WORDS BETWEEN LINES: DEVELOPMENT DISCOURSE ON DAMS FOR SUSTAINABLE DEVELOPMENT AND A CLIMATE CHANGE FUTURE IN PAKISTAN

by

HENRY W. HOUSTON

A THESIS

Presented to the Department of International Studies
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Arts

June 2017

THESIS APPROVAL PAGE

Student: Henry W. Houston

Title: Words Between Lines: Development Discourse on Dams for Sustainable Development and a Climate Change Future in Pakistan

This thesis has been accepted and approved in partial fulfillment of the requirements for the Master of Arts degree in the Department of International Studies by:

Yvonne Braun	Chairperson
Anita M. Weiss	Member
Katie Meehan	Member

and

Scott L. Pratt	Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded June 2017

THESIS ABSTRACT

Henry W. Houston

Master of Arts

Department of International Studies

June 2017

Title: Words Between Lines: Development Discourse on Dams for Sustainable Development and a Climate Change Future in Pakistan

Pakistan currently experiences a deficit in its energy supply and upcoming water shortage. Lack of energy negatively impacts the country's economy, and water shortage would put stress on its agriculture, for example. Furthermore, climate change will further exacerbate these two problems. Dams are considered as a solution because of their ability to manage water resources while generating electricity. Informed by Michel Foucault's power/ knowledge, the purpose of this thesis is to understand how energy and water professionals in Pakistan view sustainable development, and if dams can be considered as sustainable development and climate change adaptive infrastructure. Drawing on interviews in Pakistan, I found that professionals supported dams through mobilizing technocratic discourses that were perceived as apolitical. Yet, I also find that these discourses are political, and I discuss the ramifications of the mobilization of technical discourses that claim to be apolitical for future energy policy decisions in Pakistan.

CURRICULUM VITAE

NAME OF AUTHOR: Henry W. Houston

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
California State University, Monterey Bay
Allan Hancock College, Santa Maria

DEGREES AWARDED:

Master of Arts, International Studies, 2017, University of Oregon
Bachelor of Arts, Humanities and Communications, 2013, California State University, Monterey Bay
Associate of Arts, English, 2010, Allan Hancock College

AREAS OF SPECIAL INTEREST:

Sustainable Development
Pakistan
Water
Dams
Climate Change

PROFESSIONAL EXPERIENCE:

Preparedness Coordinator, American Red Cross, 2017

Editor, *Springfield Times*, 2016-2017.

International Studies Department Newsletter Editor and Designer, 2016

Graduate Teaching Fellow, University of Oregon, 2014-2016

International Studies Department Newsletter Designer, 2015

Contributor, *Santa Maria Sun*, 2009-2014

GRANTS, AWARDS, AND HONORS:

Thurber Award, Department of International Studies, University of Oregon, 2016

ACKNOWLEDGMENTS

I want to open by saying I am indebted to each committee member for assisting me in this process. The insight, expertise, and patience they offered me throughout this process was instrumental for my success in completing this thesis. This thesis was able to get its feet on the ground and running thanks to the fact that Yvonne Braun always had an open office for me to brainstorm ideas. I also want to thank Anita Weiss for assisting me in coordinating my field research in Pakistan without which my experience would have been dramatically different, as well as always being a source of knowledge about Pakistan. Katie Meehan was also an instrumental committee member whose coursework inspired me to reimagine the role of water in society. Of course, a thank you is owed to the Graduate Teaching Fellows Federation for empowering each employed graduate employee. Without the dedication of this union, I would have been deeply impacted by necessary medical procedures.

My field research owes its success to the tremendous amount of hospitality I received while in Pakistan. From lunches and chai at Sustainable Development Policy Institute, valuable research advice from Dr. Imran Khalid and Dr. Abid Suleri, and the kindness from each Pakistani I encountered, who were always willing to help me in some way. I am forever grateful for each participant who offered his or her perspectives on dams. For some, this is their livelihood. And they were kind enough to not just share it with me but for me to put it under the metaphorical microscope.

Lastly, thanks to my family and friends, who were a pillar of support. They not only supported me traveling to Pakistan but also provided encouragement whenever I hit roadblocks. Rebecca was a large part of this pillar and was always willing to provide a

fresh set of eyes on drafts whenever necessary. I want to end with an overdue acknowledgment to my dad for taking me taking me to work with him when I was growing up. Who would have imagined all those days in rivers and visiting dams would lead to this.

TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

Power interruptions are barely noticed in Pakistan. It does not cause even a hiccup in daily life and operations. During my field research, I lost count of the amount of times I experienced a power outage in which Internet connection was lost, television shows were interrupted, and lights were extinguished. In the middle of a conversation, lights will flicker out and not even a pause of recognition of loss of power is mentioned. In Islamabad, the interlude between electricity from the power grid to the switch of the power generator is quick, though. It is a near immediate switch thanks to the loud and polluting use of a fossil fuel-operated generator. On average, there is a daily reliance on power generators of about 12 hours (Malik, 2011; Ullah, 2015). These diesel-fueled generators blare out 88 decibels of noise, and those that are gasoline-fueled exceed 95 decibels. It is parallel to an idling bus outside one's house, and the amount of greenhouse gas emissions generated from these generators in Pakistan equates to a thermal power plant (Malik, 2011). Besides serious hearing damage from power generators, pollutants emitted can result in public health issues, such as bronchitis (Teepu, 2011).

Power generators are especially essential for Pakistanis when temperatures swell during summer. In preparation for summer, the purchases of imported power generators rose in 2014 and 2016. In economic terms, a reliance on imported power generators from China force the country to spend a large amount of foreign exchange reserve, putting stress on the country's balance of payments (Khan, 2016). The economic effect of power generators hits the industrial sector as well. Large firms are able to rely on sufficient

generators; however, smaller and medium sized enterprises either use smaller generators or are forced to shut down their production (Anwar, 2015).

Pakistanis are not fond of their reliance on power generators and the cost of operation, but it is how the population continues their life within a country that suffers severely from a gap in supply of energy generation. Pakistanis depend on their power generators, which is essentially a Band-Aid approach for power shortages. A power gap is not unique to Pakistan. The whole region of South Asia experiences a drastic infrastructure gap—about $2.5 trillion (Andres et al., 2014). Despite a 6.7 percent annual growth rate in the region, the infrastructure gap places stress on the region but more importantly on households. 71 percent of the population has access to electricity, compared to 92 percent in East Asia. In Pakistan, according to 2010 data, only 67 percent of the country has access to electricity (Andres et al., 2014).

In the meantime, in Pakistan, power generators are a short-term solution for a country that needs at least $64 billion in investments to its electricity sector (Andres, 2014). However, the political atmosphere in Pakistan only exacerbates the ability to delivery electricity. One reason for political shortcomings is that leadership often focuses on short-term projects, which is what participants I spoke with often described. Before current Prime Minister Nawaz Sharif and his Pakistani Muslim League-Nawaz (PML-N) Party came to power in 2013, Sharif accused the former administration of being unable to solve the electricity crisis (The Economist, 2012). Sharif's promise to end power outages is what brought him to power in 2013, and power outages are a large indicator for many voters in deciding whether he gets another term in 2018. Because of this, Nawaz Sharif and his PML-N party have mobilized development narratives in support for large-scale

development projects. This is apparent with Nawaz Sharif and his inspiration from Sher Shah Suri—the Mughal-era ruler who built the Grand Turk Road—to pursue development in Pakistan (Jorgic, 2016; Sethi, 2013; Anwar, 2014).

Foreign aid is often thought of as the most realistic option to finance infrastructure projects. Indeed, Pakistan's energy projects have become dependent on foreign aid. Currently, the most notable aid package is the China-Pakistan Economic Corridor[1] (CPEC), an aid package that resulted in China promising Pakistan about $46 billion, for infrastructure (Tiezzi, 2016). CPEC will provide clean energy sources, such as solar and hydro; however, coal power plants will also accompany these energy projects. Officials at the Water and Power Development Authority (WAPDA) said Chinese development firms would invest about $15 billion over the next 15 years out of $33 billion reserved for energy generation from CPEC. This will result in an increase of carbon dioxide emissions, and Pakistan is already experiencing an annual increase of 3.9 percent (Shaikh & Tunio, 2017). Since the aid package consists of coal-fired power plants, which are largely seen as highly polluting, along with some clean energy projects, it puts forth the question of what can be considered as sustainable energy generation when the country is so dependent upon such dirty energy.

In addition to its energy deficiencies, the country also faces a water resource shortage that remains a challenge to the economy. Most of the water supply is sourced from the Indus system, a collection of six tributaries: the Indus, Chenab, Jhelum, Ravi, Beas, and Sutlej Rivers. There is additional snowmelt, glacier melt, and rainfall that average about 494 mm a year. Most of this rainfall comes from summer monsoons, yet is

[1] See Figure 5 in Chapter VI for a brief breakdown on projects that are funded by CPEC and location of the trade route through Pakistan.

uneven in patterns (Mustafa et al., 2013). The country is water stressed, and by 2030 it faces a future of being categorized as experiencing water scarcity[2] (Mustafa, 2013; Kugelman, 2009). This change will be felt in its agricultural sector, which is a large component of the country's economy on which many people have built their livelihoods and use about 90 percent of the country's water resources (Kugelman, 2009).

At the same time, Pakistan experiences other forms of water stress that will only be exacerbated as the climate change era continues. One does not have to look toward 2030 to see a gap in water supply and demand begin to burgeon in Pakistan. At 2025, the total demand is projected to be at 338 cubic meters although the country's water supply will remain at 236 cubic meters. Besides a physical shortage of water, there are also other variables that add to an overall shortage. This includes dilapidated irrigation infrastructure, agricultural practices, and an overall population growth among other factors. With this in mind, Kugelman (2009) said there is an immediate need for solving the country's supply and demand gap, which is fitting considering scarcity occurs at different levels of supply (Kamal, 2009)

Although the twin issues of a gap in the supply and demand of water resources and energy affect the country currently, infrastructure problems are not new to Pakistan. Ever since Partition, when Great Britain divided the South Asian subcontinent, Pakistan inherited an infrastructure shortage (Weiss, 2014; Jaffrelot, 2016). Despite this imbalanced boundary drawing, Pakistan and India experienced similar economic growth rates, but it did not take long for Pakistan to face stagnation (McCartney, 2011). Currently, the state and economy of Pakistan are fragile even though its position in the

[2] Water scarcity and water shortages use a designation given to a country with annual water availability below 1,000 m^3. However, Kamal (2009) views water shortages as an absolute term and scarcity as a relative concept.

region shows promise for economic growth. Although there is promise, there are considerable barriers: lack of reliable electricity that stunts economic growth, natural disasters, and climate change vulnerability that appear likely to return on a regular basis in the South Asian subcontinent.

To solve the issues of energy deficiencies and the increased threat of climate change-induced natural disasters, dams have emerged as a possible solution to both of Pakistan's issues (Ebrahim, 2014). Water and Power Development Authority (WAPDA) is Pakistan's public utility that owns about 54 percent of the country's total electrical power generation capacity. In 2001, WAPDA announced its strategy, titled Vision 2025, to build 23 dams over three phases to prepare for an increase of the population by 2025 (Mirza, et al., 2007). WAPDA's plan has not had an update, but in 2013, Prime Minister Nawaz Sharif, in the government's *Pakistan Vision 2025* report, provided a list of goals that included increasing energy in the national grid. Out of a list of 10 goals, hydropower is a large part of an energy generation resource mix, including a call to complete the large-scale projects of Diamer-Bhasha and Dasu dams. The two dams are projected to generate a potential of 9,500 megawatts, which is more than half of the country's current energy demand (Ministry of Planning, Development & Reform, 2013). In 2015, former United States President Barack Obama and Pakistani Prime Minister Nawaz Sharif met in the White House, and dams were discussed as a solution for strengthening Pakistan's electric grid. The two leaders agreed to cooperate to allow foreign direct investment, and local investment, to fund construction of the dams. President Obama also expressed explicit support for Pakistan to build the two large-scale dams, Diamer-Bhasha and Dasu dams (Obama White House, 2015).

Dams are perceived as an infrastructural solution that can provide relatively clean energy production to transmit electricity to electrical grids, as well as provide flood management services (WCD, 2000). This debate emerges time after time from civil society organizations, governmental bureaucracies, and foreign agencies. However, the quality of these debates are often generalized by critics who believe these professionals echo the views of decision makers, therefore perpetuating hegemonic rule of certain knowledge in Pakistan (Ahmed & Rashid, 2010). This thesis project will examine developmental discourses among water and energy professionals in Pakistan in regards to climate change and possible clean energy resources and also nuance an otherwise generalized perspectives held by professionals in the country. Therefore, I focused my research on the question of how water and energy policy experts in Pakistan perceive dams as sustainable energy generation and climate change adaptation.

A context to Pakistan

Where Quaid-e-azam[3] Muhammad Ali Jinnah, founder and first governor general of Pakistan, stood in Lahore in 1947 to announce the birth of a nation-state for Muslims living in South Asia now stands a landmark, Minar-e-Pakistan, across from the historical cultural presence of the Lahore Fort. Before this historical proclamation, years of negotiations of how to organize a nation-state faltered and that is when Jinnah put forth the idea there were two nations in India: Hindu and Islam. The result in the Lahore Resolution in 1940 codified that areas in the Indian northwest and eastern areas, which were Muslim majority, should be autonomous independent states. At the same time, this

[3] Urdu for "Father of the nation"

should not be seen as a call for Pakistan because there was no mention of a partition. Newspapers instead took it as an opportunity to frame the resolution as a call for independence, though Muslim politicians did not take the idea of partition seriously (Weiss, 2014).

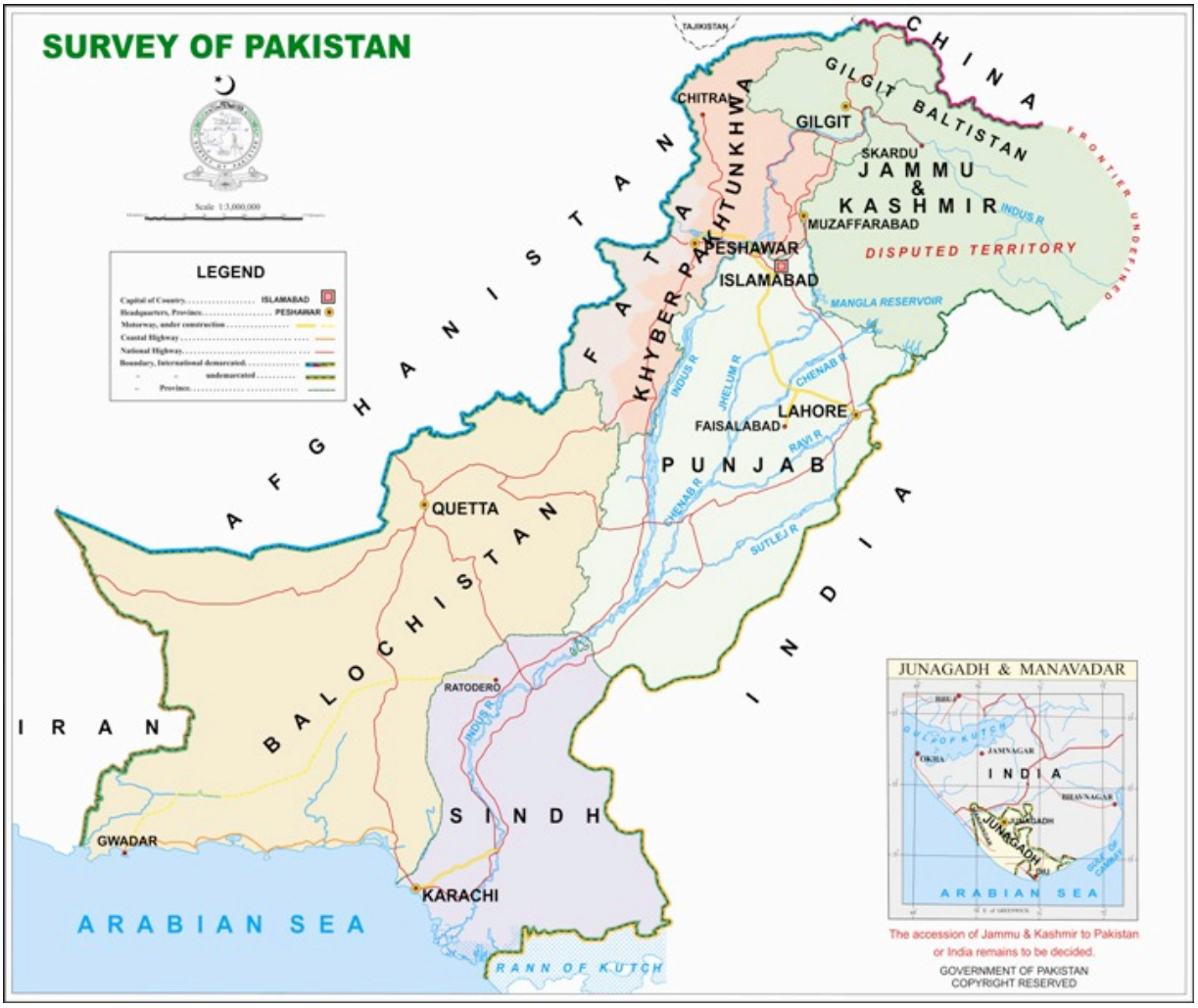

Figure 1: Administrative map of Pakistan (Government of Pakistan, 2014)

The Muslim League pressured Jinnah to establish a homeland for Muslims who would not be persecuted by a Hindu majority population in India. The result was the

founding of Pakistan[4], which, in Urdu, translates to "land of the pure." Partitioning India and Pakistan was the result of the Muslim League who felt unsure about their existence under a Hindu Congress (Weiss, 2014; Jaffrelot, 2015). Jinnah aimed for a country that would have an active civil society that would be dedicated to the well-being of the people and was not influenced by religious and ethnic divides (Weiss, 2014).

Uneasiness was apparent in the early founding of Pakistan when, after the first war with India in 1948, many Pakistanis felt the need to have a strong military for existential security (Weiss, 2014). Since 1948, the military grew to become a consequential figure within Pakistan, and power has not left its grip. Siddiqa (2007) views the military and government's relationship as a "milbus" (p. 7). The milbus in Pakistan grew alongside the military coming into the political front. Whereas Indian political leadership created a political class and civil bureaucracy, Pakistani milbus crafted an economic command of the state and within the country. The military created a system wherein senior officers are able to access state resources and profit off this access. It did not take long for the military to gain a foothold within the state after its war with India. Immediately after Jinnah died in 1948, there were three aspects of conflict within the state: within different political groups for state control, civil and military bureaucracy against the political classes, and military and other civilian actors. Political party clashing led to the stagnation of adopting a constitution since political parties became factionalized within the country. Since there was chaos underway in the infancy of the state, other civil bureaucrats joined forces with the armed forces. Ghulam Mohammed, governor-general during the 1950s, believed the military had the ability to pacify political

[4] The name of Pakistan also serves as an acronym to represent the regions that unified to form the country: Punjab, Afghania, Kashmir, Sindh, Tan (the final portion of Balochistan) (Weiss, 2014).

infighting and keep "raucous politicians at bay" (Siddiqa, 2007, p. 70). Because of the greater trust held in the Army over the civilian prime ministers, Governor-General Ghulam Mohammed asked General Ayub Khan to take over Prime Minister Mohammad Ali Borga's position. This then led to governor-general Iskandar Mirza to take over (Siddiqa, 2007; Jaffrelot, 2015).

The Ayub-Mirza alliance was an attempt by the civil bureaucracy to have a "superordinate-subordinate" relationship (Siddiqa, 2007, p. 70). The armed forces through Ayub Khan gained more power and authority in the state, but Mirza grew suspicious and proclaimed martial law in 1958; however, this was in vain since Ayub Khan brought the military to the forefront of the state during a counter-coup within a month of Iskander Mirza's martial law. Both Ayub Khan in 1958 and General Yahya Khan in 1969 came to power through coup d'états and not through election (as did Zia ul-Haq in 1977 and Pervez Musharraf in 1999). The military gained more prominence through quickly grabbing control of national defense, which included foreign affairs. In addition, the military was able to secure backing from the United States. This was in part because the United States saw a strategic advantage in fighting the Soviet Union (Siddiqa, 2007; Nawaz, 2008). Military expenditures would come to total about 68 percent of the national budget (Siddiqa, 2007). The military subsided during Zulfiqar al Bhutto's rule during the 1970s, but when he attempted to use the military for his absolute authority, the military came back to power (Siddiqa, 2007). To this day, the military is suspected of developing former international cricket superstar Imran Khan, who is Prime Minister Nawaz Sharif's rival, into a politician (Jaffrelot, 2015).

The presence of the military has not been limited to power in political leadership. Anatol Lieven (2010) sees a presence of political power in retired military officers as well due to a higher standard of education and experience in the efficient organization. Some members of the military have shown that the army views itself as not just morally superior, but also more modern and better-educated than the political class (Lieven, 2007). Ayub Khan injected the state with active and retired members of the military. Military members were trusted with managing military boards (Siddiqa, 2007). Lieven (2007) attributes this to the fact that there was a lack of a well-tended middle class citizenry. The military, though, has been seen as an institution that has brought mobility to people as well. Over the years, Siddiqa (2007) said the military provided social mobility to a wide variety of people within Pakistan, due to the institution's activity in the economic and political spheres. The political class is aware of this. During the 1999 military coup, politicians did not contest martial law. In addition, both Lieven (2010) and Siddiqa (2007) found that the military is an arbitrator in terms of political conflicts. Whereas political leaders may not question the role of the military, members of the military view politicians as inherently inept because politicians have not received a proper education and discipline in governance and to manage the state, compared to the military. This is apparent with the former head of Musharraf's National Reconstruction Bureau. He experienced a contrast in parliamentary upbringing in Germany where every member received institutional training and education. Because of this, the military is perceived as overall more qualified and more educated than a politician (Siddiqa, 2007).

It is important to note the demographic that has historically made up institutions such as Pakistan's military and bureaucracy. Although some Punjabi Muslims were

unsure about the idea of Pakistan, the demographic dominated the country from its inception. Punjabis were only about a quarter of the population, according to the 1951 census, but they held about 80 percent of the military's and government administration posts (Jaffrelot, 2015). Muhajirs, those who migrated from India during Partition, came to dominate the country economically. The power and influence of Muhajirs (economically) and Punjabis (politically and somewhat culturally) became problematic for other ethnic groups in Pakistan, which periodically rose up to resist this domination through ethnic nationalism. This included Sindhi nationalism that emerged and assisted in bringing down the military-led government of Ayub Khan in 1968, Bengali resistance to West Pakistan's domination and the issue of self-determination in Balochistan (Jaffrelot, 2015).

Another factor in influencing policy within Pakistan is the meager number of local professionals who engage in substantive applied research on the environment, which places Pakistan essentially at the mercy of the recommendations of international institutions.[5] This is the result of a government whose policymaking is confined behind closed doors due to its "strong military-administrative apparatus" (Ahmad & Rashid, 2011, p. 89). Additionally, aid agencies have filled the space local think tanks usually inhabit. Donors define projects, policies and programs based on their lending needs. Then consultants, who are local though directed by international organizations, develop the projects. In the end, the government accepts these projects due to diplomatic goodwill pressures (Rashid, 2011). This is exacerbated by the fact that many of the highly qualified candidates for the civil bureaucracy opt out for local government service and instead

[5] SDPI is a notable exception and is a globally ranked think tank on sustainable development.

work for international institutions—such as the World Bank, Asian Development Bank, USAID, and the United Nations Development Program (Shafqat, 2013).

Politicians within Pakistan focus on gaining political legitimacy, a frequent concern pursued through attempting to essentially buy the poor. For example, politicians offer cash transfers to the poor rather than building the infrastructure needed to advance education and other gauges of progress. This process is, however, temporary. Numerous cash transfer programs are viewed as politically motivated for votes and parties both in power and in the opposition recognize this, so there is a welfare race via cash transfers. This results in bleeding out the state's coffers, though. Pakistan really needs investment in social policies that are not political or development safety nets (Khattak, 2010).

While Pakistan has relied heavily on aid from international financial institutions, domestic revenue should also be examined to see the state's role in creating infrastructure. Rather than invest in programs such as cash transfers that are concentrated on advantaging a political party, McCartney (2011) said the government's role should be in allocating surpluses toward economic development that may not be undertaken by the private sector, which includes increasing the power supply of a country. The role of the state in constructing developmental infrastructure is examined in different episodes of growth. State-created credit institutions played a role in providing the finances necessary for established firms to invest in long-gestation projects—such as dams. Although the return of profit was substantially less than with private firms—about half—the fact is that the private sector was avoiding these industries. In times where the state was not active in mobilizing and allocating resources through its apparatus, economic growth rates fell to stagnation (McCartney, 2011).

Lack of local research data, the power of the military, and the dependence on temporary welfare programs converge to create developmental insecurity in the country and state. Crises that hit Pakistan often come as fiscal, fuel/ power, food, the war on terror, and functional democracy—and now fragility, due to externalities from climate change. Human development insecurities surface due to the state's expenditures on debt repayment, defense, corruption, and daily operation costs. Constable (2011) observed the detachment the middle class has felt, as they feel the economy is not able to support them. University-educated Pakistanis find their place in the local and domestic economy limited. However, building senseless infrastructure also does not solve the issue, which can be illustrated through the existence of ghost schools in which there are no teachers present (Constable, 2011). Education is seen as a human right that needs investment to eradicate poverty and can lead to populating ghost schools with personnel when lack of employees is a problem. Khattak (2010) argues that for Pakistan to move forward, the state needs to end its policies of cash transfers that decrease other investments, such as in the health and education sectors. Politicians rely upon the coffers more to sway the poor within the country, which, from a state perspective, has stunted the economy substantially (Khan, 2011; McCartney, 2011). The country has not progressed from these as they only serve a small margin of the population (Khattak, 2013). Ahmad and Rashid (2015) claim that these past policies have historically weakened civil society in Pakistan that permits shortsighted politicians and the military's grip on the government and policymaking process. An investment in education and structural institutions can also provide Pakistan with the sovereignty in knowledge needed to step away from the external policy research that dictates development models (Ahmad & Rashid, 2015).

Given the strong presence of the military and the dominant top-down decisions made from national levels, social commentary in Pakistan often criticizes the role that civil society professional organizations have had in checking the role of an at times-authoritarian government (Ahmed, 2010). Following the arguments of Alexis de Tocqueville regarding the importance of free associations—or civil society—governments are tempted to grab more power whenever the individual attitude of citizenry weakens, which is why Ahmed and Rashid (2010) argue a weak civil society is a problematic aspect of policy making in Pakistan. Despite the issues that arise in regards to the performance of civil society organizations, theoretically there is importance in their existence. In fact, Weiss (1999) makes the argument that when women organize in groups to advance a political purpose, significant advancements in the presence of a civil society appear.

The presence of nongovernmental organizations (NGO) and a general existence of a civil society with a mission of development and advocacy surfaced during the mid-1980s. NGOs emerged as a reaction to the failure of a top-down, centralized approach and instead called for a bottom-up approach to development. Historically, civil society in Pakistan has helped in agenda setting issues such as entitlements of vulnerable populations. Because of this, Khan (2001) argues that civil society and organizations within this realm are creating a space for democratizing a state that has otherwise been dominated by authoritative forces. Empowering women through civil society groups is also perceived as an action that can work toward not only freeing the country of Pakistanis stuck in poverty, but also toward a more democratic country (Weiss, 1999; 2001).

Pakistan's development story was meant to become an example for the world, according to modernization theorists. In order to make Pakistan this example, large sums of foreign capital would be used to lessen the gap between the poor and rich in the country. The Harvard Advisory Group utilized their influence in Pakistan during the 1950s and 1960s to argue that, with loans or joint ventures, economic growth would boom. During this time, from 1958 to 1968, Pakistan experienced its Golden Age of Development (Weiss, 2014). However, this development boom had the caveat that it benefited the industrial elite, known as the "Twenty-Two Families" (Weiss, 2014, p. 179; McCartney, 2011). Developmental discourses during this period were focused on the importance of infrastructure planning and long-term development plans. Long-term planning included engineering firms leading extensive studies for countrywide electrical grids in East and West Pakistan. Nevertheless, Pakistan's economy growth remained dependent on foreign advisors and aid (Anwar, 2014).

Foreign expertise and investment played an important role in Pakistan's development history. For its future, climate change will transform the country, which is a bigger threat than terrorism (Nazar, 2016). This change is apparent in its cotton value chain, an industry that is experiencing water resource change. The cotton value chain is the largest source of export earnings for the country and supports livelihoods of about 42 percent of the labor force (Government of Pakistan, 2016). Climate change is a factor that is threatening this industry. Cotton production in Punjab and Sindh regions is found along the Indus River, which is susceptible to flooding: nearly 21 percent of the cotton cultivation area was destroyed during the 2010 flood. Whereas floods could wipe away cultivation areas, a change in rainfall will be detrimental to growing, and salinization is

already destroying the crops. Rising temperatures will also jeopardize crop productivity (Batool & Saeed, 2016). Pakistan's parliament recently passed a climate change bill that establishes a framework Climate Change Council and Climate Change Authority to move the country forward to adapt to climate change and set a bar on greenhouse emissions. The bill establishes the Climate Change Council, which the Pakistan Prime Minister will serve as a chairperson, along with provincial chief ministers, and other stakeholders. The council is empowered through the legislature to develop policies to meet climate change obligations, such as the Paris Agreement. This bill comes after the Nawaz Sharif government stripped the Ministry of Climate Change by more than 60 percent in 2013 (Khan, 2017).

Research Methodology

The aim of my research was to understand how water and energy professionals view the role of dams as sustainable energy and climate change-adaptive infrastructure. Ahmed and Rashid (2010) argue that professionals frequently base decisions on knowledge sourced from multilateral donors, such as the World Bank. Therefore, the purpose of this thesis is to nuance professionals' perspectives on dams and development.

My research, which was conducted in Pakistan from January to March 2016, allowed me an opportunity to understand how professionals view dams—especially during the sustainable development era. This thesis is built on two forms of research: secondary research and qualitative field research, which includes interviews. I read and analyzed literature about Pakistan, its water and energy policies, and reports from governmental and international nongovernmental organizations. My argument is further

supported by the independent research I conducted while in Islamabad and Lahore, Pakistan, as well as my internship at a top ranked policy think tank, the Sustainable Development Policy Institute (SDPI).

Since SDPI is located in Islamabad, I primarily conducted my interviews in this city. The capital of Pakistan, Islamabad, is the most diverse metropolis in the country and has the largest expatriate and foreigner population, so the majority of Pakistan's diplomatic and governmental agencies are located in the city (Capital Development Authority, 2016). Because of the diversity of the city, as well as its role as a detached city—ideal for developmental planning—Islamabad provided professionals who would be able to participate in the study (Hull, 2012). Pakistan's original capital was located in Karachi, a port city in the south, but a new capital city was founded and named Islamabad. A European firm led by Constantinos Doxiadis designed a master plan of Islamabad. He believed that, in order to control the growth of the city, the capital should include all social and income groups. However, President Ayub Khan wanted to isolate bureaucratic agencies from the rest of the country as a means to control the country (Hull, 2012). By focusing my research in Islamabad, I therefore had an opportunity to speak with professionals located in this capital who had some experience with government officials.

While conducting field research, I followed purposive sampling, specifically stakeholder sampling. Since I was immersing myself in the field and looking to interview prominent policy experts about water and energy issues in Pakistan, stakeholder methodology was relevant. Palys (2008) summarizes the use of this methodology as one relevant for identifying major stakeholders. With stakeholder sampling, interviews are

arranged with those who are major stakeholders involved with, in this case, designing or providing input on development projects (Palys, 2008). I relied upon stakeholder sampling methodology as an intern at SDPI. Given SDPI's prestige in policy analysis, its staff of researchers was well aware of experts I should interview. In order to decide which participants I would interview, I attempted to maintain a consistent characteristic within them. This resulted in speaking with primarily water and energy professionals who have had experience working with energy and water policies. I also chose two participants—a journalist and an academic—who have had experience covering water and energy policies. Besides using the professional networks of researchers at SDPI, I researched professional organizations by examining their mission statements and research operations.

I found that participants were easygoing in speaking about their opinions and beliefs regarding dams. Although I used a hand-held audio recorder whenever possible, I continued to rely upon vigorous note taking. I used a hand held recorder in all but two interviews—one due to the participant's reluctance and the other due to audio issues where the interview was conducted.

In Pakistan, I held formal, audiotaped interviews with eight Pakistani professionals. Although there was a spectrum of professionals, and education, and experience differences among them, I asked the same questions, following a semi-structured format. All participants spoke openly and freely about their opinions and their professional backgrounds in natural resource planning, water management, and sustainable development in terms of dam planning. Although each participant's interview

was in some way unique, which is the nature of semi-structured interviews, I continued to work off a set of questions.

In addition to the formal semi-structured interviews, I conducted informal interviews at local conferences I attended and during my internship at the SDPI while in Pakistan. While in Islamabad, I attended a conference organized by the International Red Cross and Red Crescent Federation in collaboration with a local nongovernmental organization that focused on sustainable issues, LEAD Pakistan. In addition, I traveled to Lahore to attend a water management workshop at the Lahore University of Management Sciences (LUMS), titled "Spring School on Water Systems, Science and Practice." This workshop offered an opportunity to speak with students, working professionals, and included a tour of the Nestlé Water Treatment facility outside of the city to understand methods of coping with climate change and water management.

Upon returning from Pakistan, I relied upon grounded theory to analyze my field notes, interviews, and other secondary sources I obtained. In order to analyze my data, I coded for themes. To do this, I examined transcripts from the audiotaped interviews—except the one I had with a journalist for identity protection—for themes that emerged. I began with an initial line-by-line coding that allowed me to see themes develop into larger, broader themes, such as sustainable development. Charmaz (2006) argues that beginning with an initial line-by-line coding process removes the researcher from the research, and it provides a fresh perspective for the researcher. After completing line-by-line coding, I was then able to perceive themes within interviews. Berg (1995) views themes for analysis as apparent in documents, news reports, and interviews, which makes themes a powerful unit for analysis. Throughout this analysis process, I also adhered to

grounded theory in guiding the qualitative analysis process. The benefit of following grounded theory is that it allowed me to suspend myself from the field data and the analysis stage. Essentially, with grounded theory, I avoided distorting the data into theory (Glaser & Strauss, 1967). Furthermore, grounded theory facilitates ideas to emerge, rather than relying on preconceived theories (Charmaz, 2006).

Coding also shapes the analytic frame that is used to build an analysis and provides a method of analysis through coding, which contains different phases. In the first phase, initial coding, there are a series of questions that the researcher asks: what does the data suggest and from whom is this point of view. In this stage, I remained close to the data to ensure the data is not distorted. Focused coding is the second major phase. After I had constructed major directions in my analysis, I relied upon memo writing as an intermediary between data collection and draft writing, which Charmaz (2006) argues is a crucial moment in the research process since it allows for increasing abstraction.

Limitations of this study

Despite the research design that I followed and the carefulness of grounded theory, there were some limitations that emerged during the research process. Due to security constraints in Pakistan because of my United States citizenship, I was limited in where I was able to conduct research and collect data. Although limited to Islamabad and LUMS in Lahore, this limitation was minimized since, as one participant remarked, Pakistanis often travel and relocate from other cities in the country to these two major cities for research presentations, conferences, and job promotions. Islamabad, therefore, is a conglomeration of many perspectives from diverse ethnicities and nationalities.

Hull (2012) recounts a joke about the centralization of Islamabad. The theory of Islamabad's founding was to have a detached capital for the sake of planning and, as a result, it has created a further distance for others in accessing the capital. Because of the perceived detachment of the local Pakistani experience, it seems that this has created a limitation. However, because of the cosmopolitanism of Islamabad, it allowed me to access varied professionals as a cultural outsider of Pakistan.

Since I am not proficient in Urdu, which is considered the national language, I conducted interviews in English. I was able to communicate easily with professionals since most of them had been educated abroad in either Western European countries or in North America.

As a United States citizen, gaining a visa into Pakistan limited my time in the country for research even further. Because my visa application had been lost at the Washington D.C. Pakistan Consulate Office, my trip had been shortened by two weeks. In addition to the limitations brought on by a shortened stay in the country, my status as an American prevented me from visiting dam locations because they are categorized as high security locations; I could not visit them without prior permission from governmental officials.

Lastly, I have decided to use pseudonyms for the participants in my research. Although some of the professionals did not ask for anonymity—because their name, they said, was what gave their perspectives its weight—providing pseudonyms provides an extra layer of protection to mitigate any unforeseen consequences from their statements.

Summary of chapters

In Chapter II, I provide a literature review that locates my argument and the literature written on the role of knowledge in decision-making. Through this navigation of existing literature on development, sustainable development, varying perspectives on water, and the role of knowledge in society, I plan to contribute to the gap in the literature on how technical knowledge held by water and energy professionals in Pakistan is mobilized to support dams as sustainable and climate change-adaptive infrastructure.

In Chapter III, I turn to secondary research to argue that engineering and technocratic knowledge has had a historically privileged role within Pakistan. This chapter does not strive to be an exhaustive examination of the role of technocratic knowledge in Pakistan. Nevertheless, it does intend to provide a context to how technocratic knowledge was mobilized to support supposed apolitical development via dams. The first moment is the Indus Water Treaty and the role that Tennessee Valley Authority founder David Lilienthal had in spearheading the negotiation between the India and Pakistan to avoid another war between the countries. Secondly, the reasoning for President Ayub Khan's approval of the Indus Water Treaty was premised on apolitical development. The acceptance of the Indus Water Treaty led to a report cataloging optimal sites for hydropower infrastructure. This report was mentioned to me during an interview with a longtime engineer with the Government of Pakistan, who recommended that I read a report written by Pieter Lieftinck for the World Bank. The role of WAPDA and the Planning Commission continues the tradition of relying upon technical knowledge for development.

In Chapter IV, I turn my focus to primary data from field research I conducted in Islamabad and Lahore. In this chapter, I present primary data to support the argument that professionals in Pakistan often rely upon technocratic, engineering perspectives in supporting dams as infrastructure for sustainable development and climate change adaption. I organized perspectives from the interviews into thematic clusters that support this argument.

In Chapter V, I examine the case of two dams in Pakistan, Kalabagh and Diamer-Bhasha. Although they are both dams, there are different views held about each dam. Kalabagh Dam, is highly controversial and participants brought it up, though it was not a part of my interview question list. The Diamer-Bhasha Dam is located in the northern region of the country. This dam project was never brought up during conversations, except for an informal discussion with a graduate student from Karakoram International University in the northern province of Pakistan, Gilgit-Baltistan. By looking at these two dams, it provides a step toward a discussion of overall themes that emerged from my research.

The final chapter, Chapter VI, serves as a conclusion and briefly discusses the future of Pakistan and with its neighbors, India and China. In addition, I discuss ideas for future research that would serve as another step toward understanding the role of technical knowledge in implementing dams as development in Pakistan.

CHAPTER II

LITERATURE REVIEW

"The Pakistan Paradox," according to Jaffrelot (2015), has three types of tensions: a unitary nation-state and strong ethnic identity found in the provinces, the political tension of authoritarian political culture and democratic ideals, and a competing notion of Islam in how it should be present in the nation-state. Continuing with Jaffrelot's Pakistan Paradox, I draw on literature by Nader (1996), Ferguson (1990), and Goldman (2001, 2006) to consider how knowledge is used in mobilizing support for dams and development in Pakistan under a sustainable development and climate change context. This exploration engages with two vectors of Jaffrelot's "Pakistan Paradox," namely the political tension and unitary nation-state and strong ethnic identity. Some professionals in Pakistan I interviewed justified dams as sustainable and as climate change-adaptive infrastructure through a technocratic lens, while others who critiqued the role of dams said supporters apply a technical justification. These technocratic arguments for dams as development often work with an assumption that it is an argument stripped of politics and other partisan rhetoric.

This literature review is split into separate sections but still threads together relevant research conducted on dams and development and the role of knowledge. Within the first section, I present literature that discusses research on global development studies, which leads to a discussion of research on Pakistan's waterways. In the second section, I discuss literature on how knowledge operates in modern society and how it affects development.

Arrested development

Development continues to play a large role in molding developing nation-states into a specific model. In fact, development has been the vessel in which foreign technical knowledge influences developing countries. Whether it is for installing mosquito nets or providing expertise for water resources development, technical expertise has historically played an important role in development planning.

McMichael (2012) adds that colonialism forever changed non-European cultures, but more along the lines of how international development operates. Immediately after World War II, when independent states were separating from colonial relationships with Western nation-states, the current notion of development also emerged (McMichael, 2012; O'Brien & Williams, 2010; Rist, 2008). Easterly (2012) points to early versions of the current development model and agendas established through international organizations. For example the Rockefeller Foundation attempted to introduce technocratic-led development in China during the 1920s that would transcend through authoritarianism because development ideals and values were apolitical (Easterly, 2013).

However, the infrastructure goals of the Marshall Plan would serve as one of the origin points of foreign development programs, at times one-sided (Easterly, 2013; Rist, 2008; McMichael, 2012; Escobar, 1995). The Marshall Plan was United States bilateral development for European reconstruction to stabilize and to manage the spread of communism (McMichael, 2012). Aside from securing the region for the interest of capitalism, Rist (2008) argues the Marshall Plan is evidence that the Global North is more invested in itself rather than the Global South.

One year after the declaration of the Marshall Plan, United States President Harry Truman delivered his Inaugural Address in 1949. He went on to deliver one of the most memorable speeches in terms of global development. In his speech, Truman not only divided a global population into developed and underdeveloped categories but also promised to ensure that all of the world can attain freedom and dignity (McMichael, 2012; Rist, 2008; Escobar, 1995). Rist (2008) argued the Point Four Program announcement is a "minor masterpiece" that stated development as a direction toward a final state (p. 69). Furthermore, Truman's Inaugural Address marked a moment in which the Global North-South relationship departed from a colonizer-colonized relationship toward a developed-underdeveloped that followed the recent Universal Declaration of Human Rights (Rist, 2008). For Escobar (1995), the Truman Doctrine intended to urge the rest of the world to replicate the high levels of industrialization and urbanization that characterized post-World War II societies. This included exporting to developing countries capital, science, and technology (Escobar, 1995).

McMichael (2012) deconstructed the methods underdeveloped nation-states underwent for development, which he refers to as the Development Project; it became the response to the era of decolonization. McMichael (2012) breaks down the Development Project phenomenon with the first portion consisting of the nation-state. The nation-state, he argued, was the framework of the project. Nation-states were territorially defined political systems based on nineteenth-century Europe. Borders of nation-states within the African continent are seen as a problematic product of the Development Project (O'Brien & Cox, 2010; McMichael, 2012).

The most important aspect of the development project, McMichael (2012) argued, was that planners, government elites, and citizens would hold the belief that development was destiny. In fact, it was a major tenet of both Cold War blocs. Nation-states were encouraged to promote national development policies that would shrink the agriculture sector meanwhile growing manufacturing and service sector. Furthermore, industrial growth would provide technological advancement in agriculture, therefore lessening the need for agriculture labor (McMichael, 2012).

The Truman Doctrine had good intentions of ensuring that countries around the world would be able to enjoy the values of human life that emerged from the Renaissance Era, which is what the United States was modeled after. But Escobar (1995) contends the Third World has instead experienced underdevelopment, impoverishment, and exploitation. The development dream "progressively turned into a nightmare" since development began in the 1940s (Escobar, 1995, p. 5). This is further critiqued as Nandy (1997) argues that modern colonialism through development prevailed not through military or technological advantage but through a creation of a secular hierarchy. This hierarchy resulted in a creation of polarities throughout the global community. The polarities are indicative through relationships between the scientific versus the non-scientific, the expert and the non-expert, as well as the modern and the primitive.

Categorization of knowledge was apparent in Lesotho, a landlocked country within South Africa. Ferguson discussed how a World Bank report mobilized a different form of discourse to categorize Lesotho. Development discourse used by the World Bank painted Lesotho as a country with a blank slate due to government inaction. Lesotho was constructed by the World Bank to be a country that was not yet incorporated into the

modern world and reliant on agriculture that required improvements. Moreover, if development did not materialize, it was the fault of the government, not those of the planners. This categorization of Lesotho had a real world effect wherein livelihoods were lost (Ferguson, 1994; Braun, 2011).

Problems associated with development also stem from how aid is distributed to countries categorized as less developed. In the case of Lesotho, multi-lateral aid agencies, such as the World Bank, have distributed large sums of money for programs to construct infrastructure to advance the country into a modern nation-state (Ferguson, 1990; Braun, 2010). Not only does this aid relationship assume the nation-state relationship necessary for the Development Project but also assumes development operates through the state regardless of politics (Ferguson, 1990; McMichael, 2012; O'Brien & Williams, 2010; Carothers & deGramont, 2013).

Aid and development

To finance the Development Project, massive amounts of money have been distributed from more developed nation-states to lesser-developed nation-states. Western nation-states previously developed their colonial territories for the sake of exploiting raw materials in those territories. During the post-colonial era, developmental aid has provided a larger role in supporting the Development Project. Official development assistance (ODA) intends to promote economic development and welfare and is provided through a grant, loan, or sometimes appears as both. Technical assistance is also included with ODA. Infrastructure projects were once the model of the aid industry and are still perceived as an approach to engage with an economy that is growing. Typically, these

projects are large-scale investments on which the donor has calculated rates on return (de Haan, 2014).

Most aid flows through bilateral or multilateral institutions. Some bilateral ODA flows from national governments to both nongovernmental organizations that operate in aid-receiving nation-states, multilateral organizations, or to the government of an aid-receiving nation-state. An issue with bilateral aid is that it follows the foreign policy motives of the donor nation-state and is often tied aid, which means money must be spent on goods and services from the donor. Aid from multilateral ODA has its own problematic dimensions as well. Aid from these organizations stem from Bretton Woods institutions—International Monetary Fund (IMF) and World Bank—or other groups of nation-states—such as the Asian Development Bank or United Nations (de Haan, 2014). The World Bank and the IMF are frequently criticized for their roles in lending large sums of development loans in exchange for neoliberal restructuring of aid-receiving nation-states, referred to as structural adjustment programs (McMichael, 2012; O'Brien & Williams, 2010).

Aid is delivered not just through finances but also through technical assistance of an exchange of knowledge. Technical assistance forms about one-fourth of total official development aid. Technical assistance focuses on transferring knowledge and skills to an aid-receiving country that sometimes flows through a nongovernmental organization or government agency (de Haan, 2014).

Debate on aid effectiveness in aid-receiving countries continues, and the issue of technical assistance often takes the focus, a debate that William Easterly and Jeffrey Sachs have taken issue with localized development versus technocratic development,

respectively. This debate between the two represents a larger debate on how aid should approach development in the developing world. Sachs (2015) believes these technical approaches can be beneficial and that large money infusion into development in nation-states located in the Global South is necessary. With this in mind, the poor are stuck in a poverty trap and are too poor to save enough capital to exit such poverty. Aid should therefore work toward individual accumulation of capital, which will then lead to growth. Further aid should invest in infrastructure and other services that can improve human capital. This investment should be directed at schools, health sectors, and other infrastructure (Sachs, 2005).

For Easterly (2014), development that relies on technical, outside knowledge, is a misguided solution. These programs, such as mosquito nets, do not confront the issues that are the systemic problems in a nation-state's economy or government. In addition, Easterly (2006) also aimed to discredit the premise that aid effectiveness can encourage economic growth. He argues that, in reality, the poverty trap is not the issue that impedes economic growth. Instead, it is poor governance (Easterly, 2006). Other academic concepts support Easterly's skepticism about aid effectiveness strategies found in Sachs's arguments. Fungibility of aid finds that whenever an aid-receiving country receives aid, it does not have to spend in the way the donor requests it (Feyzioglu et al., 1998). In addition, large sums of aid into a country's relatively small economy can leave the aid recipient suffering from Dutch disease, a negative economic effect that increases its currency value and affecting its international economic competiveness (Riddell, 2007).

Essentially, this debate has Easterly supporting that development should empower the poor first, and Sachs believes projects and programs that cost large amounts of money

can lead to development. Stripping down their arguments further—and associating them with mainstream Western economics thinking—finds Sachs aligning with Keynesian economics and Easterly along with free-market thinkers, like Hayek (Miller, 2010).

The conversation on aid has changed during the sustainable development era. The purpose of aid, according to many, is to now provide assistance to nation-states as they develop according to the tenets of sustainable development (Sachs, 2016; United Nations Development Programme, 2016). Although sustainable development was one of the Millennium Development Goals[1], it has now become a set of 17 goals, titled Sustainable Development Goals.

Sustainability and the future of development

Sustainable development became the new global goal of development in 2016 after the Millennium Development Goals (MDGs) ended in 2015 (Sachs, 2016; UNDP, 2016; Pope Francis, 2016; World Bank, 2016). Despite becoming the central focus of development in 2016, the modern conception of sustainable development has been around since the Brundtland report, titled *Our Common Future*, was published in 1987 (McMichael, 2012; O'Brien & Williams, 2010; Sachs, 2016). The report argued that ideas of limitations should be defined—whether the state is centrally planned, market-oriented, developed, or developing. Furthermore, the state should be cognizant of how its future ability to meet human needs is jeopardized if it overexploits resources. The Brundtland report additionally found that ecological interactions are not confined by political boundaries (World Commission on Environment and Development, 1987).

[1] MDG Goal No. 7 was to ensure environmental sustainability through an integration of the principles of sustainable development (UN, 2015).

However, McMichael (2011) finds the development challenge of sustainable development as an "environmentalist's paradox" (p. 251) because living standards have risen due to development despite the likelihood of continued development strategies to intensify social inequalities and environmental degradation (United Nations Development Programme, 2011).

With sustainable development, one concern, according to the United Nations Development Program, is how to reduce poverty and improve welfare through creating dignified sustainable work (UNDP, 2015). The other challenge is essentially how to avoid a global environmental disaster (Brundtland, 1987; Matthew & Hammill, 2009). This means sustainable development must include approaches to confront the "business as usual" model—which has the worst case scenario for the future of the global climate at a 2° Celsius change in global climate levels—to a drastic change that shows climate levels remaining what they are today (McMichael, 2011; Sachs, 2016). Despite hope for continuing global temperatures as they are today, McKibben (2010) argues that global warming and climate change is no longer a threat but our reality now. Parenti (2011) conceptualized this reality as the "catastrophic convergence" (p. 7). This means the reality of global climate change will cause a collision of political, economic, and environmental disasters that do not necessarily have a domino effect but rather amplify each other. To avoid this phenomenon, Parenti (2011) argued the optimal solution is to address the effects of climate change and the economic and political consequences that leave us vulnerable.

The question of how to avoid global environmental disasters is a relevant sustainable development question for Pakistan. Pakistan is one of the most vulnerable

nation-states facing a high risk from increased natural disasters during the era of climate change. The 2010 floods affected one-fifth of the population and were responsible for impacting the national gross domestic product by 5.8 percent (Khan, 2015).

Khan (2015) argues that to avoid disaster risk in Pakistan, the country must mitigate and adapt. Pakistan's energy models currently include coal; its energy sector, therefore, will contribute the most to greenhouse gas emissions. However, if the country invests in energy conservation and renewable energy, including hydropower, greenhouse gas emissions would reduce. Khan's policy suggestion for adaption to climate change in Pakistan follows the first model of sustainable development.

Dams and (sustainable) development

Seeing how sustainable development discourses have emerged about how development operates between aid-receiving countries and donors, as well as the discussion about sustainable development, the question of which means are more efficient to arrive at sustainable development emerges. Following the tenets of modernization theory of encouraging economic growth, infrastructure construction was one way to industrialization (McMichael, 2012; O'Brien & Williams, 2010). Water and energy security are seen as an important components of sustainable development (Biswas & Tortajada, 2016). Dams, therefore, are seen as one way of leading nation-states to industrialization—including during the sustainable era (Tortajada, 2014; Khagram, 2005). This section surveys literature on dams and their entry into infrastructure for sustainable development.

Although dams can be a source of cleaner energy and cheap electricity, they are, without a doubt, highly controversial. There are socio-economic costs to constructing large-scale projects, such as hydropower dams. Gellert & Lynch (2003) argue that displacement is an inherent feature of what they refer to as mega-project development. With this in mind, the authors continue, strong states are able to handle large-scale projects in terms of displacement. Weak states, however, are often unable to succeed. Furthermore, communities that are detached from the center of power are often more affected. Dam planning and development can spur internal displacement of populations and require the state to compensate those who are directly affected. In general displacement can also push populations into already densely populated cities, which exacerbates the already existing inequalities (Gellert & Lynch, 2003). Braun (2011) reveals how hydropower infrastructure reinforces gender inequalities through employing a feminist analysis of the Lesotho Highlands Water Project, which contributed to an understanding of how women are affected by the large-scale transnational project. The Lesotho Highlands Water Project, a mega project dam that marketed water to South Africa, impacted the lives of women living in its proximity and reinforced local and global patriarchal policies and hierarchies (Braun, 2010, 2011, 2011a).

Since developing countries often do not have the capital to finance a dam, it also requires developmental aid from multilateral organizations or the state needs to attract foreign direct investment through economic liberalization (Ahmed, 2012). Global South nation-states, because of these loans, often were restructured through economic policies like structural adjustment policies (O'Brien & Williams, 2010; McMichael, 2012). In addition to experiencing donor conditionality and its impact on an aid-receiving country's

economy, dams as development benefit the aid industry. Development banks and aid agencies have used low-interest loans to finance large-scale dams. Additionally, bilateral agencies used dams during the Cold War to illustrate a donor-client relationship (McCully, 2001).

Ecologically, critics who took a hardline stance against dams, like McCully (2001), argue that negative externalities, such as sediment retention in dams, loss of riparian ecologies, and even water quality, could place additional stress on already-water stressed Pakistan. Since dams eliminate natural flooding, it also eliminates a number of species in the watershed of the river when dammed. Furthermore, this can devastate a river's delta, as apparent with the Colorado River (Reisner, 1986).

These negative effects of dams and development became internationally publicized during the process of the Narmada Valley Dam Project, where local protestors halted dam constructions and escalated to forcing multilateral institutions to alter their policies on lending for development (Khagram, 2003; Wade, 2004). This change in development practices forced multilateral institutions to include environmental concepts in development. In fact, Wade (2004) recalled a World Bank official telling him, "You can't write anything about development these days without mentioning the environment" (p. 89). Goldman (2006) contradicts this, though, in assessing the hierarchy of knowledge within the World Bank and how economics has a privileging role over social sciences within their policies.

For dams and development, however, the hiatus and uncertainty continued until the World Commission on Dams (WCD), a conglomeration of a wide array of perspectives on dam building, met in the late 1990s to discuss and come to a consensus

on the future of dam building. When the WCD published its seminal report in 2000 to discuss the role of dams, it stated that when dams are seen as the best alternative, the Commission would support it. The WCD was more than just a decision that said dams were a flawed but necessary infrastructure solution (WCD, 2000). Dubash (2010) argued the WCD acted as non-state actors who were bridging a gap in governance in regards to dams and development. Although the WCD was not effective as a rule-making entity, it was a unique way to inject new ways of thinking about dams and development into global governance institutions (Dubash, 2010).

The WCD may have made the decision that dams are a flawed yet essential component of development, but dams have re-emerged in discussions about climate change and energy generation to reduce greenhouse gases. Erlewein (2014) argued within the context of climate justice that dams were revived thanks to the financial support that has come from the United Nations' Clean Development Mechanism (CDM). CDM supports projects that avoid greenhouse gas emissions while working toward sustainable development. Although CDM supports other renewable energy—such as solar or wind energy—hydroelectric energy projects are dominant. Packaging dams as CDM projects is counter-effective to the program's goals of carbon offsetting. However, the author recommends that if dams continue to benefit from the CDM program, the projects should comply with the sustainability guidelines of the WCD.

Different sizes of dams are also discussed to support hydropower without the financial strain, ecological degradation, or socio-economic effects. Small dams vary from 2.5 to 25 MW, mini dams are below 2 MW, micro dams are below 500kW, and pico-hydro below 10kW. These different sizes provide alternatives to large-scale dams, which

often require planning processes that are costly and lengthy. Small dams can also be located in more remote areas, benefiting villages that are removed from the national electrical grid (Bhutto, et al., 2011). Rather than focusing on just large-scale dams, academics have suggested constructing dams according to the needs of the nearby community. This means constructing small hydropower projects, which vary in generation from 2.5 and 25 megawatts, for smaller populations. Of course, a large population would require a larger scale dam. For example, an aspiring international industrial region like Punjab would have consumers to pay the costs for a large-scale dam. Building to size of the consumer demand and need also decreases the loss of power that occurs in transferring electricity (Bhutto, et al., 2011; Siddiqi, et al., 2012). The discussion of dam size leaves room to mitigate the issue of the negative externalities of dam building for the sake of electrical generation.

Large dams are still at the forefront of discussion because of the amount of potential electricity and ability to provide water (Tortajada, 2014). However, dams have changed the ecology around where they are located. Because of this, Nüsser (2014) views large dams as not just engineering and infrastructure but instead as a central component to the transformation of a fluvial environment; it is a technological hydroscape that has transformed the entire socio-environmental landscape (Nüsser, 2014). Because of the change of a landscape that a dam can cause, governments and other agencies should identify potential impacts in advance of a large project to assist in making better decisions about development strategies. This should include establishing meaningful social impact assessments that empowers stakeholders, using methods such as participatory social impact assessments (Tilt et al., 2009).

Water worldviews

The Narrator in Ernest Hemingway's *The Old Man and the Sea* found the sea on which Cubans fished had two ways to refer to it: *la mar,* when the fisherman loves her like a woman; or *el mar*, as the male enemy (Hemingway, 1952). The narrator's description of a dualistic perspective of the sea prefaces the surrounding literature that exists in showing the continuum of how water is perceived. In this section, I provide a survey of literature that shows how water is viewed and how it has changed in terms of its relationship with the state.

Just as Hemingway's Old Man said fishermen saw the sea as either gender, many have examined how water is more than just a chemical bond of hydrogen and oxygen (Morgan & Smith, 2013; Bakker, 2014). Morgan & Smith (2013) surveyed various perspectives of water to illustrate that "water isn't just water" (p. 106). By this, the authors do not mean to dismiss the dire consequences that many in the world face whenever there is a water shortage. Furthermore, pre-modern conceptions of water affect water management. Throughout Western history, the hegemonic worldview of water management has been influenced by factors including Puritan beliefs of water conservation and human motivation to improvement of God's land. Because of that, modern water management is based on belief—whether in the divinity or scientific progress (Morgan & Smith, 2013).

Market environmentalism challenged the state hydraulic paradigm as a way of perceiving how water resources are to be managed during the 1980s. Bakker (2014) surveyed five dimensions of market environmentalism's view of water resources, which fits alongside a perspective of water through an economic lens for water resource

planning. The worldview of market environmentalism is that positive environmental goals can be accomplished through the market, market institutions, and organizations. The worldview of market environmentalism is not considered hegemonic, and has only replaced the state hydraulic programs in some nation-states as to how water resources should be managed. Although the state hydraulic paradigm was a model—and still is for some—for industrialization, the paradigm has been critiqued for overlooking environmental issues and an over-consumption of water resources (Bakker, 2014).

Bakker (2014) also applies the market environmentalism concept to the water sector, which consists of five dimensions. Privatization in the water sector is fueled with the intentions that private sector actors can contribute to solving the global water crisis. Commercialization in the water sector often involves private companies managing water supply infrastructure or injecting private-sector business models into government agencies. Marketization is supported because it is perceived as a way to allocate scarce water resources to support efficient use of water. The fourth dimension of market environmentalism is the use of liberalization of governance. This supports reforms that will enforce good governance through transparency and empowering stakeholders. One of the most important dimensions in considering perceptions of water is in the establishment of economic valuation of water. Those who support this argue that it can lead to an improvement of water security and water governance (Bakker, 2014).

Shiva (2002) asks the question of to whom water belongs and how it should be accessed. Although market environmentalism surveyed by Bakker is seen as a departure from the state hydraulic paradigm role in water resource management, Shiva (2002) argues instead for an embrace of peoples' alternatives—not the state or the market. When

Maharashtra was hit by a drought in the 1970s, perceptions of water resources management supported pushing away from the export-oriented crop sugarcane to support water control toward its residents instead (Shiva, 2002).

In order to understand water resources, some have examined the role of the hydrological cycle within which water moves (Linton, 2008; Linton & Budds, 2013; Linton, 2014; Bakker, 2002). Bakker (2002) clarified the chemical reaction H^20 circulates through the hydrologic cycle. Instead, water as a resource moves through a complex network of pipes, meters, and garden hoses. Water as a resource is regulated by water law and treaties and has an end-user: the consumer (Bakker, 2002). Meehan (2014) provides insight into a more localized water cycle in Tijuana, Mexico. In Tijuana, some collect rainwater under the eaves of housetops with a rain barrel that is then treated as gray water, meaning it is used for non-consumption uses in times when water is not delivered from the government. This form of water collection serves in a way to limit the power of the Mexican state power, especially as some harvest rainwater in the absence of state water infrastructure. This water cycle also illustrates segments of alternative forms of water authority, decision-making, and power that can even move communities toward a more democratic form of water use, whether under a context of neoliberalism or governmental authority of water.

Linton (2008) further problematizes the hydrological cycle by questioning whether it is sustainable. Under the modern hydrological cycle, Linton argues, dams and development are natural inventions. Within this cycle is a humid fallacy in which it is assumed a hydrological cycle is as similar in England as it is in India. This is further described as a hydrological Orientalism. This means hydrological engineering is needed

to civilize non-West arid regions. Therefore, Linton (2008) argues, a sustained use of the modern hydrological cycle will jeopardize the health of ecosystems and water resources (Linton, 2008). Furthermore, Linton & Budds (2013) perceive that the modern hydrologic cycle also created a special field of scientific inquiry, scientists referred to as hydrologists. By creating this new field of expertise, it legitimized a technical authority over water (Linton & Budds, 2013).

Rather than viewing the upcoming water crisis as a resource problem, Linton (2013) argues that all water problems are fundamentally social problems and should be solved this way as well. If water is instead perceived as going through a hydrosocial cycle, a process in which water and society make and remake each other over space and time, it puts people and politics at the center of all water issues (Linton, 2014). Linton & Budds (2013) advance the concept of the hydrosocial cycle by highlighting the dialectical and relational process through which water and society relate with each other.

Certain lenses have been historically applied to water, besides the hydrological cycle or hydrosocial cycle. Blatter, et al. (2001) discussed how emerging perspectives of water have challenged dominant modern perspectives of water. Modern meanings of water have included a legal, economic, and engineering dimension. Lawyers have viewed water as a property of territory, engineers as transformable products for consumption, and economists view it as a commodity that can be traded and exchanged. These are categorized as low variety in difference of approaches, according to the authors, meaning that it has supported a narrow understanding of water. However, under a social constructivist approach, water is an essential component to identity creation for communities.

Given the apparent diversity of water perspectives, some have argued this should be integrated in future research. Blatter, et al. (2001) argued future scholarship on water should include one of two approaches. The first is to help bridge between various meanings and understandings. The second is to enhance legitimacy of non-instrumental uses of water, such as explaining specific cultural meanings of water (Blatter, et al., 2001). Swyngedouw (2009) viewed the debate of water resources takes priority over democratic governance and instead supports technological or economic efficiency. As water-related crises increase during the climate change era, the question of what capacity democratic and other forms of governments are capable of emerges (Swyngdouw, 2009). These suggestions for future research are relevant when looking at how professionals view dams as development in the climate change era of Pakistan.

Pakistan's waterscape

Before colonial intervention by the British, the Indus River experienced minimal diversions and damming by the riparian farmers for the sake of irrigation. During British colonialism, though, the British were awestruck by the similarities the Indus River had to that of the Nile River—except the Indus was about three times the size as the Nile (Pearce, 2007). The British increased diversion and damming exponentially in southern Punjab so as to irrigate land for the cotton necessary to run the textile industries back in England, essentially developing water for the sake of exploitation. This irrigation system devised by the British is seen by Pearce (2007) to be the origin of the hydraulic state in Pakistan in which the state—or colonialist—dominated the management of freshwater supply (Bakker, 2014).

The revolutionary beginning of state-led irrigation infrastructure can be traced to the irrigation of the western territory of the United States and then British Punjab. During the end of the 1800s, irrigation engineers began to introduce large-scale modern irrigation structures that created the role of experts, state power, and how agrarian zones would be developed. These engineers were revolutionary in introducing changes that resulted in ecological, technological, and social changes. However, expertise in the United States west and the British Punjab had different experiences. In the United States west, the federal government argued they should control irrigation because of the speculative value of water in the west. On the other hand, the British Punjab maintained control reluctantly to preserve imperial power. Engineers relied on utilizing irrigation methods in both regions to increase production and settlement. For these authors, their analysis on the two regions, though focused on the 1900s, is indicative of the dynamics in both regions and their relationship with engineers and the population. Specifically, professional engineers hoped to resolve social problems through an expansion of profit and territory meanwhile expanding the power of the state (Akhter & Omerod, 2015).

For Pakistan, the issue of relying upon engineering principles to resolve social problems is evident with large-scale projects, such as Tarbela Dam and can instead result in a continued fragmented political state. Majed Akhter (2015) examines the role of these large-scale projects on creating national identity. Since Pakistan emerged in 1947, it is a very young country relatively speaking, yet the two provinces of Sindh and Punjab have had a tumultuous history, and this was evident during the planning process of Tarbela Dam. Essentially, Akhter drew technocratic debates within Pakistan to show how Tarbela Dam was presented by a Punjabi-dominated government as a development strategy that

was good for the rest of the country. This research left Akhter with commenting that the political question one must ask is "*for whom* is this state, and nation, called 'Pakistan' for?" (p. 868).

Organizationally, Pakistan has an extensive network of actors involved in implementing hydropower projects, who are criticized for not supplying the country with steady electricity. The major organization is the Water and Power Development Authority (WAPDA). WAPDA was established in 1958 to generate, transmit, and distribute electricity; in addition, it provided irrigation, flood control, and water supply. Overall, it supplies electricity to 88 percent of Pakistan and owns 54 percent of the country's total electrical power. Karachi Electric Supply Corporation (KESC) is one of the oldest utilities in the South Asian region and serves Karachi's population. Due to the organizations' inability to supply electricity in the 1980s, the Government of Pakistan reacted with its power policies. After the 1995 Hydel Power Policy, more than 41 Letters of Interest were sent to the state (Mirza et al, 2007). Pakistan has continued to codify its power reforms through its 2013 Power Policy, spearheaded by the Nawaz Sharif administration. Some stipulations have met the approval of Pakistan's donors, such as the withdrawal of subsidies for a three-year period. The state has addressed financial shortfalls through raising tariffs on commercial and industrial users by 44 percent and on residents by 32 percent in late 2013 (Aziz & Ahmad, 2015).

Nausheen Anwar (2014) asserts that Pakistan developed much like many nation-states in the Global South. International borrowing was utilized to finance large-scale projects in the country in order to spur economic growth. Additionally, gross domestic product was the focal point of measuring success. Anwar adds that early in Pakistan's

existence, outside expertise had suggested energy development projects for its industrial growth. These foreign engineering firms undertook installations of energy generation sites throughout East and West Pakistan. Most of the foreign advisors, who were characterized as competent experts, came from the United States and Western Europe. Foreign aid was therefore seen as an essential need for economic development.

Knowledge and its keepers

So far, I have discussed the overall discussion surrounding development—which includes evolving ideas including sustainable development, perceptions of water, and how dams fit in within these discussions. Since technical assistance—the lending of development expertise from the donor country—has an effect on how development programs and projects are designed, in order to understand the discourse behind technical assistance, it is necessary to understand the literature on how knowledge operates in relation to power and politics.

Technocratic mentality

When justifying public comment on the Kalabagh Dam, Ghazanfar (2008) wrote that every person—whether they are illiterate or not—has a right to comment just as spectators of a cricket game have the right to criticize a cricket player even if they do not know how even to hold a bat. This comment segues into a presentation of technocratic thinking. Just as a professional cricket player is immensely more talented at cricket than any spectator in the stands, a technocrat is someone who possesses different sorts of knowledge of their specialty compared to the common person.

There are several definitions of technocracy. The general definition is a form of governance in which experts rule (Burris, 1993). Meynaud (1968) nuances this by claiming that technocrats are drawn from pools of technologists, a group of skilled individuals. This can include those who are skilled in mechanical, economic, industrial, or national planning. These individuals therefore also enjoy a privileged role in how their expert advice influences policy since "no politician would dare question the value or expediency of their advice and actions" (Meynaud, 1969, p. 37). Arguments extend this further by stating that it implies industrial technology is important to shaping society. Another argument views technocracy as an idea that claims technical discourses are more important than political discourses, which therefore minimizes the role of politics in policy making. Burris (1993), however, argues that technocracy does in fact engage with politics in many ways and that politics has a role in technocratic societies.

The roots of technocracy ideology, according to Burris (1993), stems from the Western Enlightenment period during which reason, science, rationality, and technology were emphasized. This foundation, however, emphasized a hierarchical and patriarchal society, though ruling through science was rooted in enlightenment and benevolence. Meynaud (1969), by examining media clippings, illustrated themes of technocratic ideology. The technocrat is lauded for being an image of competence because of their efficiency in terms of prioritizing facts before preconceived ideas. This quality of a technocrat means the individual will be more likely to keep peace in society, Meynaud said. Although modern technocratic thought supports democracy, there are authoritarian tendencies in technocracy because reforms under a democratic system can make it impossible to find agreement.

Putnam (1977) outlined a typical picture of a technocrat, someone who holds firm the belief that technical knowledge must replace politics and whose role is defined as apolitical. The core principle is in rational, scientific approaches. Secondly, a technocrat's decision-making process is based on technical knowledge and is skeptical about political institutions and politicians. This can elevate to a "technocratic dictatorship" since under a technocratic mindset, non-experts should not be considered in the decision-making process. Policy is also not discussed along the lines of ideology or morals because each issue has a solution sourced in practical terms. Lastly, the technocrat commits to technological progress rather than social justice. However, it is more than just what sort of education an individual received. It depends on how much politics are involved in a certain ministry—or government department—that creates variability in the technocratic mindset, Ribbhagen (2011) argued.

The early work of Hayek (1945) can be seen as a critique of central planning that is based on technocratic knowledge. Hayek (1945) questions not only how to allocate resources, but how to secure the best uses of resources that are known to members of a society. To apply Hayek in a situational scenario, the knowledge of water resource use in Pakistan, is not someone in an international nongovernmental organization, such as the anti-dam organization International Rivers, nor is it someone in the large, multilateral organization of the World Bank. It should be someone who is aware of the local resources. Hayek continues to critique sciences that support the assumptions of Keynesian economic models, which are asserted to inform a central planner what exactly a population needs. This critique is concentrated further at the use of statistical models by central authorities. To avoid the glaring generalizations that occur when central

authorities rely heavily on statistical models, Hayek posits that those who are familiar with a territory or a particular resource should be empowered rather than central planners focusing on statistical models and other sciences needed for large-scale planning. Easterly (2014) has since applied Hayek to argue how development strategies that rely on central planning and technical expertise, rather than empowering people as a way of confronting poverty, in reality traps those in poverty.

When considering the role of technical knowledge and technocracy in society, it is important—in the case of this thesis—to consider the role of bureaucracies since this is often a space of governing that a technocrat occupies. According to Weber (1978), bureaucracy is threefold: first, there is a rigid division of labor; secondly, a chain of command reinforced through regulations; and, thirdly, the people employed in this chain are qualified through education and training. Since bureaucracies consist of people who are trained with technical knowledge—what could be seen as by Meynaud (1969) as technologists or even technocrats—engaging with the work of Weber's literature proves useful in how to frame the developmental discourse behind supporting dams as development.

Foucault and Knowledge

Technocracy and bureaucracy are related to how dams are implemented as development (McCully, 2001). Pakistan not only has a history with bureaucracy in governing practices (Hull, 2012) but a system of actors in water management and hydropower infrastructure implementation. In order to justify dams as development, bureaucracy and technocrats often rely on technical discourse because it strips politics from development.

Within Pakistan, state actors are criticized for implementing development policies behind closed doors in a non-participatory fashion and members of civil society also receive criticism for acting as a "rubber stamp" for these top-down decisions. Overall, though, the international donor community dominates knowledge that circulates throughout the country (Ahmad & Rashid, 2011). Despite the critiques of the overwhelming power of the international donor community in decision-making, there is still a place to examine the discourses used by professionals in terms of suggesting dams as climate change adaptive infrastructure and for energy generation. I will focus on how local professional organizations perceive these problems. Within local discourses, there are solutions apparent, such as WAPDA's Vision 2025 commitment and the Ministry of Planning and Development's *Vision 2025*. Insight into the knowledge production process within the civil society organizations is important to understand the processes of decision-making—whether it is for planning hydropower projects or defining what sustainability is. To make these discourses intelligible, I will frame it within a Foucauldian power/ knowledge paradigm, as well as branches of the paradigm.

The approach of this thesis is influenced by Foucault's writings of power and knowledge. Since knowledge is expressed through discourse and discourse is coded with power, knowledge is discursive. Power/ knowledge is explored in Foucault's lectures:

> … in a society such as ours, but basically in any society, there are manifold relations of power which permeate, characterize and constitute the social body, and these relations of power cannot be established, consolidated nor implemented without the production, accumulation, circulation and functioning of a discourse (Foucault, 1980, p. 93).

Foucault's definition of discourse revolves around producing and circulating knowledge to convince people about what exists in the world in order to dictate peoples' behaviors.

Essentially, discourse is defined by rules of knowledge production and it outlines clear specifications in validating a statement (Waitt, 2010).

In order to conceptualize another understanding of how power operates not only in terms of a top-down state-population relationship but also domestic institutions like schools and factories. Foucault (1977, 1978, 1980) developed the concept of governmentality. The role of these domestic institutions, such as the school, was to enforce knowledge and power to its inhabitants. In addition to governmentality, biopolitics became an important aspect of how power mechanisms manage life in modern society (Lemke, 2011). Biopolitics refers to Foucault (1978) confronted how power over life evolved during the 17th Century in *History of Sexuality*. Two poles—one centered on the body and the other on the species—were developed during this time and were regulated by disciplining the individual and the other through holistic regulation, such as births and mortality, level of health, and life expectancy. With the advent of public institutions, the Western power was now concerned with investment of life rather than power through the right to kill (Foucault, 1978). Others have also interrogated the role of power in other ways of life, such as in statistics and migration (Hacking, 1975; 1990; Lemke, 2011; Agamben, 1998).

Rutherford (1999) expanded Foucault's work on governmentality and biopolitics to include the role of the environment and titled the phenomenon as eco-governmentality. In order to justify the application of biopolitics to that of the ecology and environment, he argued the management of environment is concerned with similar issues as Foucault's concept of biopolitics: they both attempt to solve the problems and concerns through technologies of power. Eco-governmentality entered as a power after World War II as

"big science," a capital-intensive, research concerned with industrialization and computerizing ecology and environment, attempted to manage the environment. Furthermore, eco-governmentality shows that scientific expertise often influences policy, as apparent in the influence of mundane environmental impact surveys (Rutherford, 1999).

A Foucauldian approach had been undertaken by Ferguson (1994), who provided a discursive analysis of development in his study of development in Lesotho. Development discourse in and about Lesotho stripped politics from its discourse of planners. Instead, the government was intended to operate as a neutral machine in which social services and economic growth would go through (Ferguson, 1994).

A discursive analysis relying upon a power/ knowledge approach has shown a hierarchy of knowledge is evident in multilateral donors as well. In his examination of the World Bank, Goldman (2006) utilized a power/ knowledge approach. He found throughout his conversations with natural and social scientists that expertise that conflicted formal scientific reports were never published. Goldman (2006) argues that this process of knowledge/ production established hegemony in development discourses. The knowledge that is created by the World Bank is read all around the world and is some of the most cited material in the social sciences. Goldman (2006) found that the World Bank supplies themselves with their own data and a dominant culture within the organization. Pakistan often receives knowledge from institutions that either craft knowledge like the World Bank or cite material from them.

Furthermore, it is possible to view other works on scientific research—social science included—as a product of a power/ knowledge relationship. Although scientific

research is often seen as the byproduct of neutral observations, Nader (1996) critiques the usually glorified life of the scientist in the West. Nader's observation has place in Pakistan's knowledge production as well. Although Pakistan is far from being located in the West, the place of professional think tank organizations and government bureaucrats in Pakistan still applies to Nader's statement that "all science has social and political implications" (Nader, 1996, p. 9).

Lastly, Escobar (1994) examined the role of discourse in development. In terms of sustainable development, he questioned who would be viewed as the knowledge keeper of saving the earth from disaster. "But who is this 'we' who knows what is best for the world as a whole?" (Escobar, 1994, p. 193). In reality, it was going to most likely be the Western scientist, who he said speaks for the earth rather than peasants or other indigenous forms of knowledge (Escobar, 1994). Sustainable development is more prevalent in today, so this question that Escobar asked is still relevant today. With Pakistan, who views what is best for sustainable development? Are dams a part of that conversation?

In the context of Pakistan and its current policies on dams for hydropower and climate change disaster mitigation, it is possible to see that science has social and political implications. Knowledge that comes from foreign aid agencies has implications in directing public policy and the creation of knowledge within Pakistan (Ahmad & Rashid, 2010). Since Pakistan receives a sizeable amount of developmental aid[2], there are concerns about the role of locally created knowledge in country decisions and plans. This is not a recent phenomenon. For most of Pakistan's history, Ahmad & Rashid (2010)

[2] In 2014, Pakistan received more than $3.4 billion in official developmental aid (World Bank, 2016).

argue that there has been a lack of locally credible evidence-based policies because international aid agencies have replaced the function of the local think tank and civil society organizations. Dr. Nazir Ahmad, perceived as a highly respected scientist in Pakistan, argues that Pakistan has always relied on foreign expertise ever since its Independence, which eroded local expertise and distorted the benefits of constructing the Indus Basin Irrigation System (Ahmed, 2003).

As professionals consider dams as the solution for climate change-adaptive infrastructure and energy production, it is important to see how this conclusion was made. To understand this perspective, the concept of "studying up" emerges as a strategy for research, which is why I selected water and energy professionals as participants (Nader, 1972, p. 289). In this case, this strategy aims not to inquire how those who are affected by support for dams as sustainable infrastructure but to instead understand why people are affected by the discourse that supports dams as sustainable development. In other words, what informs these decisions in supporting dams in Pakistan (Nader, 1972)? Essentially, how do professionals view dams in solving Pakistan's electricity shortage and minimizing natural disasters that stem from climate change? According to local professionals in Pakistan, what is sustainable energy and climate change-adaptive infrastructure, and are dams a solution?

CHAPTER III

A HISTORICAL CONTEXT OF TECHNOCRACY AND DAMS IN PAKISTAN

After a tumultuous struggle for independence from Great Britain, South Asia ended up divided after political parties were unable to find common ground. Pakistan, despite becoming an independent nation-state on Aug. 14, 1947, continues to be divided with how to resolve its myriad internal conflicts. There has not been a national consensus on issues such as sharing water, the rights of women, the role of Islam in the government, and a back and forth leadership between military-rule and democratically elected leaders (Weiss, 2014). After war with India in 1948, technocratic solutions emerged, as a way to avoid future conflicts that the West feared could result in the spread of Communism. The West, namely the United States and the United Kingdom, saw India and Pakistan as valuable nation-states through a geo-political lens. Nevertheless, technocratic solutions emerged in the lead-up to the Indus Water Treaty and continue in a way to shape Pakistan's water and energy shortages (Akhter, 2014).

These technocratic solutions, which assume engineering principles can circumvent politics, is problematic for a nation-state that is embedded with political struggles and a strong religious identity that is apparent in Pakistan. I argue in this chapter that there is a history of technocratic knowledge that is privileged within decision-making process in Pakistan. Dams had been viewed historically as a technocratic solution to manage water resources in Pakistan, which has been categorized as a water-stressed country, as well as provide electricity for a country that is affected by a large gap in energy supply for its demand. I will illustrate this through the Tennessee

Valley Authority (TVA) founder David Lilienthal's role in the Indus Water Treaty, a report developed by Pieter Lieftinck for the World Bank, WAPDA's role in Pakistan, as well as recent reports published by officials in Pakistan. Through an application of works by Ferguson (1990), Goldman (2001, 2006) and Weber (1978), it will be apparent that technocratic solutions have a history in Pakistan in support of dams as technical and apolitical solutions for development.

Technical justification for dams as development

Dams have long been an instrument of river control in South Asia and have even been discovered to have been used in ancient civilizations. In greater India, damming was used for river control for the sake of agricultural purposes to sustain the Buddhist monk class (Shaw & Sutcliffe, 2000). On the other hand, it is thought that Mohenjo Daro, one of the largest cities of the Indus Valley civilization that was excavated in what is now Sindh province, was a city planned by builders familiar with how the Indus River flowed and who tried to capture control of the river. (Jansen, 1993) It is a possibility that, evident from the presence of silt sediment, natural dams were utilized near Mohenjo Daro. (Possehl, 1979)

Dams historically played an important role in many civilizations outside of South Asia. An example of state-dictated water-engineering projects is evident in the Mesopotamian city of Mashkan-Shapir for the sake of diverting water to irrigate wheat crops in arid regions, though soil salinization in the system led the city and project to fail. There have also been accounts of river control infrastructure in the New World. As the Spanish Conquistadores entered the Aztec capital of Tenochtitlan, expecting to export

development technologies to the New World, they were surprised to see elaborate water-engineering projects that were used to irrigate and control floods, as well as for urban use (Tilt, 2015). In terms of modern development, however, dams have received justification from technocratic-minded experts because of the infrastructure's ability to accomplish two functions: store water and generate electricity.

These two functions are why dams continue to be present in development discussions despite the controversies of dislocated populations and environmental degradation. Technically, dams can yield benefits for regional and national economies. For Tortajada (2013), dams are an essential component of development. Hydropower is the most accessible source of energy generation since its technology is always advancing, it is relatively inexpensive and flowing rivers retain a visible presence. The hydropower industry continues to adapt to sustainable principles through adoption of bettering its performance by revisiting the principles of planning, design, optimization, the construction process, and operations systems. Because of this, hydropower has the potential to be a large part of the global supply of renewable energy (Tortajada, 2013).

The World Commission on Dams (WCD), in their seminal report in 2000, upheld the technical benefits of a dam for its population. The technical features of a large dam provide an ability to deliver water and electricity to a population for a prolonged period although there is an impact on rivers, watersheds, and ecosystems. The extended life of a dam may justify its environmental degradation since dams roughly exist for about 30 to 40 years before requiring renovation. Throughout this time period, large dams are able to deliver electricity and water to a population. Although dams often do not meet the

potential level at which they are planned, it typically generates enough power to meet financial targets (WCD, 2000).

In order for a dam to generate electricity, there are technical conceptions necessary for consideration when planning the projects, a consideration that makes some sites more optimal than others. Various models and strategies for dams are seen as benefits compared to other forms of energy generation—such as coal and nuclear. For dams to generate electricity, a steeper gradient will allow for water to turn turbines, which turns water flow into energy. An additional option is the use of pumped storage dams. This strategy has dams generating electricity during peak hours of electrical consumption. Then the water is pumped back up-hill during the off-peak electrical times. An alternative to the typical hydroelectric dam is a run-of-river dam—one that does not possess a large reservoir. However McCully (2001) contends it is a bit misleading in name since it still have an ecological effect. A body of water is still needed in order to generate a stable level of electricity, and this can still impact the surrounding ecology. These are all options that supporters of dams use when promoting the use of dams as development.

A technocratic discursive reasoning behind modern day dam development is utilized in China. Tilt (2015) explored the role of dams in development in China. The Chinese government has prioritized dams as clean energy based on the technical specifications of dams. China continues to experience the effects of fossil fuel energy for its industrial development, which includes dense pollution. To combat this, it has utilized dams as green energy, as evident in its development on its western rivers to transfer electricity to its coastal cities. Furthermore, the Chinese government is an entity that

prides technical knowledge over other forms of knowledge. This is especially apparent with the high number of scientific higher education degrees held by policymakers. In fact, former President Hu Jintao has a degree in hydraulic engineering (Tilt, 2015). In this case, technical expertise within planning ministries in China utilizes dams as development for their technical allure in spurring economic development.

This technical discourse is used to justify dams as development: it is found in China's support for dams, and had a role in development of dams in Pakistan both past and present. In the following sections, I present discourse used to promote dams to resolve development crises in Pakistan, but first, the story begins in Tennessee.

Figure 2: The Indus River System after Partition (Haines, 2014).

The road to the Indus Water Treaty

David Lilienthal had already made a successful career by the 1950s. He established the Tennessee Valley Authority (TVA) during the Great Depression, which brought its residents inexpensive electricity rates in a regional economy where there was formerly a monopoly on electricity. In order to develop the TVA, it required developing a shared water space for the six states (Ekbladh, 2002). With his success in the United States,he considered the TVA a size-fits-all approach to energy and water resources management throughout the world[1] (Lilienthal, 1951). Lilienthal hoped to use an engineering voice—which brought cheap electricity to the United States' south—to solve a water conflict in India and Pakistan. His hope for the two countries to view the Indus River as a natural space failed. Instead, the Indus Water Treaty resulted in political discourse, which he hoped to avoid (Haines, 2014). Rather than the treaty being vetted through a neutral, technocratic discourse, which Lilienthal believed is mutually exclusive with politics and religion, it took finances and infrastructure for the countries to agree (Haines, 2014). In this section, I present secondary research to show that Lilienthal was seeking a de-politicization of development that Ferguson (1994) found in Lesotho. In a way, this discourse worked when Pakistan experienced a change in government make-up, which supported the role of technocratic-led expertise.

Partition of India and Pakistan created nation-states that would become embroiled in political conflict. The two countries had already fought a war in 1948, yet Lilienthal, after visiting both countries, would posit a technocratic solution based on engineering infrastructure to settle a future conflict over Kashmir and the Indus River and its

[1] Lilienthal's efforts of exporting the TVA model to Iran and Southeast Asia would find failure since political issues in those regions would problematize his engineering solutions (Neuse, 1996; Haines, 2014).

tributaries since newly drawn boundaries cut through the rivers (see Fig. 2). Lilienthal wrote an article, "Kashmir: Another Korea in the Making?" that was published by a United States magazine publication, *Collier's,* in 1951. Throughout the article, he warned readers in the United States how dangerous the political relationship between India and Pakistan was, and it would have drastic consequences for the international community if they warred over the Kashmir territory. For Lilienthal (1951), the kernel of the conflict was over water rights to the Indus, the source of which is in Kashmir. It represented a political conflict over a space that could be solved through shared development.

Lilienthal wanted the two nation-states to put aside their religious and political differences and adopt "common sense" engineering principles (Lilienthal, 1951, p. 58). Now, besides keeping the two nation-states from falling into military conflict with each other, Lilienthal wanted the two to view the five rivers of the Indus as a shared space rather than a space through which two borders were drawn. By implementing a water resource management system similar to the TVA, he hoped to also solve India's lack of irrigated agriculture land and Pakistan's lack of water resources for irrigation—as well as ease Pakistani paranoia about India tampering with the water flow (Lilienthal, 1951; Haines, 2014). This intention does follow the Foucauldian "instrument-effects" Ferguson alluded to (1990, p. 255). In the case of Lesotho, Ferguson argued that the development apparatus was not a machine for eliminating poverty. Instead, it is a machine to reinforce the power of a state bureaucracy that enters to solve poverty (Ferguson, 1990). In the case of the Indus Water Treaty, Lilienthal hoped to have shared bureaucratic water resources—like the TVA—enter to solve the poverty issues between India and Pakistan (Haines, 2014). What Lilienthal thought was common sense was essentially what

Ferguson said is like turning off gravity with an anti-gravity machine. In this case, Pakistan and India would, with the aid of the anti-politics machine, set aside the political tensions they had for an engineering perspective on viewing the system as a natural space—not as territory.

In the moments leading up to the agreement on the Indus Water Treaty, it is possible to perceive technocratic principles emerging between Lilienthal, India and Pakistan. He did not want to have political discourse or nationalistic fervor come into the way. In fact, he attempted to bar the two from even issuing official comment to their respective news media sources for fear that politics would tamper with otherwise rational, scientific discussions (Lilienthal, 1967). This intention does appear to be a technocratic motive of avoiding politics into what should be a discussion of scientific reasoning—such as the principles of applied engineering on the Indus River System. It is noteworthy, however, that Cold War politics was a motivating factor for Lilienthal, and he hoped to use it as a vessel to raise awareness of the India-Pakistan conflict.

The World Bank's intentions

India and Pakistan sat down to sign the Indus Water Treaty on September 19, 1960 in Karachi. The World Bank issued a press release after the two countries set aside the possibility of war to sign the treaty that "marks the end of a critical and long-standing dispute and opens the way for development of water resources in the Indus basin, on which depends the livelihood of some 50 million in India and Pakistan" (Ahmad, 2011, p. 75). Although Lilienthal saw a vision of the two countries sharing the Indus, the World Bank mobilized its influence to have India and Pakistan sign a treaty. The World Bank,

just as Lilienthal, mobilized supposed technocratic discourses to support a shared water space.

The Indus Waters Treaty is 102-pages long. Within this document, it gave India unrestricted use of the Sutlej, Beas, and Ravi Rivers. For Pakistan, it received control of water in the Indus, Jhelum, and Chenab. Under the treaty, India was not to interfere with the flow of water that would cause any interference. The treaty also established the right for each country to appoint a permanent Commissioner of Indus Waters, a high-ranking engineer competent in hydrology and water reuse, to represent the country. The two commissioners would be a part of the Permanent Indus Commission that is required to meet once a year (Biswas, 1992). The Indus Waters Treaty did more than just brought the two countries to agree on dividing the Indus. To encourage the agreement, Eugene Black, then World Bank president, put together a consortium of countries: the United States, Canada, United Kingdom, Federal Republic of Germany, Australia, and New Zealand. This consortium's purpose was to provide money for the Indus Basin Development Fund Agreement. This fund was used to provide $541 million to Pakistan for grants although the specified amount for Pakistan after the treaty negotiations was $893.5 million.

Before the Indus Water Treaty was even negotiated, the World Bank repeatedly denied loan requests from India and Pakistan to develop along then-disputed Sutlej River. This resulted in raised tensions between India and Pakistan because an inability to develop on the Sutlej River threatened to curb any potential development possibilities for the two countries. The World Bank therefore offered a mediation based on three principles: the Indus basin possess enough water for both countries, the Indus basin would be treated as a single space rather than arguing over individual rivers, and

negotiations would be set aside political grievances and focus on technical focus (Alam, 2002).

With the two countries at a negotiating table, the World Bank involved itself in drafting a treaty. Through pushing for the countries to agree to a solution, it was the first major intervention the World Bank is responsible for (Akhter, 2010). However, the role of engineers in drafting the treaty held what Akhter (2010) see as a sort of unusual prominence, which therefore suggests modernist assumptions in the role of water resources management. The World Bank intended for the Indus Waters Treaty, at its core, to prove that technology can and does resolve social and political conflicts (Akhter, 2010). This is evident through the third principle the World Bank stated above that negotiations would set aside political grievances and therefore focus on technical matters.

Many academics, since the Indus Waters Treaty was signed in 1960, have analyzed the motives of the World Bank to bring India and Pakistan to the table. Biswas (1992) sees Eugene Black's leadership in resolving conflict with positive solutions as a model that should be replicated by bilateral and multilateral institutions throughout the world today. Viewing Black as exhibiting exceptional leadership is further seen by Alam (2002) who sees the Indus Water Treaty as an example that illustrates that cooperation is the result of water scarcity, which is contrary to the water war rationale that states war occurs between countries dependent on a shared water resource if there is water scarcity.

Indus Water Treaty and military technocracy in Pakistan

The military is an active decision-maker within Pakistan, and their role had a consequential moment during the negotiations of the Indus Water Treaty. The military

control often relates to the ineffectual nature of political parties within the country (Siddiqa, 2007). Because of the military's involvement in development, it is possible to see their developmental decisions based on a continuation of privileging technical knowledge over politics for development. There are several ways to disseminate the role of the military's involvement in Pakistan—especially their role in restructuring the government and economy to benefit them[2]. However, for this thesis, I focus on their role in implementing development after the Indus Water Treaty.

The military's entry into support of a technocratic, development state is evident in the Indus Water Treaty negotiations, and the lead up to the negotiation involved restructuring the government to reflect a more technical perspective. In 1958, top-ranking bureaucrat, Iskander Mirza, collaborated with Field Marshall Ayub Khan to conduct a coup, which was successful. Ayub Khan later ousted Iskander Mirza from the government and Ayub Khan worked toward a military-bureaucratic state. It was under this state that Pakistani elites accepted the Indus Water Treaty under the belief that, through advanced technology on the Indus, Pakistan would be under less downstream vulnerability from India (Jaffrelot, 2016; Akhter, 2015). Under a military government, the decision to accept the World Bank-funded projects, despite previous disagreements under the leadership of politicians, was justified under technical—albeit military strategy—decisions.

Ayub Khan agreed to the Indus Basin Project to legitimize a technocratic military-bureaucratic government in the role of leadership within Pakistan (Akhter, 2015). Akhter (2015) argued Ayub Khan used this river development that was financed through the

[2] See Siddiqa, A. (2007). *Military Inc*. for insightful analysis on the role of the military in creating a self-beneficial government and economy. Also see Nawaz, S. (2008) *Cross Swords* for a holistic view of the military institution.

Indus Basin Project as an example of a developmentalist passive revolution—a Gramscian concept that posits a masked top-level revolution to ease political opposition below in a hierarchy of political classes. Essentially, Ayub Khan aimed to transform top-level leadership in Pakistan under the ideology of technocratic knowledge and development through accepting the Indus Water Treaty. Ayub Khan's term is referred to as the Golden Age of development. It was during this period that the country's economy grew with a boost in the agricultural and industrial sectors (Weiss, 1991; Akhter, 2015).

Even after Ayub Khan was ousted in a coup d'état in 1968, the military still continued its role in legitimizing its leadership via technocratic knowledge. The military's involvement in development was justified because of the ineffectual state of politics in the country (Nawaz, 2008; Siddiqa, 2007). Pakistani military not only trains its officers in military science but also to tackle social issues. However, Nawaz (2008) argues that it is not a wide range of learning material. Rather, military officers learn from experts and a small collection of reading material. Nevertheless, military officers are revered as a highly qualified group of professionals once retired because they apply an apolitical, technocratic approach.

"If you look [at the history of governments in Pakistan] the sustainable policies came about in military regimes, like Zia and Musharraf," a participant told me during an interview. "For 10 years policies were consistent…" For this participant, the military—despite the problematic issues that emerge from a prolonged military dictatorship—are able to implement and sustain policies that would otherwise be overthrown by a rival political party in a civilian government. These are political parties, he added, that typically come to power through offering short-term promises and priorities that

contradict with that of the opposing party. In a way, this participant's views align with Iskander Mirza when he echoed similar concerns. "The country, to put it bluntly, is being ruined by the politicians," Mirza told his son in a letter (Jaffrelot, 2016, p. 303).

Essentially, Ayub Khan's military-bureaucrat government was used to implement technocratic development policies funded by the Indus Basin Project. It is possible to extract from this data that during this time Pakistan experienced a developmental discourse in which technocratic knowledge had a privileged role in informing decision makers. It has left a mixed legacy for some of the participants I interviewed. Although one of them noted a military government did not have the same drawbacks as a civilian government, another lamented the loss of water from the Indus River when Ayub Khan "gave away one-third of the water" without seeking advice from outside of the Punjab region. However, Ayub Khan believed he did not need to discuss the deal with other officials because it was a justified decision based on technical knowledge.

Lieftinck's image of Pakistan

In the previous section, I provided two examples of how technical knowledge was used as a way to mobilize dams as development in a way to extinguish two near-warring nation-states. Through an examination of Lilienthal's involvement in bringing India and Pakistan to the table for negotiations and the justifications of Ayub Khan for accepting the Indus Water Treaty, it becomes apparent that technical knowledge did have an important role over politics to bring economic development to India and Pakistan. In this section, I discuss the role of a World Bank report that deconstructed how Pakistan should

develop to encourage economic development. Throughout this report, development can be possible according to the technocratic suggestions from Lieftinck.

"You could write a whole dissertation on this report," Fazlullah Qaisrani, a consultant and specialist with Sindh affairs, told me toward the end of our interview. Fazlullah Qaisrani was referencing Pieter Lieftinck's report on the water resources of West Pakistan and the effect it had on development within the country. Consisting of three volumes, each of which are several hundred pages long, the report provides an analysis of how the country can be developed to implement economic growth.

Lieftinck's report is exhaustive. It covers in detail several dimensions of water resources development in West Pakistan. However, it does align with what Ferguson had discussed in terms of apolitical development. Throughout the document, the authors base their findings on a methodology that only discusses the technical issues of Pakistan; the politics of Pakistan are neglected. For example, World Bank consultants gathered data through conducting surveys on farming practices in the sample areas. When examining the requirements for irrigation water needs, it was determined by three factors: cropping pattern, crop water requirements, and cropping intensity. What informed these factors included analyses of the agriculture sector, and it all surrounded requirements to grow food.

When the report was published in 1968, Lieftinck's approach to dams in Pakistan is much like the views established by the World Bank when proposing development programs and projects in Lesotho. Ferguson (1994) argued that the state is viewed as a machine that implements development programs, which are apolitical tools for delivering—in this case—agricultural inputs and engineering economic growth. After

reading Lieftinck's report, his suggestions also follow this same logic posited by Ferguson.

The central message of the report maintains Ferguson's argument about governmentality in development discourse. For the authors of the report, dams and other water resources infrastructure will act as a vessel to facilitate economic growth. In this case, West Pakistan's economy will therefore be responsive to higher economic growth if policymakers follow the authors' suggestions.

The report is divides programs into divisions of yearlong periods. Whether it is for tube wells[3] or other projects, the authors stress the importance of implementing programs to kick-start the economy. These statements follow under similar critiques of Ferguson's premise of governmentality. Attention should be directed toward the report's discussion of the Tarbela and Mangla Dams. For the authors, they viewed it as the "most critical meeting point" between agriculture and power that justified the dam (p. 69). With Mangla and Tarbela Dam, two choices are made in terms of national planning. Either the dams could release water during the *kharif*[4] season for irrigation use during the *rabi* season, or it could maintain a steady flow for hydropower (Lieftinck, et al., 1968).

The technical solution to the issue of developing Pakistan once again falls into development for the sake of inclusion into the global economy.

> It follows that agricultural output must grow nearly as fast as the total output of the economy as a whole simply to meet increasing domestic demands. If it grows at less than this rate, then domestic consumption eats into the surpluses that were previously available for export. (Lieftinck, et al., 1968, p. 19)

[3] A tube well is a pipe that bores into the ground to access an underground aquifer.

[4] The Pakistani and Indian cropping season is divided into two seasons: *kharif* refers to the crop season from July through October during the southwest monsoon, and the *rabi* is during the winter season.

Building a large-scale dam in this case reinforces the premise of development for the purpose of involvement into the global economy.

Pakistan continues technical, engineering views

In the introduction of Lieftinck's report, he urged that West Pakistan should continue the process of future development past 1975, which is when the report's proposed two Five Year Plan periods would cease (Lieftinck, et al., 1968). This was a strategy that Pakistan followed since, as Figure 3 shows, dams have emerged along the Indus System. In this section, I examine documents published by the Government of Pakistan in regards to water and power generations and their plans to development. In addition, I discuss the strategy of WAPDA in the Vision 2025 that was released in 2003. Because of the difficulty in accessing WAPDA's strategy, I relied upon news articles and other accounts printed during the time of Musharraf's administration.

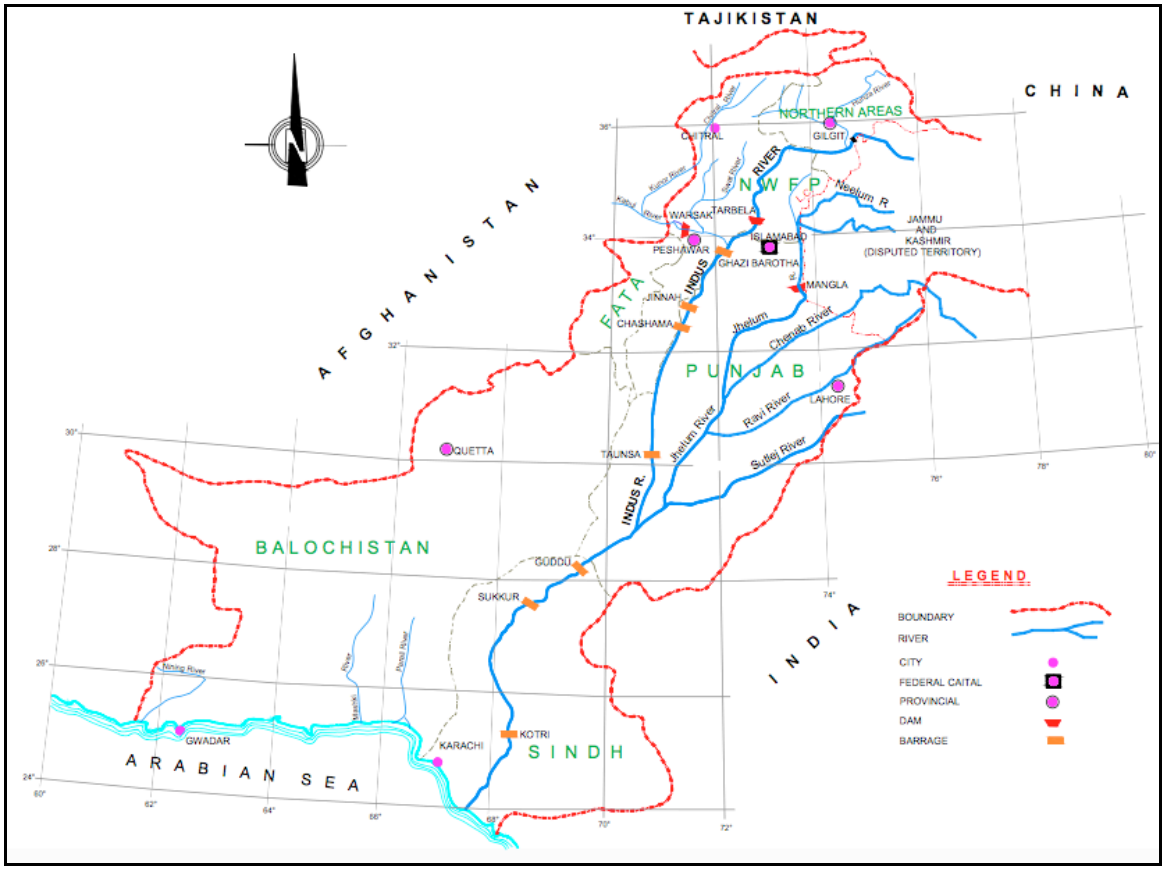

Figure 3: Locations of dams along the Indus System (WAPDA, 2014).

Planning Commission in Pakistan

Pakistan's *Vision 2025*, presented by Pakistan's Ministry of Planning, Development, and Reform, announced that it was designed to address the increasing water and energy needs in the country (WAPDA, 2014). One of the seven pillars was providing energy, water, and food security for the nation-state. The report attributed the damages from its energy shortfall as a four to seven percent loss in the country's GDP. Almost 30 percent of the population is without electricity, the report adds. To increase electricity access in the country, the report proposed to add 25,000 MW by 2025 through an energy mix of oil, gas, hydro, coal, nuclear, wind, and biomass.

In order to lessen the electrical gap in the country, the report commits to completing the Diamer Bhasha[5] and Dasu dams. Although the planning commission's report does not discuss in depth the Dasu Dam, WAPDA does offer its thorough report on its website. Dasu Dam is projected to emit an annual 7,284 tons of carbon dioxide and is located in the Khyber Pakhtunkhwa province within the Kohistan District. It is partially funded by the World Bank, WAPDA, and the Chinese government (WAPDA, 2014; Dawn, 2017). Consultants for the project are Japanese and Turkish experts. WAPDA officials claim the project will provide cheap electricity and also improve the living standards of local people who are dislocated since they will be moved to a new town with modern facilities, as well as provide them with jobs during the construction process (WAPDA, 2014).

In addition, the dam will improve the tourism sector in Kohistan and Gilgit Baltistan. In the Dasu Dam report, there is discussion about the social demographics of those who would be affected by the development. However, the section paints a population who is more in need of this project than the rest of the country's energy needs since it would provide a high level of economic growth and economic opportunities. Although census data cited by WAPDA perceives people in the Dasu area as poor, at the same time the agency is also aware that "people in the area do not consider themselves poor; they see themselves as a lower middle class agrarian society" (p. 5-24). Nevertheless, the dam project is seen as a technical boost to the area in not only upgrading their access to modern conveniences that can also support Pakistan's hope for a tourism industry, since there are numerous cultural artifacts near the dam, especially

[5] Diamer Bhasha will be discussed later in Chapter V

two ancient mosques (WAPDA, 2014). What is important of this information published about the social demographics is that WAPDA believes the Dasu Dam will impact the area positively. Once again, it is possible to see this discourse follow similar logic of Ferguson's governmentality argument about Lesotho. This project is viewed as an apolitical approach to inject economic growth into the Dasu area.

Returning to the planning commission report, foreign technical and economic contributions from China—through the China Pakistan Economic Corridor (CPEC)—is claimed that it would "serve as a backbone of the energy strategy to overcome power crisis in Pakistan (p. 61). Besides Chinese financial assistance, CPEC will additionally provide increased technical assistance in Pakistan, thus making it a more technocratic decision.

The report also looks to reservoirs to help as the country experiences climate change. Since 75 percent of the country's water supply is rain-fed from its three months of monsoon rain, the report commits the country in building new reservoirs. These reservoirs will provide water for the agriculture, industrial, and domestic sectors. The language of this commitment is of interest. The Planning Commission's report added that reservoirs are needed since the water ends up running to the sea. This statement ignores the purpose of water flows wherein water carries sediment to provide deltas—as well as downstream terrain—with necessary sediment. Furthermore, centralized large-scale infrastructure projects, such as reservoirs, are technocratic in nature. There are two ways of meeting water-related needs: hard path, such as large-scale infrastructure; and soft path, investment in decentralized facilities (Wolff & Gleick, 2002). Embedded within

hard paths, such as large-scale reservoirs, are premises rooted in engineering principles. This includes dams that are supported in the Planning Commission's *Vision 2025* report.

The planning commission report, as well as the WAPDA report on the Dasu Dam, are examples of technocratic, apolitical approaches to finding solutions toward the country's water and energy crises. These approaches are justified because large-scale dam projects will work toward providing a stable percentage of energy into the country's energy mix and will provide economic growth to the affected areas. These government arguments follow technocratic as they are presented as rational and scientific planning. The following subsection will discuss the role of WAPDA in cultivating and maintaining knowledge within Pakistan.

Knowledge management

Lilienthal believed a regional dam water resources bureaucracy, such as the TVA, was important because it provides more access for the population it affects (Ekbladh, 2002). He was not the only one who saw regional development being supported through local governmental agencies of knowledge possession. During the late 1960s, the United States invited representatives throughout the world to learn about the secrets of water resources development the United States used (Stamm, 1967). Furthermore, in Lieftinck's report, he encouraged Pakistan to continue re-evaluating its water resources every five years. For Pakistan, WAPDA has filled both roles. It was established in 1958 and was empowered to establish the construction of energy generation infrastructure and water resources management. The agency distributes energy to about 88 percent of Pakistan and owns 54 percent of the electrical power generation. Nowadays, WAPDA also performs a wide

range of duties. From sponsoring activities—such as bodybuilding and cricket teams—to housing schemes and colleges, it is a well-known organization. WAPDA, in its own words, is a major contributor to the progress of the country in the engineering field (WAPDA, 2015).

The establishment of WAPDA as the de facto water and energy resources management institution can be seen not just when it was established but about ten years later. Once the Indus Water Treaty was signed by India and Pakistan, WAPDA received a large sum of money, which made it the most funded agency in the country with the exception of military branches (Akhter, 2015). This can be seen as an early empowering of the agency by international organizations since it created an organization in which money and knowledge can flow through.

Furthermore, WAPDA functions as a research institute that informs policymakers, as well as an agency that collects data to plan future water and energy projects (Bandaragoda, 1993; Mustafa, 2010). The strength of its research abilities is reinforced throughout Pakistan, where there are WAPDA housing schemes, training institutes, and universities. In fact, in 2016, current WAPDA chairman, retired Lt. Gen. Muzammil Hussain, announced that the agency would establish a university of engineering and technology and a postgraduate college in the vicinity of Tarbela Dam (Dawn, 2016). Just as Goldman argued that the World Bank established hegemony of certain disciplines in its organization, WAPDA's reputation as a research organization is reinforced through establishment of a university.

These are a few themes of note that illustrates the organization as an important agency within Pakistan in terms of knowledge management. This purpose illustrates

WAPDA as an agency that operates as a bureaucracy as characterized by Weber and maintains a knowledge hierarchy that Goldman (2001, 2006) discussed.

WAPDA's Vision

Working with the argument that WAPDA is a bureaucratic institution apparent in Weber's argument, it proves useful to look inside the organization's commitment, titled Vision 2025, to implement a number of hydropower infrastructure. This example shows how the bureaucratic institution of WAPDA justifies its development commitment through technocratic discourses.

General Pervez Musharraf, president of Pakistan from 2001 to 2008, was in his military attire when he announced the WAPDA's plan to spend $45 billion to get Pakistan back on track to closing its energy gap and prepare for the explosive population increase the country would experience in 2025. Musharraf was confident in the leadership that Lieutenant General Zulfiqar Ali Khan would exemplify in leading WAPDA to this goal.

Whereas previous dam and water resources developments in Pakistan were rooted in technocracy trumping politics, the case of WAPDA's Vision 2025 is an illustration of the government delivering upon development through its military as a way to avoid politics. Official documentation on this seminar is missing, but there still are online news articles that covered the strategy. The purpose of the seminar, then WAPDA chairman said, was to inform potential national and international investors about hydropower projects the agency planned.

The developmental state of Pakistan at the time of this seminar was abysmal, according to General Zulfiqar Ali Khan. The seminar discussed three phases. All of these dam projects placed priority in constructing large-scale dams. In fact, the strategy had been described as the most ambitious development program in the country's history. The ineffectual infrastructure was far below its surface water reservoir potential. Because of sediment build up, Tarbela, Mangla, and Chashma reservoirs lost a capacity of 4.26 MAF, and its loss was projected to a further 5.94 MAF by 2010. A $45 billion investment in hydropower dams would be necessary to confront the lack of water for agriculture (Rizvi, 2001). WAPDA does not have information about this ambitious development program, however. Because of this lack of information on the program, I have relied on newspaper articles published about the strategy. However, strategy was created without input from those possessing knowledge from other disciplines. In addition, the strategy works with the assumption of utilizing a hard path will provide the country with water and energy security.

The decision making process behind this strategy involved technocratic knowledge sourced from the Pakistani military. During Prime Minister Nawaz Sharif's initial period of leadership in the 1990s, he asked the Pakistani Army to manage WAPDA (Rizvi, 2001). This shift reflects more of a move that recognizes that the military, as Ayesha Siddiqa (2007) and Shuja Nawaz (2008) have explored, is more capable of handling technocratic development planning—as apparent in Ayub Khan's leadership discussed earlier.

Conclusion

When Ayub Khan led a coup that brought him to leadership, Akhter (2015) argued it was the moment that ushered in Pakistan's developmental state, and, under his presidency, Pakistan experienced a "golden age of development" (Weiss, 2014, p. 179). During this time, the economy had grown, which included industrialism (Weiss, 2014; McCartney, 2010). Much of this, McCartney (2010) argued, is because of the state's engagement with financing the development projects. It should also be added that during Ayub Khan's presidency, Pakistan saw the construction of the Tarbela Dam—which is the world's largest earth-fill dam. In addition to providing a picture of what sort of discourses drove dam development in Pakistan, focusing on the periods during Ayub Khan's presidency shows the most activity of dam development from the international community.

CHAPTER IV

PROFESSIONAL PERSPECTIVES ON DAMS

"When in doubt, we blame India," a well-respected ambassador and researcher at Sustainable Development Policy Institute (SDPI) told me, in a half-joking tone, after hearing about my research. Although I did not have a chance to interview him because of his active schedule, that one line has reverberated in my mind. Essentially, this comment represents a justification for supporting dams in Pakistan along the Indus River system in part for an uneasiness and distrust targeted at India. So, despite dams having a sort of technocratic purpose, they also have a justification based on preemptive politics since politicians are not to be trusted.

In Chapter III, I discussed the privileging role that technocratic expertise historically had in Pakistan's decision-making regarding dams and development. This was apparent through the lead-up and signatures of the Indus Water Treaty, the cataloging of water resources sites by the World Bank, and current perspectives held by Pakistani agencies regarding water resources. In this chapter, I draw on primary data I collected through semi-structured interviews in Pakistan to show that dams are perceived as sustainable infrastructure to solve the country's future—and current—water resources and energy problem. But when justifying dams as sustainable infrastructure, most professionals justified it through the perception that dams, as development infrastructure, are technical and apolitical. Although technocratic discourse works under the assumption that politics does not permeate into their discourse, others have argued that technocratic discourse does in fact engage with politics. This is a case where support for dams that is anchored in technocratic discourse has politics in the background.

Professionals define sustainable development

The planning and development of future hydropower sites in Pakistan is an investment in inexpensive, dependable, and environmentally friendly infrastructure, according to WAPDA. Furthermore, the agency said, there is a need to increase the hydropower share to the overall energy mix in Pakistan to create sustainable economic development in the country (WAPDA, 2015). It is clear that, for WAPDA, dams are sustainable. However, I wanted to understand how professionals in Pakistan define sustainable development. Before discussing dams and sustainable development with professionals in Pakistan, it is important to note that all professionals spoke about sustainable development in similar ways. Each participant viewed sustainable development as something that not only meets technical definitions in terms of inexpensive renewable energy, but also something that should not divide the country in political terms. That being said, differences did emerge whenever I discussed sustainable development with participants. In this section, by engaging with participant interviews, I will discuss how participants viewed the concept of sustainable development. This discussion will provide a necessary background before talking about how dams can be considered sustainable.

The most technical definition of the phrase sustainable development came from Majid Ibrahim, an engineer and researcher with a membership organization that had an office in Islamabad and actively works in Pakistan. In fact, a few times he corrected me whenever I mistakenly called his organization a nongovernmental organization. He said it was instead a member-run organization that receives donations from donors to maintain its operations of educating the people of Pakistan about environmental issues and

development. For Ibrahim, he said the principles of sustainable development are "very clear." It's a technical definition that requires a project generate energy that doesn't affect the environment or its local conditions and should be a long-term operation. Through environmental assessments, he added, the construction process can also be sustainable. Essentially, he views sustainable development as a very clear concept. It should not affect natural resources once installed and, if designed carefully, dams can be sustainable.

Hamza Malik used to be a chairman at WAPDA, and he later found himself in political leadership of Khyber Pakhtunkhwa. Today he serves as an executive director of a scientific institute. He earned a Bachelors of Science from Lahore Engineering, but speaks with pride that he was awarded an honorary doctorate, which he added his son tells him he earned from a lifetime of working in science. For him, he argued, in addition to factors that everyone else said, that sustainable development is something that must be agreeable politically, offers an affordable price for infrastructure and consumers, and does not adversely affect other natural resources.

Wasseem Anwar works for an international nongovernmental organization that focuses on environmental issues and studied engineering and business. For him, he looks at it in terms of how long the project can be functional. "It's sustainable if it can supply for 50 to 75 years," he said. No matter what the project is, for this participant, the lifespan of a project is a priority when considering sustainability.

However, Naseer Mirza, executive director for another nongovernmental organization in Islamabad, perceived sustainable development as something that is not just restricted to infrastructure. For him, sustainable development should not be harmful to the environment and not place financial stress on a country or its population. In terms

of the context of Pakistan, he wanted to see two dimensions be added to the concept of sustainable development. The first, he said, is that development projects have to be equally beneficial for the poor and the disadvantaged. Projects have to be considered politically, not just in technical terms. Mirza viewed many projects as detached from their political impact on poorer populations in the country. This concern is accented in his assessment of including the project construction process.

Secondly, Mirza said, projects should not jeopardize the political interests of a country. Because some projects have political implications, he views dams as not just technical solutions. It does not have simply socio-economic but serious political factors. An example of how downstream cutoffs can become political is apparent through the relationship between Pakistan and India. "India brought us on our knees when they stopped the water in canals," he said. From this perspective, there are downstream effects to dam projects, which can increase political pressure, as apparent with his comment on India's upstream development. Pakistan has a history of not applying sustainable principles in its development, Mirza added. Those who are downstream from large-scale projects have historically been negatively affected. With this track record, Mirza holds some suspicion of whether Pakistan can implement dams as sustainable infrastructure, especially since a large portion of the population lives near the Indus River.

Dams and sustainable development

In the previous section, I discussed how participants I interviewed viewed sustainable development. Overall, there was a shared understanding of what is meant for a project to be considered sustainable. First, it must be something that can last a long period of time.

This ensures that the project can be financially stable and pay off the investment. Secondly, the project must not irreplaceably use resources. What is missing when applying a technical view that assumes an apolitical stance is the fact that downstream effects can become political, according to one participant.

In this section, I will discuss how participants viewed dams as technical, yet sustainable, infrastructure. Dams are seen as a technical solution because it meets several needs that Pakistan will face in the upcoming future. However, that means dams need careful planning, which requires technical expertise to navigate through some conflicts it could face. Lastly, dams are seen as a step on what professionals view as a linear pathway to sustainable development.

It's technically right

For Hamza Malik, the water resources of Pakistan are the lifeblood of the country. It would be foolish to think otherwise. For him, dams are not just sustainable it's a necessity.

> We have not yet found gas, oil, anything of that nature. But there were two prominent: Indus Basin, the 60,000 square miles of rich soils; and Indus River—the sixth largest river in the world… what we inherited was a system of canals, barrages, and operating those systems so for us there were problems. The problem was that our river system was variable in flows.

Malik views dams as an instrument that is necessary for the country to harness its only natural resource advantage: water. Furthermore, it seems rational to him that Pakistan would continue the pathway of dams as development when it was the main infrastructure that was left behind by the British. In fact, Malik was not the only one who held pride in Pakistan's irrigation system. While I attended the Lahore University of Management

Sciences water conference, many spoke highly of the irrigation system, even calling it the most complex in the world.

Dams may be the lifeblood of the country but it is also a step on the ladder toward sustainable development. “Solar power is for the rich countries,” Hamid Ali told me. For him, solar panels are good for small-scale development, such as powering fans in villages. It is possible to see this argument align with linear models of development. Dams are considered an early—yet important—step for Pakistan in sustainable development. Fazlullah Qaisrani agreed with solar power seen as a pathway to sustainable development further down the road. For him, solar and wind power are sustainable and renewable resources, but it comes with high costs of importing experts and technology.

With more than 40,000 MW in potential within the country, Majid Ibrahim viewed dams as a cheaper form of energy generation. Furthermore, the infrastructure’s effectiveness can be maximized and negative externalities avoided to achieve utility through Pakistan’s technological system. “If you control that water, according to very good forecasts that we have, if you have lower rainfall, just keep water in the dam and save it according to scientifically forecasts,” he said.

Mirza questions the discourse that emerges from professionals who support dams, on the other hand. “One side of the economic benefits are presented. There are counter arguments,” he said. If dams are built according to their technical specifications, it does destroy resources, which is a contradiction of how professionals defined sustainable development.

Dams need careful planning to be sustainable

The inter-provincial conflict between Sindh and the Punjab provinces emerged several times when talking with participants. Planning for dam sites should require awareness of the historical relationship between the provinces of Sindh and Punjab and the negative externalities of dam development.

"It depends for dams as sustainable development. For reservoirs holding dams, they should be downstream and upstream for hydropower—run of river. That will help manage political conflicts in the country—for example between regions of Sindh and Punjab," Anwar told me.

Careful planning should include the decision of where to locate future sites for dams, some participants noted. For Waseem Anwar, there are better alternatives for water resources management than just constructing a dam with a large reservoir. For Anwar, just like many Pakistanis, he has pride in the complex irrigation and canal system the country inherited from the British. Because of this canal system, dams should be planned more along the lines of hydropower rather than managing water resources during the climate change era. However, he added that if dams are the best solution for the country, the place of the dam is more than just looking at the physical landscape of the terrain. By this, he means that for dams that have a large reservoir, they should be downstream and run of river dams should be located in the north. Through careful planning of reservoirs, it will help manage the political tensions between Sindhi and Punjabi people.

Especially for dams to be considered in the sustainable development period, each dam must possess a relocation program as part of its plan. Malik, a former province

governor and manager at WAPDA, told me that if any people are affected to better the country through development projects, those affected people should benefit more.

Multi-purpose uses

Although there is a long period for a dam to be functional—participants estimated about seven years—it still appears as a more efficient form of sustainable infrastructure as the country experiences effects from climate change. This is apparent in the support for dams based on its multiple uses, whereas other energy sources like solar or wind were dismissed since it only has one function. For a financially stressed country like Pakistan that is also water stressed, dams can provide water storage while generating energy.

Hamza Malik said hydropower plants are more efficient infrastructure compared to other renewable energy. This is because there are three uses for dams, which can include agricultural, power, and flood management dimensions. When compared to other energy infrastructure—which includes run-of-river dams—hydropower dams with reservoirs provide more use.

Furthermore, he added, Pakistan is in need of increasing its agriculture yield. Pakistan's *kharif* season—summer—experiences higher levels of flow in the Indus with 84 percent runoff. During the winter—or *rab*i—season, flow decreases to 16 percent. Because of these radically different numbers, Malik said Pakistan needs to address it to ensure there is irrigation water for the *rabi* season. He said that Pakistan only needs about 66 percent of the Indus flow for irrigation during the *kharif* season, so nearly 20 percent is lost in runoff that should be saved for the *rabi* season. "The water is lost! It's not available when you need it."

Some participants noted that Pakistan does have wind corridors and areas of the country that are sunny near-year round, but a one-purpose energy solution like solar is not something that Pakistan should invest its money in. For one reason, Hamid Ali said, is because the country just doesn't have the money in its coffers for something like that:

> But the solar energy is more green [sic] since there are more sunny days in Pakistan. At the moment, the technology is not at that level so that solar is expensive also… So maybe one day it would become cheaper and capture the potential and therefore although Pakistan uses them in the poorer regions.

Because of the high cost of solar and wind energy, hydropower is supported as a more sustainable option because the country not only has some of the expertise, but for a country that is not as wealthy as Western countries, participants said, hydropower can be a good first step toward sustainable development. This is because climate change will be affecting the country in a way that hydropower is designed for: water retention and sustaining its agriculture.

Can provide cheaper rates for consumers

Inexpensive rates are important for a country where there is a high rate of electricity theft[1], especially since tariffs are then used to fund future projects (Mustafa, 2010). Professionals I spoke with hoped to address the electricity theft issue from a supply side, meaning that if the government invested in more affordable energy, therefore providing a cheaper tariff for its customers, it would deter theft.

Hamid Ali said the government is losing money at each unit sold because of political motives. Since the government subsidizes energy prices, energy projects should

[1] The Pakistani government identified electricity theft as a problem and seeks to punish those who steal electricity through the establishment of a judicial system of handling it case-by-case and is codified through the Theft Control and Recovery Act of 2016 (Government of Pakistan, 2016).

be constructed on how much electricity would cost at a per unit basis. Energy sourced from hydropower projects, for Hamid Ali, makes the most sense for providing low-cost tariffs for customers. Hamid Ali said thermal energy per unit is about 14 to 16 rupees[2] per unit. However, hydropower energy is projected at two to three cents per unit[3].

Malik elaborated further on the inexpensive rates for customers with hydropower. He said the next cheapest option is gas, which is seven cents per unit. He added that according to the letter of intents for solar and wind energy projects in the country, proposed rates surpass 20 cents per unit.

Fazlullah also commented that solar panels are five times more expensive than hydropower and three times more than coal power. It is expensive because the technology is imported from other countries. "As far as we are importing, it will be expensive," he said. He was also critical of the use of wind power because of their low capacity and because the technology is also imported from other countries. Since there has not been any private—foreign or domestic—the state would be responsible for investing in these energy forms. Because of that, hydropower, he said, is the most sustainable option considering the prices.

Size matters for dams

Controversy is associated with size of dams. After the Narmada Valley Project in India mobilized international environmental networks, the international development community exercised more caution when supporting large-scale dams[4].

---

[2] As of 2017, the conversion rate would be about 14 to 16 US cents.
[3] This participant originally used rupees. I converted to US currency, which as of 2017, was rated at 1 rupee to 1 US cent.
[4] ICOLD defines large-scale dams as 15 meters tall.

Malik remembers traveling to a workshop in Washington D.C. during a period of international uneasiness about large-scale dams. World Bank officials invited him to come to the United States to speak at the workshop, where protestors were confronting the attending professionals, suggesting them to support the implementation of small-scale dams instead of larger ones. Malik recalled that he then took the stage and presented why small-scale dams were not useful for Pakistan.

> Now what happened there were environmentalists and protestors, who said 'large is ugly and small is beautiful.' I stood up and said, 'Gentlemen, I have a problem. We have a river that becomes 10 miles wide during the floods… [can a] small irrigation project be built on a river that is 10 miles wide?' Nobody said anything. 'Well, could somebody tell me how to build a small powerhouse on a river that large? So let's agree that there are certain things that nature has made and there are specific ways that those resources can be developed. A large river cannot be developed by a small dam… If you want to do that development you have to do it thousands of times because there are many villages.'

The World Bank workshop was also an attempt to include other professionals from other disciplines, he said, by including social scientists and environmentalists.

The international development's shift from large-scale dams to the more supposedly environmental-friendly approach of small-scale dams is, in a way, resulting in a sort of inequity for Pakistan, according to Malik.

> It's not fair that China, USA, and India have been allowed to dam their waterways with dams that environmentalists said would have destroyed the country. If a large dam would have destroyed those countries, they would have been destroyed several hundred times over… This should settle the argument. Because they can store three years flow of Colorado River. 850 days of flow of Colorado River. They have not done damage. They have done good. The people who say [otherwise]? They are living somewhere—even dreams do not give such irresponsible and unsustainable conclusions.

For Malik, this unfair principle that Pakistan must adhere to compared to India, China, and the United States represented an international inequality based on political discourse rather than rational, technocratic discourse. The United States, India, and China are able

to have a safety net of water storage, yet Pakistan continues to suffer from international pressure on large-scale dam opposition: "If it's so dangerous that I should contain myself to fewer water days and agriculture yield because your children will die. If this was to happen, it should've happened in China, Colorado? Why is it that only Pakistan should be singled out for this?" Although Malik views the discourse that now restricts Pakistan from receiving international support for dams irrational and based on political discourse, it is possible to see how his own discourse—which includes exaggerating language—has political connotations to it.

While the international community discusses the role of large-scale dams in development, time is meanwhile running out for Pakistani dam local expertise. Fazlullah Qaisrani told me that if Pakistan wants to plan and build large-scale dams, it would have to involve foreign experts. Although the country does have capable and competent experts, gone are the days of the working professionals who worked on past large-scale dams. "Mangla and Tarbela intellect generation is over," he told me. "They studied Kalabagh and then left." In the meantime, in order to plan and construct the Neelum-Jhelum Dam, located a few kilometers from the Line of Control between India and Pakistan's claim of the conflicted territory of Kashmir, it required collaboration with the Chinese. In addition, the political relationship influenced the Chinese on the project since the project was located in the Azad Kashmir province. Niazi told me that the decision to have the Chinese construct the Neelum-Jhelum Dam was also because of its location in Kashmir and to avoid Indian conflict. One broader issue that stems from the completion of the Neelum-Jhelum Dam project is that works as a legal claim to the Neelum River,

which some have said is under threat from India's development on the river (Kiani, 2011).

Can provide a step toward more sustainable projects

Many participants suggested that dams would be a step toward more sustainable projects. It was an argument that seemed reminiscent to linear stages of development. In this case, early stages to sustainable development required harnessing the indigenous resources—such as water for hydropower—before generating energy from solar, which could be considered as the final stage in sustainable development.

Despite Hamid Khan's concerns stated earlier about solar power only for "rich countries like the United States," he does conclude that solar is the ultimate end goal for sustainable energy generation. For right now, however, solar power is best used according to scalability. This means dams have the capability to provide electricity that can be reliable for a national grid. Solar power, on the other hand, is useful for smaller villages. As an example, he told me how it is best to run something like a fan in a village. "Maybe one day it would become cheaper… We should be hopeful that one day we would be able to harness this for our industry and domestic energy needs," he told me. Dams for Hamid Khan, serve as a step on a linear pathway to pure sustainable development.

Hamza Malik agreed with Hamid Khan when he criticized solar power options to me as: "options, which filthy rich can afford. We must pursue hydro." To be fair, hydropower projects do, of course, come with a high price tag as well. It is a price tag that Majid Abdul said is worth the investment because it can pay for itself quickly. This

is evident in the case of Tarbela Dam. Tarbela Dam was a project that was financially supported after India and Pakistan accepted the terms of the Indus Water Treaty as a way to replace the loss of the Indus System's three eastern rivers to India. The agreement secured about $895 million to construct two large dams and other irrigation infrastructure, all financed from grants from Global North nation-states. The price tag, however, began to rise, which worried the international donor community (Akhter, 2015).

> Tarbela was at a huge cost but it has repaid itself. Agricultural water is cheap but for the sake of electricity, it has repaid itself two or three times over. I have gone over the numbers many times. If you take the debt for building a good dam, it will pay back. Tarbela was classic because it paid off the interest so right now we are receiving free electricity.

Abdul is not the only one who believes dam projects can repay themselves, despite drawing money from foreign investors. For those who support the high price tag that comes with multi-use hydroelectric projects, the case of Tarbela Dam paying off its debts is an indication that these projects should not be dismissed with the argument of debt.

Dams, climate change— and politics?

In the previous section, I discussed how professionals viewed dam building as an apolitical, technical solution for development in a sustainable and climate change context. However, in this section, I will show how these ostensible apolitical solutions actually have political ramifications.

Although dams seem to fit as sustainable development in a climate change context, it is more complex to participants. In fact, those who supported the infrastructure were aware that it could also increase disaster. "Can your solution be a part of the problem as well?" Mirza asked me. "What if a dam could not sustain the flow? It would be devastating." During my interviews, participants recognized that climate change-

related natural disasters are primarily human-made disasters and dams are a part of that problem—although they are at the same time packaged as solutions. Furthermore, dams for the sake of Pakistan would have to be solely for flood management.

A lot of climate change discussion focuses on the issues of carbon dioxide emissions. Pakistan, for the most part, missed curtailing its emissions targets, as well as failed to meet any of the Millennium Development Goals set forth by the United Nations. There are opportunities to develop clean energy in the country, Bina Siddiqui, an environmental journalist covering South Asia, said, but Pakistan's relationship with China has continued a commitment to dirty energy. Bina Siddiqui was the only female I spoke with but spoke with the most disdain about Pakistani global political relationship. Although she was a journalist, she earned a graduate degree in England. The relationship, according to her, embarrassed Pakistan at the Paris Climate Talks in 2015.

> At the Climate Talk in Paris, the delegates from Pakistan wouldn't even make any promises because they had been waiting until [China-Pakistan Economic Corridor] was finalized. I think our leaders understand the importance of climate change and are preparing for it. They attended Paris. It's just not a priority. From a planning perspective, the "business-as-usual" perspective of Pakistan's leaders is putting the country in a difficult position.

Bina Siddiqui's recalling of Pakistani officials attending a global climate change conference with restrictions is an illustration that shows how there is a political background to development projects. Pakistan's planning objectives are continuing to change the physical landscape by operating under "business as usual," she added. This is apparent in the over-development of Lahore with its constant construction. When I traveled through Lahore, I noticed the heavy construction that I had been told contributed to a large amount of pollution and carbon emissions. In fact, there was some outcry within the country for some of the construction was destroying cultural artifacts of the

city. Bina Siddiqui said this was turning Lahore into Karachi—referencing the commercial megacity in Pakistan. “During the summer, it’s going to result in a high heat wave period not to mention ruin ground water resources. It’s not sustainable planning.”

The Pakistani state is more interested in building larger projects, Bina Siddiqui added. There are a lot of smaller projects in the Khyber Pakhtunkhwa region. Smaller projects would be more effective, she said, but the government wants its projects to be visible for the whole country. These larger projects are a waste of money and just cause a lot of controversy, though. Large-scale projects, which are supported through technical knowledge, in reality, serve a political purpose.

Bina Siddiqui argued that these large projects have resulted in irreversible damage to the environment, which will become problematic as the climate change era continues. Such large projects are influenced through the China-Pakistan Economic Corridor. “The Chinese are pushing us with loans to do old technology. They are selling us projects that are low grade and the fossil fuel emissions are causing pollution. The public is being misled with these CPEC policies,” she told me.

Rather than pursuing large, technical projects such as dams with large reservoirs, she instead suggested more ecological alternatives. Bina Siddiqui said the Pakistani ecology is in need of restoration and the forests need protection to protect groundwater recharge. Business as usual development in Pakistan is instead causing damage to groundwater and other water bodies: “The Ravi [River] is filled with dead water because of all the construction that goes on in Lahore.”

Business as usual is evident in the bilateral development relationship between China and Pakistan. This is apparent, according to Fazlullah, in the construction of coal

plants. Pakistan agreed to the construction of very low-grade coal plants, he said, despite the rest of the world has critiqued the use of this low-grade coal. "The Chinese want more coal power… We import coal, too. Now the world is moving from critical to super critical to ultra critical, but we are in the dangerous place with coal," he said. Pakistan is investing in coal power due to political pressure from China. Because of this, Pakistan is committed to heavy pollution inherent in coal power although there is international pressure to pursue more sustainable options.

Finding a balance of ecological protection and development is a tricky thing for Anwar. He recognized two threats that Pakistan faces. The first is the country's security from terrorism and the second was poverty. He said that climate change resilience needs to be linked to poverty and food security and then there can be a discussion about development. Once government officials see this link, they will begin to decide from a better informed position.

However, to solve poverty, Anwar added, there has to be some sort of development projects enacted as Pakistan experiences its population growth. With this in mind, development should take some priority over environmental protection. "With population growing and other factors, there is a need to implement some sort of development to eradicate poverty. We might need to focus more on development so people can eradicate poverty, then we can protect our environment," he told me.

During interviews with participants, they all felt the state should undertake dam projects, even though there has been a trend in other nation-states for private companies to build hydropower plants. Now, SinoHydro and Three Gorges Corporation—both of

which are Chinese corporations—are active in Pakistan, but there is not any other private interest in dam construction in Pakistan.

"It's always going have to be built by the government," Hamid Ali told me. Part of this is because of disaster risk. Since 2010, Pakistan has experienced high-risk floods, and this is concerning for private enterprises that are investing in a six to seven year project, he said. The other reason why the government must take the risk of dam construction is evident with the fact that there is a security concern that affects foreign investment despite Pakistan's potential investment opportunities[5] (Khan & Ullah, 2015).

"If you look at the floods that Pakistan has experienced—the 2010 and 2013—they were so devastated that so much water was wasted and went to the sea," Abdul told me. An important aspect of this quote is that he referred to water being wasted by going to the sea. For those in the Sindh region, it is important that the Indus flows to the sea for the health of the Indus Delta. Before the 20th century, average discharge of the Indus was 3,000 cubic meters and a silt load of 250 million tons per year. Continued construction along the Indus River resulted in deterioration of the Indus Delta, which results in sea intrusion, since sediment is not able to flow from the mountainous ranges to the delta (Syvitski et al., 2013; Kalhoro et al., 2016).

Climate change and water solutions

During my internship at the Sustainable Development Policy Institute, I attended a presentation led by a researcher from SDPI regarding the near future of water scarcity in Pakistan. Essentially, the researcher argued, if planetary carbon dioxide levels do not

[5] The issue of security and investment is discussed in Chapter VI with CPEC and security.

drastically change, Pakistan will experience a totally different rainfall pattern that will decimate its agricultural sectors, which includes its cotton industry. It was an ominous future the researcher was describing, yet for other researchers it was news they were used to hearing.

The higher rate of melting glaciers in Pakistan is another issue the country faces and will directly impact the amount of flow in the Indus River System since it is glacier-fed, in addition to monsoon and snowmelt. World Bank researchers estimate that glacial runoff contributes 19.6 MAF to the total flow of the Upper Indus Basin (Yu et al., 2013). In other terms, Pakistan's glacier area covers 17,000 km^2 and is the largest mass of glaciers after the north and south poles. Glacier melts feed into more than fifty rivers in the country. In the absence of glacier melt, river flows will be hindered and significantly affect agriculture, industrial and residential water consumption, and hydropower generation (Rahman & Shaw, 2015). The glaciers are currently experiencing melting due to climate change. Warmer temperatures have been consistent and are projected to increase exponentially, which will affect the Himalaya-Karakoram-Hindu Kush glacial ranges. This creates increased stream flow in the country and is resulting in glacial retreating (Rasul et al., 2008). Using glacial melting as a reason for damming does not seem as an appropriate measure for the country for Bina Siddiqui. The country has not even measured the total area of glaciers in the country, she told me, so the government does not know how much will melt.

"Climate change will push Pakistan into a water starved category. To mitigate this, we need more reservoirs. Maybe not dams, though," Bina Siddiqui told me. She is wary of dams because of the high cost that is associated with them. Therefore, even in a

climate change context, it is not a wise financial decision. Naseer Mirza, the civil engineer working with LEAD and WWF, agreed. With a country that has a high per capita debt, accepting foreign aid has costly strings attached. It means following along geopolitical strategies set forth by the donor. "There's a political price, which is not often accounted for." For example, he said, if Pakistan borrows from Saudi Arabia, then they would be asked to fight in Yemen. In this case, searching for donors to finance dams commits the government to donor conditionality. This concern of Mirza also seems to follow the concerns of Parenti's catastrophic convergence. Parenti (2011) argued that climate violence would amplify during the era of climate change. This could appear as counter-terrorism tactics, as apparent with the continued War on Terrorism that United States involves itself and allies—like Pakistan. That means that, as signified by Mirza, accepting aid and financial support from donor countries can tie the government to increase their involvement in military conflicts.

In short, dams seemed to be too expensive as a saving grace for Pakistan in the upcoming era of climate change. Anwar noted that there were better alternatives than dams. The idea that there were better alternatives to dams emerged to a few other participants as well. Muballigh Mustafa, an academic who works out of England but frequently travels to Pakistan for research, was cautious in considering dams as sustainable or even renewable energy. For him, he said dams are too costly infrastructure for a climate change future. In addition, Mirza told me that if Pakistan were truly concerned about becoming water stressed, the government would consider confronting the water losses that occur from its canals. Overall, relying on dams is problematic for Mirza because "climate change can deceive you."

Dams and natural disasters?

Malik said when engineers rank floods, they do so based on statistical occurrence. Through this statistical ranking system, a 1:1 flood is annual. The floods of the past few years, he said, were a 1:10,000 year floods. Because of this, Pakistan needs to be prepared for more frequent floods, otherwise there could be massive population displacement. "What would have to be? A migrant society?" He asked me. "These floods happen and for that you have to be ready." In this sense, dams should be a higher priority than protection of the environment because it can provide a sense of existential security.

When asked if dams could manage against natural disasters, participants remarked they saw natural disasters caused by humanity. Dams, for example, can cause disasters. However, the role of dams could also provide a "buffer," as Abdul told me, for floods. He referenced the 2010 and 2013 floods in which water was "wasted and went to the sea." Despite a buffer role, dams need to be carefully designed in terms of where they will be located otherwise they could be deadly due to either increased snowmelt or earthquakes. Abdul also looked back at an incident decades ago when he said management was not trained for deciding on releasing flows. "He had to open the gates and many people died and lots of property damage as well. It's difficult to predict natural disasters and on the climate side…" he told me. Nevertheless, he sees it as a necessity in the era of climate change, especially as drought increases in Pakistan.

In addition, Hamid criticized the role of dams used for flood management and the motives of those who managed the planning process of dams. He pointed to Tarbela Dam

as proof of an ulterior motive. Before the construction, about 300,000 cusecs[6] would run through the Sindh province every year. During flood seasons every 15 years, about 500,000 cusecs would flow and did not cause much damage. This flow of water and sediment was the basis of the province's agriculture industry. It recharged groundwater and provided silt and sediment to Sindhi farmers. After Tarbela was constructed, however, this changed. "You never know what you get… All [dam management officials] do is distribution for irrigation. That is the priority," Hamid told me. His concern was that those who control the dam flow release only divert for irrigation and have ignored ecological or socio-economic concerns for water. It is a primarily technical approach to floods and water resources management, he said.

Before I left my interview with Hamid, he provided me with some research[7] he wrote about dams and Pakistan. His research provides an augmentation of what he spoke with me about since he had published these articles to raise awareness about the damage dams have done for so-called technical development. His research discussed how damming on the Indus River System has in reality worsened floods in Pakistan. There has been flood plain settlement where the Indus River System would flow through. This is a large reason for increased flood damage. Furthermore, the removal of forestlands that would absorb some of the floodwaters has been removed because of development.

Without water management tools, all is lost

In the previous section, I discussed how dams are observed at the intersection of climate change and politics. Professionals I spoke with either applied a technical argument in

[6] A unit of flow equal to one cubic foot per second
[7] To maintain anonymity of this participant, I will not provide a citation for his research.

why hydropower was a more sustainable option for Pakistan or critiqued support for dams as a narrow and technical mindset. In this section, I will present observations and themes that supported increased water resources in Pakistan.

There is a management problem right now in Pakistan that is necessary for large-scale dams. Abdul said for large dams—such as Mangla and Tarbela—the country needs outside expertise to manage the dams. Without the expertise needed, it can increase the problem of dam failure. Mirza already considers dam management in the country abysmal. He told me that dam management does not have an understanding of the benefits and costs of the dam.

At the Lahore University of Management Sciences (LUMS) water conference, speakers reminded water professionals and students in the audience of the importance of water management throughout the country. Those attending the conference seemed to not have any faith in the government to spearhead proper, neutral water management strategies undertaken by Pakistan. This aligned with some participants I spoke with when they pointed to the poor state of Pakistan's canal system and the amount of water that is lost in the system from poor management and seepage. Without these water resources management strategies, investing in large-scale infrastructure was futile. However, the conference discussed how LUMS students are confronting this water resources management problem. During a classroom visit, LUMS students presented drone cameras that were controlled through Microsoft XBOX 360 video game consoles. The purpose of the drone camera was to fly along canals to observe how much water was flowing in it at a given time. Furthermore, it would inspect the state of the canals.

The World Wildlife Foundation of Pakistan and Nestle sponsored the conference. Although members of the conference spoke dismissingly about Nestle and its history with Lahore, a tour of the water treatment center provided participants a chance to observe how Nestle, a multinational corporation based in Switzerland, sells bottled water to the nearly 10 million people who live in Lahore. Nestle arranged for the conference attendants to visit their water treatment plant in Sheikhupura, an industrial city outside of Lahore. The tour illustrated the company's dedication to treat water and its bottling practices despite the falling water table where the treatment facility is located. The purpose of the field trip was to observe a solution to water shortages and how the multinational corporation treats water that is otherwise brackish and polluted. What motivated the tour was for the company to showcase its state-of-the-art methods in water treatment and the group I was in was pressured to not leave until reporting to the marketing and communications department of the impression the plant had on us for a public relations video.

Although Nestle considered their water treatment to be a success for the Lahore region, the broader issue of privatizing water resources in the country will not occur in the country, according to Hamid Ali. He told me that Pakistanis are terrible with how they appreciate water. "As a nation, the whole nation throws water away… since water is seen as a free commodity and unlimited." However, if a private organization were to build a dam and sell the water as irrigation, he said there would be outcry. At the same time, he added that the concept of buying bottles of water was a foreign concept 20 years ago, so there is a possibility that the country would be convinced to do so. Nevertheless, Pakistan remains a country that is inhospitable for foreign direct investment. In the end,

he said people are not mentally ready for privatized water markets and the government is not willing to attract the necessary private investment, domestically or foreign.

Politicians are uninformed

In the previous section, I discussed the technical justifications professionals apply when discussing dams as sustainable infrastructure. Considering all of what these professionals mentioned about dams and sustainable development, politicians in Pakistan do not comprehend this technical justification for dams.

Imran Niazi is a consultant with a Chinese dam construction firm and former politician. When he talked about the current Nawaz Sharif administration, he criticized it for not relying on actual scientists or professionals in their decision-making process. Rather than relying on their opinion or expertise, Nawaz Sharif appointed politicians to lead government ministries. By doing this, he said the government is looking at the short term instead of working toward development that actually works. In short, this has fostered an environment in the government that prioritizes planning according to political discourses rather than planning according to science.

Hamid Ali agreed with this when he told me that he views politicians as a group that focuses on elections rather than long-term projects. This is how the government has worked for the past 30 years, he said. Hamid Ali added that technocrats and bureaucrats are hesitant to change the system of governance in Pakistan because they are happy with the system. "Since they are not very close to the people, they are not aware of how people are affected," he told me. Furthermore, the priorities of each political party are to contradict the opposing party's policies, which does not move the country forward, he

said. In this case, technocrats and bureaucrats take advantage of a poisonous political system that is not productive to prove their discourse is better for the country.

The 18th Amendment in the country is an example of the government being too afraid to govern, Hamid Ali added. One aspect of the 18th Constitutional Amendment was that the Council of Common Interest (CCI) was responsible to settle center-province or inter-provincial conflicts over water resources management. Membership of CCI consists of chief ministers from all four provinces and four members nominated by the Prime Minister (Zahid, 2013). He said the amendment empowered each province in the country to have more autonomy, but not to deal with bigger issues that are apparent in environmental issues. This also made constructing large-scale projects a bigger problem. This is part of the reason why dams near provincial borders—like Kalabagh Dam—are politicized: because the federal government gave too much power to the province. Hamid Ali does feel hopeful with Pakistan's history with negotiations, as long as there is a strong government. Furthermore, since "the water of Punjab" was given to India after the Indus Water Treaty, Hamid Ali told me that Pakistanis and politicians need to be reminded that infrastructure should ensure enough water for all.

Abdul echoed Hamid Ali's concern about the 18th Amendment. Although the 18th Amendment did allow for provinces to develop their own small- and micro-scale dams, it was not addressing the shortage that is present at the national level, he said. Abdul said there had been a lot of projects in hilly areas that produce enough electricity for small villages and the energy does not connect to the national grid.

Civil Society's impact on state officials

Hamid Ali recognized that civil society experiences a barrier in informing politicians and the population. Over time civil society has become more empowered, but he said technocrats and bureaucrats in the government are too comfortable with their position in power. Furthermore, he added, these people in power are detached from everyday Pakistani lived experiences.

> The bureaucrats come from a particular place and then come to Islamabad after a long time working in other areas. By the time in Islamabad, he is aged and has served a long time in the bureaucratic channels. They become the habit of bosses so on a technical matter, it's their product and their area and they are not sensitized to climate change and the environment.

Nevertheless, he said, civil society has made some strides in democratizing Pakistan in terms of providing different perspectives in decision-making roles. He recalled that in 1992, there were not any environmental seats in governmental agencies. However, that changed after the international nongovernmental organization International Union for Conservation of Nature published a report about environmental impacts in the country.

Mirza added that civil society organizations have had a positive effect in shedding light on the socio-economic effect that development projects have on populations. With work that International Union for Conservation of Nature, World Wildlife Foundation, SDPI, and LEAD has published, he said that policymakers could not ignore ecological and socio-economic issues—but he still recognized that it would be a while until it is made a priority. Despite an overall pessimism that seemed present in how participants talked about how civil society is ignored by policymakers in government, there seemed to be a glimmer of hope that they are in fact listened to.

"Actually, civil society is very biased," Fazlullah told me. Because Fazlullah mentioned that civil society organizations are biased, they do not distribute neutral information to policy makers and decision-makers that can be considered apolitical and therefore used in rational policymaking. "When you talk to someone in Punjab, they will say they need the dams to control the river flows. In Sindh they always complain and say that the water is diverted too much in Punjab," he told me. The location of a civil society organization therefore taints its reputation as knowledge that bases its discourse on politics rather than technical data.

Furthermore, he added, in his experience working in the government, he never consulted any professionals outside of the state. Yet, state officials claim they have consulted with outside professionals for the China-Pakistan Economic Corridor (CPEC)—which seems untrue to him. "When you talk about CPEC, I talk to civil society a lot and people don't like it." Anwar agreed that although civil society organizations are raising awareness about issues in Pakistan, government officials listen—but don't pay attention.

Nevertheless, the role of civil society organizations has played a small, yet impactful, role in steering government policies, Bina Siddiqui said. Just in Islamabad, she said, organizations have reversed decisions that were made top-down that would cause environmental harm. A case that she provided an example of was some projects that would have degraded the Margalla Hills, a hill range that is a part of the foothills to the Himalayas located outside the city of Islamabad. The courts ended up invalidating the development projects, she said.

Civil society organizations have therefore been able to change how the argument is conducted in Pakistan, Abid Mustafa said. He said that these are organizations that are providing research for public consumption is different from WAPDA. He was still critical about these civil society organizations, however; he still saw it as a positive thing that they were changing the conversation.

Dams as sustainable development

Sustainable development is a concept that all professionals interviewed have similar perspectives. Technical aspects of a project emerged from their definitions, as well as the idea of environmental sustainability and it justified the support of dams as sustainable development. However, politics does emerge as a larger role rather than within just one component, however. It is evident in each aspect of their definition. Therefore, sustainable development principles do illustrate a need to include political discussions into planning, which complicates the view of supporting a project just because it is viewed as a technical solution.

At first, it seemed that defining sustainable development was a straightforward thing for participants. In order to be considered as sustainable development, according participants, there are technical aspects each project must meet: it has to provide low tariffs for consumers, it must not affect the environment, and operate for a long period of time. With these aspects, participants felt confident in suggesting dams as a form of sustainable energy generation. But there is also a political aspect to it that needs to be confronted whenever implementing development projects, they added. A sustainable project must not jeopardize political factors within the country. Now this was an entry

point into looking at how politics can play a role in an otherwise technical project. As one participant said, politics of uprooting a community who held a particular piece of land for centuries can undermine a whole project.

After an exploration of maintaining a stable relationship between the state and its population, it becomes clear that the other components have political dimensions to them as well. Although sustainable development definitions were meant to be technical, component to it as well. Dams are considered to provide low cost rates for tariffs when compared to solar and wind. Many participants did not believe that solar and wind can provide a low rate for consumers. If there is not a low rate for consumers, it is very likely that energy theft will either increase and/ or there will be political turmoil in elections. This means that support for dams and the technical feature of dams to provide low cost rates for consumers has a backdrop of politics in its discussion, especially when solving the energy crisis and reducing the cost of energy to benefit the industrial and residential users was a campaign promise by Nawaz Sharif (Dawn, 2015).

Each participant included the environmental health of the country into their definition as a way to ensure that development projects do not overexploit natural resources. This can also be seen as a factor that has a political nature to it since downstream effects can amplify any political conflict, especially in a country that has an already-strained interprovincial history. Within Pakistan, upstream development of dams has not only provoked suspicion of the province of Punjab attempting to grab more political power in the country but also weakening the economic performance of the province of Sindh's agriculture[8] by affecting the flow of the Indus System. To support

[8] More about this will be discussed in Chapter V with the case of Kalabagh Dam.

dam development therefore supports environmental degradation experienced in the Sindh province. Now, this seemed to be noticed by some participants. That is why there seemed to be many calls for national unity under one Pakistan rather than a continuation of fragmented regional politics.

The contentious history between India and Pakistan and the loss of the three Indus System eastern rivers to India represents an additional ongoing environmental political issue that should be taken as a cautionary story according to some participants. The international concern for upstream development is apparent in the hydropower development that India led.

Going further with their concept of sustainable development maintaining a political dimension is evident in the argument that dams are justified as a more sustainable development approach that is more efficient than solar and wind based on an economic perspective. As O'Brien and Roberts (2010) discuss, it is impossible to separate politics from economics and vice versa. For these participants, the opportunity cost of pursing other renewable energy projects over dams is an opportunity cost that is too high for the country.

Participants told me that Pakistan has regions that would be advantageous for solar and wind energy development. "Pakistan is not ready to develop these technologies," Fazlullah Qaisrani told me. This concern is based on importing these technologies and expertise from other countries in order to establish a large-scale project. Others told me it is fine if you are putting in a solar panel in a village to power a cell phone or fan during summer, but it cannot be enough to solve the country's energy crisis.

However, other participants had informed me that foreign expertise is needed for large-scale dams.

Sustainable development was thought to be a rather technical definition, though there was some acceptance that politics had a small part in making something sustainable. Through examination of participants' definitions, it is possible to see a political backdrop in each variable of the definition of sustainable development. After this, it is reasonable to see why Abid Mustafa did not want to discuss dams as sustainable development but rather as renewable energy generation.

Conclusion

In this section I threaded together the views of participants who participated in my study. Their views showed that there is support for dams as sustainable development and during the climate change era. However, the way in which participants supported dams as sustainable development involved mobilizing technocratic discourse that both supported dams and critiqued those who relied on politics to oppose dams. In the following chapter, I discuss how technocratic support does, in fact, have a political dimension to it. In a way, it aligns with Burris' (1993) argument that technocratic discourse does in fact engage with political discourse.

CHAPTER V

TALE OF TWO DAMS:

KALABAGH AND DIAMER-BHASHA

So far, I have shown how technocratic knowledge has had a privileged role in Pakistan, as apparent in Chapter III. That was evident in the role that technical knowledge played in motivating the negotiations between India and Pakistan kicked off by the founder of Tennessee Valley Authority, David Lilienthal. Dams were central to Lilienthal's argument, just as it was for Pieter Lieftinck in his World Bank-funded research of the water resources of Pakistan. This development discourse has continued throughout Pakistan, as apparent in the Planning Commission's *Vision 2025* report and WAPDA's Vision 2025 strategy. In Chapter IV, I discussed the primary data I gathered through field research in Islamabad and Lahore, Pakistan.

In this chapter, I analyze data I gathered to show that although development discourse in support of dams as sustainable development within the context of climate change is portrayed as something technical and apolitical, there is in fact a political dimension within this discourse. Interestingly, although Lilienthal aimed for dams to be a vessel to make the Indus River System a natural space rather than water resources split by political demarcations, he worked with Cold War politics in the background of his otherwise "common sense engineering" principles. This foreshadows the research I conducted in Pakistan. Water and energy experts I spoke with said that professionals in Pakistan have a belief that dams are infrastructure necessary for Pakistan to develop sustainably and for in bracing themselves for the climate change era. Although this discourse aims to be technical and apolitical, this discourse indeed engages with political

discourse. In this case, the two dams of Kalabagh, located in the Punjab province near the border of Khyber Pakhtunkhwa, and Diamer-Bhasha Dam, located in the northern region, serve as an illustration of this discourse.

A Tale Of Two Dams

There was nothing wrong with Kalabagh Dam. It unfairly became political. That's what some professionals thought when Kalabagh Dam emerged during conversations. At the root of the problem is that Pakistanis refuse to see themselves united under one national identity, according to Hamid. Of course, to argue that Pakistan has a national identity problem is to pull at a thread that consists of a large library of literature that confronts that issue, though this is outside the scope of this thesis. However, it seems that professionals in this case argued that Pakistan should see itself as one country under a national identity of technocratic-led development.

In this section, I discuss the cases of Kalabagh Dam and Diamer-Bhasha Dam. The issue of Kalabagh Dam became political, some participants said, although there was nothing wrong with the project. On the other hand, participants spoke less about Diamer-Bhasha, which is located in the northern region of Pakistan. Nevertheless, the discourse that emerged about these dams serves as an illustration of how technocratic perspectives engage with political discourses.

Kalabagh Dam

Engineering firms began to search for the best site for the Kalabagh Dam in 1953 and two sites were found, which were within 10 miles of the current location (Nawaz, 2011).

More than 10 years later, Kalabagh emerged once again as a viable dam, but Tarbela Dam was prioritized instead since it was more advantageous. This decision, according to Pieter Lieftinck's (1968) World Bank report, was because Kalabagh Dam was more susceptible to silt, therefore affecting potential power generation, compared to Tarbela Dam. Putting Tarbela and Kalabagh Dam side by side, Lieftinck wrote, it would be a more financial-wise decision to construct Tarbela Dam before Kalabagh Dam. Kalabagh Dam's construction, due to its controversy, remained dormant until President General Pervez Musharraf advocated for the construction of Kalabagh Dam in 2005 while in Nowhsera, the town that would be affected by the dam's construction (Dawn, 2005). However, three years later when the Pakistan People's Party came to power in 2008, WAPDA Minister Raja Pervez Ashraf said Kalabagh Dam would be shelved and the money reserved for the project spent elsewhere (PakTribune, 2008). Most recently, the dam has been listed as a project that is ready for construction, according to the current government (Khan, 2016).

The technical specifications of Kalabagh Dam are fourfold. The first purpose was that it would provide 6.1 MAF of excess water storage that flows down the Kotri Barrage that would assist other dams that are increasingly burdened with siltation. Secondly, through canal irrigation, it would provide 2.4 million acres of new farmlands. It would also have the generation potential of 3,600 MW of hydropower. Lastly, it would provide flood control, which the Government of Pakistan said uncontrolled floods result in 35 MAF of waste to the sea (Ghazanfar, 2008).

Figure 4: Location of Kalabagh Dam and Diamer Bhasha Dam. Source: Author.

The former chairman of WAPDA, Zafar Mahmood, wrote a recent article in 2016 to separate the facts from fiction about the dam. For Mahmood, he felt frustration that many vilified the Kalabagh Dam and all provinces supported the Diamer-Bhasha Dam, despite being on the same river and providing the same functions (see Figure 1). WAPDA is still, nevertheless, dedicated toward publicizing the benefits of Kalabagh Dam, which has been embroiled in political controversy for more than 30 years. The article series was written because he felt that the "media can play an effective role to bring real facts in the domain of public knowledge" (Mahmood, 2016). It is worth

mentioning the fallout of that occurred after Mahmood wrote the article. A month after writing it[1], he was pressured to resign as chairman because of Prime Minister Nawaz Sharif's discomfort over the support of Kalabagh Dam (Hasnain, 2016). Ironically, the point of the article was to extinguish some of the politicization of Kalabagh Dam, yet it resulted in Nawaz Sharif reacting politically by requesting the chairman's resignation.

Kalabagh Dam's technical specifications offer Pakistan a lot, which is why many talk about it. Whenever I spoke with Pakistanis about why I was in their country—since an American in their country often brought interest into why I was there—the issue of Kalabagh Dam would emerge. For some, it was an essential element of water resources development. It would provide the country with the needed electricity and irrigation. In addition, it provided a way of maintaining water resources since India is perceived as illegally diverting water that does not belong to them. On the other hand, others viewed the dam as a historical continuation of power abuse at the hands of the Punjab province against Sindh. In this section, I will discuss how professionals viewed Kalabagh Dam. Although I did not include a question about Kalabagh Dam in my interviews, each participant nevertheless brought it up.

Diamer-Bhasha Dam

Before I left for Pakistan, I met with a faculty member from Karakoram International University, which is located in the province of Gilgit-Baltistan, the northernmost province of Pakistan. He told me how great the Diamer-Bhasha Dam would be for

[1] The 26-part article that appeared in *The Nation* from May 31 to June 25, 2016.

Pakistan. With the dam constructed, it would provide irrigation for the country so it could increase some of its agricultural exports.

Diamer-Bhasha does not face any similar criticism that Kalabagh faced, though, as a former WAPDA chairman noted, it is a similar dam (Hasnain, 2016). Diamer-Bhasha is located 315 kilometers upstream of Tarbela Dam and 180 kilometers downstream of Gilgit City, the capital of the Gilgit-Baltistan province. The dam, projected to be 272 meters tall in height, would feature a storage capability of 6.4 MAF. It would also generate a potential 4,500 MW. In addition to providing flood control, it would also prolong the life of the Tarbela Dam.

WAPDA presents this dam as necessary clean energy as well as a project that is needed to assist the country's strategy in establishing food security. In WAPDA's 2014 annual report, the organization said Diamer-Bhasha Dam was a necessary project to provide irrigation for the agriculture system, the "backbone of Pakistan's economy" (2015, p. 64). However, the dam has a price tag of $12.6 billion, and, although the dam was to be ready in 2016, the project has not finished yet (Kamal, 2009).

Participants who did mention Diamer-Bhasha spoke positively about the project since development in the northern region of the country was a less politically dangerous strategy. Fazlullah said the project would relieve—and therefore protect—the Tarbela Dam. Diamer-Bhasha would relieve Tarbela Dam—and Mangla—of too much siltation, which comprises the electrical generation of these dams.

However, Mirza was critical in terms of the amount of aid that is necessary to pay for the Diamer-Bhasha Dam. "We have to borrow. Someone has to pay. Every Pakistani and unborn have to pay $60 to $70 billion foreign and domestic [debt]. We need to waste

that huge amount? Bhasha is $10 billion," he told me. The United States is one country that has sent financial aid to Pakistan for the project (Obama White House, 2013). Mirza reminded me that receiving money from the United States comes with a cost, which could mean playing a bigger role in the Global War on Terror by increasing its combat role in Afghanistan. Although accepting this project that can be perceived technically as sustainable development and infrastructure for climate change-adaption through irrigation for agriculture, for Mirza, there are broader political issues that are tied with it.[2]

In addition to Diamer-Bhasha representing a broader geopolitical issue, this project also serves as an example of WAPDA's attempt to retain political and development power, Mirza added. If Bhasha is constructed, he told me, then Kalabagh Dam does not need to exist. However, WAPDA wants a dam in the Punjab province, whereas there would be multiple provinces that would share the benefits of the Diamer-Bhasha Dam. This shows how Kalabagh Dam in reality serves the interests of WAPDA, he said, since WAPDA was delaying the construction of Diamer-Bhasha Dam to try and pressure the public into construction of the Kalabagh Dam.

Discussion of themes

Technically, nothing wrong

Many participants viewed the Kalabagh Dam as technically correct and that political discourse had politicized the issue. This politicization overshadowed the importance of the dam for the whole country.

[2] As of March 2017, Pakistan armed forces are now accompanying Saudi Arabia, a donor and a country a participant thought had donor conditionality, in fighting in Yemen.

"There's nothing wrong with it, they will tell you," Mustafa told me. Mustafa, an academic currently based in England although he still travels to Pakistan for research. He expressed concern about how Kalabagh is perceived by experts in the country. These professionals frame Kalabagh Dam as an apolitical infrastructure component rather than accepting there are socio-economic and alternative ways of viewing water. Engineering views, he added, are the only ways of viewing water according to these professionals. With the case of Kalabagh Dam, Mustafa believes technical knowledge is used to assuage the people of Pakistan that the dam could not have any political connotations to it, due to the fact that development founded upon engineering is impossible of political discourse if it is carefully planned.

For Hamza Malik, those who designed the dam did not bring politics into the discussion but the dam became unfairly political. Hamza Malik, once a high-ranking political leader in the province of Khyber Pakhtunkhwa, said one of the political parties in the country used its political power irresponsibly. The Awami National Party (ANP) unfairly had their anti-Kalabagh Dam platform become mainstreamed through a coalition government. Once ANP formed a coalition party in 2008, their anti-Kalabagh perspective represented the whole province. "Out of total registered voters of 10.6 million, ANP got .578 million votes. 5.6 percent of the vote," he told me.

Hamza Malik was the only participant to discuss the ANP and the politics of Kalabagh Dam in Khyber Pakhtunkhwa. Despite the silence from participants on the province's view on Kalabagh, it is important to illustrate how some in the province criticized the project. The ANP, for example, incorporated opposition of the Kalabagh Dam into their agenda as far back as 1988, though Malik criticizes the place of the dam

on their 2008 political agenda. Bacha Khan, one of the leaders of the party, told attendees at the Peshawar convention against the Kalabagh Dam: "I would leave no stone unturned to stop the implementation…. And even would be happy to sacrifice my life in resistance… Moreover I also consider the dam as the conspiracy by the Punjab government against the smaller provinces" (Muhammad, 2012). What the excerpt from Bacha Khan illustrates is that the ANP opposition to the Kalabagh Dam shows more than just political opportunism but it is a legitimate concern of an imbalance of representation compared to the federal government and the Punjab province's intentions of the Kalabagh Dam. This is evident since chief ministers of Khyber Pakhtunkhwa and Sindh believed they were not included in the preparation of the Kalabagh Dam when five consultants developed project proposals (Muhammad, 2012).

The technical features of the Kalabagh Dam could also manage any environmental concerns that Sindh may have about seawater intrusion in the Indus Delta, according to Majid Ibrahim.

> Water is needed to go to the sea—and I have to be careful when saying lost to the sea. So we need to protect the Indus Delta. Lots of sea intrusion. I am convinced of this even if it gets me enemies in Sindh. If we had Kalabagh, it would have stored enough water and could've sent enough water to enough stakeholders and satisfied all these users. We need 10 MAF to the sea. We have to release enough at the right times to make sure that it's sustainable. So that's the idea of the dams to me at least. These dams act as your saviors of the environment as well as your own life. That's why it's the lifeline.

In this case, Kalabagh Dam is presented as a way of operating as a mechanical river. By this, I mean that Kalabagh Dam is thought of as a way to not only work to provide water resources but also provide enough water necessary to mitigate any environmental crisis that will occur from continued damming along the Indus River and the Indus Delta. Kalabagh is additionally thought of as a way to assuage tensions between the provinces

of Sindh and Punjab. As discussed in Chapter I, Sindh and Punjab are two regions that have had a problematic history. Much of this has to do with the Punjabi domination of military and government bureaucracies, and WAPDA is included since its headquarters is located in the Punjab province. Jaffrelot (2015) recalled that Muhajirs[3] looked down on Sindh as a backwater of the South Asian subcontinent and felt superior to Sindhis. This tension then percolated to hatred. This was further exacerbated through the shifting of Pakistan's capital from Karachi in Sindh to within the Punjab province and Sindhi marginalization in the Pakistani military, among other factors (Jaffrelot, 2015). Because of this historical drama between the Punjab and Sindh provinces, technocratic support for Kalabagh Dam accuse protestors continuing a historical political debate rather than sticking to the technical facts. However, it is possible to see that support for Kalabagh Dam does follow a business as usual attitude to the issue.

Interprovincial relations

The provinces of Sindh and Punjab have had history of political conflicts that roots back to the British Punjab (Jaffrelot, 2015). Kalabagh Dam, it seemed from talking with professionals, is a continuation of the strained relationship between the two provinces. Although participants were focused on Sindh and Punjab, there was not any discussion of Khyber Pakhtunkhwa and the effect Kalabagh Dam has on the region. Khyber Pakhtunkhwa, the western neighboring province of Punjab (see Fig. 3), is affected from the development of the Kalabagh Dam. Considering the role of Punjab, Sindh, and

[3] Migrants from India to Pakistan during Partition.

Khyber Pakhtunkhwa, Kalabagh Dam is an illustrative example of how dam development can strain interprovincial relations in Pakistan.

"Kalabagh is not a technical but political problem. If we saw [Pakistan] as one nation, it wouldn't be such a problem," Hamid Ali told me. Political unity through appreciation of technical knowledge was also examined by Ghazanfar (2008), who said no one province should dictate which project should determine national interest, Hamid Ali argued that the rest of Pakistan should follow this dam project that would be located in Punjab. The political conflict about the Kalabagh Dam is continuing the energy crisis in the country, he added.

Within the province of Sindh, opposition for Kalabagh Dam is a product of the Sindhi wealthy landlords reinforcing their power. Because of this wealthy class, the rest of the province has ignored the technical benefits since they do not need the benefits, Hamza Malik said.

> The landlords don't want it. They already have the water. They don't need water… They don't pay bills off electricity… It doesn't benefit them. They live in towns that are not flood prone. What Kalabagh will do won't benefit them. Secondly, it gives them an opportunity of opposing because they have sort of taken over millions of acres of land in the riverbed of the Indus. And to them, flooding of Indus is more important than control of Indus.

Kalabagh Dam for Hamza Malik is a continuation of the wealthy exerting their power to preserve their power in the decision-making process in Pakistan. Some landowners would experience some loss of land with the construction of the Kalabagh Dam. However, increased control of the Indus would allow for more irrigated land in Sindh, thus providing increased yields to poorer farmers. However, because landowners would lose some land so the poorer farmers could gain stable electricity, protection from floods, and increased agricultural lands, these landowners have loudly opposed the dam.

Opposition to the Kalabagh Dam is misinformed and this has injected politics into the debate, according to Abdullah. “Kalabagh is nothing more than a political problem. This dam is damned because it has been politicized,” he told me. This political debate over the Kalabagh Dam is putting additional financial strain on the country. He added that millions of dollars has been spent on this project but it cannot be built because of misinformation about the project. If the dam is built, he told me, it would generate profit and repay the money taken out to support the project. However, the dam is delayed, making the country lose money.

Kalabagh Dam has a direct impact on the Khyber Pakhtunkhwa province. The major concern for Khyber Pakhtunkhwa is that Kalabagh Dam would threaten Nowshera town. This is because if there is a high flood, which protestors refer to the flood of 1929, the reservoir of Kalabagh reservoir will affect the water level in the Kabul River, effectively flooding the town. WAPDA, however, cites computer simulations that suggest this accusation is false. In addition, some in Khyber Pakhtunkhwa believe the Kalabagh Dam would submerge 4,500 acres of land. 100 acres of this land is agricultural land. WAPDA once again questions this claim (Nawaz, 2011). Those who are affected by development projects should be compensated, as Hamza Malik indicates. However, part of the animosity those in Khyber Pakhtunkhwa feel about the Kalabagh Dam is rooted in the fact that nearly 96,000 people displaced during the construction of Tarbela Dam still have not been compensated. This is a large part of why there is so much distrust between displaced people, the provincial government of Khyber Pakhtunkhwa, and the federal government of the country (Muhammad, 2012). Kalabagh Dam would dislocate about 34,500 people, as well as an additional number of people who are dependent on the river

for their livelihood, such as fishermen and boatmen (Nawaz, 2011). Because WAPDA objected to these claims, Nawaz (2011) views opposition to Kalabagh as "baseless" (p. 252). However, these claims cited are based on technical discourses, without taking into consideration how, for example, lives are tied to the river and cannot be merely replaced through relocation to a new site. Once again, it proves necessary to state that this background is thought of as politicization of Kalabagh Dam and not a technical matter, therefore not a matter that is necessary to confront.

Part of Abdullah's job is to go out into different communities to inform them about different policies, which includes presenting how dams can be beneficial. He recounted to me about an experience he had when he planned to discuss water conservation strategies within a community.

> They said, 'you are from government to tell us about the Kalabagh… If you build the Kalabagh, then Punjab can steal as much water.' But, today, we have so many checks and balances you can't steal. That mistrust among the provinces has to be removed before you can make large dams. You have to keep hammering your message about these dams: Kalabagh isn't meant to steal. It's to manage.

He added that with water resource management today, it is impossible to steal water without getting caught. In fact, modern water resources management operation systems only make water surveillance more effective.

Imran Niazi is aware of the problem of the general public misinformed with the purpose of the Kalabagh Dam. However, part of the problem, he said, was that there are no longer any trustworthy political leaders in Pakistan. Now, this is a very common sentiment in Pakistan. No matter whom you ask in Pakistan, they will most likely tell you their last great leader was Muhammad Jinnah.

When Ayub Khan accepted the World Bank's offer of financing the Tarbela Dam and Kalabagh Dam, Ayub Khan requested to construct Tarbela first. His thought-process, Niazi said, was that Kalabagh Dam would be easy to build compared to Tarbela. However, Ayub Khan was respected by the people as he had empathy for the people affected by development projects. By the time Kalabagh was approached for development, those affected by the development of Tarbela still had not received their settlements, which also affected how people viewed large-scale development.

Dams must be developed by the government

The Pakistani state, despite the changing nature of the state in the West and most nation-states in the Global South with structural adjustment and other austerity measures, is still thought of as the leading agent toward development. This was evident in my discussions with participants who did not mention scenarios in which private foreign direct investment would materialize in financing large-scale dams. That means, for the most part, the Pakistani state and its government officials—like WAPDA—are responsible for locating the funding through engagement with donor countries or multilateral lending agencies. Because of that, despite attempts of those who support dam development as something technical and apolitical, in reality, it consists of some political discourse.

Whenever I asked participants about private investors financing dams in Pakistan, they said they were not aware of this happening. There are Chinese firms developing in Pakistan, but those are also considered to be products of China's state-led hydropower development firms—SinoHydro, Three Gorges Corporation, for example.

Regardless of policies enacted by the state to entice investors[4], private investors are discouraged by the unstable politics of the country and uncertainty of their rate on return, participants told me. Additionally, there is a lack of faith in WAPDA to transmit this electricity into the national grid for consumers because participants said the agency aims to maximize their ability to control electrical utilities. This all converges into placing responsibility of water and energy infrastructure to the state.

With the government in charge of planning hydropower projects, it therefore makes it receptive to political discourse. There is political discourse, for example, evident in supporting dams on the technical feature that the electricity it generates can provide cheaper per unit electricity than other forms of large-scale energy generation. Revenue from energy rates is how WAPDA maintains infrastructure and uses it to invest in constructing new infrastructure as well (Mustafa, 2011). However, Pakistan—as well as most of South Asia—experiences a lot of energy theft.

Furthermore, dam planning through the government, as Niazi mentioned, utilizes China's state-led firms to construct dams in more politically contentious zones. Most notably, this is occurring in the Kashmir territory with the 969 MW installed capacity Neelum-Jhelum Dam. Fazlullah Qaisrani was aware of this too. He said that Pakistan is unable to plan and construct these dams alone, so they work in a consortium with foreign experts. In the case of Neelum-Jhelum, the government relies on the expertise of the Chinese. Besides providing technical expertise, the Chinese also provide a way for Pakistan to construct this dam without resulting in a bigger political conflict with India.

[4] Pakistan did implement Hydropower Policy 1995 but WAPDA still has the role of large-scale dam development.

Overall, in this section, I showed that since the Pakistani government must engage with dam development, it illustrates the manifestation of politics in the technocratic language in support of dams. Despite shown as technocratic and apolitical, the appearance of the government pursuing these development projects shows it is not just technical discourse but there is a backdrop of politics, which is evident with Niazi's remark about the current Nawaz Sharif administration that has filled positions with politicians that should be otherwise be filled with scientists. This political backdrop continues into the discourse within dams justified as sustainable development.

Expertise, not politics, is needed for planning dams

Although dams are perceived as a technical solution for professionals, politics is in the background of the discussion. This is apparent after an examination of the narratives in their definitions of sustainable development. However, it is also embedded in how professionals view the role of expertise in the planning process of dams.

Before discussing what participants said, presenting what was not said is noteworthy. Professionals who supported dams—and those who did not—said dam planning process in Pakistan is designed without participation from the people. For example, Abdul mentioned that one of the purposes of the organization he works for is to conduct workshops, and, after saying that, he added that he really wanted to start arranging some to inform people about why large-scale dams are necessary for Pakistan. In this case, it seems that rather than gathering data and learning why these people are against dams—or uncertain about them—Abdul's intention to inform them presents a hierarchy of knowledge. This dam process, rather than utilizing sustainable principles

spoken by the participants of being inclusive in the process, instead reflects a process of persuasion.

The concerns of the prioritization of technocrats and bureaucrats in the planning process held by professionals do seem to follow similar hegemonic descriptions of disciplines that Goldman (2007) discussed in his study of how knowledge operates in the World Bank. Abdul mentioned that the Planning Commission did permit including an environmental position in the 1990s. But participants never talked about how the state has included other perspectives. Because of this, it is possible to see how there is a prioritization of knowledge within the Planning Commission and other state agencies.

Furthermore, as Abdul noted, expertise shows there is an importance in choosing where is the correct place to construct a dam. This is especially consequential considering Pakistan is susceptible to earthquakes. It is possible to see this comment as something that prioritizes the discourse of experts in development discourse because, regardless of how populations are affected, the location of the dam is necessary to avoid human-made disasters via dam failure.

Just as the World Commission on Dams concluded, relocation settlements are a part of the planning process for dams, according to the professionals I spoke with. With this in mind, Malik had told me that those who are affected most by a project construction should benefit the most. This benefit would surface once a population is moved from a village to a new settlement that has all of the conveniences of modernity, including hospitals, schools, and other institutions. In fact, Malik told me that he grew up in a village as a way of justifying this perspective. This comment on ushering villages into modernity and education does reflect a discourse that illustrates a hierarchy of

knowledge. It is possible to see discourse supporting the notion of marginalizing local discourses as an exercise of power. For Foucault (1997) power represses groups such as nature or individuals through subjugated knowledge—a whole series of knowledge that is disqualified as inferior to scientific knowledge. In this case, it is evident that supporting dams as development will improve the human capital of an affected population into more productive citizens is an exertion of the government power toward a group of people who are not considered modern by those who plan dams. Because of this, it is then possible to view this as political discourse in what is presented as technical justification for a dam. Malik is not the only one who presented this, however. WAPDA has used this justification in their report on Dasu Dam[5].

Despite so-called politicization of dam construction that emerged around the Kalabagh Dam, Hamid Ali told me that Pakistan always settles its conflicts in the end with negotiations. This comment shows that in order to implement development projects that are perceived as technical decisions, technocratic decision-makers nevertheless use their discourse in political methods.

A political dimension to the technical support of dams emerged when I was told about the importance of water resources management. After speaking with participants, it became apparent that there is an important role for water resources management needed. Through management of water resources, it can ensure that politics does not permeate into technical discussion of dams, which is what Majid Ibrahim implied when he argued that Sindhi protestors are paranoid because it is impossible to steal water during an era where data is found easily. The concept of using technology to observe water resources

[5] See Chapter III

was not just present in the interviews I had with professionals. Returning to the use of unmanned aerial cameras connected to a Microsoft XBOX 360 video game console discussed in Chapter IV, this technology could be used to further the country's ability to justify water deliveries via dams, and it could also represent an ability to empower local farmers and others to conduct water resources management in nearby canals. Since dams are seen partially as a method to manage water flow in the country, the use of drones challenges that top-down solution. Essentially, this could work as a method of using technical methods to support political claims about how dams can deliver reliable water to those who use the irrigation network rather than relying only on expensive dams. In addition, if the cameras are used as a bottom-up approach to holding government accountable, it is once again being used as a political tool.

Climate change and politics

The Pakistan government is a necessary component in dams and development since none of the participants I spoke with recognized private investment as a feasible alternative. This means the state is necessary to find investment, whether it is from foreign states or multilateral aid agencies. However, there is acceptance of the politics attached to these aid agreements whenever dams are supported as an option during the era of sustainable development.

Part of the concern about sustainable development is that it must also not be too expensive to construct relative to other options. What reinforces dams as sustainable is that participants are able to see it as more affordable partly because they imagine the electric rates per unit will be low enough. Foreign direct investment is a concern as well

because participants were not optimistic about any private investors arriving in the country.

In addition, just as a few participants told me, there is a cost of accepting aid. Although constructing dams is perceived as a technical project, it could result in becoming involved in increased military conflicts in the United States' War on Terrorism or to provide military support for Saudi Arabia in Yemen. This also applies to the aid received from multilateral agencies. News reports while I was in Pakistan showed protests about the public owned Pakistan International Airway being privatized at the request of the International Monetary Fund. So it seems technocratic justification for these development projects does come with a cost of the political agenda of whoever is providing the aid. Although dams are presented in a very technical manner by supporters, the means of attracting finances necessary in order to construct the project means it is accepting any strings attached to the aid package. Therefore, implicit in this scientific discourse is acceptance of a geopolitical discourse—such as the United States' War on Terrorism.

While the international community discusses bracing for the upcoming climate change era, Pakistan is still involved with what participants criticized as dirty energy sources that China was invested in. The acceptance of dams that are funded by China is another case that ties the two countries and the politics associated with it. Many participants spoke directly about the China-Pakistan Economic Corridor (CPEC) $46 billion aid deal (CPEC). Acceptance of building dams that have a high price tag means the state will have to engage with China's global politics, and this has already resulted in international embarrassment, according to Bina Siddiqui, during the Paris Climate Talks

in 2015. Pakistani state officials' inability to commit to any sustainable projects is rooted in that if China will pay for any dams, the country will also have to import technology to construct low grade coal power plants. This concern of Bina Siddiqui and other participants about CPEC shows that these are not just technical decisions about specifications of how much a dam will cut down on carbon dioxide. Rather, it becomes politics when the country begins to shop around for a buyer to bankroll the project.

The political dimensions of CPEC emerge once again when considering the amount of money that Pakistan would dedicate to combating militancy along the Chinese-paved route to Gwadar Port. Now, CPEC is not just a road built by China to access the Gwadar Port. The aid package also includes energy and other development projects. In fact, the Government of Pakistan asked China to invest in the Diamer-Bhasha Dam as a part of the CPEC deal (Dawn, 2015). However, after interviews with participants and informal discussion with others showed that it would be commitment of Pakistan in ensuring that terrorism does not affect Chinese goods travelling on the road to Gwadar. This means the Pakistani military must secure this area. As Naseer Mirza discussed, CPEC has the potential to cost Pakistan in terms of military security of the area. Therefore, it is possible to see how otherwise technical projects, like Diamer-Bhasha Dam, possesses a dimension of politics in its construction although these projects are presented as apolitical.

The professional road to Islamabad

Many people often told me there was nothing to do in Islamabad but to shop and eat. Despite this, the city remains an important point for professionals to end up because it is

the location of several central offices of government ministries and the federal government. When I spoke with professionals in Islamabad, many of the planning decisions seemed to emerge from this city of more than two million people. During the professional pathway to Islamabad, professionals noted that government bureaucrats, technocrats, and politicians often lose touch with how people are affected with development, which can be applied to dams. Therefore, we see that by the time government officials arrive in Islamabad, they have become accustomed to making decisions based on technical specifications.

The process of how long it takes a bureaucrat to arrive in Islamabad, the planning center of the country, is worth noting in that it seems to remove a people-centered approach to development. It takes several years to earn the opportunity to live and work in Islamabad for a bureaucrat. By the time that person is in the city, the person is more likely to be separated from how many Pakistanis in the country live, as Hamid Ali argued about how one makes it to promotion in Islamabad. These observations of bureaucracy and technocracy in Pakistan held by participants illustrate some parallels with Max Weber's theory of bureaucracy. Most notably, it appears many Pakistanis begin public service in regions outside of the capital. For example, Hamza Malik proudly told me that he was born in a village and was able to advance to high political office. Therefore, once someone makes it to Islamabad, that person has the rules of decision-making cemented into their minds. This does fit in with some of Weber's ideal characteristics of a bureaucracy. Specifically, the second principle in which there is office hierarchy that "stipulate a clearly established system of super- and subordination in which there is a supervision of the lower offices by the higher ones" (Weber, 1978, p. 957). The move

from what are then perceived as lower rung offices to Islamabad is a representation of a hierarchy. This move up the professional ladder does show that, if Weber's theory of bureaucracy holds up, professionals do give priority to technical knowledge within one's bureaucracy over offering an inclusive perspective on dams and development, especially when considering that the fifth principle of Weber's theory states that "official activity demands the *full working capacity* of the official" (p. 958).

Conclusion

In this chapter, I presented a discussion about two dams, Kalabagh and Diamer-Bhasha. These two dams evoked a different reaction from each of my participants. I did not ask any questions about Kalabagh Dam to any of the participants in the study, yet it emerged naturally each time. Participants argued that Kalabagh Dam is a project that does not have politicization features in it. Rather, opponents invented political dimensions to Kalabagh Dam. On the other hand, Diamer-Bhasha Dam was only spoken about with a few participants and was talked about in a much more positive light.

CHAPTER VI

CONCLUSION

The purpose of this study was to examine how professionals in Pakistan viewed dams as sustainable development and climate change-adaptive infrastructure. This thesis provided an answer to this research inquiry. Professionals view dams as a technical, apolitical response to sustainable development in a climate change context. The point of illustrating this is that this otherwise technical discourse has a political dimension to it. This has been apparent in Pakistan's history; it is not a new phenomenon. As I discussed in Chapter III, technical knowledge had a privileged place in decision-making. This was evident in David Lilienthal's intervention between India and Pakistan before they warred over the Indus System basin, which is located in contested Kashmiri territory. In Chapter IV, I discussed themes that emerged from my semi-structured interviews with professionals in Islamabad and Lahore. In Chapter V, through discussion of the Kalabagh Dam and Diamer-Bhasha Dam and extrapolation of the interviews I conducted, I discussed how this technocratic discourse in reality contains a political dimension to it.

This thesis also serves as a way to nuance the Pakistani professional, a departure from how Ahmad and Rashid (2011) view them. Professionals' perspectives on sustainable development shared similarities. Essentially, for a project to be considered sustainable, participants told me that energy projects must function for a long period of time and does not put jeopardize the existence of natural resources. However, I was also told that energy projects should not be politically divisive. From there, participants were divided on dams as sustainable development and climate change-adaptive infrastructure. Some felt that dams are technically right for the job, especially when water resources are

perceived as the country's main natural resources. On the other hand, as I learned with the case of Kalabagh Dam, dams can place political stress in the country. This may be because Pakistan does not see itself as a united country with a shared idea of nationalism, as one participant said. Or it is because building dams puts the upstream community in a higher place of power, as another participant said, drawing a parallel to India and Pakistan.

Political discourse attached to international development discourse affects the country as well. Conferences that debated the place of large-scale dams in development was an affront to reasoning for Hamza Malik, who said if these projects were so dangerous, India, the United States and China would have been destroyed. Interestingly, Bina Siddiqui told me how embarrassed she was during the Paris Climate Talks in December of 2015. In that case, China dictated how Pakistan behaved because Pakistani leaders did not want to jeopardize any development projects from the CPEC aid package.

With this thesis, I hope to have illustrated that professionals hold development discourses that are not just reverberated from international finance institutions, such as the World Bank. In fact these professionals' discourses are used as a way of criticizing the government's plans of development at times. To be sure, these participants do find that the Government of Pakistan decides policy in a top-down manner—even those who support dams criticized the government for this. Furthermore, throughout this thesis, I discussed how technical discourse utilized by professionals does have a political dimension to it. Therefore, I do believe it would benefit the country, especially when considering sustainable projects are those that last a long period of time, if technical discourse were not relied upon as apolitical. By doing so, it moves toward removing that

technocratic knowledge that is used as power against those who are affected and feel unable to be included in the dam development process. This is something that the World Commission on Dams felt was necessary as well (WCD, 2000).

Making sense of politics in technocratic discourse

Illustrating political dimensions that are evident in these supposed technocratic discourses is important to do in order to question the role of scientific authority in a modern democratic government. As a way to wrap up the importance of indicating the political dimension in these discourses, in this section I discuss the significance of these discourses being political. I aim to make sense of the politics in the supposed technocratic discourse used by energy and water professionals to support dams as sustainable development in Pakistan. This is what leads me to finding how this technocratic discourse exerts power by relying on the nature of authority that comes with science, how it shapes dams as the more efficient form of development, and how it is used to dismiss those who argue against dams.

First, it should be discussed what happens when science attempts to create specific political outcomes, as attempted by these technical discourses. When science is used to inform decision-making, it is referred as following a linear model. In other words, political debate focuses on science rather than discussing possible alternative actions. This is because science is uncertain in its nature and there is a diverse body of scientific findings to support any political agenda (Pielke, 2004; Bijker et al., 2009). For example, examining Majid Ibrahim's belief that since science supports dams as sustainable development, public opinion should therefore support this development shows a form of

the linear model as discussed by Pielke (2004). The result of this linear model is that it is more effective in bringing politics into science rather than science into policy. This is because science plays the central role in a political battle (Pielke, 2007).

Moreover, Pielke (2007) argues that scientists who seek to mobilize science discourses with the intention of bolstering support for policy decisions already made—such as policies on dams—serve as "Issue Advocates" (Pielke, 2007, p. 118). This form of scientist typically aligns with a group and aims to advance this group's interest through engaging science and decision-makers through which this scientist also participates. As an issue advocate, working toward political advocacy, a reduction of the scope of choice in decision-making is the result.

Asking why scientific discourses are mobilized to support dams as sustainable and climate change adaptive infrastructure is an important question to ask. Those who supported dams used perceived technical discourse in a political form. This resulted in shutting down "biased" civil society groups and opportunistic politicians in Khyber Pakhtunkhwa, as participants told me. Now, this is a common characteristic that Pielke (2007) finds in the dismissive use of "junk science" versus "sound science" (p. 126). The problem with this is that political debates focus on whether the science is sound or junk rather than focusing on specific policy alternatives (Pielke, 2007). The use of dismissing contesting discourses as "junk science" is a way to exclude others from having legitimate arguments against dams as sustainable development, which is what I encountered whenever participants would refer to environmentalists in favor of small-scale dams as misguided science due to the flow of the Indus River.

Because it is evident to see that politics is apparent in the technocratic discourse in support for dams as sustainable development, it is important to see what it means that this discourse should be considered political. Continued reflection on Pielke (2007), it is possible to still agree there is science in the discourse participants in my study used to support dams. However, this science is used for issue advocating. In this case, it is possible to see that these professionals utilized technocratic discourse to mobilize science in favor of limiting the scope of policy options toward dams for sustainable development, an already existing policy within Pakistan.

In order to categorize professionals, who support dams as sustainable development, as "Issue Advocates," the issue they are supporting should be obvious to see. In this case, it is. It seems the discourse used by professionals to support dams as sustainable development limits the scope of possible policy options toward dams. What this means is that science is relied upon to limit the possibilities of infrastructure development policies in the era of sustainable development to dams for water resources management and energy generation. With this support of dams depending on the authority of science, it also follows along the power/ knowledge paradigm in that their scientific knowledge is used to coerce others into agreement.

After exploring the repercussions of science used in a political sense, it therefore answers what it means to find the politics in their technical discourse. That means that by illustrating that science can be used to limit the scope of possibilities to match a political agenda. For most participants in this study, it was not clear in terms of which political party they endorsed. Nevertheless, in a country where opposing dams is a part of a

political party's platform (as found in the Awami National Party), to reduce sustainable development possibilities to that of dams takes part in a political conflict.

The near future in Pakistan

As I conducted the secondary research for this thesis, I would frequent the Pakistan section of local bookstores to see if there are any interesting books I should include. This would typically be in vain because the typical book on Pakistan paints it as a country in disaster due to Islamic militancy, terrorism, and the United States killing of Osama bin Laden in Abbottabad. It should go without saying, but this is an inaccurate picture of Pakistan's future—or past and present. For example, a recent report by PricewaterhouseCoopers, a multinational professional network, claimed that Pakistan is on its way to becoming the 20th largest economy by 2030 and the 16th largest by 2050 (Hussain, 2017). Despite that future, there are a few aspects that should be looked at, primarily its relationships with its neighbors: China and India.

China and Pakistan: A special relationship

My final day in Lahore—and second to last day in Pakistan—was spent driving through the city. India and Pakistan were about to face off in a hyped up cricket game, but throughout the city of Lahore signs were displaying a conference about the China-Pakistan Economic Corridor (CEPC) aid package. It is about $46 billion aid package, which is more aid Pakistan has received from the United States since 9/11 (Abid & Ashfaq, 2016). A student I spoke with in Lahore told me that he considers CPEC as consequential for Pakistan, would propel Pakistan as an important country and a sign that

Americans should be learning Urdu. CPEC was on the front of the mind of just about every Pakistani professional with whom I spoke. Within this thesis, I discuss some aspects of this massive aid deal, but I am using this subsection as an example of the relationship between the two countries and how it uses similar apolitical discourse to support development policies.

China and Pakistan have had an enduring special relationship for many years, in part because of both countries' animosity towards India. But CPEC moves that relationship forward in unique ways. The roots of CPEC date back to the Musharraf era of Pakistan, but this was limited to speculation. From 2013 to 2014, leaders from Pakistan and China signed agreements that by February 2014, and the amount China pledged to Pakistan began to rise up to $46 billion (Abid & Ashfaq, 2016). The intentions for China are to secure energy production for consumption and transport goods from China through Pakistan to the Arabian Sea. It is a country whose territory possesses only one percent of oil reserves yet consumes 12 percent of the global amount. Currently, China experiences insecurity for its energy transportation, which ranges from an uncertain political relationship with the United States to attacks from pirate attacks in the Strait of Malacca. With this sense of insecurity, China will now be able to access the deep sea Gwadar Port (near Karachi) by land and begin to transport oil supplies through Pakistan (see Fig. 4) (Chaziza, 2016). Besides energy projects, CPEC also focuses on development of the Gwadar Port and the construction of an international airport. Furthermore, the Karakoram Highway that connects the two countries will also be widened and railways in the north will upgraded (Abid & Ashfaq, 2016).

Because China must rely on Pakistan's infrastructure, it committed $46 billion for overall infrastructure development (Sheikh, et al., 2016). Throughout the corridor from Gwadar, Pakistan to Kashgar, China, there are several development components. The first is the Gwadar Port Project, a deep sea port at which China will have a 40-year operational control (Chaziza, 2016). A geopolitical factor that is affected by CPEC development is for Pakistan to have resources to confront terrorism from within the country.

The largest component of CPEC is China's investment into Pakistan's energy sector. Nearly $33 billion of the aid goes toward energy development. China's funding will contribute to solving Pakistan's energy shortfalls through building a natural gas pipeline from Iran to Pakistan. Also included are two large-scale dams: Suki Kinari Hydropower Station in Khyber Pakhtunkhwa estimated at $1.8 billion; and Karot Hydropower Station located in Azad Jammu Kashmir and Punjab estimated at $1.42 billion (Government of Pakistan, 2017). Although Pakistan and China have discussed such an investment like CPEC since the 1990s, there are some environmental issues that will result due to the many projects financed. For instance, the construction of a pipeline is impossible to be considered ecological and resilient in a climate change context (Shaikh et al., 2016).

Now some Pakistanis I spoke with were excited about this aid investment but others were hesitant about the effects of a military commitment to combating terrorism along the corridor as this may result in more violence, not less. Nevertheless, it is projected to be an economic boom for the country. Ramay (2015) argues that CPEC promises critical development for the future of both China and Pakistan because of the

infrastructural investment (see Figure 5). This investment is projected to bring in gross domestic product growth by six percent. In addition, the Chinese investment could also provide energy security for Pakistan through more than 15,000-megawatt energy in coal-based power plants. This could lead to a growth in the private sector (Naseem, 2015). Because of the possible benefits for Pakistan from CPEC, Abid & Ashfaq (2016) recommend that all political parties should express full support for CPEC and resolve any political issues for the mutual benefit of CPEC's success. At the same time, the Pakistan government should also make public all details of the projects and ensure the security of Chinese foreign workers (Abid & Ashfaq, 2016). What can be taken from these recommendations is consistent with some of the discourses presented in this thesis: setting aside any political differences in favor of the technocratic discourse apparent in what CPEC will bring to Pakistan.

Figure 4: A map detailing the potential for connecting China and Pakistan (Shaikh et al., 2016).

	Investment (US$ bn)	Domestic Share	Domestic Share (US$ bn)
Energy (Breakup is given below)	33.8		
Coal 7560 MW	8.8	20%	1.8
Wind 200 MW	0.5	20%	0.1
Hydel 1590 MW	4.2	50%	2.1
Solar 1000 MW	1.7	0%	0
Second Phase 6445 MW	9.5	20%	1.9
Mining Expenditure	9	50%	4.5
Road	5.9	80%	4.7
Rail	3.7	50%	1.8
Mass transit in Lahore	1.6	50%	0.8
Gwadar Port	0.7	50%	0.3
China Pak Fiber Optics	0	0%	0
Total	45.7		18.1

Figure 5: China investment into Pakistani sectors (Naseem, 2015).

China and Pakistan have had a friendly relationship since the 1950s. In fact, Pakistan was instrumental in working as a conduit through which diplomatic talks between the United States and China began (USC, 2011). Nevertheless, China's relationship with Pakistan is referred to as the closest to an alliance China has ever had since both have a similar outlook on India. CPEC, no matter the outcome, is another chapter in the strong relationship between the two countries (Godbole, 2016).

India and Pakistan: A looming crisis over the Indus Waters Treaty

To say Pakistanis harbor a feeling of paranoia about India is an understatement. Pakistanis are within their rights to retain a sense of paranoia about India in terms of the Indus Water Treaty. A participant in my study criticized India's dam construction as it tends to violate this treaty, and many other casual conversations I had with Pakistanis

lamented Pakistan's lack of dam building as a dangerous flaw because they could be sabotaged by Indian development. In this case, apolitical development policies are driven by political motives in regards to India.

The Indus Waters Treaty is widely considered as the most successful cooperative venture between India and Pakistan, a pact which has been honored even at times of war (Subedi, 1999). Yet more than 50 years since the Indus Waters Treaty was signed, India and Pakistan continue to argue about the treaty. Pakistan objects to Indian dam projects in Jammu and Kashmir, claiming this will result in less water downstream, and officials asked the United States and the World Bank to intervene and lead a mediation process between the two countries (Gupta & Ebrahim, 2017). The Government of Pakistan also requested that water security be a part of the CPEC framework. One way CPEC can be used toward water security is that Pakistan requested China to fund the Diamer-Bhasha Dam to help Pakistan avoid water scarcity in the future (Rana, 2016).

If India decides to back out of the Indus Water Treaty, the Nawaz Sharif administration would perceive it as an act of war. Backing out of the Indus Water Treaty would have India in upstream control of the Indus System and could lead to a tremendous humanitarian disaster (Kugelman, 2016). With this in mind, it is important to reflect on what Naseer Mirza told me about how India can easily bring Pakistan to its knees. In addition, Hamza Malik's concerns are also noteworthy when placed alongside Indian tensions. Essentially, decision-makers, when describing dams as apolitical, should be aware that redirecting flow of rivers can provide the higher ground when political affairs emerge. Kugelman (2016) illustrates how India could punish Pakistan in ways that would not result in an international crisis of ending the Indus Water Treaty. One outcome is that

India could construct more dams and retain nearly a month's water supply from Pakistan. A reality like this has Hamza Malik calling for increased large-scale dams in Pakistan as a way to ensure Pakistan's water security.

Differences between India and Pakistan stem from two factors, according to Iyer (2005). First, there is the issue that the Indus Waters Treaty was a technical treaty, which is evident in the details of the appendices and annexures of the treaty. This results in both Indian and Pakistani engineers disagreeing over meanings of the treaty. An example that Briscoe supplies is the difference between run-of-river projects and storages. Indian engineers can plan dams as they would anywhere else and according to the treaty's guidelines, but Pakistani engineers have the ability to veto power over Indian projects (Iyer, 2005). This therefore provides Pakistani engineers with the ability to prioritize national interest via engineering discourse.

What further drives discontent over the treaty, according to Bhatnagar (2009), is that the treaty was a short-term solution for Pakistan's water needs and India's interests for water resource construction in the 1960s. The World Bank then worked under the assumption there was enough water for both countries in the Indus Basin; however, populations have risen exponentially in both countries that threatens this assumption. Because of this, the treaty needs to be reexamined to see how the basin should be applied to growing populations. For Pakistan, revisiting the treaty should ensure its needs are met, which means implementing an assurance Pakistan's minimum water flow is met despite Indian upstream construction. Through reconsidering the Indus Waters Treaty, India and Pakistan can avoid any conflict, which is perceived as a soon to be future occurrence for water sharing countries (Bhatanagar, 2009). Iyer (2005) says Pakistan is

happy to renegotiate, yet India does not want to lose its position of political power (Bhatanagar, 2009). However, through the use of a mediator—such as the World Bank's role in the 1950s—India can renegotiate without appearing to surrender any political power (Bhatanagar, 2009).

Suggestions for future research

The purpose of this thesis was to understand how professionals view dams as sustainable development within the context of climate change. My understanding after finishing this project was that dams are justified through technocratic discourse. Although this discourse is presented as apolitical and lauded as strictly factual, it in fact has a political dimension to its discourse. That being said, as my scope was set and I began to write this thesis, I discovered a few ideas that should serve as ideas for future research to move toward a better understanding of dams and development in Pakistan.

WAPDA remains a powerful agency within Pakistan. However, it seems there is a lot of undiscovered dimensions to it. Toward the end of this project, I came to the realization that research focused on how this organization operates, and how knowledge circulates within the agency would provide powerful insight into the role of technocratic knowledge in decision-making in Pakistan, especially within the discourse of dams as development. Because my research was geographically limited to Islamabad, and WAPDA's headquarters are located in Lahore, I was unable to visit their headquarters or officials. Furthermore, because of my limited stay in Pakistan, I was not able to arrange a visit to any official WAPDA dam sites. This is an avenue I believe would be productive to understanding how knowledge operates in the agency.

Another possible research pathway to understanding the broader issues of dams and development in Pakistan is to take a global political economy approach. As O'Brien and Williams say (2010), it is difficult to separate politics from economics, and Global Political Economy approaches can illuminate how supporting dams over other renewable energy projects shows how there is a political dimension to what is otherwise supported as technical and apolitical in design. What some participants told me should be expanded into further research to understand how professionals view dams versus other larger scale forms of energy. This was evident with how skeptical participants were with the investment in more expensive solar energy generation. Some participants were not convinced this was a rational investment considering that Pakistan would have to import more of the necessary technology to install competent solar or wind energy. Because of this skepticism, an approach to dams and sustainable development informed by global political economy would provide an understanding how professional discourse interacts with economics.

Onward and Upward…

The ending thought of this thesis brought me to wonder: what's the point? For this thesis, I do want to end with a few qualifications on the argument. In this thesis, I examined how professionals view dams as sustainable development within the context of climate change. I found that scientific disciplines had a privileged place over other ways of knowing. This was even evident at the SDPI. I noticed some researchers at the institute favored more mathematical-informed disciplines. Whenever I talked with researchers during lunch about my research, I would occasionally be asked, "What economic models

are you using in your research?" I would respond, "none," and this seemed to leave the other person confused as to how I could ever conduct research without this perceived fundamental.

Once I found that professionals who view dams in this manner do so under the justification of technocratic decision-making, it provided some sense to the question stated above. Why this is important is to view how these development decisions and the use of knowledge drive planning and the use of public resources. This knowledge is used as a way of persuading others about its benefits, rather than a culture of inclusion in the development process. In a post-World Commission on Dams (WCD) period, it is also important that affected populations have an ability to comment on the dam planning process. In fact, despite the WCD's lasting comment on the importance for dams if no alternative is available, the report did leave a strategic policy framework for future dam development. The framework puts forth seven points for planners to consider[1]. The first component of the framework states that planners should ensure that river development projects should have public acceptance and should be developed through an open and participatory process (WCD, 2000).

A quick clarification of what I'm *not* saying proves useful to try and ensure my argument is not misunderstood. I am not advocating for an anti-science stance based in populism. Pakistan had many instances of populism in its politics already. It does not take someone in the United States far to see how current United States President Donald J. Trump has taken advantage of and furthered an anti-science policy standpoint through stripping the Environmental Protection Agency and even issuing a gag order on the

[1] See WCD for a complete description of the framework.

United States Parks Department regarding climate change Tweets, as well as threatening existing and future research regarding climate change and exiting the Paris Agreement (Nuccitelli, 2017; Shear, 2017). What I am saying is that persons in the position of planning dams should be cognizant of the fact that there are people who view water and have values tied to water, for example, that may be more diverse than the narrow utilitarian views that dominate. These voices should be heard during the planning process of development projects, such as dams, if they are going to be branded as sustainable.

This transitions into how Pakistani government officials and those in power can foster a more understanding society in terms of dams and sustainable development. Mustafa told me his concern for water resources development in Pakistan was that science and engineering subjected water as something exploitable. This technical treatment of water has stripped whatever political or cultural values attached to water. Much like transforming the hydrological cycle into the hydrosocial cycle, he believes Pakistan's engineering schools should include a more interdisciplinary approach to water. By this, he meant that universities in each province of Pakistan should be open to instructing engineering pupils that there are a variety of worldviews attached to water. Looking at National University of Sciences and Technology's curriculum for a Bachelors of Arts degree in Environmental Engineering, the course pathway does not implement any coursework focused on a social science approach to understanding the environment, for example (NUST, 2017). Furthermore, the participant told me Pakistan's engineering offices—such as WAPDA—should broaden their job descriptions of engineers to include requirements for the position that should essentially include a mix of science and social sciences.

Although one of the messages of the World Commissions on Dams report was that dams were a flawed option for development, there were some other messages that illustrate that having an inclusive process in implementing dams as development that carries over to this thesis. Dams have proved to be an instrument of development that at times leads to impoverishment for many (WCD, 2000; Tilt et al., 2009). What this thesis aims to contribute toward is how bringing a local sense of water and climate change is instrumental to actual sustainable infrastructure.

Including diverse perspectives on water within Pakistan is a step toward water justice in Pakistan. However water justice cannot just appear from codification and legal push for official acknowledgement. Zwarteveen and Boelens (2014) discuss that the pathway to water justice includes questioning "official water truths" and these truths' claims to "rationality, efficiency, democracy and equity" (p. 155). What these authors mean by water justice is to challenge water's cultural and political dimensions (through allowing more equity and representation) and the availability of it (redistribution). To demand greater water justice, it requires such a critical view that is informed by cultural, political, and material dimensions. This process occurs through struggle and representation, as well as at the negotiation table and a transdisciplinary creation of knowledge in regards to water (Zwarteveen & Boelens, 2014). Now, as a participant told me, Pakistan has a history of resolving issues at the negotiation table, so perhaps the first step toward water justice would have some sort of familiarity. At the end of the day, however, I hope this thesis is a contribution—albeit small—of questioning official water truths in Pakistan.

APPENDIX

PARTICIPANTS

NAME	EDUCATION	PROFESSIONAL BACKGROUND
Naseer Mirza	Civil Engineering	Teaching water resource management, different organizations, LEAD and WWF, and a local participatory organization
Fazlullah Qaisrani	Developmental Economics MA in 1965	Economist at World Bank, West Pakistan Bureaucrat then Sindh, specializes in Sindh affairs
Hamid Ali	M.S. from Netherlands, Forest Management, and Forest College in Peshawar.	Worked as a Forester, then in development sector including Planning Commission and NGOs
Majid Ibrahim	Civil Engineer, MA, and then PhD from United States university in state of Washington.	Pakistan conservation for a long time, UNDP, IUCN, ADB and FAO Consulting
Bina Siddiqui	M.A. Environmental Development from United Kingdom	Award-winning journalist focusing on climate change issues in South Asia
Abid Mustafa	BA, MA, and PhD in Geography from United States	Academic who has extensive writing experience on Pakistan and climate change. Focused on critical geography.
Hamza Malik	B.S. from Lahore Engineering	Former Managing Director of WAPDA, then promoted to chairman. Honorary doctorate from a university in Lahore.
Imran Niazi	B.S. in Electrical Engineering from United States	Consultant with Chinese dam development firm and former politician.
Waseem Anwar	B.S. Civil Engineering from Lahore, MA Corporate Development from United States	Works for international nongovernmental organization that has environmental focus

REFERENCES CITED

Abid, M., Ashfaq, A. (2016). CPEC: Challenges and opportunities for Pakistan. *Pakistan journal.* 16(2), 142-169.

Ahmad, K. (2003). We were swept away in a flood of foreign expertise. In Bengali, K, Ed. *The politics of managing water.* Oxford: Sustainable Development Policy Institute.

Ahmad, R., Rashid, A. (2010). Discourse, donors, and development: The policy conundrum in Pakistan. *Fostering sustainable development in South Asia: Responding to Challenges*. Sang-e-Meel publications: Lahore.

Akhter, M. (2010). More on the sharing of the Indus Waters. *Economic and political weekly.* 45(17), 24-30.

Akhter, M. (2014). The hydropolitical Cold War: The Indus Waters Treaty and state formation in Pakistan. *Political Geography.* 46, 65-75.

Akhter, M. (2015). Infrastructure nation: State space, hegemony, and hydraulic regionalism in Pakistan. *Antipode*. 47 (4), 849-870.

Akhter, M., Ormerod, K. (2015). The irrigation technozone: State power, expertise, and agrarian development in the US West and British Punjab, 1880-1920. *Geoforum* 60 123-132.

Agamben, G. *Homo sacer: Sovereign power and bare life.* Stanford: Stanford University Press.

Alam, U. (2002). Questioning the water wars rationale: A case study of the Indus Waters Treaty. *Geographical journal.* 168(4), 341-353.

Ali, F., Beg, F. (2007). The history of private power in Pakistan. *Working paper series No. 106.* Islamabad: Sustainable Development Policy Institute.

Andres, L., Biller, D., Drappe, M. (2014). *Reducing poverty by closing South Asia's infrastructure gap.* Washington D.C.: World Bank.

Aneel, S., Haroon, U. (2014). *Sustainable development in South Asia: Shaping the future.* Lahore: Sang-e-Meel Pulications.

Anwar, N. (2015). *Infrastructure redux: Crisis, progress in industrial Pakistan & beyond.* New York: Palgrave MacMillan.

Aziz, R., Ahmad, M. (2015 June). "Pakistan's power crisis: The way forward." United States Institute of Peace.

Bakker, K. (2002). From state to market?: Water mercantilization. *Environment and planning.* 34, 767-790.

Bakker, K. (2014). The business of water: Market environmentalism in the water sector. *Annual Review of Environment and Resources.* 39. 469-494.

Bandaragoda, D. (1993). The role of research-supported irrigation policy in sustainable irrigated agriculture: an interpretive precis of the case of Pakistan. Colombo, Sri Lanka: International Irrigation Management Institute.

Berg, B. (1995). *Qualitative research methods for social sciences.* Needham Heights: Simon & Schuster.

Bhatnagar, M. (2009). Reconsidering the Indus Waters Treaty. *Tulane environmental law journal.* 22(2), 271-313.

Bhutto, A., Bazmi, A., Zahedi, G. (2012). "Greener energy: Issues and challenges for Pakistan-hydel power." *Renewable and Sustainable Energy Review.* 16 (2012). Pages 2732-2746.

Bijker, W.E., Bal, R., Hendriks, R. (2009). *The Paradox of Scientific Authority: The Role of Scientific Advice in Democracies*. Cambridge: MIT Press.

Blatter, J., Ingram, H., Doughman, P. (2001). Expanding perspectives on transboundary water. In Blatter, J., Ingram, H. (Eds.). *Reflections on water: New approaches to transboundary conflicts and cooperation.*

Biswas, A. (1992). Indus water treaty: The negotiating process. *Water international* 17, 201-209.

Biswas, A., Tortajada, C. (2016). *Water security, climate change, and sustainable development.* New York: Springer.

Boås, M., Vevatne, J. (2004). Sustainable development and the World Trade Organization. In Boås, M., McNeil, D. (Eds.), *Global institutions and development: Framing the world?* (p. 95-107). New York: Routledge.

Braun, Y. (2010). Gender, large-scale development, and food insecurity in Lesotho: An analysis of the impact of the Lesotho Highlands Water Project. *Gender and development.* 18(3), 453-464.

Braun, Yvonne A. 2011. "The Reproduction of Inequality: Race, Class, Gender and the Social Organization of Work at the Site of Large-Scale Development Projects." Social Problems 58(2): 281-303.

Braun, Y. (2011). Left high and dry: An intersectional analysis of gender, dams, and development in Lesotho. *International Feminist Journal of Politics*. 13(2), 141-162.

Capital Development Authority (2017). Facts & statistics. Retrieved on May 9, 2017. Accessed from http://www.cda.gov.pk/about_islamabad/vitalstats.asp.

Carothers, T., de Gramont, D. (2013). *Development aid confronts politics: The almost revolution.* Washington D.C.: Carnegie Endowment for International Peace.

Charmaz, K. (2007). *Constructing grounded theory: A practical guide through qualitative analysis.* Thousand Oaks: SAGE Publications.

Chaziza, M. (2016). China-Pakistan relationship: A game-changer for the Middle East. *Contemporary review of the Middle East.* 3(2), 147-161.

Constable, P. (2011). *Playing with fire: Pakistan at war with itself.* New York: Random House.

Dawn. (2015, November 18). China urged to include dam in CPEC projects. *Dawn*. Accessed on April 24, 2017. Retrieved from https://www.dawn.com/news/1220481

Dawn. (2017, March 10). Dasu power project to provide more than 8,000 jobs. *Dawn*. Accessed on March 24, 2017. Retrieved from https://www.dawn.com/news/1319628

Dawn. (2004, December 14). Kalabagh dam during Musharraf rule: Rashid. *Dawn.* Retrieved from https://www.dawn.com/news/169826.

Dawn. (2015, October 9). Resolving energy crisis by 2018 top priority, says Nawaz. *Dawn.* Accessed on March 31, 2017. Retrieved from https://www.dawn.com/news/1211972

Dawn. (2016, September 3). Wapda to set up university college in Tarbela. *Dawn.* Accessed on March 31, 2017. Retrieved from https://www.dawn.com/news/1281757.

de Haan, A. (2009). *How the aid industry works: An introduction to international development.* Sterling: Kumarian Press.

Dubash, N. (2010). Viewpoint: Reflections on the WCD as a mechanism of global governance. *Water Alternatives*. 3(2): 416-422.

Easterly, W. (2006). *The white man's burden: Why the west's efforts to aid the rest have done so much ill and so little good.* Oxford: Oxford University Press.

Easterly, W. (2013). *The tyranny of experts: Economists, dictators, and the forgotten rights of the poor.* New York: Basic Books.

Ebrahim, Z. (2014, September 17). "Pakistan floods trigger fresh dam debate." *Dawn*. Web. Accessed on 1 October 2015 from http://www.dawn.com/news/1132514.

Economist, The. (2012 May 21). Pakistan's energy crisis: Power politics. *The Economist*. Retrieved on the Web on 11 November 2015 from http://www.economist.com/blogs/banyan/2012/05/pakistan%E2%80%99s-energy-crisis

Ekbladh, D. (2002). "Mr. TVA:" Grass-roots development, David Lilienthal, and the Rise and Fall of the Tennessee Valley Authority as a symbol for U.S. overseas development, 1933-1973. *Diplomatic History*. 26 (3), 335-374.

Erlewein, A. (2014). The promotion of dams through the clean development mechanism: Between sustainable climate protection and carbon colonialism. In Nüsser, M. (Ed.) *Large dams in Asia: Contested environments between technological hydroscapes and social resistance.*

Escobar, A. (1995). *Encountering development: The making and unmaking of the Third World.* Princeton: Princeton University Press.

Ferguson, J. (1994). *The Anti-Politics Machine: "Development," depoliticization, and bureaucratic power in Lesotho.* Minneapolis: University of Minnesota Press.

Feyzioglu, T., Swaroop, V., Zhu, M. (1998). A panel data analysis of the fungibility of foreign aid. *The World Bank Economic Review.* 12, 29-58.

Foucault, M. (1977). *Discipline and punish: The birth of the prison.* New York: Pantheon Books.

Foucault, M. (1978). *The history of sexuality*. New York: Random House.

Foucault, M. (1980). *Power/ knowledge: Selected interviews & other writings 1972-1977.* New York: Pantheon Books.

Foucault, M. (1997). *Society must be defended: Lectures at the Collège de France, 1975-1976.* Picador: New York.

Gellert, P., Lynch, B. (2003). Mega dams as displacements. UNESCO. Malden: Blackwell Publishing.

Ghazanfar, M. (2008). Kalabagh dam and the water debate in Pakistan. *Lahore journal of policy studies.* 2(1), 153-180.

Godbole, S. (2016, September 6). Event report: China-Pakistan relations: A new chapter? *Brookings.* Retrieved from https://www.brookings.edu/research/event-report-china-pakistan-relations-a-new-chapter/.

Goldman, M. (2001). Constructing an environmental state: Eco-governmentality and other transnational practices of a 'green' World Bank. *Social Problems*. 48 (4), 499-523.

Goldman, M. (2006). *Imperial nature: The World Bank and struggles for social justice in the age of globalization.*

Government of Pakistan. (1995, May). *Policy framework and package of incentives for private sector hydel power generation projects in Pakistan*.

Government of Pakistan. (2016). Manufacturing and mining. *Economic survey of Pakistan.* Accessed May 8, 2017. Retrieved from http://www.finance.gov.pk/survey_1516.html

Government of Pakistan. (2017). CPEC: China Pakistan economic corridor. Retrieved from http://cpec.gov.pk/energy.

Gupta, J., Ebrahim, Z. (Jan. 6, 2017). Win some, lose some, Indus Water Treaty continues. *Thethirdpole.net.* Accessed on April 24, 2017. Retrieved from https://www.thethirdpole.net/2017/01/06/win-some-lose-some-indus-waters-treaty-continues/

Hacking, I. (1975). *The emergence of probability: A philosophical study of early ideas about probability, induction and statistical inference.* Cambridge: Cambridge University Press.

Hacking, I. (1990). *The taming of change.* Cambridge: Cambridge University Press.

Haines, M. (2014). (Inter)Nationalist rivers? Cooperative development in David Lilienthal's plan for the Indus Basin, 1951. *Water History*. 6 (2), 133-151.

Hasnain, K. (2016, August 23). Pro-Kalabagh dam chief of Wapda resigns. *Dawn.* Retrieved from https://www.dawn.com/news/1279375.

Hayek, F. (1945). The use of knowledge in society. *The American Economic Review.* 45 (4), 519-530.

Hemingway, E (1952). *The old man and the sea.* New York: Scribner.

Hull, M. (2012). *Government of Paper: The materiality of bureaucracy in urban Pakistan.* Berkeley: University of California Press.

Hussain, D. (2017, February 9). Pakistan could become 16th largest economy by 2050: PwC. *Dawn.* Accessed on April 6, 2017. Retrieved from https://www.dawn.com/news/1313636.

Jaffrelot, C. (2015). *The Pakistan paradox: Instability and resilience.* Haryana: Random House India.

Jansen, M. (2017). Mohenjo-daro: Type site of the earliest urbanization process in South Asia. *Studies in the history of art*. 31, 35-51.

Jorgic, D. (2016, October 10). Pakistan PM rushes to end energy shortages ahead of 2018 poll. *Reuters*. Accessed on May 8, 2017. Retrieved from http://www.reuters.com/article/us-pakistan-power-politics-idUSKCN12A030.

Kalhoro, N., He, Z., Xu, D., Faiz, M., Yafei, L., Sohoo, N., Bhutto, A. (2016). Vulnerability of the Indus River Delta of the North Arabian Sea, Pakistan. *Global NEST journal.* 18(3), 599-610.

Kamal, S. (2009). Pakistan's water challenges: Entitlement, access, efficiency, and equity. Eds. Kugelman, M., Hathaway, R. Woodrow Wilson International Center for Scholars: Washington D.C.

Khagram, S. (2004). *Dams and development: Transnational struggles for water and power*. Ithaca: Cornell University.

Khan, A. (2016, January 31). Power crisis costs $4bn in four years thanks to import of generators. *Dawn.* Accessed on May 8, 2017. Retrieved from https://www.dawn.com/news/1236437

Khan, I. (2016, October 1). Kalabagh dam on list of 'ready for construction.' *Dawn*. Retrieved from https://www.dawn.com/news/1287284.

Khan, R. (2017, March 24). Pakistan passes climate change act, reviving hopes – and skepticism. *Reuters*. Accessed on May 8, 2017. Retrieved from http://www.reuters.com/article/us-pakistan-climatechange-lawmaking-idUSKBN16V19N.

Khan, N., Ullah, M. Issues relating to investment in Pakistan and its effects on economic Growth. *Journal of commerce*. 7(3), 90-109.

Khattak, S. (2010). Research in difficult settings: Reflections on Pakistan. *Fostering sustainable development in South Asia.* Salman, A., Aneel., S., Uzma, T., Eds. Lahore: Sang-e-Meel Publications.

Kiani, K. (Dec. 4, 2011). Neelum-Jhelum hydropower project – an engineering marvel. *Dawn.* Accessed on 23 April, 2017. Retrieved from https://www.dawn.com/news/678239.

Kugelman, M. (2009). Introduction. *Running on empty: Pakistan's water crisis.* Eds. Kugelman, M., Hathaway, R. Woodrow Wilson International Center for Scholars: Washington D.C.

Kugelman, M. (2016, September 30). Why the India-Pakistan war over water is so dangerous. *Foreign Policy.* Accessed on May 8, 2017. Retrieved from http://foreignpolicy.com/2016/09/30/why-the-india-pakistan-war-over-water-is-so-dangerous-indus-waters-treaty/.

Lemke, T. (2011). *Biopolitics: An advanced introduction*. New York: New York University Press.

Lieftinck, P., Sadove, A.R., Creyke, T. (1968). Water and power resources of West Pakistan: A study in sector planning. Baltimore: The Johns Hopkins Press.

Lieven, A. (2011). *Pakistan: A hard country*. Public Affairs: New York.

Linton, J. (2013). Modern water and its discontents: A history of hydrosocial renewal. *Wiley Interdisciplinary Review-Water.* 1(1)- 111-120.

Linton, J., Budds, J. (2013). The hydrosocial cycle: Defining and mobilizing a relational-Dialectical approach to water. *Geoforum.*

Mahmood, Z. (2016). Kalabagh Dam: Sifting facts from fictions. Retrieved from http://www.wapda.gov.pk/index.php/about-us/wapda-articles/kalabagh-dam.

Majeed, Z., Piracha, A., Munir, K. (2008). Role of dams in the economic growth of Pakistan. *The 3rd International Conference on Water Resources and Arid Environments.* Lahore: Hydro Planning Organization, Pakistan Water and Power Development Authority.

Malik, S. (2011, May 22). Power problems: Generators add to air and noise pollution. *The express tribune.* Retrieved from https://tribune.com.pk/story/173568/power-problems-generators-add-to-air-and-noise-pollution/.

Matthew, R., Hammill, A. (2009). Sustainable development and climate change. *International affairs.* 85(6), 1117-1128.

McCartney, M. (2011). *Pakistan – The political economy of growth, stagnation, and the state, 1951-2009.* Routledge: New York.

McCully, P. (2001). *Silenced Rivers: The Ecology and Politics of Large Dams*: Enlarged and Updated Edition. Zed Books: New York.

McKibben, B. (2010). *Eaarth: Making a life on a tough new planet.* New York: Henry Holt and Company.

McMichael, P. (2012). *Development and social change: A global perspective, 5th Ed.* Los Angeles: SAGE Publications.

Meehan, K. (2014). Tool-power: Water infrastructure as wellsprings of state power. *Geoforum.* 57, 215-224.

Meynaud, T. (1968). *Technocracy.* London: Faber and Faber.

Michel, A. (1967). The Indus Rivers: A study of the effects of partition. New Haven CT, USA: Yale University.

Miller, D. (2010). Sachs, Easterly, and the banality of the aid effectiveness debate: Time to move on. *Mapping Politics*, 3. Retrieved from http://journals.library.mun.ca/ojs/index.php/MP/article/view/216

Mirza, U., Ahmad, N., Majeed, T., Harijan, K. (2008). "Hydropower use in Pakistan: Past, present, and future." *Renewable & Sustainable Energy Reviews.* 12 (2008) Pages 1641-1651.

Morgan, R., Smith, J. (2013). Premodern streams of thought in twenty-first-century water management. *Radical History Review*. 116, 105-129.

Muhammad, U. (2012). *Hydro politics and interprovincial relations in Pakistan: A case study of the Kalabagh Dam controversy*. (Masters Thesis).

Mustafa, D., Akhter, M., Nasrallah, N. (2013). *Understanding Pakistan's water-security nexus.* Washington D.C.: Peaceworks.

Mustafa, D. (2010). Hydropolitics in Pakistan's Indus Basin. *United States Institute of Peace Special Report, 261.*

Nader, L. (1996). *Naked Science: Anthropological inquiry into boundaries, power, and knowledge.* Routledge; New York.

Nader, L. (1972). Up the anthropologist: Perspectives gained from studying up. *Reinventing Anthropology.* Hymes, D. (Ed.). Pantheon Books: New York.

Nandy, A. (1997). Colonization of the mind. In Rahnema, M. (ed.) *The Post-Development Reader*. Zed Books: London, 22-29.

Naseem, A. (2015). *Pakistan Economy: Impact of China Pak Economic Corridor – A bird's eye view.* Karachi: BMA Capital.

Nawaz, S. (2008). *Crossed swords: Pakistan, its army, and the wars within.* New York: Oxford University Press.

Nazar, S. (2016, March 4). Pakistan's big threat isn't terrorism—it's climate change. *Foreign policy*. Accessed on May 8, 2017. Retrieved from http://foreignpolicy.com/2016/03/04/pakistans-big-threat-isnt-terrorism-its-climate-change/

Neuse, S. (1996). *David E. Lilienthal: The journey of an American liberal.* Knoxville: University of Tennessee Press.

Nuccitelli, D. (2017, March 28). Trump has launched a blitzkrieg in the wars on science and Earth's climate. *The Guardian.* Accessed from https://www.theguardian.com/environment/climate-consensus-97-per-cent/2017/mar/28/trump-has-launched-a-blitzkrieg-in-the-wars-on-science-and-earths-climate.

Nüsser, M. (2014). *Large dams in Asia: Contested environments between technological hydroscapes and social resistance.* New York: Springer.

NUST (2017). Course curriculum for Fall 2015 and prior entries. Retrieved from http://www.nust.edu.pk/INSTITUTIONS/Schools/SCEE/Institutes/IESE/AP/UG/BEE/Pages/Course-Curriculum.aspx.

Obama White House. (2015). 2015 Joint Statement by President Barack Obama and Prime Minister Nawaz Sharif. Accessed on May 8, 2017. Retrieved from https://obamawhitehouse.archives.gov/the-press-office/2015/10/22/2015-joint-statement-president-barack-obama-and-prime-minister-nawaz.

O'Brien, R., Williams, M. (2010). *Global political economy, 3rd ed.* New York: Palgrave MacMillan.

PakTribune (2008, May 27). Kalabagh shelved: Pervez Ashraf. *PakTribune.* Accessed from http://paktribune.com/news/Kalabagh-dam-project-shelved-Pervez-Ashraf-200959.html.

Palys, T. (2008). Purposive sampling. In L. M. Given (Ed.) *The Sage Encyclopedia of Qualitative Research Methods.* (Vol. 2). Sage: Los Angeles, pp. 697-8.

Parenti, C. (2012). *Tropic of chaos: Climate change and the new geography of violence.* New York: Nation Books.

Pearce, F. (2006). *When the rivers run dry: Water, the defining crisis of the twenty-first century.* Boston: Beacon Press.

Planning Commission Ministry of Planning, Development & Reform. Government of Pakistan. *Pakistan 2025: One nation – one vision.*

Pope Francis. (2015). Laudato Si': On Care for Our Common Home [Encyclical].

Possehl, G. (1979). The Mohenjo-daro floods: A reply. *American anthropologist.* 69, 32-40.

Putnam, R.D. (1977). Elite transformation in advanced industrial societies: An empirical assessment of the theory of technocracy. *Comparative Political Studies.* 10(3). P. 383-412.

Rahman, A., Khan, A., Shaw, R. (2015). *Disaster risk reduction: Methods, approaches, and practices.* New York: Springer.

Ramay, S. (2016). China Pakistan economic corridor: A Chinese dream being materialized through Pakistan. Retrieved from https://sdpi.org/publications/files/China-Pakistan-Economic-Corridor-(Shakeel-Ahmad-Ramay).pdf.

Rana, S. (2016, December 30). Pakistan's water security made part of CPEC framework. *The Express Tribune.* Accessed on April 24, 2017. Retrieved from https://tribune.com.pk/story/1279029/pakistans-water-security-made-part-cpec-framework/

Ranjan, A. (2016). Disputed waters: India, Pakistan and the transboundary rivers. *Studies in Indian Politics.* New Delhi: SAGE Publications.

Rasul, G., Dahe, Q., Chaudhry, Q. (2008). Global warming and melting glaciers along southern slopes of HKH ranges. *Pakistan journal of meteorology.* 5(9), 63-76.

Reisner, M. (1993). *Cadillac Desert: The American West and its disappearing water.* New York: Penguin Books.

Ribbhagen, C. (2011). What makes a technocrat?: Explaining variation in technocratic thinking among elite bureaucrats. 26(1), 21-44.

Riddell, R. (2007). *Does Foreign Aid Really Work?* New York: Oxford.

Rist, G. (2008). *The history of development: From western origins to global faith, 3rd Ed.* New York: Zed Books.

Rizvi, H. (2001). *Military, state and society in Pakistan.* New York: St. Martin's Press, Inc.

Rutherford, P. (1999). The entry of life into history. In Darier, E. Ed. *Discourses of the environment*. Malden: Blackwell Publishers.

Sachs, J. (2006). *The end of poverty: Economic possibilities for our time.* New York: Penguin Press.

Sachs, J. (2015). *The age of sustainable development.* New York: Columbia University Press.

Scudder, T. (2005). *The Future of Large Dams: Dealing with social, environmental, institutional and political costs.* Sterling: Earthscan.

Sending, O.J. (2004). Policy stories and knowledge-based regimes. In Boås, M., McNeil, D. (Eds.), *Global institutions and development: Framing the world?* 56-71. New York: Routledge.

Sethi, M. (2013, April 1). Watch the throne: Nawaz Sharif on the cusp of power. *The Caravan.* Accessed on May 9, 2017. Retrieved from http://www.caravanmagazine.in/reportage/watch-throne.

Shaikh, S., Tunio, S. (2017. May 2). Pakistan ramps up coal power with Chinese-backed plants. *Reuters*. Accessed on May 8, 2017. Retrieved from http://www.reuters.com/article/us-pakistan-energy-coal-idUSKBN17Z019.

Shaw, J., Sutcliffe, J. (2010). Ancient dams, settlement archaeology and Buddhist propagation in central India: The hydrological background. *Hydrological Sciences Journal*. 48(20), 277-291.

Shear, M. (2017, June 1). Trump will withdraw U.S. from Paris Climate Agreement. *The New York Times.* Retrieved from https://www.nytimes.com/2017/06/01/climate/trump-paris-climate-agreement.html.

Sheikh, F., Ji, Qiang, J. (2016). Prospects of Pakistan–China energy and economic corridor. *Renewable and Sustainable Energy Reviews*. 59, 253-263.

Shiva, V. (2002). Water Wars: Privatization, Pollution, and Profit. South End Press: Cambridge.

Siddiqa, A. (2007). *Military Inc.: Inside Pakistan's military economy.* Oxford: Oxford University Press.

Siddiqi, A., Wescoat, J., Humair, S., Afridi, K. (2012). "An empirical analysis of the hydropower portfolio in Pakistan." *Energy Policy.* 50, 228-241

Stamm, G. (1967). "Importance of Water Users Organizations in Federal Water Resource Development." International Conference on Water for Peace. United States Government: Washington, D.C.

Stern Review, the. (2006), The Stern Review on the Economic Effects of Climate Change. Population and Development Review, 32: 793–798. doi: 10.1111/j.1728-4457.2006.00153.x.

Subedi, S. (1999). Hydro-diplomacy in South Asia: The conclusion of the Mahakali and Ganges River treaties. *The American Journal of international law.* 93(4), 953-962.

Swyngedouw, E. (2009). The political economy and political ecology of the hydro-social cycle. *Journal of contemporary water research and education.* 142, 56-60.

Syvitski, J., Kettner, A., Overeem, I., Giosan, L., Brakenridge, G., Hannon, M., Bilham, R. (2013). Anthropocene metamorphosis of the Indus Delta and lower floodplain. *Anthropocene*. 3, 24-35.

Teepu, I. (2011, October 21). Diesel generators becoming major pollutant. *Dawn.* Retrieved from https://www.dawn.com/news/668708/diesel-generators-becoming-major-pollutant-2

Tiezzi, S. (2016, January 13). China power up Pakistan: The energy component of the CPEC. *The Diplomat.* Accessed on May 8, 2017. Retrieved from http://thediplomat.com/2016/01/china-powers-up-pakistan-the-energy-component-of-the-cpec/.

Tilt, B. (2015). Dams and Development in China: The Moral Economy of Water and Power. Columbia University Press: New York.

Tilt, B., Braun, Y., He, D. (2009). Social impacts of large dam projects: A comparison of international case studies and implications for best practice. *Journal of environmental management.* 90(3), S249-S257.

Tortajada, C. (2014). Dams: An essential component of development. *Journal of hydrologic engineering.* 20(1).

Ullah, I. (2015). Noise pollution from generators—no remedy insight. *News Lens Pakistan*. Accessed May 8, 2017. Retrieved from http://www.newslens.pk/noise-pollution-from-generators-no-remedy-in-sight/.

United Nations Development Programme. (2011). *Human development report 2011: Sustainability and equity: A better future for all.* New York: United Nations Development Programme.

United Nations Development Programme. (2016). Sustainable development goals. Retrieved from http://www.undp.org/content/undp/en/home/sustainable-development-goals.html.

USC. (2011, July 21). Getting to Beijing: Henry Kissinger's secret 1971 trip. Retrieved from http://china.usc.edu/getting-beijing-henry-kissingers-secret-1971-trip.

Wade, R. (2004). The World Bank and the environment. In Boås, M., McNeil, D. (Eds.), *Global institutions and development: Framing the world?* (pp. 72-93). New York: Routledge.

Waitt, G. (2010). Doing Foucauldian Discourse Analysis—revealing social realities. Hay, I., ed. *Qualitative research methods in human geography.* Don Mills: Oxford University Press.

WAPDA. (2015). *WAPDA Annual Report 2014-2015.*

WAPDA. (2016). WAPDA, NUST sign MoU for training, research in management of water resources. WAPDA. Retrieved from http://www.wapda.gov.pk/index.php/newsmedia/news-views/127-wapda-nust-sign-mou-for-training-research-in-management-of-water-resources.

Weber, M. (1978). *Economy and society: An outline of interpretive Sociology.* G. Roth, C. Wittich, (Eds.). University of California: Berkeley.

Weiss, A. (2014). Pakistan. In Guneratne, A., Weiss, A. (Eds.), *Pathways to power: The domestic politics of South Asia.* (pp. 169-225). Lanham: Rowman & Littlefield.

Weiss, A. (2001). Social development, the empowerment of women, and the expansion of civil society: Alternative ways out of the debt and poverty trap. *The Pakistan Review.* 40(4), 401-432.

Weiss, A. (1999). Women, civil society and politics in Pakistan. *Citizenship Studies*, 3(1), 141-150.

Weiss, A. (2013). Introduction. In Weiss, A., Khattak, S Eds. *Development challenges confronting Pakistan*. Sterling: Kumarian Press.

Wolff, G., Gleick, P. (2002). The soft path for water. *The biennial report on freshwater resources.* Gleick, P., Ed. Washington D.C.: Island Press.

World Bank (1970). Report and recommendation of the president to the executive directors on a proposed credit to the Islamic Republic of Pakistan for the West Pakistan water and power development authority power transmission and distribution project.

World Bank (2016). Sustainable development. Retrieved from http://www.worldbank.org/en/topic/sustainabledevelopment.

World Commission on Dams (2000). *Dams and Development: A new framework for decision-making.* Sterling: Earthscan.

World Commission on Environment and Development. (1987). *Our common future*. Oxford: Oxford University Press.

Yu, W., Yang, T., Andre, S., Alford, D., Brown, C., Wescoat, J., Debowicz, D., Robinson, S. (2013). *The Indus basin of Pakistan: The impacts of climate risks on water and agriculture.* Washington D.C.: The World Bank.

Zwarteveen, M., Boelens, R. (2014). Defining, researching and struggling for water justice: Some conceptual building blocks for research and action. *Water International.* 39(2), 132-158.