



# Water

in the West Bank and Gaza

**ANERA**

Improving Lives in the Middle East

Since 1968

**ANERA Reports**

on the ground in the Middle East

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## INTRODUCTION

The semi-arid Middle East suffers from a chronic scarcity of water. The causes are multiple and depend both on nature and man. Some of these factors are climate change, drought, desertification, urbanization, over-consumption, waste and pollution. Politics in the West Bank and Gaza also present special challenges when it comes to accessing and distributing water resources.

More than 70 percent of available water resources are used for agriculture.<sup>1</sup> Water-thirsty crops reduce what is available for drinking. Deteriorating distribution networks and treatment facilities have led to water loss and health risks. Runoff from farmland and industry and creeping sea water have polluted springs and underground reserves.

Water experts warn that availability of this precious resource in 2050 will be half of what it is today, not enough to meet the needs of a population that is growing at an average of three percent a year.<sup>2</sup>

Politicians and technicians are exploring ways to meet the challenge from a variety of approaches, including desalination plants, repair and expansion of existing water and sewage treatment networks, water conservation measures, pricing controls, more efficient and equal distribution policies as well as public awareness and education campaigns.



*In the late 1840s the American Admiral William Lynch set out with four boats to sail the Jordan River down to the Dead Sea. It was a hazardous undertaking then. He lost two boats trying to navigate the turbulent waters and rushing waterfalls. Standing on the side of the Jordan River today, it is hard to imagine that power and volume. Now it is a meandering stream that barely stretches four meters across most places. The Dead Sea itself is shrinking by roughly one meter a year because of the diminished river flow and over-extraction of minerals from the lake bed.*

## THE WEST BANK | CONDITIONS

Rainfall averages 63 inches (1,600 millimeters) in the Upper Jordan Valley and 31.5 inches (800 millimeters) around Lake Tiberias to a dry desert climate around the Dead Sea.<sup>3</sup> Drought that has endured for the better part of a decade has exacerbated living conditions.

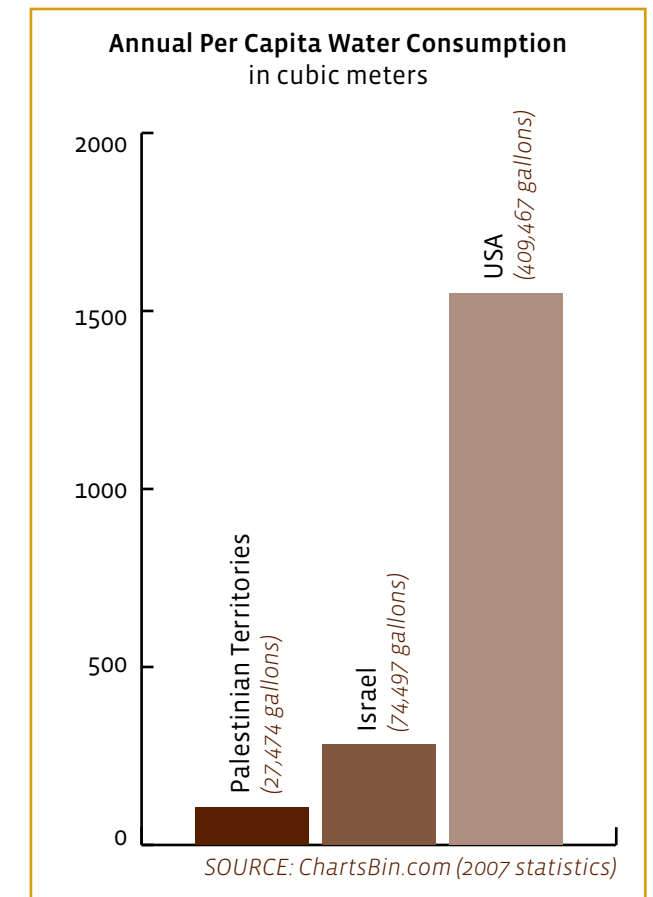
The main underground fresh water resources originate in three aquifers, the Jordan River and its tributaries as they flow to the Dead Sea, which are also shared by Israel and Jordan. Dams and canals have diverted much of the water before it reaches the West Bank.

The World Health Organization recommends a daily water intake of 26.4 gallons (100 liters) per capita but the average Palestinian receives roughly 13 to 18.5 gallons (50 to 70 liters) per capita. Water distribution from the aquifers is controlled by Israel under the 1995 Oslo II Interim Peace Agreement.

Deterioration of the water network has contributed to water losses of up to 40 percent. The lack of treatment of agricultural runoff and industrial waste has polluted ground water. Many remote communities still are not connected to clean water supplies.

Raw sewage running down valleys of the West Bank pollutes the underground reserves and the environment killing trees that could retain ground soil. The build-up of urban areas also impacts water conservation. More concrete means less soil to retain and soak up rainfall.

With the depletion of surface water sources and inconsistent distribution of water from underground reserves, 36 percent of Palestinians in the West Bank are dependent on expensive water brought in by water tanks on trucks.<sup>4</sup>



*Abu-Ghaleb and Um-Ghaleb live in the small village of Midia in the West Bank. They tend a small grove of olive trees in the surrounding countryside. Before ANERA excavated two cisterns, the couple used to buy water and transport it on by donkey to water the trees. Olives are a crop that do well in hot weather. The trees tolerate drought well, thanks to their sturdy and extensive root system.*





## WEST BANK | MEETING THE CHALLENGE

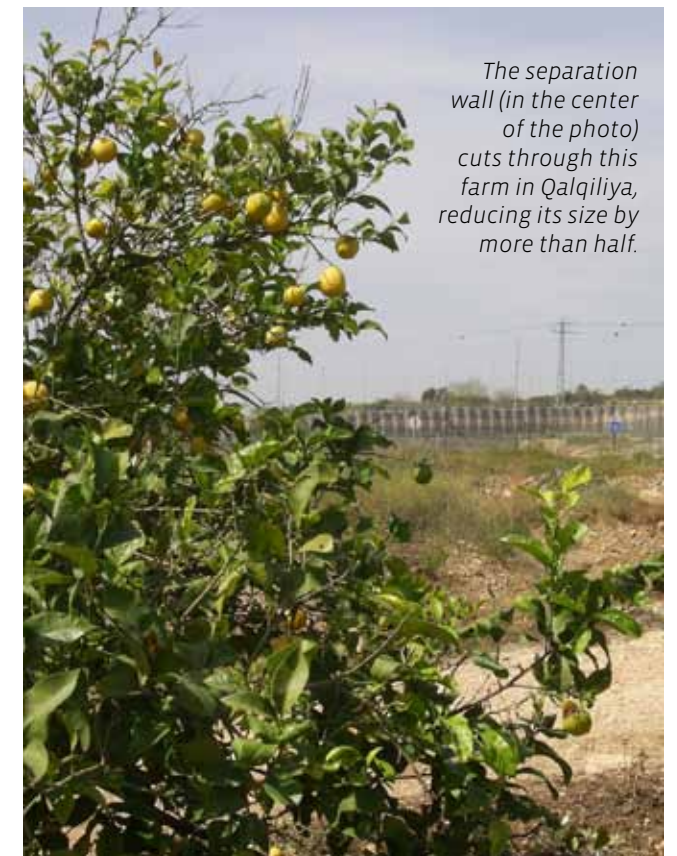
With international funding assistance, existing sewage treatment facilities and water pipeline networks are being repaired and expanded to connect remote villages to clean water.

In communities and cooperatives, training programs encourage farming families to implement better water management and conservation in order to reduce the amount of water used for crop irrigation. More water collection ponds and cisterns can maximize available surface water. Installing more greenhouses helps conserve water usage.

In the short term, residents in both agricultural and urban communities have learned to adapt to the available water supplies, especially when those supplies are irregular. The separation wall has cut access to many farms and diminished the attraction for the younger generation to farming altogether. That may well translate into fewer or smaller farms, reducing water consumption. But it may also increase the urban population, putting more strain on city water services.

Increasing reliance on desalinated water could help ease 'water stress' but pumping or trucking in water from Israeli desalination plants would be expensive.

Water transcends geographic and political boundaries so cross-border cooperation is a key to managing the limited resources. Good water neighbor cooperative agreements have brought together several West Bank, Jordanian and Israeli communities to treat waste water and implement better conservation practices.



*The separation wall (in the center of the photo) cuts through this farm in Qalqiliya, reducing its size by more than half.*

*The water network in the West Bank village of Dar Salah was old and extremely deteriorated. Not only was the water dirty and barely consumable, but the supply would get cut off on a regular basis. Families had to go through the long and strenuous process of filling bottles of water at a well, bringing them home, storing them in the shade of a tree, and then boiling the water to make sure it was clean and safe for consumption. ANERA laid more than 7,000 yards of 2-inch pipes to over 100 households. Residents now can enjoy drinking water straight from the tap in their homes.*



## GAZA | CONDITIONS

Gaza's water supply originates mostly from the shallow, sandy coastal aquifer that stretches along the coastline. There is some runoff from the West Bank's aquifer but agriculture and waste runoff have polluted the water.

Ninety-five percent of the ground water is undrinkable. The water has unusually high levels of salinity and nitrates, which are believed to be carcinogenic. Twenty-six percent of disease, especially kidney-related, in Gaza is water-related.<sup>5</sup>

Palestinian authorities estimate just 10 percent of Gaza's 1.6 million residents get water through the pipelines every day. An average of 40 percent get water every two days, 40 percent get water every three days, and 10 percent get water once every four days. About five percent are dependent on water trucked into the community.<sup>6</sup>

Over-pumping from more than 4,000 wells varying in depth from 33 to 66 yards (30 to 60 meters) has seriously depleted the underground fresh water supplies, allowing sea water to seep into the ever-decreasing water table.<sup>7</sup>

The main sewage treatment plant was damaged during the 2009 Israeli incursion, spewing more than 80 million liters of untreated sewage into the Mediterranean, polluting the fishing waters and beaches as well as the coastal aquifer that stretches along the Mediterranean. Today, nearly one third of Gaza's population has no access to a wastewater network.<sup>7</sup>

Israel's blockade of Gaza seriously limits the inflow of materials necessary to repair existing sewage treatment and water distribution networks.

Fuel shortages have caused power outages that have shut down or cut production by nearly half at pumping stations, water treatment facilities and desalination plants, significantly increasing health risks from untreated water.<sup>8</sup>

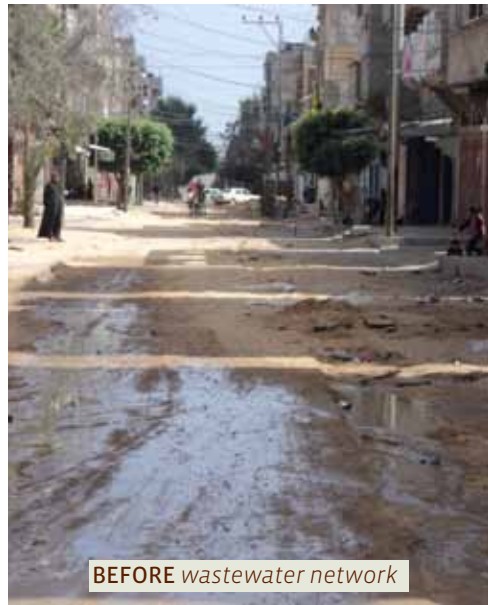
According to the World Health Organization, the level of nitrates in Gaza's drinking water is over 6 times more than what is healthy.<sup>5</sup>

**26%**  
of diseases in Gaza  
are water-related

*About five percent of Gaza's residents are dependent on water trucked into their communities.<sup>6</sup>*

### Open Sewage Basins Lead to Drowning Deaths

In February 2012, a ten-year-old boy drowned in sewage basin in Beit Lahia, Northern Gaza. In December 2011, a five-year-old boy and his three-year-old sister both drowned in a sewage basin in Khan Younis refugee camp, southern Gaza. And, in March 2007 the sewage basin in Beit Lahia flooded and killed five in a nearby town.<sup>9</sup>



BEFORE wastewater network



AFTER wastewater network

ANERA installed a wastewater network in the Al-Amal neighborhood of Khan Younis, connecting 15,000 residents to a new drainage system and a sewage treatment plant.

## GAZA | MEETING THE CHALLENGE

A constant challenge is securing clean water supplies. Repair and replacement of the sewage treatment facilities and water network are essential. So is the maintenance of a regular fuel supply to prevent power shortages that impact directly on the supply of treated water for households and hospitals.

Repair of existing small desalination stations is underway. A new, larger desalination facility is being built over the next three years with European funding.

To cut water waste, families install greenhouses and implement better drip irrigation systems. Environmentalists also promote switching crops from water-thirsty plants to those requiring less water.

Cooperatives and communities are investigating more efficient farming techniques and water conservation measures through training and education programs that help families cope with the water scarcity while longer-term solutions are sought.

Work is underway to fix and replace leaking pipes, install efficient irrigation pumps and build reservoirs to cut water losses, construct cisterns and collection pools to store rain water, provide leak detection and other modern equipment and expand existing networks to provide clean drinking water to remote communities. System maintenance and technical training are also key components of any future water conservation effort.



ANERA has nearly completed this 1.32 million gallon (5,000 cubic meters) reservoir and pumping station in southern Gaza, close to Khan Younis. It is the first of its kind to be built in Gaza in recent years.



“Before the wastewater network [was installed], sewage used to flood into the streets of the neighborhood. The septic tanks would overflow, and the sewage would mix with the winter rain. It was the worst scene ever. Life before the wastewater network was a key element of horror stories I would tell my grandchildren.”

– Abed Al-Moeti, a 70+ year old grandfather, pictured left with some of his grandchildren



#### Excavating & Using a Cistern

A hand-operated pneumatic hammer is used to dig the pear-shaped cistern.

Excavated material is pulled up manually and spread around the outside of the house.

After excavation, cement and crushed stones are used for plastering to prevent leakage.

When completed, the cistern collects rainwater in winter from the roof of the house.

The collected water is then pumped to roof tanks, which use gravity for supplying water to the house.

**In the past 6 years alone, ANERA has excavated 293 cisterns in the West Bank.**

## CONCLUSION

As natural water sources continue to be diverted from Palestinian homes and villages and a water supply that is ever dwindling, there is no prescription for sufficient access to water that won't require extraordinary investment in humanitarian efforts. While ongoing efforts to build infrastructure and increase self-sufficiency in the West Bank and Gaza are crucial, much more is needed. In the face of so many factors, both man-made and natural, the future will also require the global political will to make access to water a top priority.

#### ENDNOTES

- 1 Arab Water Council - State of the Water Report in the Arab Region
- 2 Jeffrey Sosland, Author of "Cooperating Rivals: The Riparian Politics of the Jordan River Basin"
- 3 Arab Water Council - State of the Water Report in the Arab Region
- 4 Palestinian Water Authority Water Supply Report for 2010
- 5 World Health Organization
- 6 Gaza Coastal Municipality Water Facilities
- 7 Palestinian Water Authority Water Supply Report for 2010
- 8 UNRWA Emergency Appeal 2012
- 9 Emergency Water and Sanitation Hygiene in the occupied Palestinian territory (EWASH)

### SOME ANERA ACCOMPLISHMENTS IN WATER & SANITATION

For decades ANERA has been a leader in water and sanitation infrastructure work in the West Bank and Gaza. We have received multi-million-dollar grants from the U.S. government and United Nations organizations as well as thousands of donations from individuals to install water, sanitation and drainage systems and construct cisterns, collection pools and rooftop tanks.

#### USAID FUNDING IN THE WEST BANK & GAZA

As part of five-year, \$65 million dollar water, sanitation and infrastructure program, ANERA has:

- Completed 32 water, sanitation and drainage projects
- Connected around 296,600 people to clean and regular public water sources
- Improved sanitation in 9 Palestinian communities
- Brought nearly 227,000 people better sanitation services

#### PRIVATE FUNDING IN GAZA

In the past few years, with funds from individual donors, ANERA has:

- Completed 10 water and 2 sanitation projects
- Connected around 7,400 people to clean and regular public water sources
- Improved water and sanitation in 4 Palestinian communities
- Brought nearly 1,470 people better sanitation services
- Upgraded water and sanitation facilities at 34 preschools across Gaza



*In 1979, ANERA helped create a water management system that, to this day, continues to direct large quantities of rainwater to a depleted aquifer in Gaza city.*

# ANERA

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Since 1968

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## **ABOUT ANERA'S ON-THE-GROUND SERIES**

The ANERA on-the-ground series is designed to add a humanitarian voice to the story of life in the Middle East. With data from ANERA's professional staff, people who live and work in the communities they serve, and with over 40 years of experience in the region, ANERA has a unique opportunity to build a fuller understanding of what life is like for families struggling to survive within an atmosphere of severe political strife and daily turmoil.