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"The Use of Water as a Weapon Against Public Health in Palestine and Kashmir"

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**The Use of Water as a Weapon Against Public Health
in Palestine and Kashmir**

Evan Gumas

egumas@fordham.edu

B.A. International Studies, Global Affairs Track

Fordham University – Rose Hill

Thesis Advisor – Dr. Samantha Iyer

siyer1@fordham.edu

Seminar Advisor – Dr. Christopher Toulouse

toulouse@fordham.edu

ABSTRACT: Water as a political tool has serious implications for global conflicts and its very nature has devastating impacts on public health. No disputes display these more clearly than those in Palestine and Kashmir which are, in large part, water related. Subsequently, public health is affected as water is integral to public health. Both Palestine and Kashmir's positions in their regions of the world make their experiences with water weaponization against public health unique, but their statuses as occupied territories share vast similarities which make them perfect candidates for research on the intersection of water use as a weapon and public health. Palestine and Kashmir's divergences in their geopolitical status allow us to develop a greater understanding of their individual public health crises as a result of water conflict. In analyzing the history, contexts, and politics of both territories up to their contemporary situations a clearer picture of how these two territories have experienced and are currently experiencing the weaponization of water towards their public health can be drawn. Future implications of the use of as a tool against public health in both regions will also be addressed.

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Introduction

Water weaponization is not a new concept. For centuries, the necessity of water for basic sustenance has resulted in wars over water rights. Likewise, public health has been integral in the focus of many nations with respect to their populace; a nation is only as healthy as its people. The intersection of these two issues is also not novel. Water access and quality are key to ensuring a healthy and disease-free population. In recent years, though, public health has been increasingly targeted through the use of water access or rights to harm the public health of an opponent in order to cripple and gain power or influence. Given the increasing global scarcity of water and escalation of territorial disputes, there exists a need to understand the present effects of water weaponization against public health and the potential future consequences.

In consideration of this phenomenon, two territories surfaced as the most acute and relevant examples. Palestine and Kashmir are comparable regions with similar histories and present conditions. Both are former British colonies situated in historically water insecure regions of the world, an issue that has only been exacerbated by the growing human population and subsequent demand for water. Their histories as British colonies, in large part, inform their water situations today. Each sit at the heart of important geopolitical regions with growing populations, ethnic violence, economic failure, and questionable security. Both Palestine and Kashmir play vital roles in global politics and discourse and are key to the analysis of water weaponization against public health. Exploring these conditions requires an assessment of their histories up to the present in order to provide a clearer understanding for future conflicts in other parts of the world that may parallel these two conflicts. In demonstrating the use of water as a political tool by the Israeli and Indian governments, the distinction in political status of Palestine and Kashmir becomes clear. In emphasizing the geopolitical dynamics of the two as similar

while also retaining key geopolitical and territorial differences, the unique effects on public health and how it harms the people in these territories can best be understood.

Methodology

The focus of this thesis stems from and was designed based on my interest in global public health. Palestine quickly came to the forefront of my research into water conflicts with specific ties to public health. In looking for a region comparable with Palestine, Kashmir was the best fit as its historical background and geopolitical status is similar to that of Palestine, while still maintaining unique distinctions. This thesis analyzes the effect of water as a weapon specifically to harm public health and the resulting devastating repercussions in two territories with unique political statuses. Synthesis of the situations in Palestine and Kashmir will be used to demonstrate the precedent that water weaponization and its intersection with public health sets for the rest of the world. The thesis will later discuss current and future projections of similar conflicts and an overall conclusion of the subject matter.

Research for this paper was conducted through the analysis of scholarly sources, medical journals, and contemporary news articles. Prior to my research, there had been little research on the intersection of water weaponization and public health specifically, so this thesis aims to address the gap in literature by looking at two specific cases in Palestine and Kashmir. While the bulk of the data used in the case studies is qualitative, there are a few quantitative references in discussing public health data. Due to the general understanding of the conflicts in Palestine and Kashmir, intensive background on the conflicts was not provided on each of the conflicts, though brief context is provided where deemed necessary. References to the governments of neighboring countries like Israel, India, and Pakistan are made as they are key parts of these conflicts. Both case studies will present a dual timeline-analysis in discussing the use of water as

a weapon against public health in both Palestine and Kashmir. Finally, in the discussion section, analyses of the two territories and future projections of their respective conflicts will be presented.

Literature Review

In order to grasp the severity of water weaponization, it is important to first understand what it is. Water weaponization is certainly not a new phenomenon, but one that is on the rise as water dynamics change around the world. In a 2017 report, Marcus D. King and Julia Burnell explain the implications of water weaponization in conflicts and the global ripple effect of this phenomena, as well as the different ways in which water has been and can be weaponized. They begin by stressing the nature of climate change and its effects on resource competition. They cite historical evidence of resulting conflicts from this phenomenon saying:

It is accepted wisdom that parties generally cooperate over scarce water resources at both the international and subnational levels, with a very few notable exceptions that have resulted in internal, low-intensity conflict. However, tensions have always existed: the word rivalry comes from the Latin word rivalus, meaning he who shares a river. Rivalry is growing at the sub-state level, leading to intractable conflicts. Social scientists have long observed a correlation between environmental scarcity and subnational conflict that is persistent and diffuse. Disputes over limited natural resources have played at least some role in 40 percent of all intrastate conflicts in the last 60 years (Werrell & Femia 67).

They go on to explain that trends indicate that countries with high levels of inter-state conflict often suffer increased instances of drought and war. In introducing the severe nature of water's role in conflict, they highlight the danger of its effects on human populations.

After introducing the nature of the study, the focus turns to the use of water as a weapon. They note that US intelligence has reported water weaponization in states that are experiencing growing water scarcity and that some extremist groups have already begun using water as a

weapon subnationally (Werrell & Femia 68). They provide a working definition for “weapon” lifted from the Oxford dictionary in order to establish a base for the nature of this research:

In its most basic form, a weapon is “a means of gaining advantage or defending oneself in a conflict or contest.” Wielded by a group, it can take the form of an item, action, or offensive capability used or intended to kill, injure, or coerce (Werrell & Femia 68).

With this understanding, the basis for water weaponization becomes clearer as they note that weapons can be used in a variety of ways. Around the world, examples of water use in ways intended to “kill, injure, or coerce” are seen, and in this thesis’ study of Palestine and Kashmir, specific examples of these will be explained.

King and Burnell break the weaponization of water into three working categories. These classifications are denoted by the intentions of their perpetrators. The first class is referred to as strategic weaponization; they explain water’s two-fold role in this type of weaponization as:

The use of water 1.) For virtual or actual control or destruction of large or important areas, populations or infrastructure. or. 2.) As an asset to fund state-like activities such as territorial administration or major weapons acquisition (Werrell & Femia 68).

In demonstrating actual uses of strategic weaponization, they reference the Islamic State’s deployment of the water weapon with seizures of dams in Mosul and Haditha. The repercussions of these dams being used as weapons would have resulted in hundreds of thousands of casualties as well as the displacement of millions of people (Werrell & Femia 69).

The second classification of water weaponization highlighted is tactical weaponization. Tactical weaponization is explained as:

Generally, the use of water against targets of strictly military value. Weaponization of water on a small, local scale was generally characterized as tactical (Werrell & Femia 68).

Once again citing the IS's use of water in this manner, the authors reference a 2014 move by the IS that intentionally diverted river water and prevented Iraqi security forces from advancing. They also note the term "unintentional weaponization" which manifests in the form of collateral flooding of villages and displacement of local populations (Werrell & Femia 69).

The third example of water use as a weapon is coercive weaponization. This is highlighted as:

The use of water as an instrument of subjugation through the creation of fear among non-combatants of water supply disruption or contamination (Werrell & Femia 68).

To demonstrate an example of coercive weaponization, the authors cite a 2011 case in Somalia with the Somali military forces versus the Islamist extremist group, Al Shabaab. In the mist of regional droughts, Somalia's military took back and liberated many cities from the hold of Al Shabaab. In response, Al Shabaab deviated from their usual guerilla tactics and began cutting water supplies to liberated cities.⁹ While Al Shabaab's tactics ultimately failed to regain them power, it did kill more than a quarter of a million people and displaced hundreds of thousands more, creating a dangerous and terrifying example for conflicts around the world (Werrell & Femia 70).

The report then moves to discuss the global effects of water weaponization. King and Burnell explain the ways in which conflicts in arid, water scarce regions implicate countries all around the world, not just those experiencing the conflict. They explain the primary global ripple effect of water weaponization:

Internal conflicts in the drought-afflicted countries described herein will have wider geopolitical, economic and security impacts: People displaced across borders by drought or conflict present myriad challenges. Some migrants flee one politically fragile state only to land in another equally precarious situation (Werrell & Femia 70).

In the last decade, migration has arguably become the most discussed international conflict. The effects of water weaponization in many of these regions is immense and cause for serious concern. These conflicts in water scarce countries present a strange dichotomy: water scarcity versus water weaponization. In countries that are already combatting immense water scarcity issues, the reality of regimes or extremist groups using the little water remaining as a weapon and either damaging or depriving people of water is a haunting, but increasingly normalized reality.

The authors conclude the analysis by emphasizing the risks posed by water weaponization and calling upon international actors to intervene in scenarios where the effects could be detrimental:

Water weaponization is a tool that will only swell vulnerable populations and create lasting damage unless swift and decisive policy measures are taken. Better coordination between the global community and national level actors is essential in countries where deteriorating ecological and social conditions are creating growing instability (Werrell & Femia 71).

The effects of water weaponization are far reaching. When people are deprived of access to water, desperation ensues. The human body needs water to survive and in environments where access is limited, people will settle for unsafe water. Unclean and unsafe water has deleterious consequences for public health, and in arid regions of the world where water insecurity is already

high, the threat of illness from unclean water is immense. In the Third Edition of *Disease Control Priorities* published in 2017, Guy Hutton and Clare Chase explain the dangers of inadequate water access practices. They begin by highlighting the necessity of safe drinking water, sanitation, and hygiene (WASH) for public health safety and discuss the progress being made in this sector globally (Hutton & Chase 171). They cite World Health Organization statistics that globally, improvements in drinking water sources have increased 15% since 1990 to reach a high of 91% in 2015 (Hutton & Chase 173). This is a major achievement, but they take caution to explain that this spike is due in large part to urban water access rather than rural, in which a major disparity still exists, in certain regions of the world. Likewise, water sanitation has improved significantly, though still falling short of the global target set by the WHO and UNICEF (Hutton & Chase 175). Hutton and Chase then shift focus to the impact of inadequate water practices and access. They explain the transmission of pathogens via contaminated water and a lack of sanitation (often due to inability to access clean water) by explaining the breakdown of disease transmission:

Diseases transmitted by the fecal pathway include diarrheal disease, enteric infection, hepatitis A and E, poliomyelitis, helminths, trachoma, and adenoviruses (conjunctivitis). Most of these diseases are transmitted through the fecal-oral pathway, but some are transmitted through the fecal-skin pathway (for example, schistosomiasis) and the fecal-eye pathway (for example, trachoma). These transmissions occur between humans, as well as between animals and humans ... Poor personal hygiene causes fungal skin infections, such as ringworm (tinea) and scabies. Lack of handwashing is associated with respiratory infections; inadequate hand hygiene during childbirth is linked to infection and neonatal mortality (Hutton & Chase 177).

They explain how, in developed countries, transmission in these ways is extremely low as there is easy access to clean water; however, in countries that lack these options, these diseases can prove deadly, especially in young children. Their research found that in children under five years of age, exposure to environments with high fecal loads causes enteropathy and create long-term effects such as the stunting of physical growth and cognitive development (Hutton & Chase 177).

In areas with poor access to drinking and household water, dehydration is often prevalent. Dehydration can have severe effects on physical and cognitive performance as well as bodily functions. Diarrheal diseases can often worsen dehydration, creating a vicious cycle for those in areas of water instability (Hutton & Chase 177). As explained by Hutton and Chase, the numbers are staggering:

The most recent study estimated 842,000 global deaths from diarrheal disease for 2012 ; 43 percent of these were children under age five years. An estimated 502,000 deaths were caused by inadequate drinking water, 280,000 by inadequate sanitation, and 297,000 by inadequate hand hygiene (Hutton & Chase 177).

While these numbers are high, actual numbers are much higher. In rural areas, deaths related to diarrheal diseases are underreported and the vast majority of regions affected by diarrheal diseases are more rural (Hutton & Chase 178).

The authors note a distinction in the diarrheal disease cholera and its infection rate, although its causes are generally the same as most diarrheal diseases:

Cholera is an endemic diarrheal disease, but it is strongly associated with natural disasters and civil conflict. An estimated 2.9 million cases of cholera cause 95,000 deaths each year in 69 endemic countries. Cholera is transmitted through fecal contamination of water

or food. Therefore, clean water and proper sanitation are critical to preventing its spread (Hutton & Chase 178).

Luckily, there is a vaccine to prevent cholera and prevention is relatively easy, but growing instability around the world indicates the likelihood for increases in cholera endemics.

Unfortunately, most institutional settings, such as schools, health facilities, prisons, refugee camps, and public markets, pose huge threats for outbreaks of diarrheal diseases like cholera and many others (Hutton & Chase 178).

Hutton and Chase then shift the focus from diseases caused by poor quality water to disease prevention and the ease with which these kinds of diseases can be prevented:

To increase safety, drinking water can be treated either at the source or at the point of use through a process of filtration or disinfection or both. The greatest health effects for improved water treatment technologies concern the piped water supply, with greater health benefits associated with higher-quality piped water (water that is safe and continuously available) (Hutton & Chase 182).

For many conflict ridden countries, water infrastructure is a casualty which, as noted above, has severe effects on human health. Water infrastructure is not the easiest thing to build or repair, but its necessity for public health cannot be understated.

The authors also stress the importance of infrastructure and facilities specifically designed for sanitation and health management. They explain this importance by saying:

To reduce the transmission of pathogens, sanitation technologies isolate, transport, and treat fecal waste, and they also provide users with a dignified and comfortable experience when going to the toilet. Different rungs on the “sanitation ladder” confer different health impacts and user experiences; hence, utilization of different kinds of sanitation services

or facilities can vary. For example, communal facilities may be poorly maintained, in which case they are less likely to be used by women, children, and individuals who are disabled or infirm. Distance also decreases usage of communal toilets (Hutton & Chase 182).

Noting the importance of maintaining facilities is key as, oftentimes, international agencies intervene to create facilities for regions with poor access to water, but these are not maintained once the agencies leave, defeating the purpose entirely.

After analyzing the cost-benefit analysis of implementing WASH procedures in areas of the world that need it, Hutton and Chase conclude by emphasizing the human right to drinking water and sanitation (Hutton & Chase 192). They note that, while disease levels related to water transmission have decreased globally since 1990, changing dynamics and regional conflict have the ability to alter these results. Specific emphasis is placed on the impending effects of climate change:

Climate change challenges the delivery of WASH services by affecting rainfall patterns, freshwater availability, and frequency of heat events, and it exacerbates health risks.

However, this new threat, when taken seriously, can be an opportunity to overhaul outdated policies and technologies (Hutton & Chase 192).

In noting the ability to take the threat of climate change as an opportunity for an overhaul of outdated policies and technologies, the authors underscore the necessity to maintain proper WASH conditions in order to ensure the public health of the global population.

Based on the understanding of water weaponization and the effects of water on public health, connecting these issues with Palestine and Kashmir becomes relevant. In recent years, comparisons between these two regions have grown as both Israel and India have expanded their

influence and strength over Palestine and Kashmir, respectively. Unique water crises and political conflicts have brought these two regions to the forefront of contemporary global news. Dr. Lubna Abid Ali and Sana Imtiaz Kitchlew discuss historical similarities between the two regions in their 2019 report:

The Kashmir and Palestinian conflicts emerged out of divisions under the British colonial policy of the 1940s. The historical struggle for the liberation of two disputed and occupied territories, Kashmir and Palestine, although located in diverse geographical regions, consist of similar as well as specific aspects (Ali & Kitchlew 121).

As will be discussed later in their individual case studies, British imperialism is a key factor in predetermining the current state of conflict in both regions of the world. Both Kashmir and Palestine have both been legally occupied since roughly the same year (1947 for Kashmir and 1948 for Palestine) and conflicts related to this issue have led to numerous wars and armed aggressions in the subcontinent and Middle East after their release from British colonial rule.

After understanding the history of the conflict in terms of British colonial influence, it is important to discuss the gravity of the comparison between Palestine and Kashmir. The authors discuss two key pieces of supporting evidence explaining the justification of the comparison between these two regions:

This article uses the *Youth Bulge Theory* to explore their resistance movements, along with exploring the similar and differentiating dimensions between these movements. The *Intifadas* (until victory) led by the youth against the crackdown on them, steered by the occupying forces are so similar in nature that the two disputes can metaphorically be called 'South Asian Palestine' and 'Middle Eastern Kashmir' (Ali & Kitchlew 121).

The authors reference the work of Dr. Gary Fuller and his *Youth Bulge Theory* which was first proposed in 1995 to explain a key similarity between the movements in Palestine and Kashmir. This theory proposes that when youth aged 15-24 reach over 20% of the population, the likelihood of civil war and general unrest rises due to agitation and youth rebellion against oppression (Ali & Kitchlew 122). Subsequent events have led to the proposition of the authors to refer to both disputes as the 'South Asian Palestine' and 'Middle Eastern Kashmir'.

After understanding the framework around which conflict in these two regions is observed, instances of youth rebellion are not surprising. Mainly driven by distrust in local government and frustration with lack of change for decades, movements in both occupied territories have led to their own actions for self-determination. Religious interests of occupying territories add another layer of complication to the conflicts in both regions as the authors explain:

The youth's political mobilization against right-winged Hindu nationalism (Hindutva) and Zionism have impacted the people in Kashmiri and Palestinian societies, culminating in active resistance through rhetoric and protests for the right of self-determination. Since in Islam, getting martyrdom while fighting occupation, is considered the highest glorification and is eulogized, therefore young men are highly motivated to fight for freedom (Ali & Kitchlew 123).

The idea of religious interests playing a major role in both conflicts complicates interests on both sides even more. The similarities between both Palestine and Kashmir being majority Muslim regions adds another element to the ties in both movements.

The conflicts in both regions have been further inflamed by actions of the Indian and Israeli governments to suppress and alter the occupied territories. In comparing these actions, the authors highlight the mobilization of India and Israel in Kashmir and Palestine respectively:

Both regimes led by Hindutva and Zionist ideologies are conducting demographic engineering in Kashmir Valley and Occupied Palestinian Territories (OPTs) by settling more Hindus and Jews in the respective territories, which has stoked the flames of anger even further (Ali & Kitchlew 124).

In attempts to harness more control over both regions and create justifications for occupying land, both India and Israel have moved settlers who are not of the majority religion into occupied territories. The repercussions of this action, as explained by Ali and Kitchlew, is growing resentment towards settlers in conjunction with anger and calls for revenge against government forces. Conflict in these regions often turns violent and has resulted in the intervention of international bodies to de-escalate and mediate conflicts. Unfortunately, many times these interventions do not prevent crackdowns on oppressed populations (Ali & Kitchlew 127).

An important aspect to note of these two conflicts are the differences that would be remiss not to mention. As stated previously, settlers of outside religions to the occupied territories are a technique that has been initiated to change dynamics of the regions and gradually suppress local populations; however, the historical basis of both conflicts is not directly based on religion. The authors explain the religious aspect of the conflict between Palestine and Israel saying:

Palestine is the cradle of Abrahamic religions. Zionist Jews and Palestinians claim the same land of Palestine - Palestinians being the original inhabitants, while Zionists claiming ownership being descendants of Isaac (Ali & Kitchlew 127).

Subsequently, they explain the influence of religion in the Kashmiri conflict:

While majority Kashmiris are Muslims, Kashmiri Muslims have ties with indigenous Pandits and Sikhs, but New Delhi aspires to turn Kashmir's ethnicities against Muslims, in order to portray the conflict as a communal issue (Ali & Kitchlew 128).

Recent developments have painted both conflicts as religious, though they did not necessarily begin this way. There is significance to addressing the differences in conflict between these two regions though, otherwise there is room to minimize or marginalize the causes and experience of one group in this conflict at the expense of the other.

In highlighting the most important differences between the Palestinian and Kashmiri conflicts, the authors emphasize where the focus lies:

Kashmir has a significant geostrategic location between three nuclear powers: India, Pakistan and China. It holds the key to the most important natural resource - water - being the epicenter of numerous rivers flowing between Pakistan and India. The Palestine-Israel conflict, on the other hand, impacts to the faiths of Muslim and Jewish people around the world. The original ownership and authority over Jerusalem is highly contested due to the presence of holy sites for Christians, Jews, and Muslims in the city (Ali & Kitchlew 129).

As this paper will discuss, water is the most important issue in the Kashmir conflict while in the Palestinian conflict, water became a casualty that was quickly weaponized for political gain.

What Ali and Kitchlew show in the asymmetries of the two conflicts prove to be important in the understanding of the argument of this paper.

Case Studies

In this section, case studies of Palestine and Kashmir will be used in order to aid in the explanation of how water is weaponized against public health in both regions. In presenting timelines of both of these territories' histories of water and their intersection with public health, greater clarity will be provided to the current weaponization of water against public health. As has been noted, both occupied territories share similarities in the nature of their conflicts, though their respective crises are unique. In presenting background and evidence regarding Palestine's crisis, the nature of the conflict as very much a direct attack on Palestinian water and public health will become clear. Kashmir's conflict will highlight how the territory is an intermediary in a greater conflict between India and Pakistan. The similarities and distinctions of these conflicts will also become clearer as more background and evidence is provided.

Palestine

Historical Background of Water & Public Health in Palestine

Palestine has always been dry. Throughout history, religious texts and research have detailed the aridity, history of drought, infrequent rainfall, and unique agricultural practices of Palestine.

Before the arrival of the British and creation of the British Mandate of Palestine, Arabs in the region lived as their ancestors had centuries before them. A land of unique rainfall patterns, excessive dry spells, and unpredictable heat waves, the narrow strip of land that makes up Palestine struggled to retain any water. Most rainfall and spring water quickly ran into the Dead Sea and Jordan River in the East and the Mediterranean in the West. Due to these unusual water patterns, most Palestinian farmers opted to grow drought resistant crops which they would cycle

with soil replenishing ones like chickpeas and lentils. Farmers chose dry hills that would receive occasional rainfall for their crops, used terracing to prevent erosion, and planted olive trees far from each other to prevent having to bring water to them (Broich “British Water Policy” 262).

In areas where water was more abundant, Arabs employed vast fishing industries and harvested papyrus off the banks of lakes and rivers to make baskets, mats, tents, and roofs (Broich “British Water Policy” 263). To avoid the scorching heat of the valleys (most of which lay below sea level) Arabs would move into the surrounding hills where they were still able to access water, but far enough away so that it was not unbearable. Some farmers had created elaborate irrigation systems and those on the coastal plains created advanced wells, although these were often very rare (Broich “British Water Policy” 264). Nonetheless, small-scale farming was possible, and the conditions of the region often resulted in grain surpluses which would aid in tax payment to the Ottoman rulers of the time. However, frequent poor rainy seasons resulted in lower crop yields which led to widespread debt and high inflation rates amongst the Arabs of the time. However, water scarcity and strain of this kind had been handled for centuries and people had learned to adapt (Broich “British Water Policy” 265).

Before the arrival of any foreigners in the region, Palestine was notorious for its vast deserts and swamps that harbored malaria carrying mosquitos. European, specifically British, perceptions co-opted this view and made a point to acknowledge them with an 1864 edition of *The Lancet* referring to Jerusalem as, “One of the most unhealthy cities in the world, and fever is its principal disease.” Fever was in reference to malaria that afflicted massive amounts of the population and resulted in Palestine maintaining a low population (Alexander 3). The Palestine Exploration Fund was established in 1865 by the British in order to conduct scientific research on Palestine. An 1872 expedition by the fund left many of the researchers dead due to malaria

and cemented the Western notion that Palestine was a desolate, disease ridden land (Alexander 15). In the midst of the century's long presence of malaria, Palestine was also hit with epidemics of the Black Plague, typhus, smallpox, cholera, and tuberculosis. Eastern European Zionists arriving in 1882 to flee anti-Jewish violence and hate were quickly decimated. 75,000 arrived in 1882 but by 1914, half of them had either died from disease or left due to the inhospitable nature of the land (Alexander 32). It is important to note that these views of Palestine as inhabitable and deadly for humans was a very European one, Arabs and native populations had thrived in Palestine for thousands of years and not been eradicated by disease.

Interest in Palestine predated the Balfour Declaration in 1917 though the declaration formally provided opportunities for Jewish immigration to the British Mandate of Palestine. The 1922 Mavrommatis Plan under the British proposed coupling irrigation and hydropower in the eastern and western floodplains of the Jordan River. Consequently, the World Zionist Organization pressured France and Britain to expand Palestinian territory to include the upper Jordan River headwaters as well as the Lebanese land that came with it, however this was ultimately rejected (Zeitoun 66).

The arrival of the British in the Levant was predated by visions of the people as still Biblical and stagnant in their "medieval ways." Since the Arabs had been cultivating their land in a similar fashion for centuries, British perceptions of them were that they were lazy and had not attempted to make any strides in improving the land or their water systems (Broich "British Water Policy" 265). Negative stereotypes of the Arabs as barbaric and employing a backwards way of living did not contribute to positive perceptions of them by the British. Due to their perceived incompetence, the British saw Palestine as a land that they could easily mold and thus impose their Zionist plans with ease. British ways of thinking at the time were that the Jews had

spent so much time in Europe that they had “erased the lethargy of Asia” and instead replaced this “lethargy” with modern, European ways of thinking. Thus, with the help of the Jews, the British felt that they could “fix” the Arabs and create a vibrant environment for all to live in (Broich “British Water Policy” 266).

After Mandate officials arrived in 1920, they quickly took on water redistribution as a major part of their agenda. Their proposed increase of irrigation and swamp draining was touted to create environments that would better sustain major cash crops. Draining of the swamps was also considered a pressing public health issue as the swamps were breeding grounds for malaria carrying mosquitos. Pre-mandate proposals from the British in 1919 involved extensive damming of the Jordan River and adjacent rivers to create hydropower and irrigation canals for new Jewish settlements that would eventually be built (Broich “British Water Policy” 270).

Future aspirations of the land were presented by praising the potential of the Jews and criticizing the Arabs who already lived there, as explained by Norman Bentwich:

The ancient fertility of the country may be completely restored by an industrious and intelligent population. The soil indeed is more like to that of California than any other part of the globe; and the application of modern science to its resources Will quickly undo the waste of centuries. ... It is only a question of irrigation ...

Water ... is at present allowed to run to waste (Broich “British Water Policy” 271).

Projects post declaration of the Mandate of Palestine were often facilitated by Zionist development companies and British Palestine government officials. Very early on, the transformation of water resources in Palestine was focused around making the land more hospitable and conducive to the immense production goals of the expected Zionist settlers.

In the years after British and Zionist expansion in Palestine, the waterscape of the land was completely shifted; streams were rerouted, vast swamplands drained, and, as a result, thousands of Arabs along with their farms and herds were displaced. Protests by Arabs against the projects of the British were swiftly shut down with the notion that British and Zionist projects would be for the ultimate benefit of the Arabs (Broich “British Water Policy” 271).

A major driving force used by the British to defend their water projects was the notion that they were eliminating malaria from the region in the interest of public health for all, but specifically highlighted how they were helping the Arabs. While this was their message, the process of eliminating malaria destroyed Arab water sources and town water centers, resulting in mass displacement of these peoples. Under the guise that this was for their own benefit, Arabs were unable to fight back. Many of the projects draining malaria infested swamps were deemed too dangerous for British and Zionist workers so Arabs were hired to do the work as they were more dispensable to the settlers (Broich “British Water Policy” 274).

British and Zionist efforts to change the Levantine waterscape is arguably the first example of the use of water as a tool against public health in the region. There was no alternative option for the Arabs, the only choice was to give in to British water developments. The Palestinians lacked a strong military to fight back with and could not fight projects that were pushed forward with the plan for the betterment of life for all people. Racial elements were strongly at play with the British and Zionists feeling that they would make better use of the land than the Arabs who were perceived as “lazy” and having given up on any development of the land. At the end of the day, British and Zionist projects resulted in a massive shift in the region: the waterscape remains completely changed to this day and malaria was eradicated in the region. Thus, the British and Zionists were able to accomplish their goals and set a long-lasting standard

of molding the Palestinian land in their interest under the projection that it was for the benefit of public health for all.

Creation of the State of Israel

Zionist and British policies remained in place for decades, up until the creation of the State of Israel. At the time of formation of the State of Israel, the Golan Heights, Gaza Strip, and West Bank were not occupied, thus, Israel did not have access to the water sources found in and adjacent to these regions. At the time, Israeli policy in 1948 towards water remained strong, meaning that any agricultural or developmental project would not be paused if water was not immediately available; water would be found and made available in order for projects to work. This policy was aptly titled Israel's "hydraulic mission" which ultimately led to the 1959 Water Law, granting all water resources in the state to Israeli ownership. The law provided for state control over all Israeli water sources and gave grounds for water allocation, rationing, and regulation (Galnoor 346). In 1938, the public corporation, *Mekorot*, was established as the national water authority of Israel and to this day controls almost the entire Israeli water supply (Galnoor 347).

Early water development in Israel is noted as an immense breakthrough in technology and engineering to craft an entirely new water system in the land. Reality set in in 1964 when the realization of total water shortage was acknowledged as a possibility due to the aridity of the region. The independent corporation, *Tahal*, stepped in in 1965 to create a 15-year effort with the United States to build a desalination plant; the United States ultimately pulled out due to cost. With efforts to build a desalination plant dashed, future plans focused on reusing and repurposing water from storm runoff, sewage reclamation, and aquifer development (Galnoor 352).

In 1967, the Six Day War between Israel, Egypt, Syria, and Jordan was fought, in large part due to water rights and control. The result of the war was a massive victory for Israel which saw them annex the Gaza Strip from Egypt, the West Bank from Jordan (including East Jerusalem), and the Golan Heights from Syria. The implications of this annexation would be long lasting and influence water rights in the territory to this day. See Figure 1 in Appendix for map showing pre and post-1967 War.

The aftermath of Palestine's annexation saw major setbacks in respect to water. The Palestinian population doubled from 1967-1990, although water use remained steady. However, on the Israeli side, the population was growing, and water consumption was increasing exponentially. Water conditions were incredibly poor in Gaza City where approximately 50% of piped water was lost due to poor infrastructure (Bellisari 54). Israeli control over water resources resulted in Palestinians going out of their way to collect water for their livelihoods. Palestinian physicians at the time reported increases in arthritis and rheumatism in young women who had to walk long distances to collect water. Some women were showing symptoms of arthritis by the age of forty, half the age of men showing these same symptoms (Bellisari 55). Due to Israel's excessive water extraction, the West Bank and Gaza Strip began to see saltwater intrusion in their aquifers. Consequently, reports found that water being piped into Palestinian homes by Mekorot was highly saline and unfit for drinking (Bellisari 56).

Severe pollution of natural spring sources led to an uptick in communicable disease spreading as sickness causing microorganisms infiltrated Palestinian water sources. Poor waste management also led to incredibly high levels of illness. For many years, raw sewage was pumped into the Mediterranean Sea in channels throughout Gaza. Most of these channels were overrun with garbage and would often flood during rains, resulting in sewage spreading

everywhere and causing horrific infections. To combat this flooding, Gaza residents placed stones over the channels to keep sewage from rising up. Inexplicably, Israeli military forces ordered Gaza residents to remove the stones, resulting in the re-occurrence of flooding. At the time, only 40% of Gaza was connected to sewer systems with the rest consisting of open sewage channels or large, open-air pools where sewage would be pumped out occasionally. Oftentimes, these pools would overflow into surrounding areas creating unsuitable living situations (Bellisari 57).

The implications of these shortcomings in water management were severely deleterious to public health. Incidents of viral hepatitis, chronic liver disease, bacterial and protozoal infections like cholera, amoebic dysentery, and giardiasis were becoming more common in communities throughout Palestine. A survey in the early 1990s in the West Bank of three refugee camps and a village showed that 48% of the children had been infected with intestinal parasites and 61% of village children being infected in the three weeks before the survey (Bellisari 59). Another survey studying all the villages in the West Bank along the Jordan River found that none of the water consumed was potable by international standards, one village being contaminated with sewage from the city of Nablus. Attempts from villagers to create a piping system from their spring to the village were also shut down by Israeli authorities as it was a breach of Israeli water boundaries. Incidences of fungal and bacterial infections were widespread due to the lack of sanitation facilities and running water preventing people from using proper hygiene and sanitation (Bellisari 60).

Most concerningly, all of these health-related issues were entirely preventable. Proper water access and sanitation would have almost entirely avoided the spreading of these diseases. On top of the already existing health conditions that many developing countries face like

hypertension, heart disease, diabetes, etc., Palestinian territories were faced with the reality of dealing with much more serious acute diseases that had the ability to spread in epidemic (Bellisari 61). Following all of these conditions and amidst outcry in the international community, the 1995 peace attempt between Israel and Palestine established the Oslo II Accord. The Accord prominently established the Palestinian Water Authority (PWA), among other institutions in an effort to provide Palestinians with some control.

The Oslo II Accords established the amounts of water that would be allotted to the Palestinians and Israelis for extraction. The 1995 estimates placed future Palestinian water needs to be around 70-80 MCM/yr (million cubic meters per year). The initial agreement allocated domestic water of 28.6 MCM/yr for the Palestinians; 23.5 MCM/yr for the West Bank and 5.1 MCM/yr for Gaza. Within this breakdown, 20.6 MCM/yr of West Bank water was to come from newly drilled wells and 3.6 MCM/yr would be provided by Mekorot. These numbers were to remain in place for 5 years, upon which they would be revised to accommodate for population growth and changes in the territories; to this day, they have not been revised (“Shared Water Resources in Palestine” 2015). See Figure 2 in Appendix for map showing shared water between Israel and Palestine.

While the Oslo II Accords were pivotal for water laws in Palestine and Israel, they also created very clear divides in water that Palestine was not allowed to access. In the region, the Jordan River System is the most important transboundary system. Under the Accords, Palestine was barred from all access; meaning Palestinians did not have access to any of the waters from the Hasbani, Dan & Baniyas rivers, Upper Jordan River, Lake of Tiberias, Lower Jordan River, Yarmouk River, various Wadis, and the Dead Sea. Basically, Palestinians were cut off from all main water sources, including ones that ran through or along Palestinian territory.

This aspect of the Accords severely affected Palestine's leverage in peacebuilding and made it very difficult for future water legislation (Zeitoun 45).

The 21st Century

While the past few decades had seen water issues primarily as a political conversation tool, by the beginning of the 21st century, public interest and discussion had waned. The establishment of the PWA was a key step in the advancement of the newly developing Palestinian water industry, however, the long-term outcomes would not be as positive. Reports from the early 2000s gave mixed results that demonstrated PWA water production was expanding, but at the same time, average Palestinian water consumption dropped, over a hundred communities still remained unconnected to water, and Gaza's water quality was continuing to decline (as it does today). Unresolved tensions from the failure to revisit and adjust the Oslo II Accords also bubbled under the surface of Palestinian frustrations towards Israel and the international community (Zeitoun 72).

The dawn of the 21st century saw an ever-growing gap in water consumption between Israel and Palestine. In 2001, the GNP for Israeli agriculture was 1.5% while Palestine's was estimated at 20-30%. Israeli water use for agriculture compared to Palestinian use was a 9:1 ratio but, when broken down, the ratio of the importance of each activity was determined to be 1:25; meaning that, while Israel's water use for agriculture was 9 times that of Palestine's, the actual importance of their water use was grossly smaller (Zeitoun 58).

By 2003, water divisions and separations were beginning to be more understood; 95% of Gaza and 70% of the West Bank was receiving piped water, although more than a third of it was still being lost to poor infrastructure. Clear divisions had been drawn up between Israeli and Gazan water, but the West Bank remained a bit more convoluted. 250,000 Israeli settlers in the

West Bank were consuming over a quarter of the amount of water 2.4 million Palestinians were. Conversely, no Palestinians were allowed to live in Israel and thus were consuming no Israeli water, highlighting a vast power asymmetry. Via Mekorot, Israel was able to maintain control over a large portion of West Bank water, roughly a quarter of it. Several wells that were run, administered, and staffed by the PWA were required to pipe water for Mekorot, taking away vital water supplies necessary for the Palestinian population. In the West Bank, Palestinian water control was allowed over four wells, agricultural wells dug pre-1967, and municipal wells. Until 2002, agricultural and municipal wells were independently Palestinian, but a 2002 water law included them under the PWA's jurisdiction, a move not approved of by all. Israeli control over water in the West Bank manifested in 13 wells run by the Israeli controlled West Bank Water Department, Mekorot owned wells in the West Bank, water purchased by the PWA from Israel, and water purchased from Israeli settlers in the West Bank (Zeitoun 54). Mekorot wells would first distribute water to Israeli settlements, military bases, and finally, their lowest priority client, Palestinians. Palestinians had access to some individual water resources outside of state control like rainwater collection and groundwater from natural springs (even though these technically also fell under the PWA's jurisdiction) (Zeitoun 45).

The Contemporary Crisis

In the wake of the 2014 Israel-Gaza conflict, the issues of water and public health were once again brought to the forefront of the conversation. Massive disparities in water use and the public health crisis happening in Palestine were widely documented by the international media. Unsurprisingly, water insecurity and public health had only grown worse since the early 2000s amid the numerous incidents that had occurred between the Israelis and Palestinians.

A 2017 report found that since the Oslo II Accords, Israelis were now using ten times the amount of water as the Palestinian population - even though the Palestinian population has doubled since 1995. Israel has also failed to live up to their end of the Accord, in fact, Israel has cut Palestinian water by 10% since 1995. In parts of the occupied territories, Palestinians are forced to purchase water as they are not allowed to connect to the water grid. In Area C of the West Bank (a portion that, under the Accords, makes up about 60% of the West Bank) over 150,000 residents buy water from trucks for \$0.25 per cubic meter, four times the price of water from the PWA. Infrequent water supplies from the Israeli grid often leave villages resorting to buying tanker water in the middle of the summer. A native Bedouin man living outside of Hebron expressed the sentiment that Israel is trying to expel Palestinians by depriving them of water, essentially forcing them to move if they want to keep themselves and their families safe and healthy (Oguz 2017).

On top of limited water access, Israeli forces continue to destroy or damage Palestinian water infrastructure. Research from Duke University and the University of New Hampshire found that between 2006 and 2017, 982 incidents were documented of Israeli forces, settlers, or agencies damaging, destroying, restricting access to, or disabling Palestinian food, water, and other essential services (Weinthal & Sowers 321). 98.3% of Gaza residents were once able to attain piped drinking water but by 2014, only 10.5% of residents had access to safe piped drinking water. Attacks have also damaged 60% of Gaza's water treatment plants and more than 20 miles of water and sewage pipelines, according to a 2014 UN Human Rights Council report. See Figure 3 in Appendix for visual of water infrastructure damages in 2014 conflict. Similar situations were reported in the West Bank with 685 incidents reported in the eleven year period (Weinthal & Sowers 335).

Research from the WHO and UNICEF's Joint Monitoring Program for Water Supply and Sanitation (JMP) indicates that piped water access has been steadily declining for the past two decades. Notably, urban areas have experienced declines in safe, piped drinking water since 2000 and the onset of the Second Intifada ("Systematic Review" 6). Israeli military assaults on water infrastructure in the West Bank in 2003 and Gaza in 2014 contributed the most to the decline in safe drinking water. In the case of Gaza, the Israeli blockade has prevented supplies needed to rebuild water infrastructure in the area ("Systematic Review" 7).

Research by the RAND Corporation in 2018 exposed the dire implications of Palestine's water, specifically focusing on Gaza. The study found that 97% of the drinking water in Gaza is considered undrinkable by international standards. Around 90% of Gaza residents purchase water from private purifiers but this method is not sustainable for the 2 million residents (Efron, et. al. 87). While in the West Bank water only accounts for 0.7% of monthly income, in Gaza that number stands around 33%. For a territory with 57% unemployment, this is not sustainable at all (Kubovich 2018). Water pollution was found to account for a quarter of the illnesses in Gaza and at least 12% of child deaths were found to be related to gastrointestinal issues; numbers have continued to rise since (Efron, et. al. 93). Due to severe infrastructure damage in 2014, Gaza residents have had to improvise with water collecting and carrying techniques, leading to massive outbreaks of gastrointestinal viruses. Sewage and waste often sits in large open pits which are breeding grounds for infections and disease. Purifiers donated by international agencies can only work if they are maintained, which, more often than not, they are not. Even sea water is considered hazardous to human health as research indicates at least 43 Olympic sized swimming pools worth of sewage are dumped into the sea off the coast of Gaza every day (Kubovich 2018).

Despite Gaza's intense pollution issues, a cholera outbreak had never been of immediate concern since residents are regularly vaccinated against the disease. However, the Trump administration announced the suspension of funding to the United Nations Relief and Works Agency for Palestinian Refugees in the Near East (UNRWA) in 2017. The UNRWA was responsible for the regular inoculation of 1.3 million Gaza residents and over 4 million doctors' visits. Now, without the funding, a cholera epidemic is imminent. The worsening of Gaza's water crisis is only going to exacerbate this issue. There have been documented incidents of diseases in Gaza spreading outside of the occupied territory into Israel and infecting people with researchers now urging Israel and Egypt to partner with Palestine in order to prevent a massive outbreak in the region (Kubovich 2018).

Likewise, in the West Bank, extreme competition for water resources has the potential to boil over into a full-blown public health crisis. The West Bank has been lucky in avoiding the full brunt of Israel in the way Gaza has experienced it. The WHO has designated per capita daily water consumption at 100 liters per day. In Hebron and Nablus, two of the largest cities in the West Bank, daily consumption is around 50 liters per capita per day while the mean for the West Bank is around 66 liters per capita per day. 2019 research found that water quality in the West Bank was far superior to that of Gaza, however, Palestinian access to water in the West Bank is extremely limited. Palestinians do not control any of the aquifers located in the West Bank, which are being depleted at alarming levels ("Gaza: Communicable Disease Risk Assessment – WHO Report" 3). Major cities in the West Bank are connected to water infrastructure, but in rural villages, the situation is vastly different. Estimates stand that approximately 113,000 West Bank Palestinians in over 70 villages are not connected to any central water grid. Increasingly intermittent rainfall is often disastrous for these villages as springs do not replenish and there is

not enough rainwater to harvest. In addition, Mekorot often cuts water off from Palestinians in order to ensure a steady supply to Israelis (“Systematic Review” 5).

The onset of the 2020 COVID-19 pandemic highlighted the dire state of Palestine’s public health. A lack of general resources, specifically water and electricity, increases the odds of a major outbreak exponentially. In territories that are already suffering shortages in resources, the potential for any sort of new outbreak is incredibly dangerous. As stated previously, there is a sentiment among Palestinians that Israel is attempting to push them out of their land by drying them out. In the process of weaponizing water in this manner, public health has been directly attacked. The World Health Organization (WHO) has listed waterborne communicable diseases like *Campylobacter*, *Salmonella*, *Shigella*, *Leptospira*, rotavirus, as well as other gastrointestinal diseases like *Entamoeba histolytica* and hepatitis A and E1 as major concerns in water depleted regions, something Palestine very much is. Concerns about typhoid fever outbreaks are also mounting (“Gaza: Communicable Disease Risk Assessment – WHO Report” 3). A Palestinian Hydrology Group (PHG) survey found that both acute and chronic health problems were exacerbated by poor water quality and wastewater exposure. Water scarcity and high salinity can cause chronic kidney dysfunction and liver disease which is only made worse by the hot climate. High levels of nitrates in water lead to increased diarrheal diseases with more than 10% of children surveyed by the PHG reporting diarrhea episodes in the two weeks before they were surveyed. Long term effects of water with high concentrations of nitrates include anemia and the potential to induce spontaneous miscarriage (“Systematic Review” 14).

The most unbelievable part of all these water related public health issues is that they are entirely preventable. All of these diseases and potential outbreaks can be traced back to poor water supplies and sanitation which results in people turning to unsafe water sources and risking

exposure to disease on a much larger scale. In this case, Israel has the control over water supplies and has chosen not to repair or expand Palestinian water infrastructure. In doing so, they have created massive opportunities for epidemics that could potentially spread to Israel itself, Egypt and other surrounding countries. Water pollution from the Gaza Strip has been detected in the sea off the coast of Israel and Egypt in recent years. By international standards, this is unacceptable; however, Palestinians have virtually no rights in general in Israel, let alone rights to water supplies, as has been explained. The reality of the problem is that water has been used to attack public health, whether knowingly or not. None of these health problems are unknown to the Israeli government and they have chosen to withhold international aid to Gaza and other Palestinian areas in crisis. In doing so, lives, notably children's, have been lost to diseases and conditions that are entirely preventable. Under international law, occupying powers are responsible for the welfare of their civilian populations and required to provide access to water, food, medical supplies, and shelter. Under the Geneva Conventions, Palestinians are guaranteed access to drinking water and water for hygiene and sanitation. Israel ratified the International Covenant on Economic, Social and Cultural Rights (CESCR) which provides for the right to water which the UNHCR reconfirmed in 2010. Israel is one of three nations that does not recognize these rights though and continuously breaches them ("Systematic Review" 21).

In Palestine, water scarcity has always been the norm and has already begun increasing due to climate change, but the addition of Israeli occupation is only exacerbating these problems. In Israel's deprivation of water to Palestinians and destroying of Palestinian infrastructure, water problems are being perpetuated and their direct results on public health are dire. The demographic whose overall health is most affected by water scarcity and deprivation are children. The high child mortality rate in Palestine is directly related to the current water crisis.

Accountability must be enforced as the nature of the current water crisis in Palestine is only happening by Israel breaking international agreements. See Figure 4 in Appendix for map of Palestine's land shrinking since 1917 to present.

Kashmir

Historical Background of Water & Public Health in Kashmir

Throughout its extensive history, Kashmir has never ruled itself. The lush region has been the home of dozens of now extinct religious sects and groups, with ties to Islam and Hinduism always being present in some way. Kashmir is often compared to Greece in its position in the region as a hub for culture, intellect, and a crossroads of different peoples. Control of the region by the Mughals beginning in 1587 would commence the long history of Kashmir under foreign power, whether they be Muslim, Hindu, or Sikh.

Water has always been a major part of the Indian subcontinent (the southern part of Asia that consists of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) dating back to the Indus Valley Civilization, one of the earliest recorded civilizations in history. The Indus Valley Civilization (3300B.C.E-1300B.C.E) was established alongside the Indus River which acted as a life source for the people of the region. The civilization flourished for thousands of years and is renowned for its advanced water retention and irrigation techniques (Cullet & Gupta 160). The subsequent rules of the Buddhists and Jains until around the 9th century CE demonstrates advancements of reservoir building and water technology advancements for agricultural use based on the techniques developed by the Indus Valley Civilization (Cullet & Gupta 161).

Hindu rule established guidelines for proper water use in the subcontinent long before the arrival of the British. Written in 200BCE, *The Laws of Manu* played an important role in Hindu water laws. Water was considered indivisible with the diversion of waters for personal benefit being strictly prohibited. All water projects were intended to be for the benefit of others with the only acceptable destruction of water resources being those of enemies in times of war (Cullet & Gupta 161). The *Arthashastra* ('The Science of Politics') manuscript also provided more detailed water laws for governance in during the period from 350BCE to 150BCE. The manuscript explained how all water belonged to the king and established an incredibly complex water taxing system for inhabitants of the subcontinent under this time period. Further laws stated that water was not to be used to harm others, when releasing water from dams, neighbors downstream and upstream had to be alerted, and any damage caused by water must be compensated by the person who caused the destruction. Water routes could be used for trade or transport as water was seen as a means to demonstrate civic duty to one's neighbors (Cullet & Gupta 162).

Muslim rule took over northern India in the tenth century and continued with the rule of the Mughals in the 16th century. There is little evidence of defined Muslim water laws as many of those in place from the times of Hindu rule were retained and non-Muslims were allowed to live and follow their own practices, as long as they were compatible with Muslim laws (Cullet & Gupta 163).

Colonization of the Subcontinent

After the 16th century, European colonization of the subcontinent began. See Figure 5 in Appendix for map of British India. The British quickly established a strong presence and began using waterways for logging. While British industrialization and colonization of the subcontinent was not nearly as intense as that in Africa, it had adverse effects on overall water quality. Using

waterways for logging polluted vast amounts of drinking water as well as increasing salinity which led to the destruction of small-scale irrigation for farmers, causing their farms to crumble.

Britain did not involve itself in water regulation until after the 1857 revolution which saw the East India Company increase interest and jurisdiction over canals and irrigation infrastructure (Cullet & Gupta 163). Common law took precedence in water regulation with landowners being granted access to waterways that were adjacent to or flowed through their properties while groundwater was unlimited for them. A series of laws would follow over the next forty years providing clarity on everything from canals to river embankment management. In 1873, a shift to more state control began with the passage of the Northern India Canal and Drainage Act which gave the rights of water use and regulation of public waters like rivers, streams, and lakes to the state government. Over time state control over water was strengthened, culminating in the 1931 Madhya Pradesh Irrigation Act which gave all rights of water, except groundwater, to government jurisdiction. Around this time, emphasis on the distinction between regions, states, provinces, and princely territories were widened with the Government of India Act (1935) encouraging all territories to accept government regulation and, if they did not, sending a government commissioner to negotiate acceptance of the government regulations (Cullet & Gupta 164).

On the side of infrastructure, between 1840 and 1900, Britain began a project of major water revamping based on the new engineering method called the “gravitation scheme.” This scheme reshaped landscapes in order to increase water efficiency as well as increase the access of water in more populated areas. In reshaping landscapes, rivers would be dammed, lakes raised, and valleys flooded. This pressurized water could then be pumped to nearby cities, however, the repercussions on local communities was devastating for agriculture and the

environment. The first uses of this method in the subcontinent were in Bombay (modern day Mumbai) and Colombo, Sri Lanka. In Britain, the gravitation scheme was implemented to create a system to flush cities clean and provide water to even the poorest of people. In colonized lands, these intentions were largely the same, however race, rather than class, came into play as a much greater factor (Broich “Engineering the Empire” 346).

Questions over the need and efficacy of such a scheme ran rampant through the subcontinent with inhabitants from Karachi to Colombo seeing the plan overwhelmingly negatively as they would be the ones paying and thus resented it (Broich “Engineering the Empire” 348). On the logistical side, the gravitation scheme was not altered to fit the needs and differences of the subcontinent’s unique climate and landscape which created many problems. Natural disasters mixed with the subtropical and arid climate of most of the subcontinent proved inconsistent with the gravitation scheme, nonetheless, it was pushed through and changed the dynamics of the subcontinent forever (Broich “Engineering the Empire” 349).

In the early 19th century, Britain experienced a cholera epidemic (1831) and typhus outbreak (1837) with mortality rates that were of great concern. These epidemics were largely attributed to vast amounts of filthy, stagnant water. Based on this, British engineers proposed flushing cities with clean, fresh water, hence the genesis of the gravitation scheme. This same mindset was applied to the subcontinent upon British arrival with the scheme passed on under the guise of intending to prevent a major public health crisis among the population (Broich “Engineering the Empire” 350). Under the direction of British engineer Henry Conybeare, a gravitation scheme was developed and completed for the city of Bombay. Touting the early success of the scheme in Bombay, Britain went on to build similar systems in their other territorial holdings (Broich “Engineering the Empire” 354). See Figure 6 in Appendix for graphic

of the gravitation scheme. Very quickly though, failure to differentiate schemes between those on mainland Britain and the subcontinent became apparent. Pipes that were normally buried to prevent freezing in Britain rotted and corroded in the high salinity soil of Bombay (they would have survived above ground). Within two decades, the primary water main to Bombay had corroded so badly it could be cut with a kitchen knife. Repairs meant that the entire city was left without water for extended periods of time, defeating the initial purpose of the scheme. The scheme was touted as being a solution to public health crises, but reservoirs filled up with algae, other plant life, and became breeding grounds for disease carrying mosquitoes. Algae and plant life led to the notoriety of the poor water quality in early Bombay (Broich “Engineering the Empire” 358).

In the process of creating these massive gravitation schemes, the British displaced thousands of indigenous people, much like their actions in Palestine. Villages were drowned or displaced as valleys were flooded to create massive reservoirs (Broich “Engineering the Empire” 358). Large perimeters were also demarcated as buffer zones to prevent human contamination of the reservoirs, interfering and furthering altering human life. The British had touted the plan as a way to provide equal access and quality of water to the poor all around the world, but the very action of creating such plans displaced the poor and underprivileged into even more precarious conditions (Broich “Engineering the Empire” 359).

In Britain, the creation of waterworks systems led to the closure of wells and cisterns as they were deemed unnecessary. Likewise, in the subcontinent, British municipal governments ordered the closure of wells and cisterns once waterworks were installed. They deemed wells and cisterns unnecessary as well as breeding grounds for mosquitos and disease, declaring them a public health hazard. Native peoples protested this extensively as many Hindu and Zoroastrian

rituals required well water (Broich “Engineering the Empire” 360). The minister in charge of all issues relating to malaria was not deterred by these protests and continued to close and seal wells. An 1892 waterworks built at a religious holy site on the Ganges even led to a riot.⁹⁷ All plans by the British to create water systems were opposed by native communities as they saw no need for expensive new water systems and did not want to pay for the cost. Protests, riots, and complaints fell upon deaf ears as the British pushed through their projects. Amidst all of the protests and projects, Britain was slowly centralizing water laws and ownership in their own government and leadership, a feature that would play strongly into the results of Partition (Broich “Engineering the Empire” 360).

Partition

Following Partition, which divided the subcontinent into India, Pakistan, and East Pakistan (now Bangladesh) in 1947, the conflict over ownership of Kashmir began. See Figure 7 for map of the subcontinent after Partition. The subcontinent was to be divided to create a Hindu state and a Muslim state. This was to be decided based upon the religious majority population in each territory (i.e. Hindu majority states would go to India and Muslim majority states would go to Pakistan). Princely states, like Jammu and Kashmir, Hyderabad, and Sikkim were not explicitly included in the partition plan, leading to many of the territory conflicts that occurred in the decades following Partition. Jammu and Kashmir were majority Muslim states with a roughly 61% Muslim population but amidst the chaos and violence in the wake of the announcement of Partition, the Hindu ruler of Kashmir ultimately decided to join India.

Since Partition, multiple wars and aggressive military confrontations have occurred between India and Pakistan over ownership of Kashmir. India and Pakistan’s claims to Kashmir are essential for their respective nations’ water supplies. Both countries rely heavily upon glacial

melt and rivers that begin in Kashmir. By controlling Kashmir, they control the water. Water is necessary for electricity, agriculture, and irrigation in both countries, although Pakistan relies more exclusively on waters that originate in Kashmir. Essentially, water is a national security issue between the two nations as it is a powerful weapon that India can use to cripple Pakistan's economy and national public health.

Temporary agreements were put in place immediately after Partition to accommodate the new borders. These agreements expired on March 31, 1948, and the next day, East Punjab halted water flow across the Indo-Pak border in Western Punjab. The move sent farmers in Western Punjab into crisis; crops that were about to be planted for winter could not be planted which would affect the subsequent summer crops - a full year of agriculture was on the line (Alam 342). Partition had led to the movement of millions of refugees across the border causing public health to severely deteriorate in metropolitan areas. Waterborne illnesses were on the rise and health conditions were worsening so food and water were more necessary than ever. Western Punjab was completely reliant on the waters of the Sutlej River that came across the border, which India controlled. After the personal emergency intervention of Indian Prime Minister Jawarharlal Nehru, water was restored to the West Punjab canals, though a dangerous precedent was set, and trust was never fully reestablished (Alam 343).

Following the incident in Punjab, both Pakistan and India agreed that some sort of agreement must be met between the two nations as tensions were rising. For the next several years, agreements were drafted and failed. In 1954, the World Bank proposed a plan which would divide the Indus basin, giving 20% of surface waters to India and 80% to Pakistan. Under this proposal, India would receive the Sutlej, Beas, and Ravi rivers and Pakistan would receive the Chenab, Jhelum, and Indus rivers. Pakistan felt that this was still not enough for its growing

water needs and rejected the plan. Pakistan was able to convince the World Bank that it also needed water storage facilities along the western rivers, a move India rejected as they did not want additional financial responsibility to Pakistan. This plan for storage facilities was referred to as the 1956 Aide-Memoire plan and was accepted by Pakistan along with the 1954 Plan in December 1958 following a Pakistani coup d'état in October of that same year. The treaty took two years to draft and was finally signed as the Indus Waters Treaty (IWT) in 1960 - a monumental and massive treaty for the region that would dictate water law in the subcontinent for years to come (Alam 344). In addition to the division of rivers, the Indus Waters Treaty allowed India to create projects on the western rivers for conservation, flood control, irrigation, and hydroelectricity, while ensuring they inform Pakistan of their projects. If Pakistan were to object to the project, the conflict would be solved through negotiations or, if necessary, an arbitrator (Sridhar 27). See Figure 8 for visual of the rivers divided amongst India and Pakistan and their proximity to Kashmir.

The Contemporary Crisis

Since the signing of the IWT in 1960, there have been dozens of disagreements between India and Pakistan in close proximity to Kashmir, the most notable being the Balighar Hydroelectric Plant (BHP) dispute in 2007. Construction had begun in 2002 on this 900-megawatt dam on the Chenab River in Jammu. In January 2005, Pakistan expressed concern that the BHP would divert downstream waters and could be used to cause flooding in the agricultural plains in Pakistani territory. Under this pretense, Pakistan invoked Article IX of the IWT to bring in an independent arbiter to look at the conflict over the building of the dam (Wirsing 228). Swiss engineer Raymond Lafitte was brought in and he spent 20 months studying the project. Lafitte ultimately found that, while the treaty did violate the IWT in certain aspects, it was fine to

move forward with completion of the dam. He cited the IWT as being slightly outdated in its language, having been drafted in the mid-1950s. This conclusion angered Pakistanis who felt that the treaty was not to improve dams but to prevent water related conflict. On top of this anger, being bested by India added insult to injury with the Pakistanis who now felt the treaty was no longer neutral and leaned towards Indian interests (Sridhar 28).

Unlike the BHP, the Tulbul Navigation Project (referred to as the Wullar barrage by Pakistan) was not arbitrated by any international actors, instead, it has remained unresolved for almost forty years. In 1984, India began work on a barrage with the intention of maintaining water levels of the Wullar Lake on the Jhelum River in Kashmir. The project sought to retain water in the lake from November to February in order to control the current and flow of the river for hydroelectric plants downstream (Sridhar 28). Construction was initiated without warning to Pakistan, who found out a few weeks after construction had begun. Pakistan expressed concern that the project would harm its canals downstream and referred the conflict to the Indus Waters Commission. The commission did not come to a conclusion and India abandoned the project in 1987, dropping everything, where all the construction materials remain to this day. Since then, negotiations over the project have begun and failed multiple times with the most recent being 2012. Talks have discussed moving the lock to different parts of the river, though they have never come to a clear decision. Recent changes in Indian policy in the region have rekindled interest in the project with New Delhi looking to advance the project as they have gained more control, much to the disappointment of the Pakistani government (Yasir 2016). See Figure 9 for graphic showing dam projects in India, Pakistan and Kashmir.

In 2018, a study conducted the Greater Kashmir Integrated Disease Surveillance Program (IDSP) found that 73.8% of water samples drawn across Kashmir were contaminated with

disease causing bacteria and organisms. 473 samples were drawn over a 6-month period and of those, 349 were found to be contaminated and thus, unfit for consumption. Contaminants included bacteria that cause gastroenteritis, typhoid, and other acute diarrheal diseases. All regions of Kashmir revealed contaminants, with some being much worse than others. A large percentage of child mortality cases in Jammu and Kashmir have been linked to contaminated water sources as a result of water-borne diseases and poor hygiene. Much like Palestine, Kashmir has water infrastructure that is decades old and deteriorating rapidly, leading to increased water contamination. Conflict in the region over decades has not improved the situation and a lack of aid from India and Pakistan due to the conflict has resulted in severe neglect (Nissa 2018).

Amidst conflict between India and Pakistan regarding Kashmir in early 2019, a Union minister in India, Nitin Gadkari tweeted that India had, “Decided to stop our share of water which used to flow to Pakistan. We will divert water from Eastern rivers and supply it to our people in Jammu and Kashmir and Punjab.” Interestingly, this move by India would not be illegal under the IWT. India technically had been using less water than they were allotted by the IWT but by fully utilizing their allotted water resources, the effects would be felt severely downstream in Pakistan (“Pulwama fallout” 2019). Again, this move is not illegal and objectively, India has a right to retaliate to the attacks but the manner in which they are responding sets off alarms for Pakistanis. India going from partial water use to full water use would be a dramatic difference downstream in Pakistan that causes great concern.

A year later, on August 5, 2019, the Indian government revoked Article 370 and 35A of its Constitution. These articles provided Jammu and Kashmir with semi-autonomy, allowing them to make decisions for their territories somewhat separately from India due to their historic status as a princely state and disputed territories. Simultaneously, the Indian government passed

the Jammu and Kashmir Reorganization Act which split Kashmir into the two distinct states of Jammu and Kashmir and relegated governmental control to India. In taking control over Jammu and Kashmir, India has also gained control of the waters that begin and/or flow through the territories, of which two flow into Pakistan (Kaur 2019). Amidst the chaos of repealing the articles, the Indian government told Hindu pilgrims in southern Kashmir and all tourists to leave the region due to impending security threats, causing widespread panic. Kashmiris panicked and cancelled events and began stockpiling food and medical supplies. A few days later, India sent in 35,000 additional troops, cut all communication lines (internet, telephone, and cable), placed Kashmiri political leaders under house arrest, and instated a curfew. In March 2020, 2G internet was restored to Kashmir but many restrictions are still in place (Essa 2019).

Amidst the occupation of Kashmir, India decided not to renew a 1989 agreement with Pakistan that required the two countries to share hydrological data, instead saying they would only alert Pakistan in instances of large water discharges or flood flows. India has reassured Pakistan and the world that it would not pull out of the IWT, but recent tensions have increased fears that this may not be the reality. The decision to not renew the 1989 agreement could also mean India does not need to alert Pakistan until right before diverting or releasing water, which could have dangerous consequences that would still fall under the IWT, though the ethics of that kind of move would certainly be questionable (Kaur 2019). Pakistan's response has been largely diplomatic as the government is well aware of the stakes. If Pakistan angers or damages relations with India any more, its water supply and the health and safety of millions of its citizens are at risk.

In the midst of this crisis, water security for millions of people is at stake. The implications of cutting water supplies and resources to already insecure areas are severe.

Kashmir itself has been seeing major changes in its water geography with the exacerbation of climate change. Most water supplies in Kashmir and Pakistan rely on glacial melts in the spring. In the past several years, Kashmir has been losing approximately 15-18 meters of glacial ice annually and has lost three entire glaciers in the past 70 years. 95% of irrigated land in Pakistan relies on water from Jammu and Kashmir glaciers. Increasingly dry and sporadic rainy seasons across the subcontinent have led to intense water insecurity and scarcity that has resulted in fear and violence. The winter of 2017-18 was one of the driest in history for Kashmir who ordinarily receives around 2 feet of precipitation, but that year only received 3.2 millimeters. Due to a lack of water and increasing water security, some Kashmiris have become desperate. In 2002, a project on Dal Lake in Kashmir was widely criticized by Kashmiris as they felt the waters of the lake were unfit for human consumption and ultimately, the project was moved to a separate freshwater source nearby. A little over a decade later, the lake has become even more polluted but has also now become a source of drinking water for many locals as water availability from the state has dwindled. Kashmir's Public Health Engineering (PHE) department listed the water from Dal Lake as a public health hazard but also expressed that dozens of water supply systems around Kashmir are suffering severe shortages (Hassan 2018).

The future implications of water weaponization on public health in Pakistan are severe. As previously stated, Kashmir is experiencing their own water crisis and public health problems. India's control of Kashmir and its water could have long term, dangerous results. There was a point in history where Kashmir could provide enough water to irrigate Pakistan while also supplying water that flows into India. With declining water levels in Kashmir and annual glacial melts becoming more inconsistent, there is simply not enough water to go around. India's control over Kashmir and their water supply is a huge weapon to wield against Pakistan and the

repercussions of utilizing this weapon would be disastrous. By preventing water flow, drought and famine are inevitable which are both detrimental to public health. When people do not have access to water or food, desperation ensues and what was once deemed undrinkable is now a necessity for survival. On top of that, intercommunal violence and death due to poor hygiene and sanitation practices can destroy a country and economy. Control over dams is also a major weapon that could be used to flood enemies downstream and destroy their farms.

Research conducted on public health in the wake of drought and famine across the globe has explained and exposed the harsh reality of crises like these. Famine in low and low-middle class countries manifests in malnutrition and mass mortality. In simple terms, drought harms agriculture and livestock leading to declines in quantity and/or quality of harvests (Stanke et al. 7). In turn, these declines result in malnutrition and mortality, two consequences that go hand in hand. In the case of the India-Pakistan conflict where the very industry at risk is the agricultural sector, the repercussions on the health of millions of people are at stake.

When focusing specifically on water in a public health context, quantity and quality are both necessities. Low quantities of water directly correlate to poor quality water and vice versa for a multitude of reasons. During droughts, water levels diminish and thus concentrations of chemicals, nutrients, and organic matter in the remaining water become highly concentrated (Stanke et al. 10). Likewise, pathogen concentrations increase so a person drinking from an already contaminated source that has greatly lessened are much more likely to become infected by that water source; much like the case with Lake Dal in Kashmir. The entire subcontinent is an increasingly water insecure region of the world and increased water insecurity has detrimental consequences on the health of citizens. Vector-borne diseases like *Dengue* and *Malaria* are also exacerbated by drought and famine as water sources used by humans intermingle with those used

by mosquitoes to reproduce (Stanke et al. 12). In a region of the world where vector-borne diseases are at high risk regardless of water issues, this is a risk that cannot be taken. The potential for water to be cut off to Pakistan as a threat has severe implications for the lives of millions of people and is increasingly more likely as tensions between India and Pakistan over Kashmir increase.

Discussion & Analysis

Current Effects

The thesis of this paper seeks to explain the way in which water use as a political tool by the Israeli and Indian governments emphasizes the difference in political status of Palestine and Kashmir, creating two distinct geopolitical dynamics that have led to unique effects on the health of the people in these territories. In defense of this claim, Israel and India are implicated in this weaponization, whether directly or indirectly. The lack of literature connecting the use of water as a weapon and public health in the literature review evidenced the need for research on the intersections of these two areas of study. However, in the case studies it becomes evident that, in both territories, the implications of water as a weapon are understood. In the case of Palestine-Israel, the implications have been ignored while in the Kashmir-India-Pakistan relationship, it is still too early to observe the direct results of water weaponization. Both case studies underscore the increasingly dire conditions likely to result from further weaponization in both territories and seeks to demonstrate the potential consequences. Therefore, when water is analyzed as a geopolitical and physical weapon to destroy public health in areas of conflict, the short and long-term consequences become apparent.

The proposal of this thesis which correlates two independent conflicts also recognizes that there are critical differences. The Palestine-Israel conflict clearly demonstrates Israeli policies, bureaucracy, and military are directly eroding Palestinian public health through weaponizing water by enforcing biased practices and laws against Palestinians. On the other hand, the Kashmir-India conflict does not directly affect Kashmir's water status. Instead, Kashmir's sovereignty and power are violated. Kashmir is a region that gatekeeps the majority of the water going into Pakistan and therefore offers a means for India to gain an upper hand over

Pakistan. While both of these crises have dramatically affected the local populations, the severity of the Palestinian conflict is more pronounced in that tens of thousands of Palestinians have been killed over decades, whereas the contemporary Kashmir conflict has not resulted in similar losses. The human cost directly relates to the two different approaches to water weaponization: one directly targets a population with whom there is conflict (Palestine-Israel) while the other indirectly targets a neighboring country (Pakistan) by subjugating a disputed territory (Kashmir).

Noting the differences in the two conflicts, the argument of this thesis becomes most compelling when highlighting their connections and analogies. Both territories are currently occupied by neighboring powers who—while the international community has continued to overwhelmingly oppose their actions—have not been swayed from their clear goals of domination. The conflicts have transformed and developed in strikingly similar ways and share the dubious honor of being the flashpoints for their respective regions of the world; regions that happen to have high levels of water scarcity and are being hit hardest by climate change as it relates to water supply. As earlier discussed in the case studies, British imperialism provides the context for understanding the historic similarities between the two territories. Finally, to further underscore the connectivity of these two crises in a contemporary context, Israel has recently begun training Indian soldiers who have served in Kashmir to apply similar tactics to Kashmiris as to those used against Palestinians (Siddiqui 2020).

Future Projections

While the current conditions in each territory are critical, the outlook grows even more bleak when considering the future ramifications from the weaponization of water. Palestine, already distressingly vulnerable, will only see further deterioration of quality of life for millions of residents as attacks continue on its barely-functioning public health system. As stated

previously, Palestinians overwhelmingly believe that Israel is trying to deprive them of basic necessities in order to force them from their land. Direct examples of water deprivation have been previously presented, demonstrating that these actions are part of Israel's overall policy towards Palestinians - treating them as second-class citizens. Globally, Israel is regarded as an innovator in green governance and technology, with policies that have been praised as some of the most comprehensive in combating climate change's effects on water and land quality. Israel's environmental policy presents a strange dichotomy: promoting innovative technologies and reforms for Israelis but denying Palestinians access to their water and resources (Agha 2019). Reports from the West Bank of Israeli settlers encroaching on Palestinian springs that are out of Israeli jurisdiction go unnoticed by the Civil Administration, the Israeli governing body in the West Bank, creating clear power imbalances that disproportionately harm Palestinian sovereignty (Berger 2019). In terms of infrastructure, water projects for Palestinians are incredibly difficult to complete. The Israeli bureaucracy has created a complicated process of licenses, permits, and access rights to curb Palestinian groundwater access in the form of the Joint Water Committee. This Committee controls the development and repair of infrastructure, granting few permits and actually demolishing any buildings or wells made without them. In the first quarter of 2019, 136 Palestinian structures were demolished by Israeli authorities with 7% of the buildings demolished being water, sanitation, and hygiene (WASH) facilities ("Demolitions in West Bank Undermine Access to Water" 2019). Legislation like this goes further, reaching to the Syrian Golan Heights in which Israel enacted a series of laws, specifically military orders, stipulating that land ownership does not mean water ownership, even if that water is found on private land (Agha 2019). Unfortunately, these actions through Israeli legislature and bureaucracy are enforced by the military and authorities, indicating that not much

will change in the future. This should be cause for great concern as the evidence indicates that water rights of Palestinians have been violated, and in the process, Palestinian public health has also been undermined.

Palestinians already have grossly inadequate infrastructure for handling disease outbreaks, as demonstrated during the current COVID-19 pandemic. Water and public health are deeply intertwined, so by limiting water availability and destroying water infrastructure, Israel has put Palestine on the brink of disaster. Coupled with current US foreign policy in the region that unapologetically favors Israel, funding to the UNRWA has been completely cut, with the very real possibility that the Gaza Strip sees an epidemic in the near future. While Israel may believe that Gaza is isolated, the reality may prove quite different should, for example, a cholera epidemic break out and, due to the ties to both, the disease quickly spreads into Israel and Egypt. The afore-referenced RAND report noted that, in recent years, disease outbreaks have done just that and spread into Israel from Palestinian territories. Clear from this example is that international policy currently does not account for the dangers of weaponizing water with respect to public health, setting an alarming precedent for other territorial conflicts around the world.

Analogous but not equivalent to Palestine, Kashmir's foreseeable future holds grim prospects as it continues to be a pawn used by India against Pakistan. Not only have Kashmiris recently lost their limited autonomy as a province, but they have largely lost basic human rights. In August 2019, expecting counter protests to their revoking of Kashmir's special status, the Indian authorities restricted basic freedoms like the freedom of movement, ability to gather in public meetings, shutting down of telecommunication services and educational institutions, and detaining thousands of people. Among the thousands detained under pretenses of being against Indian occupation, approximately 144 children were also temporarily held in custody. Under the

Jammu and Kashmir Public Safety Act of 1978, people can be detained for up to two years without trial on the basis of keeping them there to prevent potential unrest (“India: Abuses Persist in Jammu and Kashmir” 2020). In the wake of the 2020 COVID-19 pandemic, already existing violations of basic human rights have only worsened. The territory was placed into a lockdown to prevent the spread of the virus in March, forcing students and schools to shift to an online method of learning. Due to the continuing telecommunications restrictions, internet is restricted to 2G making it virtually impossible for students to attend online class and for Kashmiri doctors to access the latest news on COVID-19. So now, in the past year, not only have Kashmiris lost their rights to move about freely, but they have also lost their rights to gather and voice opinions that are against the current government. They also are not able to freely access the internet and thousands of children and students have been affected by this action (India: Abuses Persist in Jammu and Kashmir” 2020). Kashmiri infrastructure is already in a poor state and public health has been steadily on the decline. Increased hostility towards Kashmiris from India has the potential to push them into full-scale revolution and armed conflict, with 2020 reports indicating that the conflict could devolve into war between India and Pakistan if intervention and/or negotiations are not started immediately. Recent moves by Pakistan have fueled violence and tensions in Kashmir, with respect to India’s occupation (Jacob 12). Based on the current status of Kashmir, potential violence or fighting could initiate medical emergencies or health crises based on the lack of international access to the region and the current Indian government’s disfavor for the Muslim population (Jacob 5).

In diverting water sourced in Kashmir to India, India has, within its own territories, the ability to literally control Pakistan. Pakistan relies heavily on Kashmir-sourced waters to sustain its agricultural sector. Depriving Pakistan of water would decimate the agricultural industry,

potentially leading to famine and drought in large swaths of the country and putting millions of lives at risk. As noted in the case study on Kashmir, both India and Pakistan desire control over Kashmir, in large part, due to its importance in water control. In 2019, the chairman of the Pakistani government's Water and Power Development Authority accused India of using "fifth-generation warfare" by using their position upstream in Kashmir to release water into Punjab without alerting Pakistan. India rebuked these claims, citing that the water was not enough to cause flooding, though tensions between the two were high at the time of the incident due to India's revocation of Kashmir's special status a few weeks earlier (Nadeem, Sayeed, & Dasgupta 2019). In addition, Pakistan also suffers from poor water infrastructure and regularly experiences waterborne disease outbreak. Any move from India to limit Pakistan's water supply would only exacerbate these issues. Past moves by India towards Pakistani water security (the 1948 Punjabi dam incident and recent comments by prominent Indian politicians) do not reassure their neighbors or the international community that India would not participate in water warfare. On India's part, controlling the water supply to Pakistan is exceptionally advantageous because if they control the water, they control Pakistan's general health and thus gain complete power. Following a February 2019 suicide bombing in which India blamed Pakistan, the government threatened to cut back water flowing into Pakistan. As referenced in the Kashmir case study, Nitin Gadkari, India's transport minister, tweeted that India would be diverting water that normally flowed into Pakistan. His tweet was not out of the ordinary as officials in his ministry doubled down saying his tweet had been their long-standing policy. Likewise, Indian Prime Minister Narendra Modi threatened the same thing following an attack in 2016, saying, "Blood and water cannot flow together." Statements threatening to cut off Pakistan's water have been levied by Indian politicians for years, increasingly so during the Modi administration in order to

play to the popular anti-Pakistan sentiment. While historically these statements have not been taken very seriously, India's moves in Kashmir and power flexes in the region have created genuine concern. Arif Rafiq of the Middle East Institute said provocations of cutting Pakistan's water could be India attempting to "Leverage its upper riparian location to coerce Pakistan" adding that "we may be getting a glimpse of the future conflict in South Asia" (Gettleman 2019). It would be against Pakistan's best interests for it to sacrifice the health and safety of its population in a political conflict that has relatively little domestic impact. Kashmir, therefore, remains caught in the middle of this dispute and serves as an example to the rest of the world of how control of water can easily grow into a crisis that threatens the stability of nearly 1.5 billion people.

As has been previously elaborated, the implications of water weaponization on public health in both Palestine and Kashmir are well known. A simple glance at public health statistics confirms there are already public health problems in both regions of the world. To assume Israel and India are unaware of these effects would be naïve and uninformed. While neither country would ever admit to weaponizing water, specifically in order to attack public health, the facts speak for themselves. Past actions and current rhetoric indicate that both countries have every intention of continuing to escalate hostilities with regard to water, regardless of the effects on the health sector. Israel's historic control of all the major water sources and India's move to gain control of Kashmir and the headwaters to most of the rivers that feed Pakistan have all strengthened this notion. Current Israeli encroachment further into Palestinian water sources and rhetoric from the Indian government about taking full control of waters that flow through Kashmir indicate this weaponization of water is far from over. Unfortunately, neither Israel nor India seems to realize that by sowing the seeds for widespread disease in neighboring territories

through the use of water as a political tool, they are putting their own populations at risk by bringing these public health crises to their own borders.

Water scarcity is growing around the world as climate change worsens and water management practices fail to improve and protect water security. The effects on public health are already being seen in every corner of the world. Territorial conflicts are likewise flaring around the world, and due to the importance of water, it often plays a major role. The examples set by Palestine and Kashmir demonstrate two similar yet unique situations as they relate to water conflicts. The precedents set by these are dangerous and place millions of people's health and lives at risk. The virtually complete lack of literature and research pairing water weaponization with public health is of grave concern considering the obvious damage already caused and the likely future ramifications. Acknowledgement of and action from the international community concerning the use of water as a weapon and its direct effect on public health is essential to curbing the growth of this phenomenon as exemplified by the conflicts in Palestine and Kashmir.

Conclusion

Both Palestine and Kashmir face similar circumstances with respect to how their overlords, Israel and India, have used water as a weapon and how they will suffer as a result. Each also has unique challenges and characteristics. As the power of their occupying powers continue to grow, both territories face serious and seemingly unstoppable degeneration of public health and social stability. Contemporary issues like climate change and unassociated but equally critical public health crises only exacerbate the troubles within these territories. This paper has not touched on the other struggles occurring between these occupied territories and their occupiers which add a further layer of complexity to the issues surrounding water and public health. This thesis has presented numerous examples and justifications which lead to the conclusion that water has been used as a weapon against public health in Palestine and that all signs indicate Kashmir will follow suit.

Water weaponization is not a new phenomenon in either region, as explained in each of the case studies. The involvement of British imperialism in both territories cannot be overstated as this involvement has contributed to post-colonial and contemporary stances on water in both regions. British involvement in Palestine at the turn of the 20th century is integral to the shifting of the physical Palestinian waterscape and subsequent Israeli water politics. The importance of water in Palestine has been noted throughout history in order to sustain life and contemporary politics and crises reflect this need for water. British imperialism in South Asia likewise created the conditions for the current water crisis between India, Pakistan, and Kashmir. Aside from the direct division of the subcontinent into individual nations and the failure to properly place Kashmir in India or Pakistan, the importance of water for the survival of both nations was considerably increased through the projects undertaken by the British during their rule of the

subcontinent. These projects are still the basis for much of the infrastructure and policy of both India and Pakistan and likewise play a major role in Kashmir's desirability today.

Policies in both regions have resulted in tremendous failures in public health in both the occupied territories and their neighbors. Public health in Palestine has suffered in large part due to the water policies of Israel. Decades of conflict and subjugation to the Israeli state have decimated Palestinian water infrastructure and consequently harmed their public health severely. The Gaza Strip is on the brink of disaster in every sense but particularly as it relates to water and public health. The collapse of public health in Palestine would be detrimental to the lives of millions of people and appears inevitable as water continues to be taken from Palestinians.

In Kashmir, water is being used strategically as a weapon in the conflict between India and Pakistan. With the majority of Pakistan's water supply flowing from Kashmir, the possibility of complete catastrophe in the Pakistani public health sector is real. The added layer of the climate crisis puts Kashmiris in an increasingly vulnerable position as well. In the past, India has restricted water to Pakistan and in recent years has begun threatening to do so again. Cutting water to Pakistan would result in widespread famine and drought which would decimate public health in an already suffering country and directly harm hundreds of millions of people.

While some consequences of these conflicts and situations appear too far gone and, at this point, inevitable, future researchers may seek to find comprehensive solutions to the water related conflicts in Palestine and Kashmir. Researchers may also look to study the direct effects of water deprivation in both regions as it stands now and posture what future scarcity could mean for both regions while accounting for climate change and other factors. Acknowledgment of the distinctions in these two conflicts is also essential to understanding conflicts in other regions and their intricacies. There are many aspects of this topic that require quantitative analyses in order to

comprehend their severity. What is clear from this study is that the international community, acting through all means at its disposal, must urgently act to prevent, as forcefully as possible, the manipulation and control of water at the expense of millions who suffer the terrible consequences.

With the research presented and synthesized in this thesis, I hope to have provided a clear connection between these two territories and the severe implications the use of water as a weapon or political tool has on public health. I noticed a gap in the research of water weaponization specifically as it relates to public health and hope that my work has provided a basis for future research. Water is essential for life - the human body cannot survive for more than a week without it. Depriving millions of people of their life source is not only inhuman, but deadly. In emphasizing the intersection of water weaponization and public health, I hope more attention and research will be paid to studying and aiding in the current crises in both Palestine and Kashmir.

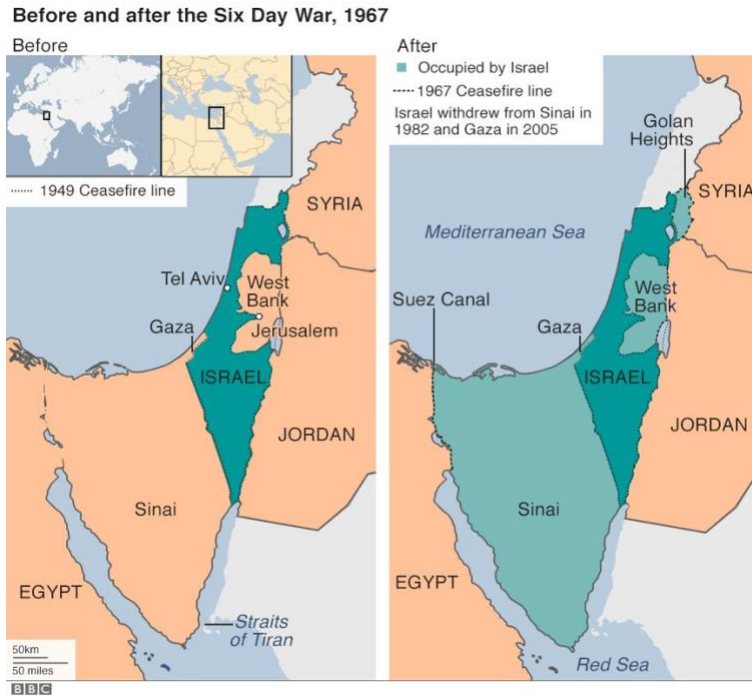
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Appendix

Figure 1



Israel and Palestine before and after Six Day War. Pre-1967 Israel did not include the Sinai Peninsula, Gaza Strip, West Bank or Golan Heights. In the immediate aftermath of the war, Israel annexed all of these territories, though, as the graphic notes, withdrew from the Sinai Peninsula in 1982 and Gaza in 2005. The West Bank and Golan Heights remain occupied to this day though. Source: <https://www.bbc.com/news/world-middle-east-39960461>

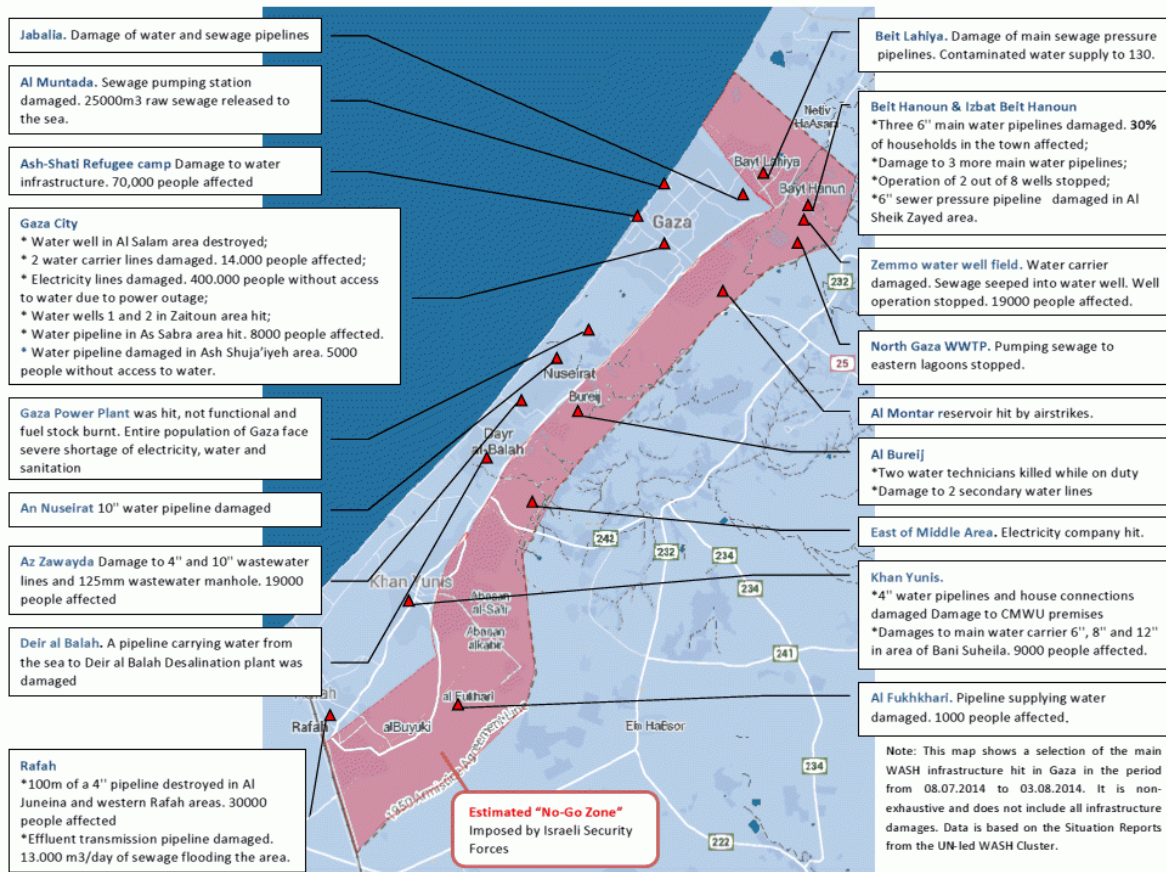
Figure 2



Shared waters of Israel and Palestine. Darker blue shapes represent where aquifers reach while lighter blue represents areas where the aquifers recharge. The arrows from the dotted lines represent the direction water flows, emphasizing water flowing into either the Jordan River/Dead Sea in the East or Mediterranean Sea in the West. Source: <https://www.internationalwaterlaw.org/blog/2014/01/08/israeli-palestinian-agreement-on-water-within-sight/>

Figure 3

Main water and sanitation infrastructure in the Gaza Strip hit during the Israeli assault (08.07.2014 to 05.08.2014)



Water infrastructure damage in Gaza during 2014 conflict alone. The red "No-Go Zone" is an area imposed by the Israeli Security Forces that is inaccessible to Palestinians. The red markers indicate areas where water infrastructure was damaged in the conflict. Source: <https://www.un.org/unispal/document/auto-insert-206040/>

Figure 4

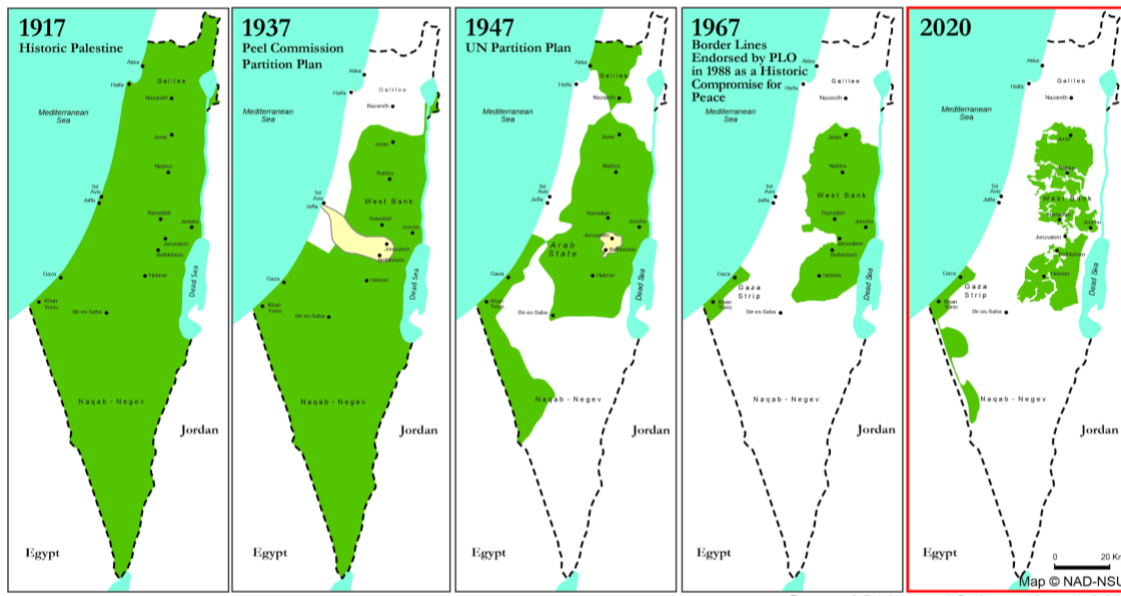
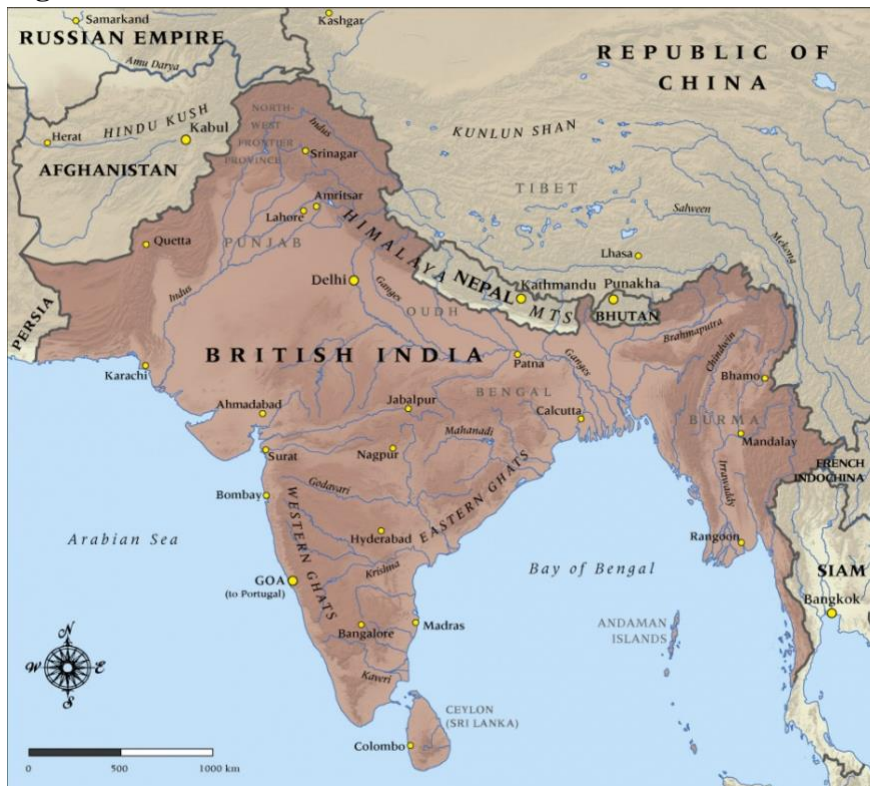
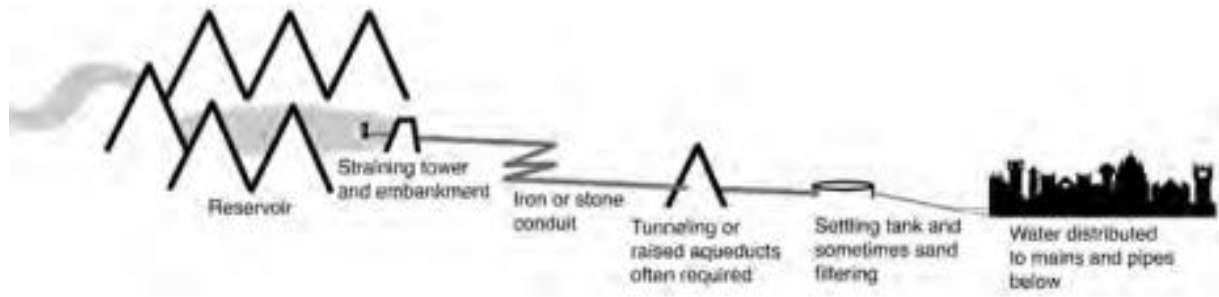


Image showing the decline of Palestine’s land. In shrinking Palestinian land access, water access is also restricted as shown by the diminishing land. Attention should be paid to the West Bank and the plan to annex the Jordan River Valley, cutting off the West Bank from access to the River. <https://www.nad.ps/en/publication-resources/maps/palestinians-historic-compromise-vs-trumps-plan>

Figure 5



Map of subcontinent before Partition. Source: <https://nzhistory.govt.nz/media/photo/map-british-india-1914>

Figure 6

Representation of the gravitation scheme as per John Broich. The graphic shows how water would be stored at higher altitudes and then brought to cities downstream. Explains a bit more why this would be controversial to local populations. Source: <https://commons.org/deposits/objects/hc:13846/datastreams/CONTENT/content>

Figure 7

Map of the subcontinent after Partition, dividing the land into Pakistan, India, and East Pakistan (now Bangladesh). Source: <https://www.bbc.com/news/world-asia-40643413>

Figure 8



Map showing the rivers divided amongst India and Pakistan in the Indus Water Treaty of 1960, as well as the rivers that originate in Kashmir. The Ravi, Beas, and Sutlej rivers (20% of the Indus basin surface waters) were given to India and the Indus, Jhelum, and Chenab rivers (80% of the Indus basin surface waters) were given to Pakistan. As visualized, all the Pakistani rivers originate in Kashmir and are now controlled by India. Source: <https://thewire.in/external-affairs/india-pakistan-indus-waters-treaty-world-bank-water-sharing>

Figure 9

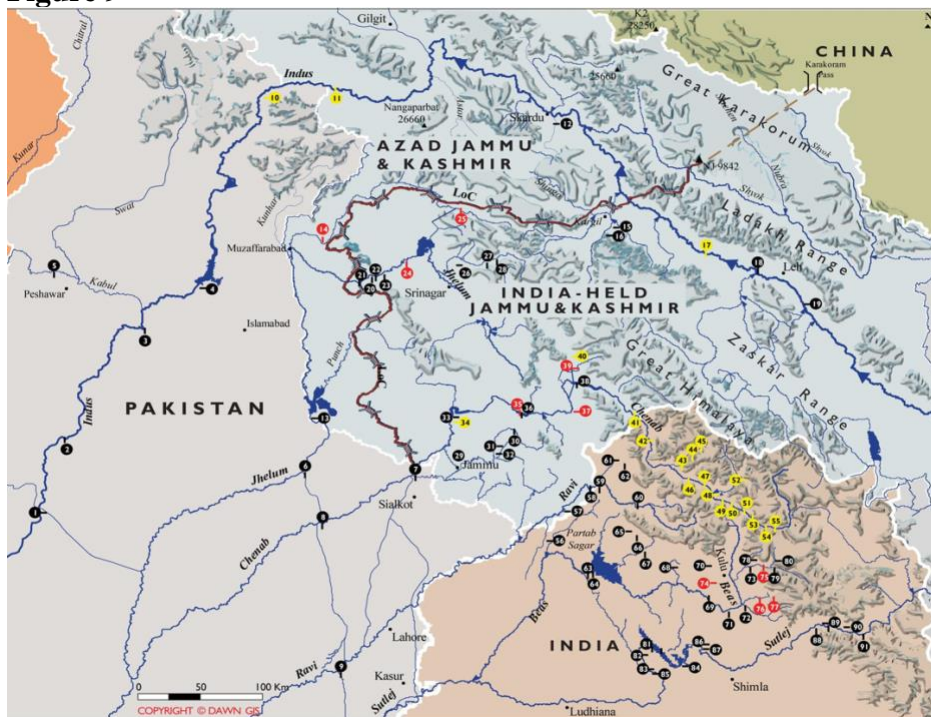


Image showing the dams and disputed dams between India and Pakistan in Kashmir. Red markers indicate disputed dam projects in India, Pakistan, and Kashmir. Attention should be paid to the density and number of projects along the rivers, denoting their importance. Source: <https://www.aboutcivil.org/impact-of-Indian-dams-in-Kashmir-on-Pakistani-rivers.html>