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A NEW KIND OF WAR: ECOVIOLENCE IN PALESTINE *Ashley Bubna*

Resource scarcity has been a topic of global discourse due to the gleaming effects of the oil crisis and global warming. Water, essential to life, is one of the scarcest recourses in the Middle East. This paper asserts that Israel is using the environment as leverage in order to maintain its control over the West Bank by denying Palestinians water. The four policy tools the Israeli government uses to commit ecoviolence include: denying water, prohibitively pricing water, destroying private water collections, and contaminating water. In the end, this paper will provide an overview of potential policy options the Israelis and Palestinians may consider to address the challenge of water scarcity.

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INTRODUCTION

Actions taken by the Israeli government to promote imbalances in resource distribution, specifically that of water, indicate that the Israeli government is using the environment to commit violence against the Palestinians. Israel has captured and is controlling water for Israeli use while leaving the Palestinians in an ecologically fragile state. At the same time, the Israeli government insists it is only protecting its people from the threat of resource insecurity. In the past, security was viewed as a zero-sum game: one party gaining at the other party's loss. However, in light of the severity of one party's denigration due to "security" measures, the legitimacy of traditional security has been challenged in the post-Cold War decades by human rights advocates. Thus, the question arises: is Israel using resource security as a veil for violence? In this paper I will detail how the Israelis are de-humanizing Palestinians and using the environment to commit violence against them in the name of security.

This paper's theoretical approach is based on the ecoviolence framework articulated by Nils Petter Gleditsch in the article, *Environmental Change, Security and Conflict*. Gleditsch essentially defines ecoviolence as the use of the environment as leverage in order to gain or maintain power (Gleditsch, 2007, 55). Implicit in the ecoviolence framework is the realists' perspective of self-preservation through coercive diplomacy and deterrence. Therefore, an understanding of the realist perspective is essential before attempting to apply theories of ecoviolence to the conflict over water between Israel and the Occupied Palestinian Territories (OPT).

First, realism asserts that a country can improve its condition and chance of survival through imperialistic endeavors. Gleditsch posits that "The international system is anarchic with unclear norms and weak institutions that cannot prevent aggression from states that challenge the established order" (2007, 53). For that reason, states often utilize offensive maneuvers such as invasion in order to secure their survival. By acting preemptively, states protect themselves from the vulnerability of outside attacks (Forde, 1992, 63). At the same time, states must not leave scarce resources such as water to chance since exploitation by a competing power would almost certainly result in a state's demise.

Machiavelli, a sixteenth century philosopher, claimed that morals are dangerous for anyone who holds them in international politics because states are only interested in increasing their own power, thus explaining the constant state of war. According to Machiavelli's cautionary tale, *The Prince*, "given the way the political and commercial worlds operate, the price of moral nobility (or even decency) is often failure, a price too large for a reasonable person to pay" (Machiavelli, 1961, 2). Therefore, according to Machiavelli and other realists, strong states should capture all the resources they can from weak states in order to ensure the stronger state's survival.

Currently, concerns regarding access to resources rank high on state leaders' agendas due to the high mortality and economic insecurity caused by the recent earthquakes in Haiti and Chile, where people lacked access to basic resources such as clean water. In addition, the world's population is straining the globe's natural resources as states push the limits of industrialization, capitalism, and overall global consumption (Gleditsch, 2007, 58). In countries throughout Europe and in America, people work to promote clean energy and are working towards a future without a dependence on oil, a resource many fear will serve as a future source of conflict. But

one resource's scarcity issue - water - may be underestimated and has the potential to create large-scale conflicts throughout the world. Water has become a scarce resource in many regions as a result of excessive water use and technologies such as electronic pumps for groundwater and dams. Due to increased population growth, the demand for water has increased three-fold since the middle of the twentieth century. These conditions combined have provided a ripe situation for water scarcity, which has become an undeniable threat and source of contention for people in the Middle East.

The area of Israel and Palestine is severely restricted in water usage due to its semi-arid environment and high degree of dependence on annual rainwater for freshwater resources (Kelly & Homer-Dixon, 1998, 75). Weather inconsistencies account for widespread drought and famine in the Middle East. Therefore, the inability to control the availability of freshwater resources causes fear of annihilation in the Israeli/Palestinian communities. In order to create dependable water reserves, enough water must be reserved to supplement low annual rainfall. For that reason, the acquisition and securing of water sources has emerged as yet another source of conflict in the wider Israeli/Palestinian conflict.

In the following section I will describe the historical precedence for Israel's policy in Israel/Palestine, the sources of water in the region and Israel's water policy. Next I will detail the four policy tools the Israeli government uses to commit ecoviolence against the Palestinians and maintain their unilateral dominance: policies that deny water, prohibitively price water, destroy private water collections, and contaminate water. Finally, I will provide an overview of potential policy options the Israelis and Palestinians may consider to address the challenge of water scarcity.

OSLO ACCORDS

The institutionalization of the water policy is due in part to the ambiguities of the Oslo Accords. The Oslo Accords, a part of the September 1993 "peace process," were hailed by some as a breakthrough in Middle Eastern relations; however, others claim it served as a perpetuation of Israeli domination. The Accords established a framework for future relations between the Israelis and Palestinians. U.S. President Bill Clinton oversaw the negotiations and signing of the Accords between the Palestine Liberation Organization (Official UN-recognized representation for Palestine) chairman Yasser Arafat and Israeli Prime Minister Yitzhak Rabin. The Accords ushered in a temporary era of optimism in the Middle East for the possibility of peaceful negotiations (Selby, 2003, 95). "There was a series of further breakthroughs, most notably the Cairo and Oslo II Agreements of 1994 and 1995" (Selby, 2003, 90). However, final negotiations for the interim agreement never materialized as the Second Intifada erased any chance of negotiations. Some policy experts believe the Oslo Accords only placated the Palestinians and helped legitimize Israel's oppressive processes. According to Middle East expert Jan Selby, the

"Oslo Accords and process brought four main changes within the West

Bank and Gaza: they led to the creation of the Palestinian Authority (PA), which had and still has many of the symbolic trappings of statehood but whose legislative, administrative, and territorial powers have always been heavily circumscribed; they granted the PA significant policing and security powers, such that it acted as 'Israel's

enforcer' in the West Bank and Gaza; they brought about a limited restructuring of Israeli-Palestinian economic relations; and they licensed Israel's further colonization of the West Bank, the settlement-building program having continued unabated since 1993" (2003, 97).

The Oslo Accords still limited the PA's authority to drill new wells or upgrade existing wells without obtaining permission from Israel, though (Amnesty International, 2009). Furthermore, authorization for new Palestinian wells is rarely granted by the Israeli government and the process is lengthy with intentional delays and price peaks. In effect, power is concentrated in Israel, which acts oppressively and negatively to constrain social activity (Selby, 2003, 42). Despite this, however, a spokesperson for Israeli Prime Minister Benjamin Netanyahu dismisses the assertion that Israel is depriving Palestinians of water. Prime Minister Netanyahu insists Israel has met all its obligations under the Oslo Accords while "Palestinians have failed to meet their own requirements to recycle water and [are] not distributing water efficiently" (Rabinovitch, 2009).

The Oslo II Agreement in September 1995 granted the PA civil responsibilities after expanding the West Bank by 24 percent, with a majority of the new population being Palestinian, to the Palestinian territory. The West Bank was then divided into three territorial jurisdictions, Areas A, B, and C. "These areas were added to as a result of further agreements negotiated in 1997, 1998, and 1999, such that by summer 2000 the PA had full security and civil control (Area A) over 17.2 percent of the West Bank, and civil control (Area B) over an additional 23.8 percent of the territory" (Selby, 2003, 99). Area A is the only area in the West Bank with full Palestinian control. Meanwhile, Area C, which contained 60 percent of the West Bank and 20 percent of the Gaza Strip, remained under full Israeli territorial jurisdiction. Overall, Oslo II granted the PA the responsibility for water services for all of A, B, and C. At the same time, the PA is unable to deliver these services because Israel still has control of the majority of the water resources (OPT: West Bank, 2010). Therefore it seems the policies of Oslo II only increased Israeli oppression by curtailing Israeli responsibilities to the people of Palestine and closing its borders to Palestinians in Areas A, B and occasionally in Area C. Thus, the West Bank and Gaza have been subject to enclosure since 1993 with only limited numbers of Palestinians being permitted access out into Israel or Jerusalem (Selby, 2003, 101).

Economically, the Palestinians became fairly dependent on Israel for jobs and imports of food and water as a result of the Oslo policies. In particular, the denial of well development and rehabilitation for agricultural irrigation caused a rapid decline in the production of citrus fruit, the region's main export. The Joint Water Committee, a committee established under the Oslo Accords with equal representation of Israelis and Palestinians, is responsible for overseeing the management of the Israeli and Palestinians' shared water resources in the West Bank. Still, Israel maintains control of the JWC due to its exclusive veto power. As a result, since Oslo not one new permit for agricultural wells has been issued and 120 of the existing Palestinian agricultural wells have remained inoperable because the JWC has yet to give authorization for repair or maintenance (EWASH, 2009). Furthermore, any water project in Area C has to have an additional "official permit" obtained from the Israel Civil Administration. As a result, Palestinian's agricultural industry has been severely hampered and many are forced to seek new

work. Making matters worse, with its borders to Israel closed, it is difficult for Palestinians to find new work or access imported food and water that is direly needed.

“Even after the establishment of the PWA [Palestinian Water Authority] up to the present day, Israel’s control of the water resources and most of the land in the OPT has allowed Palestinians little possibility to develop their water and sanitation sector and to put in place more efficient extraction systems and distribution networks in the OPT” (Amnesty International, 2009). Israel established only one sewage pretreatment facility in the OPT. The one sewage facility is unable to process all the sewage produced in the OPT, and as a result, sewage is often discarded in fields or rivers and so it seeps into the groundwater. Overall, it is suggested that the Oslo Peace Process limited Palestinians ability to gain further access to clean water.

THE WATER POLICY

Israel obtained the West Bank, Gaza Strip and full control of the land’s water resources from the Six-Day War of 1967. Unlike the massive Diaspora produced by the 1948 war, though, the majority of Palestinians stayed in the country following the war in 1967. Israel inherited an Arab population of 1.5 million (Selby, 2003, 74). These Palestinians obtained water from the same limited sources as Israelis, creating a direct conflict over resources between the two groups.

For that reason, Israel has instituted harsh measures to maintain control of the majority of water resources in Israel and the OPT in order to ensure resource security and the state’s survival (Gleditsch, 2007, 58). Still, the majority of ground water and aquifers in the Israeli/Palestinian areas are found in the OPT. Israel strategically owns the majority of areas with water reserves, according to Jan Selby, author of the book *Water, Power and Politics in the Middle East-The Other Israeli-Palestinian Conflict* (2003, 38). Access to water in the OPT is controlled by the Israeli Army. In order to access water it must be extracted from the ground using wells, which Israel controls by enforcing permits for well construction in Area C and/or authorization from the JWC. The sources of water for Israelis and Palestinians include: the Mountain Aquifer, the Coastal Aquifer, the Gaza Aquifer, the Jordan River and additional groundwater resources in Israel.

Joint Water Source

The Mountain Aquifer is the largest and most sustainable water source in the region. It is a shared groundwater supply between Israel and Palestine because it lies underneath both the West Bank and Israel. It is the only source of useable or drinkable water for the Palestinians and one of the most important groundwater resources for Israel (Amnesty International, 2009). The Mountain Aquifer consists of three aquifers or basins: the Western, Northeastern, and Eastern aquifers. Although it is the only approved useable source of water for Palestinians, Israel limits the amount of water available annually from the entire Mountain Aquifer to 20 percent for Palestinians each year. The remaining 80 percent of the water from the Mountain Aquifer is used and over-extracted by Israel, especially the water of the Western Aquifer of the mountain which holds the largest quantity and best quality of water (Ibid). Over-extraction occurs when too much water is pumped out of the ground and brackish or dirty water from deeper within the earth is deposited into the water table. According to the Israeli Ministry of Environmental Protection,

“overexploitation may lead to a rapid rate of saline water infiltration from surrounding saline water sources” (Ibid).

It would not cripple Israel if its government depleted one of its own sources because the country has two other water sources, whereas Palestinians in the West Bank only have this one resource for potable water. The total per capita water use for Israelis was almost three and half times that of Palestinians--344 cubic meters per year (cm³) and 93 cm³, respectively--in 2009 (Rabi, 2009, 2). Moreover, this disparity becomes even starker when one also takes into account that the water networks in the OPT have higher water losses from cracks in wells than those in Israel, due to a lack of resources for monitoring and fixing wells in the OPT (Selby, 2003, 30).

Palestinian Water Sources

The Coastal Aquifer is markedly smaller than the Mountain Aquifer and is located under the coastal plain of Israel and the Gaza Strip. It is the largest source of clean, fresh water for the Gaza Strip. As a result of the east to west flow of the water, Israel has not placed any restrictions on the Palestinians for water usage because Israelis take as much water as they need before the water reaches Gaza (Amnesty International, 2009). Furthermore, according to estimates by Amnesty International, Israel often over-extracts from this aquifer; thus, significantly reducing the quality and quantity of water that flows to the Gaza Strip (Ibid).

Additional, but less significant, sources of water for Gaza include the Gaza Aquifer, Western Galilee, Carmel Aquifer, and the Negev-Aravah Aquifer. The Gaza Aquifer is practically nonexistent now due to high salt content from over-extraction and sewage infiltration from mismanagement. Amnesty International estimates that 90 to 95 percent of the water from the Gaza Aquifer is unsuitable for drinking purposes (Ibid). Groundwater available from the Western Galilee and Carmel Aquifers in the north and Negev-Aravah aquifer in the south are inconsequential due to saltwater pollution from over-extraction. No reliable figures are available for quantity and quality of their yearly yield.

In addition, the Jordan River provides the most surface water available between Israel and the West Bank. However, the West Bank is denied access to the abundance of water from the river it shares with its neighbor, Jordan. Israel diverts the flow of the river upstream to the Sea of Galilee for its private use. Compared to 1953 estimates, when a United Nations report estimated the yearly flow of the Jordan River through the West Bank as 1,250 million cubic meters (MCM), this flow has now been reduced to a trickle of salty water that has been heavily contaminated by sewage infiltration (Ibid).

Price of Water

Palestinians living in villages with no direct connection to water sources, or those who suffer frequent water shortages have to buy supplies from water tankers. In an Amnesty International report, Iman Jabar, a resident of the al-Aqaba village, complained that there is no water in the village, so villagers have to carry water in from far away or buy it, which is expensive. Because of these barriers, Jabar cannot even bathe as often as needed (Ibid). Worse, tanker-delivered water must often take long detours on unpaved roads since Israel has restricted or closed roads connecting Palestinian villages (EWASH, 2009). “The journey can take up to ten times longer

than would be required if the most direct route could be taken, adding significantly to fuel and vehicle maintenance costs, which is passed on to the consumer. As a result, the cost of water has risen to unattainable prices due to mounting transportation costs and supply and demand. It is estimated that some families are spending up to 25 percent of their income on water” (Amnesty International, 2009). For that reason, the head of the al-Aqaba’s village council, Haj Sami, worries that resident migration out of the OPT will increase due to rising prices. “With the cost of transport the water costs 15 NIS per m³ [New Israeli Shekel (currency in Israel) per cubic meter], which is three or four times what it would cost if we had a connection to the water network or a well in the village. It is unaffordable” (Ibid).

DESTRUCTION OF PRIVATE SOURCES OF WATER

Although Israeli water policies are creating difficult conditions for many in the OPT, Palestinians are finding other methods to cope. For example, Palestinians discreetly collect and store rainwater in home-made cisterns, which are illegal to construct without a permit from the Israeli government. Water collected during the rainy season can cover a family’s basic water needs for several months during the dry season before water needs to be purchased from tankers. Due to the aforementioned water policies and inflated prices, Palestinian families are increasingly dependent on cisterns for water (Amnesty International, 2009). Netanyahu's spokesman Mark Regev insists Palestinians receive more than enough water, stating "Israel supplied Palestinians 20.8 million cubic liters above and beyond what it is obliged to do under the water agreement [Oslo Accords]" (Rabinovitch, 2009).

Further complicating matters, the Israeli Army has increased its efforts to demolish Palestinian cisterns and prevent villagers from building new ones or rehabilitating old ones (Amnesty International, 2009). These efforts include attacks, harassments and creative measures to deter illegal collection of rainwater (At-Tuwani, 2009). The Palestinians must constantly monitor their water for attacks from Israeli soldiers. In order to spoil the water, Israeli soldiers often throw dirty diapers, dead chickens, and other sources of garbage into Palestinian cisterns (Amnesty International, 2009). As a consequence, the water becomes contaminated and diseased. At-Tuwani community activist Hafez Hereni states, “They are trying to force us out of the area by all means, taking our land is just one way and limiting our access to water is another way (Ibid).”

Contamination of Water

Palestinians with insufficient water supplies have no choice but to drink from whatever sources are available, even if it means consuming water that may negatively impact their health. Water scarcity is one of the predominant causes of disease in developing countries and is increasingly affecting Palestinians’ health in the OPT (Gleditsch, 2007, 58). When water is scarce, people over-extract from wells which reduces the aquifer’s hydrostatic pressure and allows the infiltration of saltwater, sewage, and chemical pollution from fertilizers and pesticides (Kelly & Homer-Dixon, 1998, 84). Furthermore, the one sewage pre-treatment facility established in Tulkarem by the Israelis is grossly insufficient. “It comprised a set of collection and infiltration

ponds which were highly polluting until they were lined and rehabilitated as aeration ponds by the PWA, with funding assistance from international donors (Amnesty International, 2009)."

Moreover, in impoverished areas more people die from diarrhea than they do from bullets (Kyrrou, 2009). More than 5 million people die every year from water-related diseases or inadequate sanitation in the world (Gleditsch, 2007, 58). It only takes small amounts of fecal contamination to cause illness. For instance, giardia lamblia is a gastrointestinal infection caused by a water parasite and if left untreated could last for weeks. "The symptoms include dehydration and severe weight loss in some individuals which can be fatal for the weak if there is no antibiotics for treatment," according to Dr. Nancy Thomas of Oschner Hospital in New Orleans (Thomas, 2009). The Department of Health of the UN Relief and Works Agency (UNRWA) reported in its February 2009 Epidemiological Bulletin for the Gaza Strip that diarrhea remains the major cause of death among reportable infectious diseases in the Gaza Strip (Amnesty International, 2009).

Furthermore, high salt content in water causes adverse kidney and developmental problems in babies. "Gaza physicians are convinced that salty water is responsible for the high incidence of kidney and liver complaints among Gaza residents" (Kelly & Homer-Dixon, 1998, 84). Unfortunately there is no predetermined recommended level of salt intake for one to average against since it depends on an individual's dietary intake. Still, too much salt has been linked to hypernatremia, a type of dehydration, and thought to be responsible for high levels of "crib death" and early developmental brain damage (Ibid).

Untreated water also contains increasingly high levels of nitrates, which are responsible for "blue baby disease." "Infants suffering from methemoglobinemia may appear otherwise healthy but exhibit intermittent signs of blueness around the mouth, hands and feet. They may have episodes of breathing trouble, diarrhea and vomiting" (Amnesty International, 2009). Therefore, the majority of people in the OPT that are unable to afford privately desalinated water or clean water from tankers are forced to drink unsafe water and are suffering detrimental health effects.

Although Israel claims the water policies are to promote resource security, it appears that the policies are more likely meant to cause incredible harm to the Palestinians. In particular, it seems the policies are systematically aiding in the removal of Palestinians from the OPT (The Applied Research Institute, 2006). Still, the use of a scarce natural resource as a weapon in conflict is not a new tactic. The denial and manipulation of water served as a more effective measure for Serbians during the Bosnia-Herzegovina war to push Bosnians and Croats out of Bosnia and into Croatia than did bullets. At the Serbian concentration camp, Omarska, prisoners were given bad water on purpose in order to ruin their health. "The dirty water ruined my health by severely damaging my kidneys" states Nusreta Sivac (Calling the Ghosts, 1996). According to another internment survivor, Jadranka Cigelj, the denial of clean water was "a way of ethnic cleansing without having to do all the killing" (Ibid).

On March 20, 2009, Tony Blair, representative of the Quartet on the Middle East, went to the Palestinian village of At-Tuwani to address the injustice of Israel's water policies. "It's got to be stopped, hasn't it? This isn't what should happen. But it needs to be done in a systematic way so that the whole way this area is looked at and administered is changed to make it fair" stated Mr. Blair (At-Tuwani, 2009). Thus, the international community is no longer legitimizing

Israel's control of water based purely on resource security. Still, as Blair pointed out, the whole system has to be evaluated, including the PA. It has yet to be proven whether the PA even has the ability to properly administer the water resources to which it has access. Based on the evidence in the following section, it seems unlikely.

SHIFT FROM POWER POLITICS TO WATER ACCOMMODATIONS

In order to create an equitable outcome to the water crisis there are certain policies and procedures that must be in place in the OPT to allay Israelis' fears of resource insecurity. Appropriate access to water can ideally be reconciled by creating a two state solution; however, "many studies conducted recently have indicated that the gap between supply and demand will increase dramatically in the coming few years, thus making the Palestinian's water rights issue both a necessity to seek feasible alternatives and options in order to fill this gap" (Jayyousi & Srouji, 2009, 52). The water issue is not something that can wait another ten years for Israel and Palestine to re-start negotiations. Therefore, an adequate response for the situation, considering the time and resource constraints during the interim period, would be to insist on full Palestinian control of water resources in Areas A and B. As previously mentioned, the PWA has full control of water distribution in Areas A, B, and C but does not have the ability to deliver the water because it has a severe lack of access to water resources as detailed above. Therefore, the PWA should at least have official control over the water in Areas A and B in order to distribute the quality and quantity of water supplies commensurate with the demand.

However, some scholars claim that giving Palestinians full control of the water resources will not solve the problem completely. The PWA does not have the administrative capabilities or monetary resources to manage the water sources. The Palestinian's water problems will never be resolved simply by granting them a more equitable share of regional water resources (Selby, 2003, 191). In addition to PWA's inability to appropriately manage the water sources, there are a number of other variables that are missing to create an effective system. First, Israel's colonialist policies have made Palestinians too dependent on Israel. There is no strong Palestinian administrative state to organize and govern the resources, supplies, and demand. "Like every other corner of the PA system, the PWA is characterized by neo-patrimonial dynamics many of these being exacerbated both by the structural constraints of the Oslo Accords, any by the predominance of international donors and donor monies" (Selby, 2003, 155). Furthermore, there is no internal organization or communication within the PWA. Each of the divisions, which are determined by need, have different site locations and division heads and each of the different divisions receives their own donor funding and establishes priorities according to their donor interests; therefore, there is no coherency or organization for proper management. For those reasons, the PWA inadequately controls the actions of the local Palestinian municipalities, state donors, and individual actors (Selby, 2003, 157). Moreover, the PWA lacks serious legitimacy due to its shortage of water experts engaged in consultation and strategic planning. For instance, the director of the Water Supply and Sewage Authority, a division within the Palestinian Water Authority, was sacked and jailed by the PA in 1996 on (quite possibly spurious) corruption charges. He was replaced by a local Fatah activist, who happened to be a school teacher rather than a water expert or official (Selby, 2003, 156).

Secondly, the PWA has minimal economic power. Without monetary resources, the PWA cannot construct or maintain an integrated national water network. “In straightforward economic terms, while the West Bank had, prior to September 2000, a total GDP of around \$3.3 billion in 2009, and a per capita GDP of \$2050, Israeli GDP was \$105.4 billion, that is \$18,300 per capita (all GDP totals in U.S. dollars)” (Selby, 2003, 189). Hence, the PWA lacks the economic capacity to develop large-scale desalinization and other water treatment projects. Desalinization facilities are extremely expensive but are beneficial long-term investments, especially considering that the Mediterranean Sea is adjacent and may serve as a future water source. Although the PWA has received \$3 billion since 2007 in direct foreign donor assistance, it does not have the managerial overhead to organize and efficiently manage the donations. For that reason, the Mediterranean Sea has not been tapped as a source because the PWA does not have the resources needed to manage such a large-scale desalinization project.

Third, it seems unlikely that Israel will give up enough water to benefit the Palestinians. “Israel is currently adamant that it will ‘not allow them [the PA] to drill in the Western Aquifer, or the North-eastern Aquifer’” (Selby, 2003, 188). It is possible; however, that Israel will be forced to make some concessions during final negotiations of a treaty between Israelis and Palestinians to determine the permanent status of the Occupied Territories. The Oslo Accords are only an interim agreement that granted temporary self-rule to the Palestinian Authority until a final treaty can be negotiated. Still, the president of the PA, Mahmud Abbas, in the West Bank claims it will not resume negotiations with current Israeli Prime Minister Netanyahu as a result of Israel’s refusal to halt all settlement activity in the West Bank and Jerusalem. Hamas, the Islamic Resistance Movement and former terrorist group, took control of the Gaza Strip in 2006 and refuses to work with Netanyahu in forming a united political front in negotiations with Israel. Still, it is possible that the PWA will at some point be granted control over the Mekorot wells (an Israeli company) which tap into the Eastern Aquifer over Area C (Selby, 2003, 190). However, the Eastern Aquifer’s safe yield, or level of safe drinking water, falls far below the 172 million cubic meters per year (mcm/y) suggested in the Oslo II agreements (Selby, 2003, 191). Unfortunately, the additional water source will not adequately solve the water shortages faced by Palestinians.

Still, any additional supply of water is better than the current situation faced by Palestinians unable to access water. Although it does not seem like the PWA is equipped to handle the creation of a large-scale water network system, they are willing to tackle the following responsibilities, according to a 2009 PWA report, *Background Information and Water Resources Management Strategy*: first, the PWA will remain supportive of negotiations intended to expand Palestinian water rights in order to gain control over its equitable share of the region’s water; second, they want the responsibility to issue and supervise water abstraction licenses and to provide water resources and water sector information services; third, the PWA wants the ability and overhead to manage international aid and donations in order to plan large-scale desalinization projects; and fourth, the PWA wants to promote public awareness, stakeholder participation, and build mutual trust among Palestinians in order to establish an organized and productive water network system (Jayyousi & Srouji, 2009, 31).

Structurally, the policies established under the Oslo Accords will likely have lasting effects on the region’s water system establishment. Still, the PWA should be given a chance to manage the system under the auspices of a powerful and nonbiased third-party authority. In

terms of specific administrative recommendations, the water resources in Israel and the PTO should be distributed on a basis determined by the minimum level of subsistence. Once it can be assessed by an independent organization that every citizen has access to at least the minimum level of water needed to maintain a productive and healthy life, the amount of water allocated can be increased to appropriately higher levels that do not overexploit the wells or aquifers. “The target rates for domestic water consumption in order to bridge the gap between supply and demand falls within a range of 100 and 150 liters per capita per day” (Amnesty International, 2009). These rates will hopefully be met in the OPT after 10 and 20 years, respectively, with a target to reduce the loss rate to 25 percent over a 20-year period. These goals can only be met if water is not continuously over extracted and contaminated (Ibid). Moreover, the recommended level of water consumption will need to be updated continuously to reflect the influxes in population. At the same time, the Palestinians, especially in Gaza, will need to take responsibility for their role in the water scarcity issue by reducing their population growth rate. Neo-Malthusians theorize that “resource scarcity is usually assumed to arise when population growth exhausts the available resources” (Gleditsch, 2007, 55). For example, in Gaza the population growth rate is estimated to be between 5.2 and 6 percent, which is slightly lower than Israel but is still one of the highest growth rates in the world (Kelly & Homer-Dixon, 1998, 76). Therefore, population growth rates in both Israel and Palestine should be given attention because the current water resources cannot support increasing Palestinian and Israeli populations. A strong linear relationship has been proven between the availability of contraceptives for women between the ages of 15 and 49 and a decrease in the fertility rate or the total number of children born per woman (Bubna, 2010). Therefore, an adequate response in purely logistical terms would be to increase contraceptive prevalence in both Israel and the OPT.

Furthermore, the PWA would need to establish enough sewage pre-treatment plants to accommodate the Palestinians’ needs and ensure the discontinuation of the contamination of groundwater and streams. In addition if sewage and salinity levels were effectively monitored and routine maintenance was performed on wells and pipes then the sources of water contamination could be eliminated. Clean water would solve a great deal of the health problems faced by Palestinians and these measures would also benefit the Israelis because they live in close proximity to the Palestinians and their shared water resources would likely become polluted if this issue is not solved.

Palestinians should also be allowed to build cisterns without the necessity of permits. Cisterns are constructed by digging a hole in the ground, lining the hole with rocks or cement, and then covering the hole with a lid with an opening to inhibit evaporation and/or contamination. Compared to buying water from tankers, cisterns are a more affordable method of gaining water. In addition, cisterns do not detract from Israeli water sources, but rather create new and potable water sources for the Palestinians.

Finally, the diversion of the Jordan River would need to be either re-diverted to extend water to the Palestinians or the Israelis would have to share an equal portion of the river’s resources through pipelines. Pipelines will enable water to travel through underground pipes from the Jordan River to the West Bank and Gaza. The amount of water allowed to travel through the pipes should be jointly regulated by the PWA and Israel.

The combination of shared water resources, new wells and cisterns, transfer of responsibilities to the PWA, and the sharing of equitable portions of the Jordan River would

begin to create a large enough water supply to meet the Palestinian demand. The price of water should then reflect market value. If these recommendations come to light, the PWA will have a major challenge in translating its list of demands into realistic practice, but the PWA may have a fighting chance to provide their people with adequate water resources.

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