilities in the West Bank and one in Gaza, and
- 3- Encourage involvement of the private sector in the funding and implementation of projects.



Institution	
National Water Council	<p>The National Water Council is chaired by the President of the Palestinian National Authority and consists of five ministries and a Palestinian universities representative. The composition of the council will be amended to include representative from Palestine Water Authority, NGO's, Ministry of Health, the Farmers Union, and the private sector.²⁸</p> <p>The mandate of the National Water Council comprises to review and approve national water policies, review and approve water quotas, reconsider the issue of private ownership of water, examine the central water protects and approve their implementation. And enhance regional and international co-operation in water.²⁹</p>

²⁷ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

²⁸ Source: EMWIS – Palestine – Institutions

²⁹ Source: EMWIS – Palestine – Institutions

	<p>The NWC consists of the following 13 members.³⁰ Below a brief description of the members of the National Water Council is given.</p> <ul style="list-style-type: none"> • The Ministry of Agriculture - Responsible for the development of the agricultural sector, which is the major water user in Palestine • Ministry of Finance - Holds a mandate for the national economy, cost recovery and tariff issues. • Ministry of Health – Responsible for public health aspects, water quality standards and the alleviation of water related health risks. In the Gaza strip they do all the water quality testing. • Ministry of Local Government – Responsible for local (urban) planning, organisation of the operation of the systems via the Municipalities and participates in hearings regarding licensing. • Ministry of Planning and International Cooperation - Holds a mandate regarding the coordination of international cooperation and national planning issues. Its Directorate for Urban and Rural Planning (DURP) is responsible for overseeing the general policies, plans and programmes for the spatial planning at national and regional level. • Environmental Quality Authority - Responsible for environmental policies, strategies, and criteria to ensure ecological and environmental sound development of the surface water and groundwater resources. • Ministry of Industry (Mol) - Responsible for effluent standards, reuse of industrial wastewater and public enquiries about industrial water licenses • West Bank Water Department (WBWD) - In charge of the provision of bulk water to the various water service providers in the West Bank. In addition they are still involved in the rehabilitation, extension and construction of water facilities in the West bank. In the near future they will be transformed into the National Bulk Water Utility. • Coastal Municipal Water Utility (CMWU) - This is an association of 19 Municipalities in the Gaza area assuming the responsibility for the provision of water supply and sewerage services to these Municipalities. The tendering of a, World Bank sponsored, management contract for this utility is underway. It is anticipated that the CMWU will become one of the four. • Regional Water Utilities
<p>The Palestinian Water Authority³¹</p>	<p>PWA is a central authority that was established by the Presidential Decree no.90 for the year 1995 in 26/04/1995.</p> <p>The Law No 2, 1996, states the PWA is the official body responsible for water resources in Palestine whether surface or ground water and including sewage water which can be considered as an alternative resource if being recycled. This resolution defines the Palestine National Authority responsibility as it addresses all that is related to developing water resources, investing them, piloting and monitoring using them for national development purposes, putting criteria to maintain them, and preserving them from contamination and running out.</p> <p>PWA main objectives:</p> <ul style="list-style-type: none"> • Seeking to achieve an administration much fit for water resources' usage. • Seeking to secure water through the best planning for investing and developing water resources, and through looking for extra water resources to guarantee balancing between offer and demand. • Making water projects and supervising their implementation. • Seeking to achieve the highest level of coordination and cooperation between the PWA and all the related institutions. <p>PWA main tasks:</p> <ul style="list-style-type: none"> • Develop and reinforce water resources and seek for alternatives.

³⁰ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

³¹ Source: Palestinian National Information Centre - Boards and Institutions Concerned with Water Issues in Palestine, 1999

	<ul style="list-style-type: none"> • Building the central base for water information. • Issue licenses related to water and sewage water projects. • Prepare national water plans. • Support and develop water studies and researches. • Monitor water resources. • Organize and develop works of digging and excavation. • Prepare projects related to the manner to administrate water sector, and submit them to the National Water Council (NWC). <p>The PWA performs a lot of main programs and projects that aims at building and operate the Authority, develop water and sewage water sectors, and perform other complementing activities related to the PWA aims. ³²</p>
<p>Regional Water Utilities³³</p>	<p>Under the Water Law, a “Bulk Water Utility” is to be established, when appropriate, to manage the development of all inter-regional water supply and the transfer of water and wastewater for re-use when this becomes necessary. This utility will be an entity for the whole of the Occupied Palestinian Territories, with representatives from all regions, and will be vested in the public sector.</p> <p>Water departments within the municipalities and village councils operate and maintain the water systems within their service areas. In order to mitigate insufficient water supply, deterioration of water quality and inadequate level of services, caused by fragmented management, the PWA has adopted a strategy of creating four integrated <i>Regional Water Utilities</i> responsible for the provision of water supply and sewerage services in Palestine. They will be divided geographically into four areas: ³⁴</p> <ul style="list-style-type: none"> • Northern • Central • Southern • Coastal <p>They are responsible for delivering efficient water services to all customers. The utilities are administratively and fiscally autonomous, although tariffs are reviewed, and water abstractions and discharges are licensed and monitored by PWA. The regional water utilities are required to seek full cost recovery in their operations and to develop a customer charter.</p> <p>Until the Regional Water Utilities will be established, water supply and sewerage services will be provided by the Municipalities and water user associations. In many cases various Municipalities have already established <i>Common or Joint Service Councils</i>. These C(J)SC’s are in charge of the operation and maintenance of the municipal facilities for water supply and sewerage. As a rule administrative and financial aspects remain with the Municipalities. ³⁵</p>

³² Source: Palestinian National Information Centre - Boards and Institutions Concerned with Water Issues in Palestine, 1999

³³ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

³⁴ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

³⁵ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

Palestinian Hydrology Group ³⁶	<p><i>"The Palestinian Hydrology Group is a non-profit, non-government organization that protects and develops the water resources of Palestine. We strive, through community participation, to achieve justice in the service, allocation, and protection of the water resources of Palestine, since the sustainability of this resource is vital for the protection of the Palestinian nation, the protection of future generation, and the protection of the planet."</i></p> <p>Since PHG was established in 1987, it strives to promote the research capacity as well as its infrastructure in the field of water and environment. It developed a reasonable water related database using various software including Arc GIS. PHG has conducted a number of useful research and studies on water and wastewater resources quantity and quality issues.</p>
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2.4. Private Sector Involvement

- **Gaza – Suez Management Contract**

In 1996 a company called LEKA consisting of the French Lyonnaise des Eaux (now Suez) and Khatib & Alami was awarded a four-year contract to manage the water and wastewater system in the Gaza Strip. The contract consist in assisting the local governments and the Palestinian Water Authority to improve water services.

According to the World Bank the contract resulted in financial improvements and better water quality. Between 1995 and 1999, UFW fell from 50% to 31% and 2000 leaks were repaired; revenue collection increased from 1,1 m NIS in 1995 to 30,7 m NIS 1999. 80% of the system was mapped; 11000 illegal connections where identified and 10 000 connections were replaced; 7000 meters were repaired and 8000 replaced.

- **Bethlehem and Hebron – Vivendi contract**

In mid-1999, a four-year management contract was signed with Vivendi and Lebanese-Palestinian engineering company Khatib and Alami, known as Geko. The four-year water management contract followed a tender launched at the end of 1998. The company was required to manage the supply of drinking water, from well to tap, for an estimated 600,000 inhabitants. The main focus was the Bethlehem governorate, where the venture was put in charge of operating system on daily basis. In the Hebron area, it provided only technical assistance to the municipality and surrounding villages.

³⁶ Source: Palestinian Hydrology Group – Background – Web page

3. LEGAL FRAMEWORK

37

Law	Argument	Comment
Presidential Decree No.5/1995		The Decree established the Palestinian Water Authority (PWA).
By-Law No.2/1996	Establish and define the objectives, functions and responsibilities of the Palestinian Water Authority.	This Law gave the Palestinian Water Authority the mandate to manage the water resources, execute the water policy, establish, supervise and monitor water projects, and to initiate coordination and cooperation between the stakeholders in the water sector. ³⁸
Presidential Decree No.66/1997 -	Palestinian Water Authority.	The Decree establish the internal regulations of the Palestinian Water Authority and the rules of procedures
Palestine Water Law No.3/2002	The Water Sector Principles.	The enactment of the Water Law no. 3/2002 on 18 February 2002 resulted among other things in formalization of the scope of the authorities of PWA and more salient, it deemed water as publicly owned and managed by the PWA on behalf of the public for the public good. It legal eliminated the concept of private ownership of water. Article 7 of the Water Law defines the tasks and responsibilities of PWA.: ³⁹
Palestine Water Law No.3/2002	The Law provides further legal basis” and grants legal personality to the “Palestinian Water Authority”. The budget of the Water Authority is part of the general budget of the Palestinian Authority. ⁴⁰	<ul style="list-style-type: none"> • The Water Authority has the right to supervise and control/regulate regional utilities (art 28). • The Water Authority shall carry out control tasks including keeping records regarding water usage and licenses, setting times when licensed “operators” of water or waste water facilities must give periodic reports, and to set the necessary rules and standards for inspecting meters and to control the leak of water (art 34.1). • The Water Authority shall also have the right to inspect water resources and systems of supply, and any place where pollution is suspected (art 34.2). The Law indicates that specific regulations will be issued for specific purposes. (art 3.2; art.18; art.20; and art.25).
	The Law also sets the composition and tasks and responsibilities of the National Water Council .	The National Water Council is chaired by the Chairman of the Palestinian Authority. The members of the council are; Ministers of the most involved Ministries, the Heads of the Water and Environment Authorities, the Mayor of the Capital, and representatives of selected stakeholder groups (Union of Local Authorities, Palestinian Universities, Regional Utilities and Water Unions and Societies.)

³⁷ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

³⁸ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

³⁹ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

⁴⁰ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

		<p>The Council will primarily sanction policies and plans, ratify and approve the Water Authority's reports, guidelines and internal regulations. It is envisaged that the first meeting of the National Water Council will take place in the foreseeable future.</p>
	<p>The law also include a chapter on the Regional Water Utilities.</p>	<p>The Regional Water Utilities will be established on the desire of local authorities. The Water Authority will have the right to supervise regional utilities. Further regulations will set tasks and responsibilities of the Water Utilities.</p>

4. WATER STRATEGY

The National Water Policy for Palestine has been formulated by the Palestinian National Authority in 1996 to address the increasing scarcity of water resources in Palestine and the political complexity in relation to this valuable resource.⁴¹

This policy contains the following main principles which will govern policy and planning for the sector in Palestine:⁴²

4.1. Policy Principles

1. All sources of water should be the property of the state.
2. All citizens have a right to water of good quality for personal consumption at costs they can afford.
3. Industrial and agricultural development and investment must be compatible with available water resources.
4. Water is an economic good.
5. Sustainable development of all available water resources.
6. Coordinate the development of the water resources of Palestine at the national level, and implementation at the appropriate local level.
7. Separation of institutional responsibility for policy and regulatory functions from the service delivery function.
8. Public participation.
9. Integrating water quality and water quantity.
10. Integrating water supply and wastewater management at all administrative levels.
11. Consistent water demand management.
12. Protection and pollution control of water resources.
13. Polluters pay.
14. Conservation and optimum utilization of water resources.
15. Obtaining the right of water resources shared by other countries on the principle of equality.

4.2. Water Management Strategy

Based on the above guiding principles the Palestinian Water Authority (PWA) initiated and produced a Water Management Strategy draft in order to identify how to respond and contribute to the fulfilment of the Palestinian Water Policy. This strategy identified the following six key elements as capturing the most important issues and required strategic interventions.⁴³

- 1) Pursue Palestinian Water Rights.
- 2) Strengthen National Policies and Regulations.
- 3) Build Institutional Capacity and Develop Human Resources.
- 4) Improve Information Services and Assessment of Water Resources.
- 5) Govern Water and Wastewater Investments and Operations.
- 6) Enforce Pollution Control and Protection of Water.

Within the context of the National Water Policy and the Water Management Strategy draft the overall objective and guiding vision is the Equitable and Sustainable Management and Development of Palestine's Water Resources.⁴⁴

- **The National Water Plan**

The National Water Plan of 2000 is the strategic plan for the water sector. It sets the direction to the year 2020, and it proposes actions to be taken to achieve these goals. The document describes the role of service providers.⁴⁵

⁴¹ Source: EMWIS Web – Palestine – Institutions

⁴² Source: EMWIS Web – Palestine – Institutions

⁴³ Source: EMWIS Web – Palestine – Institutions

⁴⁴ Source: EMWIS Web – Palestine – Institutions

It says that Regional Water Utilities will be responsible for the following services:⁴⁶

- preliminary investigations and design;
- construction and/or rehabilitation;
- research;
- repairs;
- operations and maintenance.

Moreover it states that services would cover the fields of

- municipal and industrial water supply;
- waste water collection treatment and re-use;
- storm-water collection,
- treatment and re-use;
- water and treated wastewater supplies for irrigation.⁴⁷

Regional Water Utility assets will remain government owned, with a community representation on their board. Employees will be seconded to a competitively selected private operator, who will be contracted for a set term to manage, operate and maintain all infrastructure and related services for a fee. All billing and collection procedures will also be placed in the care of the operator. The Utilities will be administratively and fiscally autonomous, although tariffs will be reviewed, and water abstraction and discharge will be licensed and monitored by PWA.⁴⁸

The Regional Water Utilities will be required to seek full cost recovery in their operations and develop a customer charter.⁴⁹

⁴⁵ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

⁴⁶ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

⁴⁷ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

⁴⁸ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

⁴⁹ Source: Hiba Hussein - The Palestinian Water Authority: Developments and Challenges Involving the Legal Framework and Capacity of the PWA - IPCRI publications, 2003

5. WATER ASSESSMENT

5.1. Water Resources

- Water Resources Domestic Sector by Governorate / District and Source 2003⁵⁰

Unit: 1000 m³/yr

Governorate/District	Water Source			Total
	Wells	Springs	Purchased*	
Palestinian Territory	„	4472,0	43144,4	„
West Bank	21139,4	4472,0	39494,7	65106,1
Jenin	1148,4	100,0	2185,0	3433,4
Tubas	415,6	180,0	105,0	700,6
Tulkarm	4356,3	-	265,3	4621,6
Nablus	4294,8	1892,0	2534,8	8721,6
Qalqiliya	3506,7	-	335,0	3841,7
Salfit	-	100,0	1298,6	1398,6
Ramallah & Al-Bireh	2108,4	0,0	12999,0	15107,4
Jericho	0,0	2200,0	1042,1	3242,1
Jerusalem	-	0,0	3398,2	3398,2
Bethlehem	3995,9	0,0	5601,9	9597,8
Hebron	1313,3	0,0	9729,8	11043,1
Gaza Strip	„	-	3649,7	„

* Includes the pumped water from the wells which are located in the Palestinian Territory and controlled by Mekorot

(,,) Data not available

(-) Null

- Percent Distribution of Households in the Palestinian Territory by the Monthly Quantity of Consumed Water and Region, 2003⁵¹

Region	Quantity of Consumed Water (m ³ /month)				
	Less than 5	5 – 10	11 – 15	16 – 20	More than 20
Palestinian Territory	7,2	18,3	14,3	13,8	46,4
West Bank	8,1	25,1	14,8	14,1	37,9
North of West Bank	7,9	26,2	15,3	14,7	35,9
Middle of West Bank	8,0	23,0	12,4	15,9	40,7
South of West Bank	8,6	25,7	16,9	11,0	37,8
Gaza Strip	5,3	4,9	13,2	13,2	63,4

- Percent Distribution of Households in the Palestinian Territory by Water Resources and Region, 2003⁵²

Water Resources	Palestinian Territory	Region					Gaza Strip
		West Bank				Total	
		North of West Bank	Middle of West Bank	South of West Bank	Total		
Public water network	82,2	81,3	92,5	62,9	79,8	87,3	

⁵⁰ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Water Resources Domestic Sector by Governorate / District and Source, 2003

⁵¹ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory – Percentage of Households in the Palestinian Territory by the monthly Quantity of consumed water, 2003

⁵² Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Percent Distribution of Households in the Palestinian Territory by Water Resources and Region, 2003

Local Water Supply, Sanitation and Sewage – Palestine

Public water network	82,2	81,3	92,5	62,9	79,8	87,3
Water well owned to family	0,7	0,1	0,3	0,1	0,2	1,7
Collective owned water well	0,1	0,2	0,0	0,0	0,1	0,3
Others owned water well	2,8	0,0	0,6	0,0	0,2	8,0
Household spring water	0,2	0,1	0,3	0,2	0,2	0,0
Public spring water	1,1	2,5	2,1	0,0	1,7	0,0
Rainwater collective well	5,5	6,3	3,4	16,7	8,2	0,0
Purchasing water tanks	6,3	9,3	0,4	20,1	9,4	0,1
Purchasing mineral water	0,1	0,0	0,4	0,0	0,1	0,0
Purchasing filtered water	0,2	0,2	0,0	0,0	0,1	0,4
Using treated water	0,8	0,0	0,0	0,0	0,0	2,2

5.2. Water Supply

• Service Coverage

The unique historical water situation in the West Bank and Gaza Governorates has resulted in suppressed water demand. Water Supplies are generally constrained due to technical, institutional and political limitations. In addition to that, approximately 30% of Palestinian Communities are not served while 66% of the served communities suffer from water shortage especially in summer. Thus the current water demands cannot be used for predicting future demands.⁵³

• Percent Distribution of Households in the Palestinian Territory by Connection to Public Networks (Water, Electricity and Sewage), Region and Type of Locality, 2003⁵⁴

Region and Type of Locality	Connection to Public Networks					
	Water			Sewage		
	Public Network	Private System	No Piped Water	Public Sewage	Cesspit	No Sewage System
Palestinian Territory	89,4	7,7	2,9	50,8	48,1	1,1
Urban	95,7	3,1	1,2	62,3	36,8	0,9
Rural	73,0	19,9	7,1	11,5	87,1	1,4
Camps	98,5	0,9	0,7	83,9	14,4	1,7
West Bank	85,5	10,6	3,9	40,8	57,8	1,4
Urban	93,9	4,3	1,7	58,3	40,7	1,0
Rural	72,7	20,0	7,3	11,6	87,0	1,4
Camps	97,4	2,3	0,3	81,2	14,2	4,6
Gaza Strip	97,4	1,8	0,8	70,9	28,5	0,6
Urban	98,4	1,1	0,5	69,2	30,2	0,6
Rural	76,7	18,3	5,0	10,8	87,5	1,7
Camps	99,0	0,2	0,8	85,0	14,5	0,5

• Service Continuity⁵⁵

Percent of Households in the Palestinian Territory by Changes that Emerged on Water Resources within Last Five Years and Region, 2003

Region	Changes on water resources					
	Still normal water supply	Discontinuation of water access (twice a week in an average)	Seasonal changes on water quantity	Seasonal changes on water quality	Seasonal changes on water price	Other
Palestinian Territory	53,5	62,8	65,8	39,6	31,1	1,2
West Bank	52,7	57,4	55,2	25,8	33,4	1,7
North of West Bank	64,4	53,4	46,9	23,3	24,6	0,7
Middle of West Bank	54,7	56,1	46,6	28,5	32	0,4
South of West Bank	33	64,9	77,4	26,5	48,1	4,2
Gaza Strip	55	73,3	86,6	66,8	26,4	0,3

- Palestinian Territory
 - Still Normal Water Supply: 53,5 %
 - Discontinuation of water access (twice a week in an average): 62,8%
- Bulkwater (domestic and municipal uses):
 - Westbank, 2003: 65.106.100 m³/yr
 - Wells: 32.5%
 - Springs: 6.9%
 - Purchased: 60.7%

⁵³ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

⁵⁴ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

⁵⁵ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Percentage of household with changes in water supply and wastewater over the last five years, 2003

- Potable Water Supplied per capita and day: l/cap/day
- Supply rate for urban domestic purposes:
 - **West Bank:** between 53 l/c/day (Tubas) and 134 l/c/d (Jericho) including losses UFW rate estimated to vary between 25% (Ramallah) and 65% (in Jericho) with an average of 44% of total supply
 - **Gaza:** Average estimated to be 134l/c/d
Average per capita domestic consumption rate is only 80 l/c/d

UFW is estimated to be 45% (5% is unregistered connections and meter losses)
- The average per capita water consumption is around 70 l/ cap/day.(2002) ⁵⁶ The target rates for domestic water consumption in order to bridge the gap between supply and demand falls within a range of 100 l/capita /d and 150 l/c/d. These rates will be hopefully met after 10 and 20 years respectively with a target to reduce the loss rate to 25% over a 20 year period.⁵⁷
- There are 40 municipal wells in the West Bank that are used either wholly or partially by Palestinians. Their annual yield is insufficient to meet water demand and the deficit is supplied mainly through springs or through Mekorot (the Israeli Water Company). Some agricultural wells are also used for domestic purposes.⁵⁸
- There are more than 300 springs in the West Bank, of which more than 100 are considered to have substantial yields. Springs are a secondary, but important, source of water for drinking and other domestic purposes, and they are also used to meet agricultural needs throughout the West Bank.⁵⁹
- Rainfall cisterns collect around 6.6 Mm³ per year from rooftops.(2002)⁶⁰
- **Unaccounted for Water**
 - Palestinian total use from the groundwater resources in the **West Bank** has been estimated to be 120 MCM/year. About 86 MCM/yr. (71%) is used to irrigate 90,000 dunms. The remaining 34 MCM/yr. are used for domestic and industrial consumption (industry's share about 3%) with more than **40% of unaccounted for water** .⁶¹
 - In **Gaza**, Palestinians total use of water is about 125 mill.m³/yr. 80 MCM is used to irrigate 120,000 dunums. The remaining 45 MCM/yr are used for domestic and industrial consumption (industry's share about 3%) with **more than 50% unaccounted for water**.⁶²
- **Treatment of Potable Water**

Percent Distribution of Households in the Palestinian Territory by Means Used to Treat Drinking Water and Region, 2003.

Region	Mean used to treat drinking water				
	Percent of households using means to treat drinking water	Boiling	Using filter	Both methods	Other
Palestinian Territory	17,5	20,6	69,2	5,2	5,0
West Bank	20,3	25,3	61,6	6,7	6,4
North of West Bank	24,7	21,8	63,9	8,8	5,5
Middle of West Bank	22,2	29,1	61,7	5,7	3,5
South of West Bank	11,4	27,7	54,0	2,3	16,0

⁵⁶ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

⁵⁷ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

⁵⁸ Source: Desk Study on the Environment in the Occupied Palestinian Territories – UNEP, 2002

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⁶¹ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

⁶² Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

Gaza Strip	12,0	5,7	94,3	0,0	0,0
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5.2.1. Water Supply Methods

The Palestinian Authority is considering the implementation of a new water policy framework, aiming at setting up an autonomous Palestinian Bulk Water Supply Utility, which would take over the management of Trans-regional bulk water supply systems, comprising: existing transmission lines, currently operated by WBWD, providing bulk water supply to Palestinian communities, water projects, which are currently developed by the Palestinian Water Authority (PWA), other water sources envisaged in the National Water Plan (NWP).⁶³

The Bulk Water Supply Utility would be licensed by PWA to operate water production facilities, purchase drinkable water from national and international suppliers, convey the water to local Municipal and Industrial water distribution systems; the operation, maintenance and management of those local water distribution facilities will be progressively taken over by four Regional Water Supply Utilities that are established by the new Water Law.⁶⁴

Water Resources	Region					Total	Gaza Strip
	Palestinian Territory	North of West Bank	Middle of West Bank	South of West Bank	West Bank		
Public water network	82,2	81,3	92,5	62,9	79,8	87,3	
Water well owned to family	0,7	0,1	0,3	0,1	0,2	1,7	
Collective owned water well	0,1	0,2	0	0	0,1	0,3	
Others owned water well	2,8	0	0,6	0	0,2	8	
Household spring water	0,2	0,1	0,3	0,2	0,2	0	
Public spring water	1,1	2,5	2,1	0	1,7	0	
Rainwater collective well	5,5	6,3	3,4	16,7	8,2	0	
Purchasing water tanks	6,3	9,3	0,4	20,1	9,4	0,1	
Purchasing mineral water	0,1	0	0,4	0	0,1	0	
Purchasing filtered water	0,2	0,2	0	0	0,1	0,4	
Using treated water	0,8	0	0	0	0	2,2	

65

⁶³ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

⁶⁴ Source: Ihab Barghothi, Palestinian Water Authority, House Committee on International Relations, 5 May 2004

⁶⁵ Source: Palestinian Bureau of Statistics

5.3. Sanitation and Sewage Services

PWA is responsible according to Law No. 2 (1996) for wastewater treatment and reuse.

PWA is to set the appropriate policies for solving the problems caused by wastewater and to make use of the potential treated water resources through proper planning, design, implementation, and management of the sector, stressing the interdependence of water supply and sanitation services. This development policy priority is focused on the long term needs of the sector, taking into consideration both its current status and the momentum of the international support to Palestinian development in general.⁶⁶

Administering the construction, operation, and maintenance of wastewater and reuse systems will be done by regional utilities with various levels of coordination and involvement of other PNA organs, such as the Ministry of Environmental Affairs, Ministry of Agriculture, Ministry of Local Government, and the Palestinian Water Authority.⁶⁷

Management of the wastewater, storm-water and reuse should be:⁶⁸

- administered through regional utilities for large systems wherever possible, and through other appropriate structures for smaller and remote areas,
- integrated with other sectors in national plans, and should result in a safe, healthy, and conserved environment.

Water supply and sewerage systems are the responsibility of municipal departments, rather than commercially oriented utilities.⁶⁹

Wastewater

- Total Volume of Wastewater: 72 Mm³ (2002)⁷⁰.
- Rate of Wastewater undergoing treatment: _____%
- Wastewater undergoing treatment: _____ Mm³
 - Physical: %
 - Biological: %
 - Advanced: %
- Population served by wastewater treatment plants:
 - Urban: %
 - Rural: %

• Wastewater Treatment

Total wastewater for the Occupied Palestinian Territories is estimated at 72 million m³ (PCBS, 2002). Low per-capita water consumption within Palestinian households affects the sewage composition by increasing the organic constituents and influent salinity. The biochemical oxygen demand (BOD) level of sewage in the West Bank averages 600 mg per litre. This is higher than the common BOD levels countries.⁷¹

• Treatment Plants

There are seven old treatment plants in the West Bank and Gaza. Four are located in West Bank cities, namely Ramallah, Jenin, Tulkarm and Hebron (Al Khalil). Three are in Gaza in the cities of Beit Lahia, Gaza and Rafah. All have operational difficulties and are not functioning effectively. Most of these plants are overloaded, under-designed or have experienced mechanical failures. One new wastewater treatment plant has recently begun operating in Al-Bireh. The efficiencies of existing treatment plants in the West Bank and Gaza are very low, with only one treatment plant having acceptable effluent (Al-Bireh).⁷²

⁶⁶ Source: EMWIS – Palestine –Waste Water

⁶⁷ Source: EMWIS – Palestine – Waste Water

⁶⁸ Source: EMWIS – Palestine – Waste Water

⁶⁹ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

⁷⁰ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

⁷¹ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

⁷² Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

• **Basic Data about Wastewater Treatment Plants in the Palestinian Territory by Plant Location, 2002**⁷³

Plant location	Type of treatment	Treatment stage	Plant capacity (m ³ /month)	Incoming flow (m ³ /month)
West Bank				
Jenin	Biological	Primary	30,000	50,000
Tulkarem	Physical	Primary	18,302	36,000
Ramallah	Biological	Primary	-	-
Gaza Strip				
Beit Lahia	Biological	Secondary	300,000	260,000
Gaza	Biological	Secondary	1,050,000	1,350,000
Rafah	Biological	Primary	31,200	280,000

• **Gaza**

In Gaza, access to sewerage facilities at present varies from areas where more than 80 % of the households are served by well-functioning sewerage systems, to areas where there is no sewerage system at all. On average, it is estimated that about 60 % of the population is connected to a sewerage network. Cesspits and boreholes are the other wastewater disposal systems in the area.⁷⁴

• **West Bank**

In the West Bank, only 30-35 % of the population as a whole is connected to sewerage networks. The majority of the population uses individual or communal cesspits for temporary storage of wastewater. Cesspits are emptied by vacuum tankers, which usually dump their contents onto open ground, or into wadis, sewerage networks, irrigation channels, or solid waste disposal sites.⁷⁵

In spite of the low overall percentage of access to sewerage, approximately 70 % of houses in the main West Bank cities are connected. On the other hand, in refugee camps sewage flows through open drains originally constructed to convey rainwater. Most villages have no sewerage system and wastewater is discharged into soak-away (infiltration) pits. The existing wastewater treatment plants in the West Bank are inadequate to serve the volume of wastewater being discharged (EQA, 2001).⁷⁶

Rate of Population connected to public sanitation network: 50,8 % (2003)⁷⁷ (sewerage connection)

- Urban: 62,3 %
- Rural: 11,5 %
- Camps: 83,9 %

Rate of Population connected to Cesspit⁷⁸: 48,1 %

- Urban: 36,8 %
- Rural: 87,1 %
- Camps: 14,4 %

Estimated Rate of population with access to improved sanitation (MDG):

- Urban: %
- Rural: %

Wastewater

- Total Volume of Wastewater: 72 Mm³ (2002)⁷⁹.
- Rate of Wastewater undergoing treatment: _____%
- Wastewater undergoing treatment: _____Mm³

⁷³ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory - Wastewater Treatment Plants 2002

⁷⁴ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

⁷⁵ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

⁷⁶ Source: Desk Study on the Environment in the Occupied Palestinian Territories - UNEP, 2002

⁷⁷ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

⁷⁸ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

⁷⁹ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Household connection to water and sewage networks, 2003

- Physical:____%
- Biological:____%
- Advanced:____%
- Population served by wastewater treatment plants: %
 - Urban: %
 - Rural: %

6. TARIFFS

The economic policy aim is to reach a reasonable cost formula between the public, industry, re-user, and the Authorities. Several strategies must be applied to implement this policy, including:⁸⁰

- overall fees for storm-water handling, wastewater collection, and treatment, storage and reuse should be calculated in order to achieve full cost recovery of the system(s),
- the elements of these fees should be distributed using the Polluter Pays Principle (PPP),
- households cannot be charged more than the defined affordability and the government should cover the gap between full cost recovery and affordability,
- the farmers must contribute for making treated wastewater available for irrigation.

To facilitate enforcement of regulations and to sustain development of the sector, PWA will use economic incentives for polluting industries to abate and control pollution.

- **Percent Distribution of Households in the Palestinian Territory by the Cost of Monthly Consumed Water (in NIS) and Region, 2003**⁸¹

Region	Cost of Monthly Consumed Water (NIS)				
	Less than 100	100 - 200	201 - 300	301 - 400	400 More than
Palestinian Territory	69,4	15,1	5,9	2,8	6,8
West Bank	61,9	18,0	7,6	3,5	9,0
North of West Bank	68,3	16,8	6,0	2,2	6,7
Middle of West Bank	58,9	22,5	8,5	2,8	7,3
South of West Bank	55,8	14,5	9,0	6,5	14,2
Gaza Strip	84,4	9,3	2,3	1,3	2,7

- **Percent Distribution of Households in the Palestinian Territory by Monthly Cost of Wastewater Disposal (in NIS) and Region, 2003**⁸²

Region	General Average	Monthly Cost of Wastewater Disposal (NIS)			
		Less than 100	101 - 200	201 - 300	More than 300
Palestinian Territory	88,0	79,2	14,5	3,6	2,7
West Bank	101,0	73,7	18,3	4,5	3,5
North of West Bank	85,0	77,4	19,8	2,1	0,7
Middle of West Bank	104,0	77,7	11,8	4,9	5,6
South of West Bank	131,0	61,9	22,2	9,1	6,8
Gaza Strip	40,0	100,0	0,0	0,0	0,0

The table shows the following regarding water tariffs (2002):⁸³

- There is discernible disparity in water prices between the West Bank and Gaza Strip. The highest price for 100 cubic meters of water is 198NIS in the Gaza Strip ('Absan Al-Kabireh area) and 900NIS in the West Bank (Nablus Governorate).
- There is significant variation in water prices between governorates within the West Bank itself. The price of 100m³ ranges between 101NIS (Jericho) and 900NIS (Nablus).
- There is disparity in the billing cycle from one governorate to the next in the West Bank. In some governorates the billing cycle for water is monthly (e.g., Nablus, Hebron, Tubas), and in others it is every two months (i.e., Ramallah, Salfit, Bethlehem). This means that the method of calculating the

⁸⁰ Source: EMWIS – Palestine – Waste Water

⁸¹ Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Cost of Monthly Consumed Water, 2003

⁸² Source: Palestinian Bureau of Statistics - Water Statistics in the Palestinian Territory, Monthly Cost of Wastewater Disposal, 2003

⁸³ Source: Concerning Price Discrepancy for Water in the Palestinian National Authority Areas - Special Report Series (20) March, 2003

minimum level of water consumption differs from one governorate to the next. For example, the price of the first 5m³ of water is 26NIS in the Nablus governorate and 14NIS in the city of Tubas.

- There is no differentiation in prices for water consumed for various purposes (drinking, agriculture, industry, public gardens, etc.). In general, the above two tables reveal inequity in the costs that citizens bear for water services.

Table 1: The Water Tariff in West Bank Governorates, 2002

Consumption (m ³)	Ramallah and Al-Bireh	Nablus	Hebron	Jenin	Jericho	Salfit	Tulkarem	Qalqilya	Tubas	Bethlehem
	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)
	Every two months*	Per month	Per month	Per month	Per month	Every two months*	Per month	Per month	Per month	Every two months*
0 – 5	42.0	26.0	25.0	22.8	29.0	36.0	17.0	15.0	14.0	48.0
10	42.0	45.5	45.0	43.8	29.0	36.0	27.0	17.5	21.5	48.0
20	80.0	113.8	85.0	85.8	29.0	71.0	47.0	22.5	49.0	88.0
30	112.0	195.0	135.0	127.8	39.0	106.0	67.0	27.5	79.0	128.0
40	152.0	276.3	185.0	169.8	49.0	146.0	93.4	32.8	109.0	168.0
50	204.0	380.0	235.0	211.8	59.0	186.0	119.8	40.3	139.0	208.0
60	256.0	484.3	285.0	271.8	69.0	226.0	146.2	47.8	169.0	248.0
70	308.0	588.2	335.0	331.8	79.0	271.0	172.6	56.0	199.0	288.0
80	360.0	692.2	385.0	391.8	89.0	316.0	199.0	71.0	229.0	328.0
90	412.0	796.2	435.0	451.8	99.0	361.0	225.4	86.0	259.0	368.0
100	464.0	900.0	485.0	511.8	109.0	406.0	251.8	101.0	289.0	408.0

* The water service facility collects the water tariff once every two months, unlike the other facilities, which collect it on a monthly basis.

84

Table 2: The Water Tariff in Gaza Strip Governorates, 2002

Consumption (m ³)	Gaza City	Rafah	Khan Younis	Deir Al-Balah	Beit Lahya	Jabalya	Absan Al-Kabireh
	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)	Price (NIS)
	Per month	Per month	Per month	Per month	Per month	Per month	Per month
0 – 5	1.8	30.0	40.0	15.0	30.0	40.0	34.0
10	3.0	30.0	40.0	15.0	30.0	40.0	34.0
20	8.0	30.0	40.0	21.0	30.0	40.0	38.0
30	13.0	30.0	40.0	33.0	30.0	40.0	58.0
40	22.0	45.0	40.0	50.5	38.0	40.0	78.0
50	31.0	60.0	55.0	68.0	46.0	48.0	98.0
60	40.0	80.0	75.0	85.5	54.0	56.0	118.0
70	49.0	100.0	95.0	103.0	62.0	64.0	138.0
80	58.0	120.0	115.0	120.5	70.0	72.0	158.0
90	65.0	140.0	135.0	138.0	78.0	80.0	178.0
100	74.0	160.0	155.0	155.0	86.0	88.0	198.0

85

⁸⁴ Source: Concerning Price Discrepancy for Water in the Palestinian National Authority Areas - Special Report Series (20) March, 2003

⁸⁵ Source: Concerning Price Discrepancy for Water in the Palestinian National Authority Areas - Special Report Series (20) March, 2003

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