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*by Jonah Schein**

Introduction

This article examines the current crisis regarding water shortage, access, and quality in Israel and the Palestinian Territories as well as the most practical and effective immediate responses to this situation. As the region's population not only grows[1] but continues to be divided by political unrest, the current water needs within the Palestinian Authority become more and more difficult to facilitate. Large desalination plants, international trade agreements, and water for peace treaties all remain theoretical as both governing bodies and the international community remain reluctant to invest in costly infrastructure until a peace agreement is reached to end the current Palestinian *Intifada* (the uprising of Palestinian people in the West Bank and Gaza Strip).

With these large scale, long-range avenues temporarily stalled, the non-governmental ("NGO") community has assumed a critical role not only in addressing the area's current needs, but also in moving towards a more sustainable, and therefore stable, future. Since its inception coinciding with the first Earth Day in 1970, Earth Day Network ("EDN") has been a leader in ushering in the modern environmental movement. EDN has emerged as a pivotal role player in this movement, encouraging and empowering communities to take active roles in responsibly managing their own water use.

This article summarizes the situation in the water scarce area of Israel and the Palestinian Territories in order to display how the basic needs of Palestinian populations inside the West Bank and Gaza require immediate action, which the governing entities have in many cases failed to provide in light of the region's current political and social climate. This article then illustrates how international and local NGOs have come to fill this critical gap. Finally, it shows how the grassroots efforts of

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organizations such as EDN and our partners are helping to shape a more stable and water efficient Middle East.

Scarcity of the Region's Water Resources

Despite several heated conflicts regarding water access throughout the region, it has remained a relatively quiet issue. As J.A. Allan points out, the region's countries have been able to "easily access the surplus 'virtual water' in the global hydrological system via trade."[2] In other words, countries with limited water resources are able to compensate by not engaging in water intensive activities, such as certain agricultural crops, instead relying on trade to meet these needs. The relatively successful de-emphasis on the area's water scarcity notwithstanding, the situation has steadily worsened since the late 1960s when Israel took over civil administrative functions in the West Bank and Gaza Strip following the Six Day War in 1967. At present, the question of water access and water rights is an extraordinarily charged and potent issue.

According to the Israeli Water Commission, the combined Israeli and Palestinian population of roughly 12 million people requires a total of some 2,775 million cubic meters ("mcm") of water per year.[3] This represents a per capita usage of just over 231 cubic meters per year. But estimates of basic requirements for Middle Eastern countries, including drinking water, the usage of water in food production, and other domestic needs, typically range upwards of 1,000 cubic meters per year.[4] Such a low, efficient use of water is made possible by the importation of "virtual water" and by the use of various agricultural, domestic, and waste-water treatment techniques. However, assuming an average year of rainfall (to say nothing of a drought year), the total renewable resources of lakes, rivers, and aquifers contribute just 2,400 mcm per year; despite relatively efficient use, this rate of consumption still reflects a "deficit" (the amount of water needed in excess of the natural annually renewable levels) of some 375 mcm a year. Some of this deficit is compensated through a number of costly alternative water resources such as desalination and waste-water reclamation.[5]

In coming years, the current resources and methods of expanding supply through non-traditional means will prove inadequate to meet the region's growing needs. While the area is already struggling to balance its water usage, population trends show that rapid growth in both Israel and in the Palestinian Authority is causing the problem to worsen far quicker than it is being solved. Even a modest estimate of population growth predicts that by the year 2050 the area's water deficit will exceed 3,000 mcm.[6]

The Role of NGOs and the International Community

While the pressures on the limited water supply are steadily worsened by the increasing population, the current *Intifada* is also drastically altering the situation for the worst. Not only is the violent conflict halting plans to increase available water through desalination plants and new distribution systems, but it is continuously disrupting the current infrastructure and other supply mechanisms. Because this has made it more difficult for government authorities to provide access to water, the local and international NGO communities have played an extremely important role in maintaining access throughout the West Bank and Gaza Strip.

One of the most important roles of NGOs and other organized grassroots efforts is to effectively monitor and respond to problems as they develop. The Palestinian Hydrology Group ("PHG"), for instance, has monitored the impact of the conflict on water access for the past two years. Their findings display the severity of the situation and the necessity for a quick and informed response. As shown in Figure 1, in September of 2004, when the Israeli military divided the Gaza Strip into three segments to limit the mobility of militants, the PHG observed the following disruptions as part of their ongoing monitoring project.[7]

Figure 1

Community	Effects of Violent Conflict on Water Access
Deir Al Balah	Twenty of the wastewater systems' manholes were destroyed
	Five hundred meters of the water network's pipes were destroyed
Al Qarya al Badawiya	A facility conducting a French-Palestinian research project on the reuse of wastewater in agriculture was damaged
Al Mughraqa	At least five rooftop storage tanks were damaged
	100 meters of the distribution network's pipes were damaged, as well as 600 meters of household connection pipes

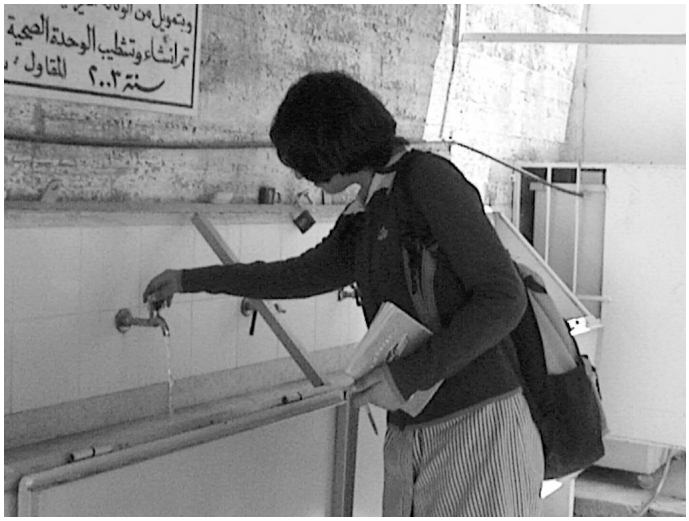
Without this type of careful monitoring, the impacts on people living in the affected areas are often felt but not properly managed. By disseminating their findings, PHG helps to ensure that relief organizations and government agencies place resources where they are most needed at that point in time (as opposed to where they were most needed the previous week or month).

Similar disruptions are continuously observed in the Southern sections of the West Bank where many people depend on mobile water tankers. Due to limited mobility, these tankers are often delayed for hours at checkpoints, and sometimes are prevented from entering the areas of service altogether. Since the vast majority of these tankers are privately owned and operated, closed routes and delays at checkpoints mean that operators are more likely not to bother completing deliveries. This leaves large portions of the population without access to their chief water supply.[8]

In these parts of the West Bank, a number of international

agencies and NGOs participate in the Emergency Water and Sanitation – Health ("EWASH") Committee. The committee serves as a means for sharing community resources and information. Rather than having two organizations work in the same village, the committee is capable of determining which group works in which community, thus ensuring delivery of the maximum amount of aid to as many people as possible.[9]

EWASH has also taken steps to help with the quality of drinking water. Since a large percentage of the Palestinian populations in the West Bank receive their water supply from private mobile tankers, it is untreated and unmonitored by the Palestinian Water Authority ("PWA"). EWASH members have worked together to distribute chlorine tablets and educate households on their safe and effective use, thus drastically improving water quality in these communities.[10]



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"Water Wise School" in Talukarem, West Bank: A student at the girls' high school in Tulkarem uses a sink recently hooked up to the grey water irrigation system.

Alternative Water Sources

No matter what population model is used, it seems clear that at current rates of consumption, the naturally available amount of water from annually renewable sources will not be enough to meet the needs of those living in Israel and the Palestinian Authority. Either the available amount of water must be drastically increased, or the per capita rate of consumption must be drastically decreased. The most likely scenario will see both happening simultaneously.

Among the leading alternative water sources is the prospect of desalination. Israel already utilizes desalination in several places, both as a means of treating sea water and to treat brackish (salty) ground water. Despite the intensive use of energy required for desalination, Israel has plans to build numerous plants along the Mediterranean coast. One of these plants, located in the coastal Israeli city of Hadera, is slated to deliver 50 mcm per year of desalinated drinking water to the West Bank. The cost of water resulting from this plant according to the Israeli Water Commission would be roughly $0.90 USD per cubic meter of water, a remarkably low figure for a method once thought too expensive to have any large scale practical use.[11]

A second alternative is water importation, or shipping potable water from areas that have an excess supply. The likely source for this imported water would be the Manavgat River, which empties into the Mediterranean on the Southern coast of Turkey. Under the proposed plan, fresh water would be loaded onto tankers close to where the river meets the sea. Using technology similar to that of oil tankers, the tankers would then sail to an offloading station on the Israeli coast where the water would be stored and distributed. Trade agreements between Israel and Turkey have been signed, and the Manavgat River plant was completed in 2000 for processing and loading the water onto tankers.[12] While it is nearly certain that importation will play some role in the region's future, according to the Israeli Water Commission, the high cost of purchasing, shipping, and storing the water (an estimated $0.80 - 1.00 USD per cubic meter), combined with the uncertainty that this will remain an uninterrupted supply, make this a less than desirable option.

Earth Day Network

"Water Wise School" in Talukarem, West Bank: The grounds keeper at the girls' high school in Tulkarem demonstrates the school's new water-efficient irrigation system.

The Grassroots Efforts of Earth Day Network

No matter which alternative water source is adopted, it is certain that any water not obtained from the region's natural hydrological system will be *very* expensive. Although the region will need to expand its water supply to a degree, further increasing the efficiency of water usage is a far more cost-effective response. For this reason, EDN, our partners, and other concerned NGOs have led the way in encouraging conservation, awareness, and improved education at the community level.

On Earth Day 2004, EDN with regional partner Friends of the Earth Middle East ("FOEME") celebrated with the openings of the first two "Water Wise" schools as part of the Good Water

Neighbors Project.[13] The openings, one located in Tulkarem, West Bank and the other in Abasan, Gaza Strip culminated the three-year awareness project, which paired cities on opposite sides of the border to encourage citizens to cooperate in conserving water resources. The schools feature rainwater collection systems, water savings fixtures, and grey-water irrigation systems that recycle water from sinks and water fountains to be used for irrigating school grounds. The school located within the Gaza Strip, where salinity levels are far higher than World Health Organization standards, also included a mini-desalination plant. Not only do the schools (eleven in all) help conserve valuable amounts of water, they also save money by reducing the often pricey water bill. In some cases, the systems have conserved water so effectively that schools that previously only had running water three days a week now have running water for the entire school week.

In addition, the "Water Wise" schools are an excellent platform with which to engage students in education that promotes not only water conservation, but also awareness of shared resources, and how their fate is tied to that of their neighboring communities. Because most of these communities benefit from modern reticulation systems with indoor plumbing and distribution systems, true awareness of the water scarcity can be difficult to impress on people in such a way that motivates them to conserve.

Awareness of the region's water issues is not a challenge faced only by residents of the region. The international community must also develop an understanding of the problems that are faced daily in the Middle East and other parts of the world where water quantity and quality are issues. In 2003, as part of the "10 Thirsty Children" Project,[14] EDN visited neighboring Jordan to spread the story of Hiba, a ten-year-old girl living in a rural section of Jordan. Hiba told people of the daily challenges facing her family because of lack of access to fresh water. Later this year, EDN plans to spread the story of a Palestinian and an Israeli child. Only by communicating the ways that water scarcity affects people's lives can the international community understand and respond to this global threat.

Conclusion

NGOs have played a pivotal role in ensuring that access to water is maintained in all areas during these years of limited supply and violent conflict, and also have served as a valuable tool in moving the region toward a sustainable future. Government authorities in the West Bank and Gaza Strip have been unable to deal with all aspects of the region's current water crisis. While the current political circumstances make the situation even more desperate, they also make it more and more difficult for these authorities to respond.

Large, multi-million dollar plans to increase the water supply will clearly be needed as the region's population and demand for water grows. However, under a best-case scenario, the relief that these projects will offer is years away. Under a worst-case scenario, the *Intifada* will continue indefinitely, and investment in the necessary infrastructure will prove too risky to undertake anytime in the near future. While it would be unwarranted to imply the local and national governments are incapable of doing anything or that they do not already provide any relief, it is fair to say that they are not fully able to accommodate the needs of the public. NGOs therefore play a significant role in filling this gap and helping to maintain access to water for populations of communities afflicted by heavy and violent conflict.

Furthermore, it is clear that under any scenario, the cost of expanding the available amount of potable water will be high enough that it is only economical to develop a culture of conservation and efficient use. Here again, NGOs are playing and will continue to play a key role in helping the region cope with its growing demand for water.

ENDNOTES: The Role of NGOs in Addressing Water Access

[1] J.A. Allan, *Water Security in the Middle East: The Hydro-Politics of Global Solutions*, SOAS/Kings College Research Group, May 2002.

[2] *Id.*

[3] See the Israeli Water Commission website, *at* http://www.mni.gov.il/english/units/water/water.shtml (last visited Nov. 28, 2004)..

[4] *Supra* note 1.

[5] *Supra* note 2.

[6] Jonathan Chenoweth, Scenario Development for 2050 for the Israeli-Palestinian Water Sector, Address at the IPCRI Water Conference, Antalya, Turkey (Oct. 2004).

[7] To learn about the Palestinian Hydrology Group, *visit* http://www.phg.org.

[8] OXFAM, Forgotten Villages, GB Briefing Paper, *available at* http://www.oxfam.org.uk/what_we_do/issues/conflict_disasters/bp28_forgotten.htm (last visited Nov. 18, 2004).

[9] Geoff Graves, Transiting 'Emergency Response Coordination' to 'Protection': The Role and Activities of the Emergency Water and Sanitation – Health (EWASH) Committee, Address at the IPCRI Water Conference, Antalya, Turkey (Oct. 2004).

[10] *Id.*

[11] Yosef Dreizin, The Impact of Desalination: Israel and the Palestinian Authority, Address at the IPCRI Water Conference, Antalya, Turkey (Oct. 2004).

[12] Ibrahim Gurer, Manavgat River Water as a Limited but Alternative Water Resource for Domestic Use in the Middle East, Address at the IPCRI Water Conference, Antalya, Turkey (Oct. 2004).

[13] The Good Water Neighbors Project was made possible by the generous support of the United States and the European Union. Nine additional schools in other communities have been opened since April 2004. For more information please visit FOEME *at* http://www.foeme.org.

[14] To learn more about the "10 Thirsty Children," *visit* the EDN website at http://www.earthday.net/goals/water/ten_children.asp.