The Technopolitics of Israeli Water Management

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

The world's water crisis cannot be only attributed to water scarcity, climate change, or population growth. Rather, the "water crisis is a water governance crisis" (OECD, 2011). It is true that climate change threatens water resources; shifting precipitation patterns, altering regional hydrologic cycle trends, increasing flood and drought risks. However, although water flows may change patterns regionally, there is enough water for all on earth. Governments must make policy changes to improve their regulations and control of water to match shifting patterns in water flows. Adequate water management is not a question of water supply, but of how officials and institutions store, allocate, and distribute flows. Good water governance provides enough continuous, reliable, and safe water allocations to all groups of people regardless of wealth in a sustainable and efficient manner, regardless of whether the region is in a state of water scarcity or surplus. Depletion, pollution, and deterioration of physical infrastructure are predominantly caused by poor water governance and lack of political will rather than by natural disaster or climate change. The water resource problem lies in our infrastructure and political failures, rather than the environment's supply.

Large scale water infrastructure links the natural environment's surface and groundwater supply to the human, built environment. It is composed of reservoirs, dams, spillways, channels, pipe networks, storage tanks and facilities, drinking water and wastewater treatment plants and navigation waterways. At first glance, water infrastructure systems seem to be solely informed by hydrologic and hydraulic principles and designed according to economic needs while maintaining a semblance of environmental sustainability. With closer analysis it is made evident that water management is interdisciplinary; these infrastructure systems are studied by hydrologists and physical scientists, designed by civil and water resource engineers,

administered by governing authorities, improved by community stakeholders, but most importantly, they are controlled and informed by political actors. Due to the functional nature of a water resources system, water management is inherently political, executing a political agenda via a technical solution. By design, constructing water resources systems calls the political process into action, requiring stakeholder collaboration, trust in government and the norms of the policy making process. Failing to study the social and political factors influencing water management and planning results in the ignorance of potentially oppressive power dynamics embedded in infrastructure and engineered technology.

We should question the functions and goals of water supply infrastructure to better comprehend, mitigate and repair water injustices and inequalities. Water inequity issues should be tackled by conceptualizing water governance and management as "distributions of water, knowledge and expertise, and voice and authority" to centralize water injustice as a primary concern rather than an afterthought after implementation and potential widespread community harm. (Zwarteveen et al, 2017). Adequately managed water resources have the potential to uplift suffering communities. The inverse is also true; water supplies are managed with limited information and poor technical decision making can exacerbate ongoing and historic environmental injustices.

Technological Politics: The inherent political qualities of technology

Water management systems are sociotechnical systems: systems built around interactions between humans, a certain technology or group of technologies, and the larger society. Technology and science are commonly deemed neutral and apolitical. Yes, they may be utilized in a manner to promote what is ethical or accomplish malicious and cruel objectives, but we tend

to think of technology as innately unbiased and impartial. Does interrogating whether technology has political qualities prior to its use or implementation provide us with more insight?

The supposed dichotomy between technology and politics is deconstructed in Langdon Winner's landmark piece "Do artifacts have politics?" as Winner argues that "certain technologies in themselves have political properties" (Winner, 1980). Winner makes the claim that technological artifacts can contain political properties[1] through two ways; first, that "the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in the affairs of a particular community" or what are called "political technologies, manmade systems that appear to require political relationships". Essentially, technological artifacts are inherently political as they require specific social relations. An example of consciously political design pointed out by Winner is the construction of "grotesque concrete buildings and huge plazas" in the 1960s and 1970s on American college campuses to diffuse student protests and demonstrations. However, political qualities may be unintentional rather than implicit or explicit, as *politics* delineates distributions of power and voice among individuals, groups of people and society. Technology may gain politics accidentally due to unconsidered social associations and potentially cause harm or favor certain groups over others.

Whether these political traits are purposefully engraved into technological and system design, or subconsciously embedded as reflections of sociopolitical nature, all technology can be analyzed using Winner's theory. Using this framework, we can examine how water management systems are more concerned with executing political agendas rather than efficiently providing an

[1] For purposes of consistency and uniformity with Winner's framework, I will define politics as "arrangements of power and authority in human associations as well as the activities that take place within those arrangements" and technology is defined as "all of modern practical artifice" (Winner, 1980).

adequate, just, sustainable, and safe water supply to all people. In this paper, I discuss the development of Israeli water management systems and water injustices faced by Palestinians as a result of Israeli water policies. These water distribution networks are currently understood to provide Israelis and Palestinians with an appropriate water supply in a supposedly water scarce environment, yet water allocation inequality and racial segregation for Palestinians integrates political complexity to a technical problem.

Contextualization: The Israeli Occupation and the International Crime of Apartheid

To analyze the sociopolitical conditions in which Israeli water management was developed, it is important to develop a basic understanding of Israeli-Palestinian politics and the terminology associated with the ongoing situation. I adopt the position that Israel is a nation-state occupying Palestinian land committing the international crimes of apartheid and persecution as described by international criminal law in the 1998 Rome Statute of the International Criminal Court (United Nations, 2011) and the 1973 International Convention on Suppression and Punishment of the Crime of Apartheid (United Nations, 1973), informally known as the "Apartheid Convention." Israel's crime of apartheid has been thoroughly documented by humanitarian organizations; in 2017 The United Nations' Economic and Social Commission for Western Asia released a resolute report describing Israel as an apartheid regime; in April of 2021, the Human Rights Watch, an international NGO, published a breakthrough report detailing Israel's human rights violations on the Palestinian people and its institutionalized apartheid (Shakir, 2021); in February of 2022, Amnesty International, a reputable and globally recognized NGO with over 10 million supporters worldwide (Amnesty International, 2015) also published a report declaring Israel an apartheid state. These reports reveal and quantify inequalities

experienced by Palestinians living under the Occupation in similar manners including "segregation and control," "[Israeli] dispossession of [Palestinian] land and property", "racial fragmentation," "discriminatory urban planning practices," and "discriminatory allocation of resources" (Amnesty International, 2022).

My research— as it pertains to infrastructure management and water resources— will focus on discriminatory water planning practices and allocation of resources, but a baseline understanding on material and living conditions for Palestinians can provide a larger context. There are around 7 million Israelis and 7 million Palestinians living in the joint region of Israel and Occupied Palestinian Territory (OPT) under Israeli sovereign rule (Shakir, 2021). For the past 74 years, Israel has held military rule over the entire Palestinian population in the region, pursuing Israeli hegemony, minimizing the number of Palestinians while maximizing control over land and resources (Amnesty International, 2022). In 1948, Israel declared itself a state and proclaimed equality for all, however this has not been codified into the Basic Laws of the State of Israel (State of Israel, 1992). Passed in 1992, the Basic Law: Human Dignity and Liberty protects "human dignity and liberty, in order to establish in a Basic Law the values of the State of Israel as a Jewish and democratic state." (State of Israel, 1992). However, this comes with a caveat in Article 8 of the same law, in which the Israeli "state's Jewishness is a legal consideration that allows the state to limit the right to equality and violate other rights that are protected within the Basic Law" (Amnesty International, 2022).

STS Research Question

To study the social and political aspects of water management, I investigate the development of Israeli water management systems and water injustices faced by Palestinians as a

result of Israeli water policy. I answer the question of "how do technical needs and political conditions influence the design and management of water resource systems?" My STS research— examining how the Israeli Occupation of Palestinian land has impacted water resource management—will provide insight on the power dynamics embedded in water infrastructure as a result of the political environment in which water resource systems are designed.

Methods and Organization

I refer to scholarly journal articles as secondary sources and original engineering, hydrology and design plans from Israeli and Palestinian history as well as Israeli code as primary sources. I review existing watershed mapping to supplement my political and social research[2]. Specifically, I develop a political, economic, and social context by detailing regional hydrography throughout the creation of Israel to modern day. I then briefly describe a history of the centralized development of Israeli water infrastructure and deterioration of Palestinian water infrastructure. Finally, I analyze historical and current Israeli water management practices its effect on Palestinian water resources using Winner's Technological Politics framework. Through my analysis, I reveal political motives behind management choices and the consequential oppressive effects on Palestinian communities.

[2] This study would benefit from watershed modeling analyses simulating river and reservoir flows and water diversions before the establishment of the state of Israel to modern day conditions. However, limited datasets and inability to access existing data inhibit such research.

Hydrography - Summary of Geography and Hydrologic Characteristics

Surface Water Resources

The Jordan River (Figure 1) originates from the Anti-Lebanon and Mount Herman mountain ranges, drains into Lake Tiberias and ultimately discharges into the Dead Sea, its 18,285 square kilometer watershed spanning Lebanon, Syria, Jordan, West Bank (OPT) and Israel (UN-ESCWA and BGR, 2013). Its pre-utilization natural flow, purely surface water, is estimated between 1200-1503 MCM/year (UN-ESCWA and BGR, 2013) (Wolf, 1995). The Jordan River's water resources are not shared equally; Jordan uses 290 MCM/yr, Syria 450 MCM/yr, and Lebanon 9-10 MCM/yr. Israel uses 580-640 MCM/yr (UN-ESCWA and BGR, 2013) while Palestinians use close to none of the Jordan River's surface water resources, despite its traverse through OPT. Around 37% of the surface catchment area is located in Israel, although Israel uses 50% of its supposedly shared annual flow (Koek, 2013). The Jordan River is diverted upstream from Lake Tiberias to Israel's coastal cities and desert communities in the south through Israel's National Water Carrier. Its waters are so overexploited by Israel that the very little amount reaching the West Bank is severely polluted (CEIRPP and DPR, 1992).

Palestinians have been denied access to the Jordan River since the Israeli occupation and assault on West Bank territory during the Six Day War in 1967. Israeli code details planning and infrastructure management plans that prevent Palestinians from accessing the Jordan River and its freshwater springs, building their own water infrastructure (including drilling new wells, deepening existing wells, installing pumps) in its segregative Israeli water agreements, such as the 1995 Israeli-Palestinian Interim Agreement - Annex Ⅲ, known as the Oslo II Accords (Government of Israel and Palestine Liberation Organization, 1995). From Military orders to written law, the State of Israel not only denies Palestinians access to their own water resources

on OPT, but actively exploits and assaults Palestinian land and its natural resources. For example, Military Order No. 291 declared previous water agreements invalid and establishes new restrictions that exist to this day (State of Israel, 1968). Although there are a number of orders regarding Palestinian water use, examining Military orders 158[3] and 92[4] in conjunction provide excellent context for understanding the severe injustices committed by the Israeli government on Palestinian communities through water policies. Together, they restrict Palestinians from developing their own water infrastructure without a permit from the Israeli government, repair existing infrastructure, access their own water, study or scientifically investigate water, implement water contamination measures, and dispute inequities at hearing and present objections to the law without permission from the Israeli Head.

[3] "Military Order No. 158: "Order Amending the Water Supervision Law" requires that Palestinian water infrastructure development including wells and springs and water projects are under the command of the Israeli Military Commander. (Israeli Military, 1967)

[4] Military Order No. 92: "*gives the absolute authority of controlling all issues related to water to the Water Officer who is appointed by the Israeli courts. "* (Israeli Military, 1967). This power was transferred to the Israeli Defense Forces (the Israeli military) in the 1970s.

Figure 1. Map of the Jordan River Basin (UN-ESCWA and BGR, 2013).

Groundwater Resources

Freshwater in the OPT and Israel is also sourced from two productive groundwater aquifers, the Mountain and Coastal Aquifers (Koek, 2013). Geographically, the Mountain Aquifer is split into three basins on both sides of the Green Line[5] on Palestinian and Israeli land. Nearly 80% of the Mountain Aquifer's Western basin groundwater recharge stems from the West Bank in the OPT, yet Israel extracts 89% of the annual overall aquifer yield. (Koek, 2013). From water balance calculations, it has a sustainable yield of 350 MCM/year[6], yet experiences annual extractions of 680-730 MCM, 80% of which are from the state of Israel (Isaac, 2006).

[5] The Green Line is the Armistice demarcation line from 1949 that divided Israel and its neighboring Arab states before the Six Day war. It precedes the 1967 "Six Day War" in which Israel colonized all of historic Palestine and drew new borders (Lowi, 1993).

[6] units: million cubic meters of water per year

Groundwater resources that are not physically in flow with the Israeli water system are tapped by illegal Israeli settlers, and roughly 95% of transboundary groundwater resources are overexploited by the Israeli government (CEIRPP and DPR, 1992). The remaining 5% left for West Bank Palestinian citizens is at risk of saline intrusion and pollution, yet Palestinians have no legal authority or control over managing and measuring the quality of their meager water supply.

The Coastal Aquifer lies underneath western, coastal Israel, the Gaza strip and the Sinai Peninsula (sparsely populated Egyptian land); it is the only source of freshwater for Gaza (UN-ESCWA and BGR, 2013). With Gaza's growing population, demand for this water resource is growing exponentially, and current extraction rates upstream of Gaza by Israel and by Gazans in the strip exceed sustainable recharge rates (Fanack, 2015). UNICEF estimates that around 96% of Gaza's water is unfit for human consumption (UNICEF, 2020); this can be attributed to deterioration of the Coastal Aquifer due to over extraction and saline intrusion. The aquifer's water table has fallen below sea levels, causing sewage from crumbling wastewater plants and sea water to infiltrate the freshwater source (Koek, 2013).

History and Development of Israeli Water Infrastructure

In the 1950s, Israel sourced around a third of its water from rainfall fed West Bank groundwater aquifers by extracting from inside the Green Line (Lowi, 1993). A series of dams, channels and other water infrastructure projects occurred in the 1950s, resulting in the Jordan River now depositing an annual flow of 100 MCM/yr with highly saline, poor quality water into the Dead Sea. Most of the river's flow was diverted to the Negev and Israel's coastal cities (such as Tel Aviv) through Israel's National Water Carrier (NWC) (Alatout, 2008). Due to the NWC, Palestinians are left with very little surface water from the Jordan River and are forced to over

extract from already deteriorating aquifers. This diversion is a direct attack on Palestinian water resources. As such, it suppresses Palestinian communities and prohibits them from thriving economically.

The West Bank

Before 1959, Israeli water resources were perceived as abundant among Zionist hydrologists (Alatout, 2008); abundance dominated the discourse as settlers flocked to historic Palestine, believing that the natural landscape had the resources to sustain incoming settlers. The early conception of water abundance dominant in Zionist politics aided the justification of Zionist immigration and settlements in Palestine and established the framework to construct large scale, centralized water infrastructure projects (Alatout, 2008). Water abundance implied prosperity, salvation and economic growth for the Zionist project. Engineers and hydrologists (namely Americans Lowdermilk, Hays and Savage) advised the Israeli government with technical water studies and greatly contributed to the early 1950s "Zionist arguments that Palestine was a despoiled paradise awaiting more enlightened management" (Rook, 2000). Under their water planning reports and hydrologic forecasts, water supply was not the imperative issue facing Israel, rather, managing water resources efficiently for incoming settlers and greening the Negev desert (Alatout, 2008) were at the forefronts of Israel planning decision making.

The lack of adequate water resources in the West Bank and the supposed water shortage are both manmade, they appear as an engineering challenge but have been constructed through a techno-political process by the Israeli government.

Several Israeli hydrology reports and interim water plans published throughout the 1950s indicate a shift in perceptions of the available water supply from one of abundance to scarcity as Israel came to occupy Palestinian land; calculated water potential was reduced from 3000 MCM/yr to 1500 MCM/yr and decision makers placed greater importance on the Jordan River diversion and centralized water infrastructure rather than local and regional projects. Controversies in water potential estimates from the same actors arose after the 1950s are not a result of improved technical methods or science, but a direct impact of Israel's agenda to centralize and consolidate its political power (Alatout, 2008). This shift in narrative was an achievement for the Israeli government, as constructing a narrative of water scarcity justified the centralized management of water resources by the Israeli government. Framing water scarcity as a fact, and the nation state of Israel were created in the same techno political process. The centralization of water infrastructure (such as the NWC) emerged in parallel with the creation of Israel, as settlements that were once local or regional projects, hence used regional water planning methods, were consolidating under the nationalization of the state on Palestinian land. It is evident that homogenous water "scarcity" gave reason and legitimacy to a strong Israeli state, national scale water infrastructure and planning, justifying the complete Israeli command of water resources. The assumption that "water resources are finite and limited" (Selby, 2005) in the Middle East, perpetuated by Israel's push to adopt a "water stress" and "water crisis" narrative creates false vindication for Israel's discriminatory water practices. Under Winner's Technological Politics framework, centralized water infrastructure reflects political motives of the Israeli government as centralized water institutions and infrastructure represent the Israeli state and its control on water resources to gain power and further its Zionist agenda.

In 1967, Israel annexed East Jerusalem, occupying all of historic Palestine including the West Bank and took complete political control of the Gaza strip (Shakir, 2021). With its new borders, the Israeli military held complete control of water resources and related infrastructure in the OPT (Amnesty International, 2017). Under centralized Israeli military management, Palestinian communities received water from an integrated Israeli water system that sharply discriminated between the two user groups. Pipelines delivering water to Palestinian communities and water storage reservoirs are often of smaller diameter and size as compared to Israeli infrastructure, "ensuring that the Israeli settler population received a disproportionate share of water supplies" (Selby, 2007).

A significant economic and political development in Israeli water resources management and its subsequent denial of Palestinian rights to water is the transferring of West Bank water authority from the Israeli military to the private Israeli water supply company Mekorot in 1982 (Koek, 2013). Although a its own company, it can be regarded as an extension of the Israeli state, upholding its interests in maintaining Israeli hegemony and Palestinian suppression and executing the government's political agenda.

Several laws and stipulations, such as the 1995 Oslo II accords Article 40 (Government of Israel and Palestine Liberation Organization, 1995), further strengthen this disparity in water power. Article 40 establishes water allocations for Palestinian and codifies existing discriminatory water management practices, or more accurately, mismanagement practices. The Oslo II accords created a Joint Water Committee between Israel and the Palestinian Authority, appearing cooperative and mutually beneficial, perhaps even progressive. However, the Oslo accords represent a "continuation and preservation of Israel's exclusive control over the Mountain Aquifer" (Koek, 2013). As the NWC and physical water networks were already in

place, Israel was further granted the ability to maintain control over the West Bank's water resources. The Oslo II accords do not require reduction in water consumption by Israeli settlers, which, as previously noted, are responsible for the exploitation of water resources in the OPT (Government of Israel and Palestine Liberation Organization, 1995). Furthermore, Article 40 solely addresses the Mountain Aquifer in the West Bank; Palestinians had no input regarding surface water resources or the Coastal Aquifer (Government of Israel and Palestine Liberation Organization, 1995). Israeli law regarding Palestinian water allocation has not changed since 1995, nor have attempts at coordination been made, and the Israeli assault on Palestinian water resources goes unchecked by the international community.

The Palestinian Water Authority, created with the Oslo II accords, is often blamed for water shortages and network breakages in Palestinian communities rather than the Israeli occupation; however, "individual discrete inefficiencies always emerge and need to be understood within the context of relatively durable social and political-economic structures" (Selby, 2005). What may seem like incompetence or negligence by Palestinian governing authorities is a product of Israeli apartheid; forcing Palestinians to rely on Israel for water and its management creates a dependency of the oppressed on its oppressor.

Palestinians are forced to depend on Mekorot due to its monopoly, theft and seizure of water resources and its related infrastructure in the region. Mekorot has sunk Palestinian wells, exploited groundwater resources in the West Bank (Figure 2), and tapped into Palestinian water reservoirs in the OPT to provide Israeli citizens and Israelis living in illegal settlements with essentially an infinitely flowing water supply (Figures 3 and 4). Mekorot sells water to Palestinian communities at very high rates (around 4-10 US dollars per cubic meter water) from the Mountain Aquifer and West Bank wells that Palestinians should have complete governing

authority over (Amnesty International, 2017). Because of the Oslo II accord's stipulations, Israel is always the water "supplier" as it controls the Jordan River and the West Bank's aquifers, such that Palestinians are always the water "purchasers" (Selby, 2007). The Israeli government also sets limits on supply amounts that can be sold to Palestinians, resulting in a staggering difference in Israeli and Palestinian water consumption; Palestinians consume a daily average of 73 liters per person, dangerously below the World Health Organization's recommended minimum of 100 liters daily per person. Israelis consume roughly four times more than Palestinians (Amnesty International, 2017). Mekorot has reduced Palestinian supply by as much as 50% during the summer to meet illegal Israeli settlers' consumption needs (Koek, 2013). Clearly, the technical design and political management of Israeli water management systems allow Mekorot, the Israeli government and illegal Israeli settlers to profit off of seized Palestinian water resources and human rights violations. Ultimately, water has been weaponized against Palestinian communities with the occupation's political agenda. Mekorot's purpose of providing water supply and management in Israel serves not only a technical function, but executes the Israeli political agenda by denying Palestinians the right to water through its segregatory practices and policies. Denying the right to water suppresses Palestinian economic development and ultimately, the right to self-determination.

Figure 2. A Mekorot pumping well in the West Bank (Amnesty International, 2017).

Figure 3. An Israeli settlement abundant with water in the West Bank (Amnesty International, 2017).

Figure 4. A dried-up canal that used to flow year-round in the West Bank has dried up due to water diversion (Amnesty International, 2017).

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Gaza

Although this paper focuses on water management primarily in the West Bank, is it insightful to touch on water injustices faced by Palestinians living in Gaza under the Occupation. Gaza is an "open-air prison" for its 2 million inhabitants living under an Israeli blockade (Shakir, 2021). It is nearly impossible for Palestinians and humanitarian organizations (such as the Red Crescent) to leave or enter the Gaza strip because Israel has restricted movement for the past 15 years. The only water source in Gaza is the Coastal Aquifer. It provides an inadequate, unreliable and polluted source of drinking water for Gazans; Israel does not allow for water to be transferred from the West Bank to Gaza (Amnesty International, 2017). Israel extracts groundwater from the Coastal Aquifer beyond its recharge capacity, depleting its water supply, storage potential and causing saline intrusion throughout the aquifer. Sewage and seawater

infiltrate the aquifer as the water table has fallen below sea level due to Israeli over extraction (Koek, 2013). Gazans are forced to rely on one fourth of the aquifer's total extractions as their only water source. Israel blocks construction supplies and materials to enter Gaza, prohibiting Palestinians from developing or maintaining water and wastewater infrastructure. Similar to the West Bank, Israel's water management policies and systems, by design, subjugate and suppress Palestinian livelihood, oppress Palestinian communities, and execute a political agenda through their inadequate and discriminatory practices.

Conclusion: The Right to Water

A thorough and complete survey of Israeli-Palestinian politics and its oppressive effects on Palestinians living under the Occupation is beyond the scope of this paper. However, a case for "water apartheid" is made with the condensed summary of Israeli water management discussed in this work. Israel's efforts to appropriate Palestinian water resources, its control of the physical water supply, and its hindering of Palestinian infrastructure development send one message to Palestinians living under apartheid and the international community. Israel's policies, management actions, and infrastructure are deliberately designed to solely advantage Israelis over Palestinians. Extending apartheid's definition to include one's right to water, Israel is complicit in committing "water apartheid", preventing Palestinians from accessing a safe, sufficient and reliable water supply and ultimately weaponize water against Palestinian communities. Palestinians are forced to depend on the oppressor for access to water. These policies maintain Israeli political dominance and hegemony; ultimately, they aid Israel in forcibly dispossessing Palestinians from their homelands and encourage the expansion of Israeli illegal settlements. Intentionally deteriorating Palestinian water infrastructure and decreasing

access to water creates a situation in which it is nearly impossible for Palestinians to prosper on their native homelands, it is made clear that the political effects and oppressive dynamics of water management are deliberate through Winner's technological political framework. A false narrative in water scarcity legitimizes Israel's policies in the face of critics and the wider international community. Israel fails to meet its obligations under international law to meet Palestinians' right to water, nor have attempts been made at improving water resources for Palestinians. The denial of Palestinians' right to water is an inherent to the design of water management; enabling Israeli apartheid and further driving Palestinians out of their land.

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