



STATE WATER RESOURCE COMPETITION AND THE RESULTING CONSEQUENCES OF DIMINISHED WATER SUPPLY

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October 2014

ABSTRACT

Water is essential to human survival and, with the passing of time, natural sources of freshwater supply are rapidly diminishing throughout the world. Because this realization is becoming more and more prevalent, the human survival instinct is prompting competition and conflict over water resourcing worldwide especially in regions like that of the Indus River to include India and Pakistan; and the Mekong River system encompassing China, Cambodia, Laos, Thailand, Vietnam, and Burma.

The research agenda generated from this topic will strive to answer the following question, “What factors have led to state competition and conflict over diminishing water resources and what are the resulting consequences?” A direct comparison of the Indus and Mekong regions shows the relational challenges and successes of the riparian countries involved and the role of China as an upstream water partner. Does China have the power over water to politically control downstream nations and, if so, is China leveraging this power to advance its own interests? The answers to these questions are explored in the following research study.

We certify that we have read this professional paper and that, in our opinion, it is satisfactory in scope and quality for the degree of Master of Arts in Diplomacy and Military Studies.

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For my people have committed two evils; they have forsaken me the fountain of living waters, and hewed them out cisterns, broken cisterns, that can hold no water.

– Jeremiah 2:12-14

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ACKNOWLEDGEMENTS

There are some folks that I wish to acknowledge without whose strength and encouragement I would not have had the perseverance to complete this research project. Dr. Russell Hart invested great time and effort to help see me through to completion of this project. Whether it was the late night after class when we were both sick, or the flurry of emails as I was trying to come up with my thesis question, or working with the Veterans Administration on my benefits, Dr. Hart was always there when it counted. He was able to take a methodical thinking Information Technology professional and squeeze out a historical research writer. In addition to Dr. Hart, I'd like to thank my two readers, Dr. Patrick Bratton and Mr. Andrew Bates.

Dr. Bratton and Mr. Bates voluntarily accepted my request to be the readers for this study. (Little did they know the amount of time it would take me to finish.) Dr. Bratton was very gracious with his time to be able to meet with me and review numerous chapter drafts. His feedback and encouragement was critical in keeping me focused throughout the process. (Methodical thinkers, like me, are not normally inclined to become historians.) His knowledge of the India Pakistan relationship and the quandary of Kashmir proved invaluable to my study of the Indus River Basin.

Mr. Bates provided valuable and timely context to my study especially with regards to the Mekong River Basin. Using his experience as a disaster management professional, he showed me the importance of my thesis to the further study of freshwater resources in South and Southeastern Asia.

Next, I want to acknowledge two of my colleagues, Mr. David Rakestraw and

CAPT Robert Soderholm, for providing letters of recommendation to Hawaii Pacific University so that I could be a student in the Master of Arts in Diplomacy and Military Studies program. Their efforts contributed to my being accepted to the program and ultimately gave me the opportunity to write this thesis.

Finally, I want to thank my wife, Ruth, and daughter, Quintina, for their patience and understanding as I spent many hours in front of a computer screen crafting this study. I greatly appreciate their love and support.

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INTRODUCTION

Since the end of the Cold War, environmental security has been added to the national security agenda of many countries.¹ In the realm of environmental security, freshwater scarcity has become a very important topic as underdeveloped countries struggle to maintain adequate and equitable amounts of this renewable natural resource. Countries in Asia are no exception.

This research study will explore the scarcity of water and the factors that can cause competition and in some cases conflict amongst Asiatic states. The study will also look into the importance of water to sustain the human race. I chose the topic for this thesis because I am concerned about the future viability of states and the concept of sovereignty in an atmosphere of globalization where water plays a central role. Water has been a point of contention amongst the countries of South and Southeastern Asia in the past and it has the potential to cause further competition or conflict if the depletion problem is not corrected. Let's examine the some of the casual factors that are at work in Asia.

Causal factors resulting in diminished water supply fall into two categories: natural and man-made. One of the natural factors to be explored in this study is *Climate Change* along with its secondary effects including *Salinization*, *Ice Melt*, *Drought*, and *Desertification*. The one man-made factor to be explored is *Industrialization*.

There has been much discussion about *Climate Change* in recent years. My

1

Roland Dannreuther, *International Security: The Contemporary Agenda*, (Cambridge: Polity Press, 2007), 59.

intention is to shed some light on the possible effects of *Climate Change* on water as a resource and study how the resulting depletion of water supplies has caused the outbreak of state conflicts and/or cooperation over the last two decades.

Climate change may be one of the main contributing factors in creating a more interdependent world when it comes to freshwater. Freshwater availability has diminished over time and the research will show how two distinct but interdependent regions in Asia are in a race against time to preserve water as a precious resource, and what the countries within these regions are doing to address the situation. The topic is appropriate because water depletion, caused in part by climate change, appears to be changing the landscape of our world for the worse. Along with a new landscape comes new demand for resource exploration that has the potential to cause increased conflict between states. *Hazards*, like climate change, have already caused disputes over state resources. They are also creating competitive situations over newly discovered resources uncovered by events such as the melting of the polar ice caps. The availability of fresh water is vital to all nations and any threat to its supply is a potential cause of conflict. My thesis will further define the effects of water scarcity on resource competition, and shed light on the consequences of water resource depletion for states impacted by natural hazards. When water is depleted, human need for this renewable resource can become paramount.

Because water is a human necessity, mankind tends to take matters into its own hands in order to preserve the resource. **When** a country is lacking in this basic resource, the people are motivated to protective action. For example, author Gwynne Dyer in his

work, *Climate Wars: The fight for survival as the world overheats*, describes how a future Indus River Basin might look by 2036 if measures are not taken by India and Pakistan to conserve water:

first the glaciers will melt, overflowing the rivers every summer – and then they will be gone, and the rivers will run dry in the summers ... a medium-sized problem for India, where a very large proportion of the crops is rain-fed ... but a life-and-death crisis for Pakistan, a country that is essentially a desert with a big river flowing through it.²

We can see from Dyer's prediction that nations must maintain sufficient amounts of water for their continued survival into the future!

To illustrate the need for survival through his Self-Actualization Theory, Abraham Maslow proposes “that human motivation can be understood as resulting from a hierarchy of needs. These needs, starting with the most basic physiological demands, progress upward through safety needs, belonging needs, and esteem needs, and culminate in self-actualization.”³ Maslow categorizes the value of water to human survival as a “demand.” The other levels of the hierarchy are referred to as “needs.” To further expound upon the human demand for water, it is important to note the breakdown of just how much fresh water each human requires each day to properly function.

According to the U.S. Geological Survey Water Science School, “up to 60% of the human body is water” and “[e]ach day humans must replace 2.4 litres of water, some

2 Gwynne Dyer, *Climate Wars: The fight for survival as the world overheats*, (Oxford, England: Oneworld Publications, 2011), 113.

3 *Encyclopædia Britannica Online*, s. v. "motivation," accessed November 26, 2012, <http://www.britannica.com.ezproxy.hpu.edu/EBchecked/topic/394212/motivation>.

through drinking and the rest taken by the body from the foods eaten.”⁴ Since direct water intake and water ingested through foods supplies the body's water level, it is important for humans to also preserve fresh water for the plants and animals that feed mankind. In addition to preserving freshwater to humans, plants, and animals, consideration should be given to address the effects of climate change on water supply.

Climate change can cause secondary effects, like *salinization*, that can impact the people living in South and Southeastern Asia, as well as the rest of the world. These secondary effects are further defined in chapter 1. *Salinization* is when the flow of upstream fresh water is restricted, allowing salt water to seep into lower portions of a river system, and resulting in delta watersheds being contaminated with salt water.⁵ This contamination can set in motion a chain of events that changes the dynamic of rivers and their ecosystems. The ecosystems of the Indus and Mekong river basins rely on freshwater in order for fish and other water species to survive. People within the riparian countries depend on these fishes as part of their food supply. Salinization caused by climate change and man-made interference is forcing fish to move out of their natural habitats upstream into to non-brackish waters, thus changing the ecology of the river. This is just one example of the fragility of the ecosystem that shows the importance of preserving existing water sources.

As indicated above, climate change is a phenomenon that can also manifest itself in natural hazard events such as accelerated melting of the glacial ice fields and snow

4 U.S. Geological Survey, “The water in you,” under The USGS Water Science School, <http://ga.water.usgs.gov/edu/propertyyou.html> (accessed November 17, 2012).

5 Damon P. Coppola, *Introduction to international disaster management*, (New York: Elsevier, 2007), 80.

packs that are so important to the continuous supply of freshwater to downstream populations.⁶ The term for this phenomenon is *Ice Melt*. *Ice Melt* is a secondary effect caused by climate change. The perceptions of people impacted by climate change events may be the same as those who are impacted by other natural disasters, but with a protracted effect. So, for the purposes of furthering research, this study shall examine climate change natural hazards and the resulting effects of these hazards on competition over water resources. Where climate change results in a lack of water resources for a country, the impact of the resource depletion will be examined and what the affected country is doing to cope.

In addition to coping with climate change, riparian nations that depend upon common water sources use competition or cooperation to manage water supply for their continued survival. This thesis explores two case studies that exemplify cooperation and disputes between the countries of the Indus River and its tributaries, and those of the Mekong River system. Existing tensions between these nations that depend upon mutual water supply can exacerbate diplomatic attempts at water sharing. This situation is further complicated by the diminishing supply of water resources in each region. We will see throughout the research that other causal factors can also result in competition and/or conflict over water. These causal factors include climate change hazards and man-made hazards. We will also examine the resulting consequences of diminished water supplies for all of the nations involved.

Natural hazards caused by climate change can cause a lack of resources. These

⁶ Coppola, *Introduction*, 72.

hazards are not always simple singular events. Most hazards that happen in the world are complex. In other words, complex hazards have different dimensions of varying degrees. A hurricane, for example, can displace populations, destroy property, and restructure existing regional geography. *Drought* can bring on *Desertification* and is an example of a slow onset natural hazard. *Desertification* can cause populations to shift location and can remove existing food and water resources.⁷ These two examples are brought on by climate change and have the potential to generate competition for resources between states.

Besides climate change, the human factor impacting water supply is *Industrialization*. Mankind can sometimes be his and her own worst enemy when it comes to managing life-giving resources like water. Industrial actions like dam building for the purpose of water diversion seeks to benefit one group of people while, at the same time, places a heavy toll on the affected downstream populations. Unintended consequences arise from these industrial damming projects, for example, silt buildup caused by reduced stream flow can inhibit navigable waters and thereby force affected countries to dredge the blocked river channels. These inhibited channels would normally be kept open by the natural water flow. Another one of man's unintended consequences is the reduction of available freshwater to downstream populations. The reduction, or curtailment, of flow is known as damming. Is damming an equitable method for upstream countries to protect their own survival and security? Are these projects a direct affront to downstream neighbors or do the upstream countries consider their controlling

⁷ Coppola, *Introduction*, 54.

actions mutually beneficial? The study will further seek to answer these questions and relate them to competition and conflict over water resources. One important commonality between the two regions under consideration in this study is the Peoples Republic of China.

China has both interest and influence in the management of the Indus and Mekong river waters because the headwaters for both of these river systems originate within the Tibetan Plateau, and China currently has control over that area. Is China, as the master of the river headwaters, the key to future equitable co-existence in these two regions? Downstream riparian nations like India, Pakistan, Burma, Thailand, Vietnam, Laos and Cambodia have had to react to China's decisions on what to do with the waters under its control, so the study will explore the answer to this question because it contributes to water management and the consequences of diminished water supply.

In summary, this study will investigate influences like natural hazards and industrialization that force state contention over freshwater resources. My goal is to produce a thesis that will add to the study of state competition over limited water resources and the consequences caused to states facing diminishing supplies of fresh water. Beginning with the research methodology, this study will lead you to possible answers to the research question - "what factors have led to state competition and conflict over diminishing water resources and what are the resulting consequences?"

Chapter 1

Methodology

In general, the threat of drought or water scarcity can trigger nations to hoard what they think their country will need for future survival. The hoarding impulse can inflame tensions with countries who also have need of the same water resources. Two other triggers are actual water scarcity and water contamination. In a river scenario, downstream nations are directly affected by the water control actions of their upstream neighbors or by actions of nations that control the headwaters of the river they share. As we unveil the methodology of this research study, it is important to understand the literature used to support the findings.

Literature Review

In addition to primary sources, applicable journals, and news articles, I've selected specific scholarly works to focus on the study of water resources. While examining the existing literature on the subject, I've found several works that are germane to the research question. The thesis research focus will be on source materials that will contribute to further study of the factors that lead to competition and possibly conflict over water resources. Two case studies will be explored. One case study will be employed to provide supporting evidence of the water challenges facing nations which depend upon the Indus River system. The second case study involving the Mekong River system and its riparian states will be used to study these same challenges. China's role

will also be examined along with its control of the Tibetan Plateau. Finally, this paper will address the consequences caused from the lack of sufficient water resources.

The primary sources used include governmental and non-governmental organization documents. Secondary sources include Michael T. Klare's, *Resource Wars*, Elinor Ostrom's, *Governing the Commons: The Evolution of Institutions for Collective Action*, Stephen Van Evera's, *Causes of War*, and Brahma Chellaney's *Water: Asia's New Battleground*. Other sources include journal articles, books and book reviews, news reports, and interviews. Combined, these sources provide a better understanding of the relationship between the case studies; the factors that influence competition and conflict amongst states over water resources; and the consequences that result from prolonged water scarcity.

My understanding of what existing scholarship has said about this topic is that climate change is a natural hazard that has also been a factor in the competition over water resources. Another factor is man-made industrialization. The scholarship also shows that there are various consequences for states facing a lack of water resources. These consequences can include disputes over territorial boundaries. In the case of fresh water, nations have fought to obtain or maintain access to this life sustaining resource. If maintaining this vital resource means moving a boundary, then human need can make it happen. Though somewhat dated, the book, *Resource Wars*, provides key trends where water and other key resources will determine the shape of global society. Recent history (since 2001 when the book was written) has shown that some of Mr. Klare's theories on conflict over water are flawed. Cooperation has been the trend as we shall see later in the

study. However; to illustrate its importance, Klare devotes two chapters to the water discussion.⁸ Another respected scholar, Elinor Ostrom, expounds on the concept of water cooperation over conflict.

Ostrom, in *Governing the Commons*, addresses governance of natural resources, such as water. She discusses “how common-pool resources can be organized in a way that avoids both excessive consumption and administrative costs” by putting in place measures to embolden proper state self-government to solve the “problems of supply, credibility, and monitoring.”⁹ Her theory sheds some light on interstate water challenges discussed in the case studies and contributes possible solutions. She along with coauthor Charlotte Hess in, *Understanding Knowledge As a Commons: From Theory to Practice*, show that “the analysis of knowledge as a commons has its roots in the broad, interdisciplinary study of shared natural resources, such as water resources, forests, fisheries, and wildlife.” Written in 1990, the book is used as a foundation for the study of the management of common-pool resources. “*Commons* is a general term that refers to a resource shared by a group of people.”¹⁰ Without organizing the distribution of water resources amongst riparian states, national governments can look forward to the potential for interstate conflict.

Stephen Van Evera in, *Causes of War: Power and the Roots of Conflict*,

“concentrates on war causes related to the character and distribution of national power.

8 Michael T. Klare, *Resource wars: the new landscape of global conflict*, (New York: Henry Holt and Company, LLC, 2001).

9 Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, (Cambridge University Press, 1990), xi.

10 Charlotte Hess and Elinor Ostrom, *Understanding Knowledge As a Commons : From Theory to Practice*, (MIT Press, 2005), <http://site.ebrary.com/lib/hpu/docDetail.action?docID=10173555> (accessed September 7, 2013), 4.

Power factors deserve attention because they strongly influence the probability and intensity of war[.]”¹¹ He discusses cumulative resources in his book and how they contribute to the causes of war. “A resource is cumulative if its possession helps its possessor to protect or acquire other resources. The more its possession eases the protection or seizure of other resources, the more cumulative the resource.”¹²

Competition over water between two riparian countries may tempt the stronger of the two nations to conquer the weaker to gain control of more of the resource. Van Evera also discusses how “modern military powers” develop through “industrial capacity.”¹³ Water, as a natural resource, is a key component to modern industrialization. One example of modern industrialization is that of water being used to generate electrical power through the damming of rivers. This type of industrialization can be a cause of competition over water. In an effort to protect its current strength, or to avoid being placed at a disadvantage, a downstream state may militarily engage an upstream state. Brahma Chellaney would agree with Van Evera in this regard. He is a scholar who has researched water as being an impetus for conflict.

In his book, *Water: Asia's New Battleground*, Chellaney focuses on the Tibetan Plateau as one of the biggest water suppliers in the world. From this plateau, both the Mekong and Indus river systems obtain their water supply. He also exposes China as a potential destroyer of interstate water supply since it controls the waters of the Tibetan Plateau. The research garnered from this and the rest of the reviewed literature has

11 Stephen Van Evera, *Causes of War: Power and the Roots of Conflict*, (Cornell University Press, 2013), 4.

12 Stephen Van Evera, *Causes of War*, 105.

13 Ibid., 110.

generated numerous terms that are used throughout the study. These terms are defined in the following section.

Definitions

Before attempting to answer the research question, it is necessary to have a clear understanding of the terms being used throughout this study. The following key terms: *climate change, resources, hydro politics, common-pool resources, borders, conflict, and competition* address the research question – “what factors have led to state competition and conflict over diminishing water resources and what are the resulting consequences?” Damon P. Coppola in his book, *Introduction to International Disaster Management*, defines *climate change* as “not a single hazard but an observed change in average global climactic conditions over time.”¹⁴ The United Nations has qualified the events that result from climate change as “slow onset disasters.”¹⁵ The study will include climate change amongst other disasters that have the potential to effect water availability.

Climate change is “an observed change in average global climactic conditions over time” that demonstrates itself through *drought, salinization, and melting hazards*.¹⁶ Coppola provides some insight concerning these *natural hazards*. He defines *drought* as “a period of unusually dry weather that persists long enough to cause serious problems

14 Damon P. Coppola, *Introduction to international disaster management*, (New York: Elsevier, 2007), 70.

15 “UNHCR - UNHCR Policy Paper: Climate Change, Natural Disasters and Human Displacement: a UNHCR Perspective”, n.d. <http://www.unhcr.org/4901e81a4.html>.

16 Coppola, *Introduction to international disaster management*, 70.

such as crop damage and water supply shortages.”¹⁷ *Drought* is another hazard that has contributed to state competition over freshwater resources according to Coppola. He goes on to describe *salinization* as groundwater that becomes contaminated by extremely high levels of salt that gets washed into the ground's fresh water table from salt water sources.¹⁸ *Salinization* can be caused by drought, so, consequently, this hazard can also contribute to state competition over water resources. Finally, climate change dynamics can cause “melting of the world's snow and ice cover at the poles and in glaciers.”¹⁹ This type of climate change, known as a *melting hazard*, can cause competition over water resources by reducing the size of glaciers. The result is less water being provided to downstream riparian nations. With less available fresh water in rivers supplied by glacial melt, the affected nations are forced to build dams and water diversion mechanisms to maintain needed water supply for their populations. With dams erected upstream, states, residing further downstream will have less of this valuable resource. The upstream dams can cause a domino effect on the lower riparian countries, and thereby, force them to build their own water catchments. We can see from these examples that climate change can cause competition between nations over fresh water resources. Considering the United Nations qualification of climate change as a type of natural disaster, and in concert with hazards being the consequent effect of natural disasters, the research herein will focus on natural hazards as an impetus for competition over water resources. Since climate change is shown to be part of natural hazards, and given that the resources

17 Ibid., 54.

18 Ibid., 80.

19 Coppola, *Introduction*, 72.

discussed here are natural, we can apply their definitions to the water study.

General resources are defined as “money, or any property that can be converted into money; assets.”²⁰ *Natural resources* are defined as “something, such as a forest, a mineral deposit, or fresh water, that is found in nature and is necessary or useful to humans.”²¹ The research here will focus on competition between nations over water as a *natural resource*. This type of competition falls into the political realm of *hydropolitics*.

Hydropolitics is the systematic study of interstate conflict and cooperation over transboundary water resources.²² *Hydropolitics* plays an important role in the management of *Common-Pool Resources (CPR's)*.

Ostrom addresses the management of *CPR's* in, *Governing the Commons*. In the book, she states that a *CPR* is “a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.”²³

She describes how water from Southern California basins has been equitably shared between communities in the greater Los Angeles area for many years. One reason for the fair-sharing of water has been the appointment of watermasters. “The watermaster in each basin has extensive monitoring and sanctioning authority. Monitoring activities are obvious and public” according to Ostrom. Because of the

20 Random House Webster's College Dictionary, s.v. “resource.”

21 natural resource. Dictionary.com. *The American Heritage® Science Dictionary*. Houghton Mifflin Company. http://dictionary.reference.com/browse/natural_resource (accessed: April 29, 2012).

22 Arun P Elhance, "Conflict and Cooperation Over Water in the Aral Sea Basin," *Studies In Conflict & Terrorism*, 20, no. 2 (April, 1997): 218. Natural water resources for the purposes of this study are freshwater resources unless otherwise specified.

23 Elinor Ostrom, *Governing the Commons*, 30.

watermaster, “the level of infractions has been insignificant[.]”²⁴ Given its success in California, the research study will examine the role of the watermaster as a possible source of water cooperation across borders in the Indus and Mekong regions of South and Southeastern Asia.

Borders are another part of the research that need clarification. What do we mean when we refer to *borders* as they apply to countries. Country borders have been a point of contention ever since the Treaty of Westphalia. Borders define the boundaries of sovereignty for an internationally recognized people who occupy a given space on the globe. Boundaries contain the identity of a nation. In other words, the boundary outlines that separate two sovereign identities (or sovereign identities and international identities) are commonly referred to as *borders*. History shows that many wars have been fought over these international dividers. Without governance of the commons, any nation would be threatened by unwelcome appropriation of water from outside countries. This risk could lead to competition or possibly even conflict.

Webster states that “conflict” (for the purposes of this project, between two or more nations) is “to contend with violence.” We can see from these definitions that having equal claim to something is not the same as fighting over it. However; where sovereign nations try to defend and preserve their claims to resources, competition can lead to conflict. One might even go so far as to say that conflict is a consequence of competition. One example is when, as a consequence of competition, one country is responsible for diminishing another's resources.

²⁴ Ostrom, *Governing the Commons*, 125.

Perhaps, this is a good point to also differentiate and properly compare the term “competition” with that of “conflict” as defined above. According to Noah Webster's 1828, *Dictionary of the English Language*, “competition” is a “state of rivalry; a state of having equal claims.” We can see from this very old and lasting definition where two countries can, in effect, compete for the same resources especially when the resources are located where borders or Exclusive Economic Zone's (EEZ's) are disputed.

EEZ's are zones where states have the rights to marines resources contained therein:

The Exclusive Economic Zone starts at the coastal baseline and extends 200 nautical miles out into the sea, perpendicular to the baseline. Thus, the EEZ overlaps both the contiguous zone and territorial waters. States also have rights to the seabed of the continental shelf up to 350 nautical miles from the coast, where this extends beyond the EEZ, but this does not form part of their EEZ.²⁵

EEZ's play an important role in the competition for resources due to the contention over where one EEZ ends and another begins. One example where this dilemma comes into play is the waters of the Caspian Sea. The states surrounding the Caspian Sea are competing for its abundant crude oil resources. World governments are concerned that this region could explode into conflict over these resources because of EEZ's that are not clearly defined.

The Military Advisory Board, in their report, *National Security and the Threat of Climate Change*, states “[w]hen climates change significantly or environmental conditions deteriorate to the point that necessary resources are not available ... [t]hese changes, and others, may create large number of migrants. When people cross borders in

25 <http://www.reference.com/browse/exclusive+economic+zone?s=t>

order to obtain needed resources, tensions can rise.”²⁶ Heightened tensions between nations are a major source of cross-border conflict. But, according to the same source:

Disputes over key resources such as water do not automatically trigger violent outcomes, and no recent wars have been waged solely over water resources. In areas with a strong government and societal cohesiveness, even tense disputes and resource crises can be peacefully overcome. In fact, in recent years, arguments have been made that multinational cooperation over precious water resources has been more an instrument of regional peace than of war²⁷

So, this source shows two “conflicting” perspectives; competition and conflict verses cooperation over water between countries. Perhaps, this disparity is a result of changes in world society where the world is faced with both the remnant protectionist attitudes of the Cold War and a budding attitude of mutual understanding when it comes to basic necessities like water for survival.

In order to prevent conflict over water, on March 17, 1992, the United Nations Economic Commission for Europe, or UNECE, held the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention)*.

The purpose of the convention was to “to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and groundwaters.”²⁸

The Convention obliges Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. Parties bordering the same transboundary waters shall cooperate by entering into specific agreements and establishing joint bodies. The Convention includes provisions on monitoring, research and development, consultations, warning and alarm systems, mutual assistance, and exchange of

26 Military Advisory Board, *National Security and the Threat of climate change*,(Alexandria, VA: The CNA Corporation, 2007), 13.

27 Military Advisory Board, *National Security*, 18.

28 United Nations Economic Commission for Europe, “The UNECE Water Convention,” <http://www.unece.org/env/water/> (Accessed October 15, 2013).

information, as well as access to information by the public.

Initially negotiated as a regional instrument, the Convention was amended in 2003 to allow accession by all the United Nations Member States. The amendments entered into force on 6 February 2013, turning the Convention into a global legal framework for transboundary water cooperation. It is expected that non-ECE countries will be able to join the Convention as of end of 2013.²⁹

The last paragraph of the quote is key for all countries interested in solutions to interstate competition over water resources including those of the Indus and Mekong regions.

Imbedded within this cooperation is the problem of mankind's propensity toward industrialization. So, how do sources respond to mankind as the causal factor of water scarcity?

Industrialization is a factor that mankind has imparted to the water debate.

Diversion works and damming projects are two human activities that are impacting water supply to riparian states around the globe. This research project examines two case studies and then compares them as they relate to water resources. The first case concerns the Indus River system and its importance to India and Pakistan. The second study exposes the water relationships of the countries along the Mekong River. Since the regions of the two studies have one country in common, the thesis will also consider how China is impacting water flow to their downstream riparian neighbors.

To summarize, the methodology of this study has taken into account existing literature as it applies to the research question - "what factors have led to state competition and conflict over diminishing water resources and what are the resulting consequences?" Literature on water scarcity and management has been considered

²⁹ Ibid.

including Michael T. Klare, Elinor Ostrom, Stephen Van Evera, and Brahma Chellaney. Causal factors of conflict and water scarcity such as natural and man-made hazards have also been introduced.

Climate change is an example of a natural hazard and *industrialization* is an example of a man-made hazard. In addition to the above factors, associated key terms such as *common-pool resources*, *drought*, and *borders* have been defined. The importance of defining and understanding boundaries like EEZ's and cross-border incursions have also been discussed, and the difference between the words “conflict” and “competition,” for the purposes of this study, has also been examined.

The methodology has also introduced the two case studies for this research project – the Indus River and the Mekong River. Both of these regions are experiencing water scarcity along with water management challenges. The project will consider the impact of these cases on the research question. The study will also consider China and the Tibetan Plateau and its effect on both the Indus and Mekong regions. The importance of *hydropolitics* in evaluating water competition and cooperation amongst riparian nations will also be an important thread in the study fabric.

Finally, the case studies will be compared using the research question to explore possible solutions to water scarcity for mankind. The next chapter examines the first case study – the Indus River.

Chapter 2

Case 1: The Indus River

Overview

The Indus region is important to the study because it is an example of successful water management in a region that has been laden with conflict. The Indus River system is vital to the survival of both India and Pakistan and this is perhaps why the two countries have a treaty that manages Indus River water distribution. The success of this treaty has helped to stave off water conflicts between these two nuclear powers.

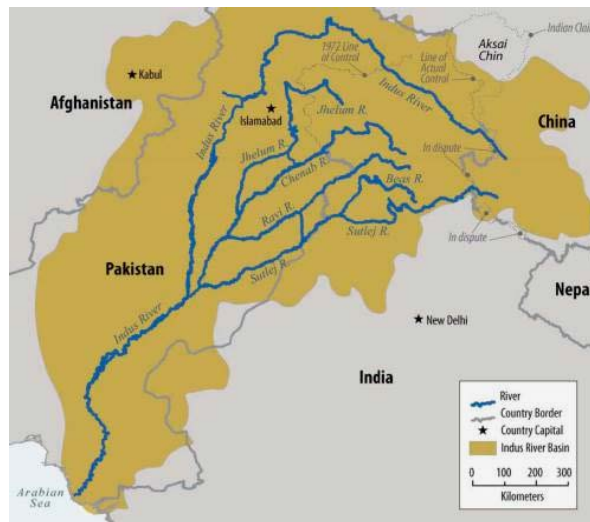


Figure 1. Map of the Indus River Basin. *Source:* Amélie Joseph, “Map of the Indus Basin (source: US senate report),” Friends of the Earth Middle East, entry posted December 30, 2012, <http://foeme.wordpress.com/2012/12/30/cooperating-over-water/> (accessed November 25, 2013).

The Indus River originates in Tibet and runs west to the Arabian Sea.³⁰

Sustaining the river basin means heavy dependence on glacial melt and snow by the affected riparian nations. In fact, the Indus River Basin has the greatest “meltwater share of the total discharge” from these two water sources according to Chellaney. The Indus water flows are “particularly susceptible to global-warming driven shifts in melt characteristics.”³¹ Since it depends upon water from glacial melt and snow, Pakistan must seek cooperation from its upstream riparian neighbor, India, to obtain consistent and adequate amounts of these vital water resources. This chapter examines the current management of water in the midst of tension between India and Pakistan, with further discussion about what has been done to alleviate contention over water and why the remedy has remained successful. Lets begin with a brief history of the Indus region with particular focus on India and Pakistan.

Historical Background

Prior to 1947, there was no separation between India and Pakistan. Both sectors were part of British India. Christiane Hartnack in, "Roots and Routes: The Partition of British India in Indian Social Memories," provides a synopsis of how Pakistan and India were divided:

30 Hamid Sarfraz, “Revisiting the 1960 Indus Waters Treaty,” *Water International*, 38:2 (2013), DOI: 10.1080/02508060.2013.784494, 204. Although the main source of the Indus River is located in China (Tibet), the headwaters of the basin lie in India.

31 Brahma Chellaney, *Water: Asia's new battleground*, (Washington DC: Georgetown University Press, 2011), 98-99.

The majority of British India's population did not strive for or initiate the Partition. In fact, most people were oblivious to the run-up to it. Rather, the Partition of British India was externally imposed and internally sanctioned. Based on the assumption of a deeply rooted animosity between Muslims and Hindus, the last British Viceroy Lord Mountbatten pushed through the hasty decision to separate the South Asian population according to religion. Muhammad Ali Jinnah and Jawaharlal Nehru, the leaders of the Muslim League and of the Indian National Congress respectively, took advantage of Britain's precipitous and poorly planned disengagement from India to implement state-building activities. Shaped as they were by their privileged social backgrounds, Western education and thinking as well as lifestyle, both politicians basically shared political views similar to those of the former British rulers; each wanted to overcome British colonial rule by establishing an independent state. In this respect, the Partition of British India was a prerequisite for each man to realise his vision: Jinnah's of a separate state not dominated by the Hindu majority, and Nehru's of an India independent of British colonial rule.³²

Aside from those mentioned by Hartnack, another player in the division of India was Mahatma Gandhi. He was an extremely popular unofficial leader throughout all India. In Uday S. Mehta's article, "Gandhi and the Burden of Civility," Mehta discussed how Gandhi put forward a form of nonviolent civil disobedience to the Indian people that he called *satyagraha*.³³ Amongst Gandhi's objectives was the independence of India from Britain and the freedom of the Indian people to make their own religious choices while maintaining peace throughout the country.

But, more important than religion itself, the territory to house that religion is what

32 Christiane Hartnack, "Roots and Routes: The Partition of British India in Indian Social Memories," *Journal Of Historical Sociology* 25, no. 2 (June 2012), Historical Abstracts with Full Text, EBSCOhost (accessed December 23, 2013), 245.

33 Uday S. Mehta, "Gandhi and the Burden of Civility," *Raritan* 33, no. 1 (Summer 2013), *Academic Search Premier*, EBSCOhost (accessed January 5, 2014), 37. Could *satyagraha* have ultimately caused the British to prematurely relinquish control of India to its own people along with hastily dividing India and Pakistan, thereby, leaving behind a vacuum of confusion mixed with hostility amongst the various factions residing in and around Kashmir? Could *satyagraha* have unintentionally set the stage for the current territorial disputes faced by India and Pakistan today? It is sobering to ponder the noble actions of an advocate for peaceful coexistence amongst the Indian people, causing unintended consequences that may have resulted in contention between former British Indians who now occupy Pakistan and India.

mattered most to Pakistan and India. Whether influenced by Gandhi's philosophy or not, the fact remains that India and Pakistan are not friendly neighbors. As Hartnack describes above, one of the driving forces in the differences between the two nations is religion. The two nations have fought at various points in time between 1947 and 1999, and tensions still remain high over the Kashmir region today. India and Pakistan were at war 1947-48, 1965, and 1971, with an undeclared war in 1999 and there has been continuous tension along the Line of Control (LOC) (see fig. 2) in Kashmir that has separated the two nations since the 1980s.³⁴ A part of this tension results from each country protecting their water resources.



Figure 2. Map of the Line of Control in the Indus River Basin. *Source:* “Op-ed — Chenab waters and Pakistan’s fear” Circle of Blue, entry posted October 14, 2008, http://www.circleofblue.org/waternews/wp-content/uploads/2008/09/pakistan_india_800.jpg (accessed January 20, 2014).

³⁴ Patrick Bratton, e-mail message to author, August 23, 2013. Professor Bratton provided some historical clarification to the India versus Pakistan war periods.

Water resource protection is one of the reasons for the mutual animosity between India and Pakistan. Because of the contention for water, Pakistan is afraid that India will again restrict Pakistan's water supply coming from the Indus River system. Robert G. Wirsing in, "The Kashmir Territorial Dispute: The Indus Runs Through It," has an explanation for Pakistan's concern about its upper riparian neighbor,

On 1 April 1948, the East Punjab government arbitrarily stopped the flow of water down the Sutlej River to Pakistan's West Punjab. This came at a critical point in the agricultural calendar and in the midst of increased fighting in Kashmir between Indian and Pakistani forces, greatly exacerbating the post-Partition crisis in India–Pakistan relations.³⁵

Pakistan was not prepared for the sudden disruption in water flow caused by India. The incident showed the leaders of Pakistan just how much their country depends upon the Sutlej River for irrigation and just how much control their upper riparian neighbor has over its water supply. Undala Z. Alam describes the impact of India's actions to stave the Sutlej water flow from crossing the Indian border into Pakistan:

For Pakistan the timing could not have been worse. Farmers in the Punjab plant two crops per year. The water shortage threatened both the winter crop that was about to be harvested, and the summer crop which would be sown immediately afterwards. Without water, both seasons' crops would be lost.³⁶

Because Pakistan lies downstream from India, there is an added sense of vulnerability about water scarcity imposed upon it by India. One example of this vulnerability is

35 Robert G. Wirsing, "The Kashmir Territorial Dispute: The Indus Runs Through It," *Brown Journal Of World Affairs* 15, no. 1 (Winter 2008), 227.

36 Undala Z. Alam, "Questioning the water wars rationale: a case study of the Indus Waters Treaty," *Geographical Journal* 168, no. 4 (December 2002), 342.

Kashmir where the vast majority of Pakistan's water sourcing originates. The vulnerability to potential decreases in water supply has added to its political and military struggle to strip India of any control over Kashmir.

According to David Masci in, "Emerging India: Can it remain an open and tolerant society?," the Kashmiri people consider themselves autonomous and "their distinct language, culture and identity justify seceding from India to either form a new state or become part of Pakistan."³⁷ In apparent disregard for Kashmir's desired autonomy, India controls the water resources of Kashmir on its side of the LOC. This control exacerbates the water resource problem for Pakistan and adds to its vulnerability. Masci describes how Kashmir became involved in this tug-of-war between these two nuclear powers. "The dispute over Kashmir began with the birth of both countries in 1947. Pakistan – created specifically as a home for Muslims living in British India – believed then, as it does now, that majority-Muslim Kashmir should be part of Pakistan."³⁸ After its first war with India ended in 1949, Pakistan "took control of a third"³⁹ of Kashmir.

Of course, India is hesitant to give Kashmir independence for many reasons, not the least of which is the existing river and canal system that runs through it. Another reason for India's concern is that it will lose a strategic military advantage over Pakistan by ceding Kashmir:

37 David Masci, "Emerging India: Can it remain an open and tolerant society?," *CQ Researcher* Volume 12, no. 15, Issue Number (April 19, 2002): 334, <http://library.cqpress.com.ezproxy.hpu.edu/cqresearcher/getpdf.php?id=cqresre2002041900> (accessed December 30, 2013).

38 *Ibid.*, 336.

39 *Ibid.*, 344.

The Indian Army, echoing nineteenth-century British geopolitics, claims that giving up the mountains of Kashmir would expose the plains of Punjab and Haryana, and even Delhi, to foreign (in this case, Pakistani) attack. The Valley is strategically important because of the communication links that run through it to Ladakh and to Siachin, where the Indians and Pakistanis remain frozen in conflict.⁴⁰

Loss of the active communications links that transit Kashmir, could turn the tables and make India the vulnerable opponent to Pakistan by giving it military strategic advantage.

Stephen P. Cohen refers to disputes like the one between India and Pakistan over Kashmir in, *India: Emerging Power*, as “paired-minority conflicts.”⁴¹ According to Cohen, paired-minority conflicts occur mainly within states, but, under certain circumstances, these conflicts rise to the interstate level. Kashmir is one such case. The driving force behind this type of conflict is distrust. Cohen explains,

These extremely persistent conflicts seem to draw their energy from an inexhaustible supply of distrust. As a result, it is difficult for one side to offer reassuring concessions or compromise on even trivial issues, since doing so might confirm one’s own weakness and invite further demands. Nevertheless, leaders entrapped in such conflicts resist compromise when they have the advantage, believing that as the stronger side they can bend the other party to its will. As if they were on a teeter-totter, the two sides take turns in playing the role of advantaged/disadvantaged. They may briefly achieve equality, but their state of dynamic imbalance inhibits the prospect of long-term negotiations.

...

Time is a critical component of these conflicts. Often, one or both parties are looking ahead to a moment when they can achieve some special advantage or when the other side will collapse.⁴²

History has exacerbated Pakistan's distrust of India. Pakistan experienced a partial collapse in 1971 when it lost East Pakistan following a conflict with India. The result was that East Pakistan took on independence by forming a new country – Bangladesh.

40 Stephen P. Cohen, *India: Emerging Power*, (Washington DC: Brookings Institution Press, 2001), 213.

41 Ibid., 198.

42 Ibid., 199.

This was a strong blow to the the Pakistan Army which has ruled the country for many years. Pakistan's loss of East Pakistan has caused the Pakistan Army, and therefore the Pakistan government, to remain strongly suspicious of India.⁴³ In other words, Pakistan does not want to face more lost territory to its larger riparian neighbor.

In addition to territory loss, Pakistan is concerned about the effects of climate change on its diminishing water resources. First hand accounts of the people in the region and their dependence on water from the Indus River are important to this study. I was privileged enough to meet someone with first hand knowledge of the Indus region while visiting Thailand in August, 2013. John Bursa is an official of the United Nations World Food Programme (UNWFP). He was working in Pakistan in 2005 and his experience illustrates the dependence of the people on meltwater availability:

In 2005[,] we saw the early days of Global Warming issues being discussed in open forums and widely covered in the media, including in Pakistan. People were discussing the concerns of glacial melt in the Himalaya's and Tibetan plateau which would directly affect their livelihoods in the future.⁴⁴

One can see from his observation that glacial melt is very important to the future for the Pakistani people. Of course, controlling the amount of glacial melt is largely out of the hands of Pakistan or India. But, Pakistan can control the stresses on the existing water supply. One major stress on Pakistan's water supply is the growing number of people using the water.

In addition to climate change causes, Pakistan is facing its own internal cause of

43 Ibid., 204.

44 John Bursa, e-mail message to author, October 6, 2013.

water scarcity – overpopulation. According to Chellaney, “there is a direct link between population futures and water futures of nations.”⁴⁵ Michael T. Klare is in agreement with Chellaney. He claims that “the growing demand for resources is driven, to a considerable degree, by the dramatic increase in human numbers.”⁴⁶ The Pakistan Ministry of Water and Power has admitted as much about the overpopulation of its country by stating, “the increasing population will have a major impact on food, power and domestic water requirements.”⁴⁷

In fact, Pakistan is already sinking into a water crisis due, in part, to its increasing large population. The availability of freshwater continues to diminish with the population increase. The water stress problem is resulting in a lack of clean water for many Pakistanis. Michael Kugelman works as an associate with the Asia Program at the Woodrow Wilson International Center for Scholars states that, “it is safe to say that anywhere from around 40 to 55 million Pakistanis—about a quarter to a third of the country’s total population—do not have access to safe drinking water.”⁴⁸ Brahma Chellaney predicts that, “as Pakistan's population swells further, the present situation of water stress there seems to slide into outright water scarcity by 2035.”⁴⁹ With the population continuing to increase and with no modification to the current structure of

45 Brahma Chellaney, *Water*, 221.

46 Michael T. Klare, *Resource wars: the new landscape of global conflict*, (New York: Henry Holt and Company, LLC, 2001), 15.

47 Pakistan ministry of water and power, *Pakistan Water Sector Strategy*, National Water Sector Profile, Volume 5, October 2002, 1.

48 Michael Kugelman and Robert Hathaway, *Running on empty: Pakistan's water crisis*, (Woodrow Wilson International Center for Scholars, 2009), 6,
http://www.wilsoncenter.org/sites/default/files/ASIA_090422_Running%20on%20Empty_web_0.pdf#page=123, (accessed January 10, 2014).

49 Brahma Chellaney, *Water*, 218.

freshwater provision, the Pakistani people will be forced to migrate to other regions in order to survive. At the time of partition, population migration was heavy between India and Pakistan due mainly to religious and cultural affiliations. Given the right circumstances, India may have to face migration from Pakistan's population if their access to fresh water does not improve. The main reason for lack of water downstream within Pakistan, is the province of Punjab.

A majority of the Indus River water flow is being siphoned away from its lower riparian neighbor provinces by Punjab; especially the Sindh province.⁵⁰ Both the Punjab and the Sindh provinces depend heavily upon irrigation water for agriculture. Crop exports are a major part of Pakistan's economy. Restriction of waters upstream in India have, in fact, affected water supply to communities downstream; both presently and in the past. Farmers in both nations depend on a consistent flow of water to irrigate their crops and the water restrictions have caused a decrease in agricultural output over the years. But, Punjab's channeling of water away from Sindh is causing Pakistan internal conflict which could eventually lead to state fragmentation if not corrected. India is not interested in letting Pakistan fragment or collapse. The collapse of Pakistan as a country could cause a mass exodus into India and exacerbate existing ethnic and religious violence in the region.⁵¹ According to Chellaney, Pakistan has diverted most of the blame for its water scarcity away from domestic causes and has managed to hold India responsible.⁵² The Pakistan government appears to be using this tactic to assuage the Pakistani people

50 Kugelman and Hathaway, *Running on empty*, 6.

51 Ibid.

52 Chellaney, *Water*, 226.

and shift the blame away from their own mismanagement of the water sources within the country. However; Pakistan is not facing water scarcity alone. India is experiencing water shortages as well.

As for India's water scarcity concerns, Robert G. Wirsing explains about freshwater availability for the Indian population,

India is moving steadily closer to a danger zone in terms of water supply, with per capita fresh water availability in India having declined by roughly 60 percent over the last half-century or so. This seemingly inescapable fact inevitably affects the thinking of India's water planners and those entrusted with negotiating river water agreements with India's co-riparian neighbors.⁵³

Adding to the effects of climate change, water supply, and the internal contention over Indus River water distribution, the political tension between India and Pakistan is raising the prospect of conflict over dwindling amounts of water in the Indus River Basin. However; because of their mutual need for survival, India and Pakistan have had to overcome their differences by using a realist approach to water security and the instrument of choice used to protect each country's water security is and has been the Indus Waters Treaty (IWT).⁵⁴ The next section discusses the water security issue for India and Pakistan.

53 Wirsing, "The Kashmir Territorial Dispute," 232.

54 Douglas Hill, "Boundaries, scale and power in South Asia," in *Water, Sovereignty and Borders in Asia and Oceania*, ed. Devleena Ghosh, Heather Goodall and Stephanie Hemelryk Donald (Routledge: 2009), 89.

The Water Issue/Conflict

Control of waters upstream in India are affecting water supply downstream in Pakistan. In this section, we are considering how both states have overcome their differences by using realism to protect each nation's water security through the instrument of the Indus Waters Treaty. Wirsing explains the lead up to the IWT and the division of Indus River waters between India and Pakistan,

On 4 May 1948, the signing of the Inter-Dominion (Delhi) Agreement set in motion a train of events that led eventually to the 1960 Indus Waters Treaty (IWT). These and other developments over the course of the last 60-odd years point to water's conspicuous presence in the evolution of the Kashmir dispute.

Having taken the better part of a decade to forge into an acceptable compromise, the 1960 IWT was, from all accounts, a monumental achievement. Its authors were scrupulously attentive to detail. In choosing to partition the six-river Indus system shared by India and Pakistan – three so-called 'eastern' river[s] (the Sutlej, Ravi, and Beas) going to India, the three 'western' rivers (the Indus, Jhelum, and Chenab) to Pakistan—instead of struggling vainly to find a satisfactory formula for the sharing of its waters, they displayed a practical realism without which there would likely have been no treaty at all.⁵⁵

The beginning of water considerations between India and Pakistan started with the divided province of Punjab. Punjab is deeply agricultural and requires adequate irrigation to produce a commercial crop yield for both sovereign states. A “standstill” agreement was drawn up in order to sustain the existing flow of waters until March 31, 1948. Frustrated by Pakistan's lack of action to enact the agreement, “Indian Punjab promptly stopped downstream flows on the Sutlej and the Upper Bari Doab canal systems, triggering a crisis in Pakistani Punjab” according to Haris Gazdar in his article

⁵⁵ Ibid., 227.

“Baglihar and Politics of Water.”⁵⁶ Gazdar goes on to explain the results of Punjab's drastic action,

Urgent negotiations followed, and new agreements were reached on April 18, 1948 between the two provincial governments for the restoration of flows to Pakistani Punjab. The wording of the new agreements implied that the West Punjab government had accepted East Punjab's right of pre-emption over supplies from the headworks located on the latter's territory. While West Punjab did not subsequently ratify these agreements it was widely perceived that Pakistan had compromised an otherwise strong riparian claim in return for the immediate expedience of restored irrigation supplies for the next crop. Chastened by this episode, West Punjab started construction of the 100-mile long Bombanwala-Ravi-Bedian-Dipalpur (BRBD) Link Canal in 1948 for the diversion of Ravi flows to the Sutlej in anticipation of future stoppages by East Punjab. The link canal was a radical engineering solution to a seemingly intractable political problem.⁵⁷

Pakistan's link canal saw the beginnings of future canal systems in the region to secure future irrigation requirements for the country. Link canals are waterways used to connect two existing bodies of water and are sometimes used to supplement irrigation projects. The new agreement to restart the water flow again on the Sutlej into Pakistani Punjab, to which Gazdar refers, was known as the Inter-Dominion Agreement of May 1948.⁵⁸

The Inter-Dominion Agreement led up to the establishment of The Indus Waters Treaty.⁵⁹ Because the Indus River system originates within its territory, India has ultimate control of how much water flows into Pakistan. It was this atmosphere that demanded development of the Indus Basin Project.

56 Haris Gazdar, "Baglihar and Politics of Water," [http://www.indiarightsonline.com/Sabrang/ethnic4.nsf/497e9bbd711b61eee5257713005d0872/54fdee8e419dbeaf88256fbd0074c509/\\$FILE/aaa265470.rtf](http://www.indiarightsonline.com/Sabrang/ethnic4.nsf/497e9bbd711b61eee5257713005d0872/54fdee8e419dbeaf88256fbd0074c509/$FILE/aaa265470.rtf), 2, (accessed January 20, 2014).

57 Ibid.

58 Douglas Hill, "Boundaries, scale and power in South Asia," 89. A copy of the agreement can be found on the International Water Law Project website at <http://www.internationalwaterlaw.org/documents/regionaldocs/punjab-canal.html>.

59 Ibid.

“The Indus Basin Project was the compensation Pakistan received for its loss of access to the eastern rivers” following implementation of the IWT.⁶⁰ An affront to the basin project was India's placement of a dam on the Chenab River in Jammu according to the IWT and the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*, the Chenab River was to be used primarily by Pakistan.⁶¹ But, by building dams upstream, India has, in effect, cut down the supply of water to the Chenab. India is one of the major builders of “large-scale” dams in the world with the site at Chenab being one such dam.

Pakistan is not innocent in this regard as they too have built large dams to control water flow. The biggest example of Pakistan's dam building is the Tarbela Dam on the Indus River. It provides nine percent irrigation water and 28 percent electrical power to Pakistan. One major problem with the Tarbela Dam is that it has displaced 96,000 Pakistanis.⁶² Since this thesis is examining what factors lead to state competition over water, it is worth mentioning that China is the largest constructor of dams in the South and Southeastern Asia regions.⁶³ Thankfully, “Dams are limited on the Indus and the Chinese factor here is not [as much of] a concern as it is on the Mekong” according to Bursa.⁶⁴ I mention China here only to show that large dam building is not confined to the Indus region. Because of over-extensive international dam construction, a group known as International Rivers has developed several reasons for not constructing large-scale

60 Ibid.

61 Hill, “Boundaries,” 89-90.

62 Ibid.

63 Chellaney, *Water*, 75-76. China's Three Gorges Dam project on the Mekong River is much larger than any of India's hydro-electric power projects.

64 Bursa, e-mail message to author, October 6, 2013.

dams.

International Rivers is an organization which works “with an international network of dam-affected people, grassroots organizations, environmentalists, human rights advocates and others who are committed to stopping destructive river projects and promoting better options.”⁶⁵ The organization has developed four reasons for not constructing large-scale dams. These reasons include displacement of populations; environmental damage; building in areas that are prone to earthquakes; and silt accumulation.⁶⁶ We can see that at least three of these reasons can be applied to the state of Pakistan and we have seen from their actions that neither Pakistan nor India, left to its own devices, cares enough about the International Rivers' reasons for not constructing large-scale dams to curb their current water hoarding practices.

But, by signing the Indus Waters Treaty, India and Pakistan have agreed not to overstep the boundaries of the agreement. In fact, the IWT has managed to keep both India and Pakistan within the constraints of the treaty. Although there is still contention over Kashmir, the sharing of the Indus waters remains in control because of the efforts of the World Bank and because of the inherent strength of the IWT.

The World Bank had its beginnings in 1944 as the International Bank for Reconstruction and Development (IBRD); a “facilitator of post-war reconstruction and

65 International Rivers, “About International Rivers,” <http://www.internationalrivers.org/resources/about-international-rivers-3679>, (accessed January 17, 2014). The group is one of the few organizations throughout the world to obtain the MacArthur Award for Creative and Effective Institutions. The award recognizes exceptional grantees who have demonstrated creativity and impact in building a more just and peaceful world.

66 Hill, “Boundaries,” 96.

development.” On June 25, 1946 , the IBRD was renamed, “The World Bank.”⁶⁷

Following the demarcation of new states in 1947 on the Indian subcontinent, the World Bank was responsible for how the river waters were divided up between India and Pakistan while the British handled the partitioning of land.⁶⁸ Sayid Ghulam Mustafa Shah is an author and friend of the late Memon Abdul Rahim (a delegate to the Indus Basin Water Dispute at the World Bank Washington). Shah had this to say about World Bank involvement in the Indus Basin:

The World Bank involvement made it truly an international issue to which the Governments of the United States and the United Kingdom also became parties. The entire problem acquired its seriousness and dimensions with the Radcliffe award in the partition of the Indo-Pakistan Sub-Continent.⁶⁹

Perhaps, the added backing of Great Britain and the United States made it easier for the World Bank to successfully incorporate water management into the treaty including ascending forms of mediation.

Success of the Indus Waters Treaty

There are several arguments for why the Indus Waters Treaty is so successful.

67 The World Bank, “World Bank Group Historical Chronology: 1944-1949,” <http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/EXTARCHIVES/0,,contentMDK:20035657~menuPK:56307~pagePK:36726~piPK:437378~theSitePK:29506,00.html>, (accessed January 25, 2014).

68 Chellaney, *Water*, 77.

69 Sayid Ghulam Mustafa Shah, *Indus Basin Tragic Sale of Pakistan Waters and Kalabagh Dam: the robbery of Indus Water a history of river waters 1945-1998*, (Karachi: Ilmi Printers & Publishers, 1998), 2. At the will of Rahim, Shah gave his word of honor to publish this book following Rahim's death in 1978. The book is a compilation of Indus Basin documents that Rahim wanted to make public after his death.

Alam argues that one reason for the IWT success was the initial involvement of the World Bank to help resolve disputes between India and Pakistan over control of the Sutlej River in the years just prior to establishment of the treaty. The World Bank was able to convince both countries that “the Indus basin had enough water for both countries ... the basin would be treated as a single unit implying all the rivers would be discussed ... [and] that the negotiations would put aside past grievances and retain a technical rather than a political focus.”⁷⁰ The IWT has provisions for both “differences” and “disputes.”⁷¹

The treaty language incorporates a *Neutral Expert* to help resolve “differences” between the two treaty Parties.⁷² The *Neutral Expert* is the mediator for the IWT should arbitration be necessary to overcome differences between India and Pakistan over water resources. The IWT uses the term *Neutral Expert* to describe one mode of arbitration for the treaty; an engineer specifically brought in to resolve differences. “Differences” are defined by the IWT as “any question which arises between the Parties concerning the interpretation or application of this Treaty or the existence of any fact which, if established, might constitute a breach of this Treaty” that cannot be resolved by the Permanent Indus Commission.⁷³ In some regards, the Neutral Expert in the IWT correlates to Ostrom's watermaster used in California water basin management.

As described by Ostrom, the *watermaster* takes on the role of monitoring,

70 Alam, "Questioning the water wars rationale," 344.

71 India and Pakistan, "The Indus Waters Treaty 1960," September 19, 1960, *Treaties Series: Treaties and International Agreements Registered or Filed or Recorded with the Secretariat of the United Nations*, 18.

72 Ibid.

73 India and Pakistan, "The Indus Waters Treaty 1960, Annexure F" September 19, 1960, *Treaties Series: Treaties and International Agreements Registered or Filed or Recorded with the Secretariat of the United Nations*, 1.

sanctioning violators, and providing water data to the water basin appropriators in California. The *watermaster* effectively provides water data transparency so that all appropriators are kept from cheating.⁷⁴ The IWT incorporates most of the watermaster functions; minus sanctioning into the role of the Neutral Expert. If a disagreement becomes a “dispute” as described in the treaty, then a Court of Arbitration will be established.⁷⁵ Both countries also have the option of resolving differences and disputes diplomatically between their two governments as stated in the treaty. Of course, the objective is to avoid conflict between the two riparian nations.

Alam, in his article, “Questioning the water wars rationale: a case study of the Indus Waters Treaty,” states that “water scarcity, competitive use and a wider conflict do not necessarily lead to war, since war cannot guarantee a country's water supply in the long term.”⁷⁶ War over water between these two nations has been averted despite conflicts over other political disagreements. The Indus Waters Treaty has set an example for other agreements to follow by sidestepping the political turmoil in order to provide for water disbursement between India and Pakistan.

The Agreement – The Indus Waters Treaty (IWT)

The Indus Waters Treaty provides for the sharing of water between India and Pakistan. The treaty covers waters that are distributed through the Indus system of rivers.

⁷⁴ Ostrom, *Governing the Commons*, 125.

⁷⁵ India and Pakistan, “The Indus Waters Treaty 1960,” 18.

⁷⁶ Alam, “Questioning the water wars rationale,” 350.

From 1947 to 1960, Pakistan did not have control of the six rivers that originate in India and pass through West Pakistan on their way to the Arabian Sea. This placed Pakistan in a very vulnerable situation being the lower riparian country. In an effort to remedy their predicament, the World Bank helped foster negotiations between Pakistan and India. The negotiations, after more than ten years, culminated in the signing of the IWT in 1960. The IWT stipulates that Pakistan has “full use of the Indus itself and two 'western tributaries' (Jhelum and Chenab) while India would be entitled to divert all flows of the 'eastern tributaries' (Ravi, Beas and Sutlej) for her own use.”⁷⁷ The treaty is working because it has the built-in mechanisms for arbitration along with technical monitoring of the water activities of both Parties. This does not mean that the IWT has gone unchallenged during the last five decades.

One challenge to the treaty came about in 1999 in the Kargil sector of Indian Kashmir. India accused Pakistan of aiding guerrilla fighters who had crossed over the LOC and into Indian territory. Despite heavy attacks on their strategic positions high in the Himalayan mountains, the guerrillas remained entrenched until the Pakistan military came to an agreement with India. Celia W. describes the situation in the Kargil region as it was in July of 1999, “For the last two months, India has used the combined weight of its army and air force to evict about 700 men who had infiltrated several miles inside Indian territory to control rugged peaks that overlook and threaten a critical military supply line in the Kargil sector of the disputed territory of Kashmir.”⁷⁸ Despite the strain

77 “Water & Power Development in West Pakistan 1947-72,” National Institute of Social & Economic Research, (Karachi: Pak Publishers Limited, 1972), 23.

78 By, Celia W., "India Says its has Evicted most Pakistani Fighters in Kashmir," New York Times (1923-

on both sides from the Kargil crisis, the IWT was not broken. This shows the strength and influence of the IWT aside from the political differences of India and Pakistan. There is evidence that the IWT has also positively influenced other international water agreements.

One successful improvement to the Indus Waters Treaty was the more recent 1996 Ganges Water Treaty between India and Bangladesh. Had East Pakistan remained part of the state of Pakistan, India would probably have incorporated the Ganges River into the Indus Waters Treaty. Chellaney explains that “the Indo-Bangladesh pact emerged without the involvement of a third party” and there have been no significant disagreements between India and Bangladesh since the treaty was implemented.⁷⁹ This is just one example. There is potential for other regions to study and benefit from the success of the IWT.

The IWT factors that have influenced its success include bilateral control, inherent arbitration, and water data transparency. The IWT simplifies the management of water when compared with multilateral agreements that are between three or more countries. Since the IWT is a bilateral treaty, all water-sharing negotiations are kept between India and Pakistan through the Permanent Indus Commission. To this end, “India and Pakistan shall each create a permanent post of Commissioner for Indus Waters, and shall appoint to this post, as often as a vacancy occurs, a person who should ordinarily be a high-

Current File), Jul 11, 1999,
<http://ezproxy.hpu.edu/login?url=http://search.proquest.com/docview/110045305?accountid=2514>,
(accessed January 29, 2014).

79 Chellaney, *Water: Asia's new battleground*, 278-280.

ranking engineer competent in the field of hydrology and water-use.”⁸⁰ Any water-sharing matters that the commission cannot resolve are given to the Neutral Expert as described earlier. Since the IWT is a bilateral agreement, this is a good place to address bilateral verses multilateral negotiating.

From my personal experience, the bilateral forum garners the most trust because there are just two nations involved. Multilateral meetings are more complicated. In settings of three or more country representatives, there is usually less common ground. Nations may also be reluctant to share information in a multilateral setting. If two nations are set in a multilateral environment, and these two nations also have a bilateral relationship away from the multilateral setting, they may not want bilateral information to be shared to the broader audience. One can see where water negotiations could become more vulnerable in a multilateral setting. Chellaney has some good points to make about possible bilateral and multilateral solutions for interstate water sharing:

Bilateral and multilateral initiatives are necessary to assist in the collection and dissemination of trusted data on river and aquifer resources, especially waters that are shared across national frontiers. Given the ease with which basic facts are distorted and water nationalism is kindled in an interstate context, the compilation of high-quality objective data, garnered through transnational efforts, can by itself serve as a conflict-avoidance mechanism. Asia's varied political systems and cultures, by fostering official opacity on specifics related to water quality and quantity, have impeded regional transparency on water-related issues. The collection and sharing of reliable facts and figures should thus serve as the building blocks for interstate (and even intrastate) cooperation. Dependable data, in any event, are critical to economically rational policymaking and to promote efficient resource allocation and utilization.⁸¹

The key here is “dependable data.” So far, both India and Pakistan have managed to keep

80 India and Pakistan, “The Indus Waters Treaty 1960,” 15.

81 Chellaney, *Water*, 305.

the IWT intact because of the reliability of data provided for in the treaty. Were the IWT a multilateral agreement (with let's say China and Bangladesh being added to the mix), would the treaty have the same integrity that it holds now?

In addition to data integrity, the IWT also provides for water rationality. Alam defines water rationality and what it means for both India and Pakistan:

Water rationality is any action taken by a state to secure its water supply in the long-term, both in quantity and quality. This implies that, nationally, a state manages its water prudently, and internationally, it maintains relationships with its co-riparian countries that are conducive to ensuring long-term access to the shared water.

Both countries needed water urgently to maintain existing works, and tap the irrigation potential in the Indus basin to develop socio-economically. Pakistan felt that India's upstream developments on the Sutlej River would damage its existing uses, and therefore threaten its very livelihood. India, in turn, planned to develop its irrigation potential to offset poverty in the country. By signing the Indus Waters Treaty, both countries were able to safeguard their long-term water supplies from the Indus basin.⁸²

The data integrity allows for water rationality. In order for both countries to have access to shared water, they must cooperate with the understanding that the IWT will monitor their actions. The IWT endured the Kargil crisis, but has it withstood more recent challenges and why?

Endurance of the IWT

Permanent Indus Commission (PIC) has sustained the successful functioning of the IWT through the 1965 war, the 1971 war, and more recently Pakistan's attack on the

⁸² Alam, "Questioning the water wars rationale," 347.

Indian Parliament in December of 2001. Neda A. Zawahri writes in, “India, Pakistan and cooperation along the Indus River system,” about the resilience of the PIC to maintain water cooperation despite political and military conflict following the attack on the Indian Parliament:

On 13 December 2001, suspected Pakistani-based militants attacked the Indian Parliament. In response, India cut diplomatic ties with Pakistan, halted all transportation and declared the Pakistani ambassador persona non grata. The adversaries deployed their troops along their shared border, placing them on high alert. April brought yet another military attack, this one against a Hindu temple in Jammu. Domestic discontent intensified with increasing calls from India's political and economic elite for retaliation. In May, the annual meeting of the Permanent Indus Commission (PIC), an institution established to manage the Indus River system shared between these states, was scheduled. Despite the impending threat of war, the Pakistani Indus Commissioner arrived in New Delhi, after a two-day flight from Islamabad via Dubai. The three-day meeting proceeded as scheduled. The commissioners exchanged data, negotiated the design of their hydrological infrastructure and planned tours of inspection. For more than 40 years, these adversaries succeeded in maintaining this cooperation ... the PIC's design has facilitated and maintained this cooperation. To allow the commissioners to perform their daily work, they have the capacity to communicate directly with one another and they hold meetings on a regular basis. The commission also has the capacity to monitor the river's development, which has allowed it to overcome states' fear of cheating. Since managing an international river involves continuous disputes, member states need conflict resolution mechanisms to draw on once a problem arises. The Indus commissioners have several mechanisms available to resolve disputes ... institutional design matters; in other words, the capabilities vested in an institution, or a river commission, can assist riparian states to cooperate. More specifically, if the commission meets regularly, has monitoring power, conflict resolution mechanisms and direct communication between its members, then it is likely to assist states in overcoming obstacles to cooperation.⁸³

Here Zawahri has given us a lens to see how the PIC, as the element of remaining trust for water security, can preserve a treaty that may otherwise fail during conflict. Could a commission, like the PIC, maintain water security in other trans-boundary waterways?

83 Neda A. Zawahri, “India, Pakistan and cooperation along the Indus River system,” *Water Policy* 11, no. 1 (2009), 2,17.

In summary, this chapter has explained the importance of the Indus River basin to the people of India and Pakistan. The Indus region has a rich riparian history with India and Pakistan agriculture being a main component. As time passes, we see the effects of climate change and the consequences of South Asia's partitioning on the Indus Basin. A major component of this partitioning was the division of India into India and Pakistan. Since the British partitioning, both countries have staunchly protected the territory on each side of the Line of Control in Kashmir. The current contention over water between India and Pakistan and the effects of upstream dam construction have created cross border conflicts but these events have not disrupted the IWT.

The chapter has described the IWT, the role of the Neutral Expert in mediation, and what has been done to manage the contention over water in the Indus basin. One reason the IWT has worked for India and Pakistan is that it provides water rationality for both countries. Water rationality provides a way for each country to have long term water security. Is there something in the IWT that can be applied to the sharing of water in the region of the Mekong River? The answer to this question may lie in the next two chapters. Chapter three covers the riparian nations of the Mekong River Basin.

Chapter 3

Case 2: The Mekong River

Overview

The second case explores the Mekong River system and the countries which depend upon its water supply. The Mekong River system has the potential to be the impetus for great water cooperation. But, the river also holds prospects for conflict when given the wrong set of circumstances. Many water appropriators reside along its path, so the Mekong water supply diminishes as it flows south.



Figure 3. Map of the Mekong River Basin. *Source:* Australian Mekong Resource Centre, "Fig. 1 Map of the Mekong River Basin with Transboundary Zones," Mekong Brief, Number 6, September 2007.

This chapter covers the historical background of the Mekong to include China's role in water-sharing. The potential for water conflict as well as for water cooperation amongst the riparian nations is also addressed. Mekong River water resource management pitfalls and solutions are discussed with a view toward future water-related operations. In order to have effective water management, cooperation between the affected nations is essential.

Just as the Indus River Basin has two riparian countries, the Mekong River Basin is shared by several nations. This case is significant because, as the Mekong River transits several countries on the way to the sea, the water flow must be properly managed and shared. What lies in the balance is interstate cooperation or conflict between the countries of the Mekong. Elinor Ostrom provides some insight to the transboundary water resource sharing predicament in the Mekong basin:

Once multiple appropriators rely on a given resource system, improvements to the system are simultaneously available to all appropriators. It is costly to exclude one appropriator of a resource system from improvements ... without a fair, orderly, and efficient method of allocating resource units, local appropriators have little motivation to contribute to the continued provision of the resource system.⁸⁴

Here, Ostrom is showing how middle riparian actors along the Mekong, like Laos for example, may have little motivation to consider the effects of dam building and water diversion projects on its adjacent and lower riparian neighbors such as Thailand, Cambodia, and Vietnam. The headwaters nation (in this case, China) is prone to consider its interests when making improvements to the Mekong River system as part of developing its best internal security posture. Additionally, China needs to consider

84 Ostrom, *Governing the Commons*, 31, 33.

provision and appropriation problems and their effects when dealing with its Mekong neighbors to the south. Ostrom provides further explanation about water appropriation and provisioning:

Provision problems concern the effects of various ways of assigning responsibility for building, restoring, or maintaining the resource system over time; as well as the well-being of the appropriators. Appropriation problems are concerned with the allocation of the flow; provision problems are time-dependent. Both types of problems are involved in every CPR to a greater or lesser extent ...⁸⁵

If nations can agree to share water resources, then it may open the door for further cooperation. The alternative is conflict between the nations over the water. In the Mekong River system, “there is no strong sense that there is a water crisis” amongst the riparian states according to a study conducted by the Australian Mekong Resource Centre at the University of Sydney, Australia.⁸⁶ This is welcome news to China as it dominates control over the river's headwaters. Just because there is no sense of a crisis now does not mean that one isn't brewing. The next section will provide the necessary historical background of the Mekong region that is the backdrop for a developing water crisis.

Historical Background

“The Mekong River drains more than 313,000 square miles (810,000 square km) of land, stretching from the Plateau of Tibet to the South China Sea. Among Asian rivers,

85 Ibid., 47.

86 Philip Hirsch, Kurt Mørck Jensen, Naomi Carrard, Stephen FitzGerald, and Rosemary Lyster, *National interests and transboundary water governance in the Mekong*, University of Sydney: Australian Mekong Resource Centre, 2006.

only the Yangtze and Ganges have larger minimum flows.” It is also the 12th longest river in the world according to Encyclopædia Britannica Online.⁸⁷ The Mekong River has provided fresh water to China, Burma, Thailand, Laos, Cambodia, and Vietnam since their beginnings. The river is divided into two distinct areas; the Upper and the Lower Mekong River basins. China comprises the Upper Mekong basin, with Burma, Thailand, Laos, Cambodia, and Vietnam making up the Lower Mekong basin. The intersection where the two basins come together is known as the Golden Triangle; the convergence point of Laos, Burma, and Thailand.⁸⁸ (Not all sources agree on this dividing line.)⁸⁹ Further downstream, the Sab River connects the Mekong to the Great Lake or Tonle Sap in Cambodia:

The direction of flow of the Sab River varies according to the season. During the peak flood season, when the level of the Mekong is high, waters flow through the Sab River to the lake, which then expands from a little more than 1,000 square miles (2,600 square km) to a maximum of about 4,000 square miles (10,400 square km). In the dry season when the floods subside, the Sab reverses its flow to drain southeastward into the Mekong. The Tonle Sap is a highly productive fishing ground.⁹⁰

The river then continues down to its delta in Vietnam and into the South China Sea. Each riparian country of the Mekong has a river-connected history.

87 *Encyclopædia Britannica Online*, s. v. "Mekong River,"

<http://www.britannica.com.ezproxy.hpu.edu/EBchecked/topic/373560/Mekong-River>, (accessed February 06, 2014).

88 Nicolas Farrelly, review of *The Golden Triangle: Inside Southeast Asia's Drug Trade*, by Ko-Lin Chin, *Journal of Contemporary Asia* Vol. 40, No. 3, (August 2010): 520-522. The Golden Triangle is well known for its opium production.

89 Nobuhiko Taniguchi, et al, "Genetic diversity of wild Mekong giant catfish *Pangasianodon gigas* collected from Thailand and Cambodia," *Fisheries Science* 73, No. 4, (August 2007): 792, Academic Search Premier, EBSCOhost (accessed November 29, 2012). This source claims that the Lower Mekong begins below Khone Falls in Laos.

90 *Encyclopædia Britannica Online*, s. v. "Mekong River,"

<http://www.britannica.com.ezproxy.hpu.edu/EBchecked/topic/373560/Mekong-River>, (accessed February 06, 2014).

Since 1950, China has taken over control of half of the country of Tibet and Chinese Han settlers have now exceeded the native Tibetans in population. So, China has, over time, taken possession of the rich water resources on the Tibetan Plateau. In this newly claimed territory, lie the headwaters to several major rivers that are the life source to South and Southeastern Asia. One these rivers is the Mekong.⁹¹ The entire Upper Mekong runs through the Yunnan province in China. Since 1950, China has taken advantage of the importance of the Mekong's water for irrigation and energy production.

To utilize this valuable water resource for its people, China has built dams to create hydropower and to service farming irrigation projects on its rivers including the Mekong. According to the *New York Times*, China claims that the dams benefit the countries downstream by easing “the annual cycle of flooding and water shortages that accompany the rainy and dry seasons.”⁹² Downstream countries disagree with China because they see a threat to their security coming from China's control of the Upper Mekong current flow. China also understands the importance of water to its farmers.

“The Chinese government has sought to encourage farmers to switch back from cash crops to staple foods so that the country does not become a major grain importer. But the continuing problem of water shortages has cast doubt on China's ability to boost the production of cereals.”⁹³ This is another reason for China's damming activities on major rivers like the Mekong. No wonder the Lower Mekong riparian countries are complaining. As we travel further south, the next riparian country after China is Laos.

91 Chellaney, *Water*, 97-99.

92 “Chinese dam may threaten food source of neighbors,” *New York Times*, September 30, 2001.

93 Chellaney, *Water*, 84-85.

Laos does not border any sea, so the Lao population must depend on the Mekong River for water, food, and transportation. The river extends the length of the country from the border with China down to Cambodia. The rich soil, provided by silt from the river, enables farmers to plant rice paddies along the river banks. Poor road conditions make it difficult to travel by car, so the Lao people use the river and its tributaries to travel by boat to different parts of the country.⁹⁴ The Mekong River also forms the western Laos border with Burma and Thailand. Laos, along with Thailand, has an interest in making the most of the Mekong to include production of electricity. Building hydroelectric dams along this section of river will provide power for both Thailand and Laos.⁹⁵

Laos was in the process of constructing a major dam, the Xayaburi, in 2013, in the northern part of the country and has plans to begin construction on a second major dam in the south near the Cambodian border sometime in 2014.⁹⁶ The building of these dams is controversial. Chiang Mai, in the article, “Damming the Mekong In Suspension,” expresses the concern for environmental groups. In discussing the construction of the Xayaburi dam, the article states that “it will devastate ecosystems and pose a threat to fisheries, food security and the livelihoods of 65m people.” The article goes on to say that the Xayaburi dam will be the first dam built outside of China along the Mekong River. By proceeding with the construction of this dam, Laos is opening the door to the

94 Donna O'Meara, “LAOS: The Mekong River,” *Faces* (07491387) 17, no. 2 (October, 2000) 6. *MasterFILE Premier*, EBSCOhost, (accessed February 9, 2014).

95 Ibid.

96 “Laos Pushes Ahead With Second Mekong Dam Project,” *Radio Free Asia*, November 12, 2013, <http://www.rfa.org/english/news/laos/don-sahong-11122013185743.html>, (accessed February 10, 2014).

development of “eight other dam projects in Laos, and two in Cambodia.”⁹⁷ Thailand will gain most of the electricity generated by the Xayaburi dam. “A power-purchasing agreement has already quietly been signed between Thailand and Laos, and the Thai side has pushed ahead with building a road to the site of the dam.”⁹⁸ If the environmental concerns come to pass, the dams could also have a detrimental effect on the downstream riparian countries of Cambodia and Vietnam.

Cambodia is one of several countries which depend on “the in flow of river and aquifer waters from across their national borders.”⁹⁹ As a result of this continuous flow of water, Cambodia is one of only two underdeveloped countries in Asia that “have sufficient water and land resources to significantly boost food production for export.”¹⁰⁰ Cambodia has a wet and a dry season and these affect the flow of the Mekong River. Greg Browder and Leonard Ortolano talk about the flooding that occurs throughout Cambodia during the wet season in their article entitled, “The Evolution of an International Water Resources Management Regime in the Mekong River Basin,” and the trouble caused by these floods:

During the wet season, torrential rains result in large-scale flooding along the entire reach of the Mekong River, with extensive over-bank flows in Cambodia and Vietnam. Because of the warm weather, there is no snowpack (except in the extreme north in China) to help store the precipitation. Every year, floods in the Mekong Basin kill dozens, sometimes hundreds, of people and cause extensive damage to crops and structures.¹⁰¹

97 Chiang Mai, “Damming the Mekong In Suspension,” *The Economist*, January 7, 2012, <http://www.economist.com/node/21542480>, (accessed February 10, 2014).

98 Ibid.

99 Chellaney, *Water*, 244.

100 Ibid., 84.

101 Greg Browder and Leonard Ortolano, “The Evolution of an International Water Resources Management Regime in the Mekong River Basin,” *Natural Resources Journal*, Vol. 40 (2000), 501, (accessed February 14, 2014).

Conversely, flooding from the Mekong provides nutrients to wetlands in Cambodia especially in the area around Tonle Sap. Browder and Ortolano explain the benefits to the Tonle Sap and its importance in regulating the Mekong water flow,

The heart of the Mekong Basin's aquatic ecosystem is the Tonle Sap in Cambodia, also known as the Great Lake. During the dry season, water flows out of the Tonle Sap into the Mekong River and then discharges into the South China Sea. In the wet season, however, there is a reverse flow and water flows from the Mekong River into the Tonle Sap, increasing its surface area four-fold from 2,500 km² (965 mi²) during the dry”¹⁰²

The ebbs and flows of the Tonle Sap have helped to balance this aquatic ecosystem, however, man made industrialization upstream in the form of large-scale dams are disrupting the natural seasonal flow norms.

John Bursa has experienced some of this disruption and its effects on the people of Laos and Cambodia. In addition to his time spent in the Indus River Basin countries, John Bursa spent time in both Laos and Cambodia with the UNWFP and has this to say about the effects of damming and climate change on the Lower Mekong River countries:

[H]uge points of contention and concern exists in regards to dams, of which apparently a number are being built in China. In Laos and Cambodia to a degree there is concern all up and down the mighty river of which I have travelled the majority. Everyone is concerned about the Chinese “exploitation”. This combined with the real affects of climate change are concerns for nearly all you come across. Climate change combined with dam building are being seen now as a concern. Not only is it bringing more rains deeper into Laos and causing flooding, but the dryer periods are also longer and harsher. Drought prior to the 2008 floodings in Vientiane were experienced throughout the Lao/Thai/Cambodian Mekong region. In 2009 we again saw flooding in lower Laos, which is also likely attributed to changes in climate as is the perspective of the people.¹⁰³

102 Browder and Ortolano, “The Evolution,” 503.

103 Bursa, e-mail message to author, October 6, 2013.

This is first hand confirmation of the impact of dam building and the secondary effects of climate change in Southeastern Asia – namely drought and flooding problems. One of the effects of these climate change events is fish depletion as expressed by Nobuhiko Taniguchi, et al, in their article, “Genetic diversity of wild Mekong giant catfish *Pangasianodon gigas* collected from Thailand and Cambodia.” The article describes the the benefits and the diversity of fishes of the Mekong River,

The Mekong River hosts one of the most diverse freshwater faunas in the world. There are at least 1200 recorded fish species, and this diversity is based on the wide range of permanent and seasonal habitats that have arisen as a result of the complex geological history of the Mekong Basin. The separation of major fish habitats in time and space forces all Mekong fishes to migrate.¹⁰⁴

One migratory fish species of particular interest that has been impacted by climate change is the Mekong Giant Catfish. Taniguchi, et al give an account of the Giant Catfish habitat. “The known habitat of this species is the main stream of the Mekong River, where the water depth is 10 m or more. The fish particularly prefers rocky or gravel substrate, and sometimes underwater caves.”¹⁰⁵ Referring back to Laos and the prospects for the Xayaburi dam, this same article discusses the contention caused by its construction. “In 2007, Thailand was one of four countries which disagreed with Laos building the Xayaburi dam because of possible detriments to the Mekong giant catfish and other fish species which depend on strictly fresh water for survival.”¹⁰⁶ However, to

104 Nobuhiko Taniguchi, et al, "Genetic diversity of wild Mekong giant catfish *Pangasianodon gigas* collected from Thailand and Cambodia," 792.

105 Ibid., 793.

106 "Catfish reprieve." *New Scientist* 210, no. 2810 (April 30, 2011): 4-5. *Academic Search Premier*,

put the matter in perspective, in 2011, Mekong Giant Catfish was a “least concern” endangered species according to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. One of the reasons for the fish still being threatened is the “species could be vulnerable to fishery pressures and impacts from future mainstream dams” as described earlier.¹⁰⁷ In addition to the effects of fishery pressures in Laos and Cambodia, Cambodia's southern neighbor, Vietnam, has also been impacted by the actions of upstream-partners.

Vietnam has the second highest population of the Mekong riparian nations and makes up the least part (only eight percent) of the Mekong Basin area.¹⁰⁸ With only 11 percent of the annual flow input from the Mekong, Vietnam gets what remains of the water after all of the other riparian countries.¹⁰⁹ Fluctuations in water flow have the most effect on Vietnamese farmers in the Mekong Delta.

The Mekong Delta is known as Vietnam's “rice bowl” because rice farming there supplies over half of the total rice production for Vietnam.¹¹⁰ As a result of the trickle down situation, there is not enough irrigation water at times for farmers in Vietnam to grow rice in the dry season, and the reduced flow of the Mekong allows for saltwater intrusion from the South China Sea to move up the delta great distances, further exacerbating the situation.¹¹¹ On the the other hand, flooding is another event that impacts the rice farmers each year.

EBSCOhost, (accessed November 29, 2012).

107 “Pangasius mekongensis (Mekong Giant Catfish),” IUCN.org, <http://www.iucnredlist.org/details/181260/0>, (accessed February 9, 2014).

108 Browder and Ortolano, “The Evolution,” 503.

109 Ibid.

110 Ibid., 512.

111 Browder and Ortolano, “The Evolution,” 504.

Reiner Wassmann, et al, describe the seasonal change from dry to wet in the Vietnamese Mekong Delta:

The rainy season in the Mekong Delta starts in May and lasts until November. Water level rapidly increases from July to October and starts to decrease in November. September and October are the months prone to large flooding due to high upstream discharge and heavy rainfall.¹¹²

It is important to note that the majority of Vietnamese Mekong Delta is only slightly above sea level, so flooding is a major concern not only for its immediate effects but also for rises in sea level and saltwater intrusion during the wet season.¹¹³ As we can see, not all of the water-related problems faced by Vietnam and the other Mekong riparian countries can be immediately controlled by the efforts of mankind as some of the detrimental effects mentioned are strictly the result of natural causes like climate change. But, those effects that can be controlled by mankind should be explored by each and all of the riparian nations along the Mekong.

If nations can agree to share water resources, then sharing may open the door to further cooperation between the Mekong riparian neighbors. The undesirable alternative is the increased prospect for more conflict.

The Water Issue and Conflict

Three of the Mekong riparian states mentioned earlier have engaged in conflict in

112 Reiner Wassmann, Nguyen Xuan Hien, Chu Thai Hoanh, and To Phuc Tuong, "Sea level rise affecting the Vietnamese Mekong Delta: water elevation in the flood season and implications for rice production," *Climatic Change* 66, no. 1-2 (2004): 92.

113 *Ibid.*, 90.

the past. These wars were fought between China and Vietnam (1978-79 and again 1986-87); and between Cambodia and Vietnam (1977-79).¹¹⁴ Stephen Van Evera explains that “war is more likely when the control of resources enables the protection or acquisition of other resources.”¹¹⁵ This may explain why a downstream country, like Vietnam, may decide to militarily engage its upstream neighbor, China, in order to protect existing levels of water resources. To illustrate this possible military engagement more clearly, dam works in China could become military targets for Vietnam. Van Evera explains how cumulative resources, like the Mekong River and its waters, can be sources of conflict:

International politics is more competitive, hence more violent, when resources are more cumulative. When many resources are highly cumulative, states more fiercely defend what they have, seek more for themselves, and seek to prevent others from gaining more.¹¹⁶

So far, China and Vietnam have not yet gone to war over water, but if Van Evera's hypothesis holds true, then conflict may ensue at some point. Let's take a look at the contentious relationship between China and Vietnam today.

Today, China and Vietnam are involved in a longstanding dispute over the Spratly Islands in the South China Sea. In July of 2012, *The New York Times* reported that China is becoming more aggressive in its claim to the islands:

The establishment of a legislature for islands and the dispatch of soldiers will antagonize Vietnam, which claims the same islands. Vietnam and China have fought since the 1970s over the three island groups; last month, Vietnam passed a law that claimed sovereignty over the Paracels and Spratly Islands. In response, China called the islands its 'indisputable' territory.¹¹⁷

114 Benjamin E. Goldsmith, “A Liberal Peace in Asia?,” *Journal of Peace Research*, Vol. 44, No. 1 (January 2007): 17.

115 Stephen Van Evera, *Causes of War*, 105.

116 *Ibid.*, 108.

117 Jane Perlez and Bree Feng, "China to Put Soldiers On Islands In Dispute," *New York Times*, July

The dispute over the Spratly Islands is part of Vietnam's economic security and adds another dimension to the protection of water resources for Vietnam because it has to consider the overall political consequences of militarily engaging China. In addition to China, Vietnam has also had past contentions with Cambodia.

Following the Vietnam War when North and South Vietnam were reunited,

relations with the revolutionary Democratic Kampuchea (Khmer Rouge) government in Cambodia rapidly deteriorated when it refused Hanoi's offer of a close relationship among the three countries that once formed French Indochina. Savage border fighting culminated in a Vietnamese invasion of Cambodia in December 1978. The Khmer Rouge were dislodged from power, and a pro-Vietnamese government was installed in Phnom Penh.¹¹⁸

Vietnam occupied Cambodia for eleven years and did not fully remove its troops until September of 1989. At that time, Vietnam was isolated from its riparian neighbors and wanted to mend its relations with them:

A peace conference in Paris formally ended the Cambodian conflict in 1991 and provided United Nations supervision until elections could be held in 1993. The Cambodian settlement removed a key obstacle to normalizing relations with China, Japan, and Europe¹¹⁹

according to William J. Duiker and William S. Turley in *Encyclopædia Britannica Online*. Because of the history between Vietnam and Cambodia, one can see where trust issues may arise with these two nations when it comes to water security. Since Cambodia

24, 2012.

118 *Encyclopædia Britannica Online*, s. v. "Vietnam," <http://www.britannica.com.ezproxy.hpu.edu/EBchecked/topic/628349/Vietnam>, (accessed February 17, 2014).

119 *Encyclopædia Britannica Online*, s. v. "Vietnam," <http://www.britannica.com.ezproxy.hpu.edu/EBchecked/topic/628349/Vietnam>, (accessed February 17, 2014).

lies directly adjacent to Vietnam, there is potential for water conflict as well as cooperation. After all, each country is looking to protect its economic and water security.

Each Mekong riparian country has its own economic and water security agenda. For example, in 2007, Thailand was one of four countries which disagreed with Laos building the Xayaburi dam because of possible detriments to the Mekong Giant Catfish and other fish species which depend on strictly fresh water for survival.¹²⁰ Like China, Vietnam has its sights set on economic development and so views the Mekong River as a way to advance this agenda. The difference here is that China does not have an upstream neighbor on the Mekong River. Vietnam is the caboose in the train of Mekong countries and the last in line to receive water. Could Vietnam be raising environmental concerns for the sole purpose of gaining economic advantage over its upstream neighbors? As mentioned earlier, Vietnam is a major rice producer. Water and silt in the Mekong Delta are vital to growing rice that feeds half of Vietnam's population and any restriction in the flow can effect rice production.¹²¹

There is some consensus that dams in China are restricting the flow of silt to the Mekong Delta. But, not all scholars agree. Shaojuan Li and Daming He, in their article, "Water Level Response to Hydropower Development in the Upper Mekong River," show that the argument is complex. The article shows that "river-flow variation is particularly subject to the influences of climate change and human activities, yet the Upper Mekong dams are but one of many drivers of change."¹²² What is not disputed is that something

120 "Catfish reprieve." *New Scientist* 210, no. 2810 (April 30, 2011): 4-5.

121 Browder and Ortolano, "The Evolution," 512.

122 Shaojuan Li and Daming He, "Water Level Response to Hydropower Development in the Upper

must be done to protect each country's water security. Is something in place, like the Indus Waters Treaty to help protect the Mekong River Basin and to prevent conflict between the affected states?

Overview of Tried Agreements and Oversight

So far, there is not a formal treaty in place for the Mekong River Basin countries to help manage water distribution but various attempts have been made prevent conflict and manage transboundary water resources. In their article entitled, "Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention," Juha I. Uitto and Alfred M. Duda discuss the importance of managing transboundary water resources and the avoidance of conflict over them:

The assumption is that shared water resources can actually provide the basis for cooperation and sharing of benefits, rather than conflict, provided that the threats to the international waters are objectively recognized and institutional structures for collaboration are created.¹²³

Though they focus on other parts of the world, the authors provide some relevance to the Mekong River situation in the article. Since there is no constant tension like that between India and Pakistan along the Mekong, the prospect of a liberal peace is possible between states like China and the other Mekong riparian countries as Alam describes in the previous case study on the Indus River. Benjamin Goldsmith in, "A Liberal Peace in

Mekong River," *Ambio* Vol. 37, No. 3 (May, 2008): 176.

123 Juha I. Uitto and Alfred M. Duda, "Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention," *The Geographical Journal*, Vol. 168, No. 4, Water Wars? Geographical Perspectives (Dec., 2002): 366.

Asia?” states that “there is a liberal peace based primarily on economic interdependence.”¹²⁴ To maintain this peace, the waters must be equitably distributed to satisfy both the liberalist and realist objectives of each riparian country. Since 1992, various facilitator groups have risen to help manage the Mekong transboundary water resource disparities and the avoidance of conflict between the Mekong nations.

One research group that is endeavoring to equitably distribute the Mekong waters is the Mekong River Commission (MRC). The MRC was established in 1995 “to coordinate water resources planning and development across Southeast Asia's lower Mekong River basin. The MRC's member nations are Cambodia, Laos, Thailand and Vietnam.”¹²⁵ Neither China nor Burma are part of the MRC, although China has signed an agreement with the commission to provide hydrological data on the water levels of the Mekong to the member countries.¹²⁶ Because two of the Mekong riparian countries are not part of the MRC, enforcing equitable water distribution is difficult in light of each nation's economic plans. The MRC is not able to stop conflict between the riparian nations over water appropriation due to its lack of authority to control the actions of any of the member nations. Now, the focus has shifted more to another group – the Greater Mekong Subregion (GMS), to come up with economic solutions in order to help the Mekong riparian countries to prosper.¹²⁷

The GMS was formed in 1992 by the Asian Development Bank to foster

124 Goldsmith, “A Liberal Peace in Asia?,” 22.

125 Jeffrey W. Jacobs, “The Mekong River Commission: transboundary water resources planning and regional security,” *Geographical Journal* 168, no. 4 (December 2002): 354.

126 Mekong River Commission Upstream Partners. <http://www.mrcmekong.org/about-the-mrc/upstream-partners-2/>, (accessed February 22, 2014).

127 Oliver Hensengerth, “Vietnam's Security Objectives in Mekong Basin Governance,” *Journal of Vietnamese Studies*, Vol. 3, No. 2 (Summer 2008): pp. 121.

economic cooperation between its member states. The GMS has three more years of experience than the MRC and its members include China, Thailand, Laos, Burma, Cambodia, and Vietnam.¹²⁸ The GMS scheme has been more successful than the MRC in accomplishing trans-boundary cooperation along the Mekong. The GMS works at the ministerial level and uses summits to bring heads of state together, and it,

is grounded in the political culture of East and Southeast Asia. This political culture, which has been termed the 'ASEAN Way,' is an informal, consultative, and evolutionary mode of cooperation that has found application in the Mekong Basin, where it is called the 'Mekong spirit'¹²⁹

as described by Oliver Hensengerth in, "Vietnam's Security Objectives in Mekong Basin Governance." The GMS has been effective in using the "ASEAN Way" without the legal enforcements of the MRC to garner international cooperation. However; this type of cooperation is also allowing each country to proceed with its own economic agenda; sometimes at the expense of their riparian neighbors.

Sokhem Pech and Kengo Sunada have addressed the protectionist behavior of the Mekong countries in their article, "Population Growth and Natural-Resources Pressures in the Mekong River Basin," using the following factors:

- Each Mekong country tends to take an independent course of action, often ignoring external and indirect effects. This represents one of the largest challenges to overcome, since the asymmetry of causal responsibility, power/capacity, and distributional problems are highly prevalent in the subregion.
- An effective and truly Mekong-wide institution for negotiating cooperative development is lacking, and there is no commonly accepted knowledge base or tools for impact assessment and monitoring.¹³⁰

128 Hensengerth, "Vietnam's Security Objectives," 104.

129 Ibid., 109.

130 Sokhem Pech and Kengo Sunada, "Population Growth and Natural-Resources Pressures in the Mekong River Basin," *Ambio*, Vol. 37, No. 3, Mekong at the Crossroads (May 2008): 224.

So, the MRC and the GMS were setup to develop cooperation along the Mekong, however, we can see that both groups lack the needed viable solutions to equally protect all of the Mekong riparian states' water interests. Additionally, two other entities were also established, in part, to help solve the water resourcing problem. These two groups are the Global Environment Facility and the Association of Southeastern Nations (ASEAN) Regional Forum (ARF).

The Global Environment Facility or GEF was established in 1991 to bridge the gap between the MRC and GMS.¹³¹ The GEF developed the GEF Operational Strategy for international waters in 1995.¹³² The GEF strategy paper offers lessons that promote “peaceful cooperation for environmental management, benefit sharing and sustainable use of trans boundary freshwater resources” according to Juha I. Uitto and Alfred M. Duda in their article entitled, “Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention.”¹³³ The article goes on to say that “there is evidence that water may also become the unifying resource around which countries cooperate.”¹³⁴ The GEF has also found evidence “that water may also become the unifying resource around which countries cooperate” and that “all relevant stakeholders in the countries – including the public and private sectors, the scientific community and civil society” must be committed to the issues in order of priority according to Uitto and Duda.¹³⁵ All of the countries participating in GMS are also

131 Uitto and Duda, “Management of Transboundary Water Resources,” 368.

132 Ibid., 366.

133 Ibid., 366, 367.

134 Ibid., 367.

135 Ibid., 376, 377.

members of GEF. How can the Mekong riparian countries mutually benefit from the precepts of the GMS, the MRC, and the GEF if there is no political enforcement of the prescribed tenets by the individual countries? The answer to this question will need to involve the “Mekong spirit” in order to maintain the existing attitude of respect amongst the Mekong riparian countries that, for now, holds them together.

Why were these Management Efforts Not Successful and What Can Be Done Going Forward?

Lack of political enforcement is the problem with GMS, MRC, and GEF solutions. Without enforcement, any beneficial solutions to Mekong water sharing disparity will be rendered ineffective. Since the “ASEAN Way” is respected amongst the riparian countries of the Mekong, perhaps leadership from an organization that embraces ASEAN principles along with political enforcement is in order. Unfortunately, not all of the GMS and GEF countries are members of ASEAN. But, they all are members of the ASEAN Regional Forum (ARF). In fact, it is interesting that India and Pakistan are also members of the ARF. The difference between the ARF and the other groups is its political teeth to accomplish and enforce the intended solutions of the MRC, GMS, and the GEF Operational Strategy.

The ARF was established on July 25, 1994 by the ASEAN Ministerial Meeting and Post Ministerial Conference. The objectives of the ARF are “to foster constructive

dialogue and consultation on political and security issues of common interest and concern; and to make significant contributions to efforts towards confidence-building and preventive diplomacy in the Asia-Pacific region.”¹³⁶ With these objectives in mind, the ARF may be the forum to address and eventually solve the Mekong River waters dilemma. It could also be the forum used to share lessons learned from the Indus Waters Treaty that could benefit the riparian countries of the Mekong River.

Additionally, according to the ARF Security Outlook 2013, “ARF provides a platform on which security needs for both traditional and non-traditional concerns can be assessed peacefully through dialogue, consultation and cooperation.”¹³⁷ Building from the goals of its founding document, the ARF is in the process of implementing the ARF Preventive Diplomacy Work Plan. *Preventive Diplomacy* is “action taken to prevent disputes from arising between parties, to prevent existing disputes from escalating into conflicts and to limit the spread of the latter when they [occur]” according to the 1992 UN Secretary General Report entitled, “Agenda for Peace.”¹³⁸ The ARF Concept Paper lays out a three-stage process to promote confidence and develop preventive diplomacy and conflict resolution¹³⁹ In its 2010 draft of the Preventive Diplomacy Work Plan, the

136 About the ASEAN Regional Forum, <http://aseanregionalforum.asean.org/about.html>, (accessed October 12, 2013).

137 ASEAN Regional Forum, “ANNUAL SECURITY OUTLOOK 2013,” <http://aseanregionalforum.asean.org/files/ARF-Publication/ARF-Annual-Security-Outlook/ARF%20Annual%20Security%20Outlook%202013.pdf>, 6, (accessed October 12, 2013).

138 Secretary-General, United Nations Security Council, “An agenda for peace: preventive diplomacy, peacemaking and peacekeeping,” (1992), http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDAQFjAB&url=http%3A%2F%2Fwww.un.org%2Fen%2Fsc%2Frepertoire%2F89-92%2FChapter%25208%2FGENERAL%2520ISSUES%2FItem%252029_Agenda%2520for%2520peace_.pdf&ei=o8lZUqTkGaf8iQKr2YHQBg&usg=AFQjCNFr2v1BbsRgkvKxh-HnXixL7_Vs2Q&bvm=bv.53899372,d.cGE&cad=rja, (accessed October 12, 2013).

139 Fact Sheet, “The ASEAN Regional Forum: A Concept Paper,” Bureau of Political-Military Affairs

ARF set down the following objectives:

- to establish appropriate preventive diplomacy mechanisms for the ARF
- to move the ARF process forward from Stage I - Confidence Building Measures to Stage 2 - Preventive Diplomacy, while recognizing and retaining confidence building measures and
- to increase the capacity and capabilities of the ARF and its participating countries in the area of preventive diplomacy¹⁴⁰

Currently, the ARF is actively working to accomplish the second objective according to the Chairman's Statement Of The 20th ASEAN Regional Forum of 2 July 2013 "through action-oriented cooperation and activities, while continuing confidence-building measures."¹⁴¹ Water resource concerns have been part of the ASEAN Regional Forum Working Group on Preventive Diplomacy since 1996. At that time, the working group considered water a subject area of "potential crisis" for the ARF member countries.¹⁴²

To help alleviate the potential for a water crisis, one ARF member country that has come up with some creative solutions to water scarcity is Singapore.

Singapore has developed water options for itself that the Mekong-wide countries

(Washington DC, July 15, 2002), <http://2001-2009.state.gov/t/pm/rls/fs/12052.htm>, (accessed February 20, 2014).

140 ASEAN Regional Forum, "Preventive Diplomacy Work Plan (draft as of 2010)," <http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CC4QFjAB&url=http%3A%2F%2Faseanregionalforum.asean.org%2Ffiles%2FArchive%2F18th%2F5th%2520ARF%2520EPs%2C%2520Dili%2C%252027-28Jan2011%2FAnnex%252012%2520-%2520ARF%2520Preventive%2520Diplomacy%2520Work%2520Plan.pdf&ei=qbtZUry2Noa5igLs3oHYDA&usg=AFQjCNE5Aq0RO6m4lelyljbicprlXLD4-Q&bvm=bv.53899372,d.cGE&cad=rja>, (accessed October 12, 2013).

141 "Chairman's Statement Of The 20th ASEAN Regional Forum," (2 July 2013). http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCsQFjAA&url=http%3A%2F%2Fwww.mofa.go.jp%2Fmofaj%2Farea%2Fasean%2Farf%2Fpdfs%2Fcs_1307_en.pdf&ei=EcZZUu-ILaGCiwL0nICQCA&usg=AFQjCNH2ZqID6efkX0kwCdWDBeihFNAdiQ&bvm=bv.53899372,d.cGE&cad=rja, (accessed October 12, 2013).

142 ASEAN Regional Forum, "Seminar on Preventive Diplomacy," (Paris: 7-8 November 1996), <http://aseanregionalforum.asean.org/component/content/article/3-public-library/137-seminar-on-preventive-diplomacy-paris-7-8-november-1996.html>, (accessed October 12, 2013).

may consider where water scarcity is an issue. Singapore has diversified their water supply by developing four different water sources including “water from local catchment areas, imported water, reclaimed water known as NEWater and desalinated water” to make up its lack of natural water sources.¹⁴³ The catchment areas are for capturing rainwater and NEWater is made from treated and filtered sewage water. In fact, NEWater is so clean that it is safe to drink.¹⁴⁴ But, NEWater is an expensive venture for countries that are not in Singapore's financial situation. The suggestion for other countries would be to develop a “diversified and sustainable water supply” as Singapore has done.¹⁴⁵

To summarize, the Mekong River system is the life source to several riparian nations along its path from the Tibetan Plateau to the South China Sea at Vietnam. China controls the source of the Mekong River and has the potential to cause great harm to its downstream neighbors by continued dam construction and water diversion. Given the history of the region and the contention among the inhabiting countries of Southeastern Asia, equitable water-sharing becomes that much more important for sustaining this limited resource.

There are groups, such as the MRC and GMS, who's purpose it is to manage water distribution and to foster economic cooperation amongst the countries of the Mekong. But these groups have fallen short in their quest to solve the water distribution problems because their decisions lack enforcement. One organization that has the potential to improve the Mekong predicament is the ARF. The ARF consists of all the Mekong

143 Four National Taps Provide Water for All, PUB, Singapore's National Water Agency. <http://www.pub.gov.sg/water/Pages/default.aspx>, (accessed on February 21, 2014).

144 I actually have a bottle of NEWater at home.

145 Ibid.

riparian countries plus other ASEAN nations like India, Pakistan, and Singapore. The ARF combines the “Mekong spirit” with political enforcement of rules to potentially produce lasting sustainability for the Mekong water supply amongst all of the Mekong nations. In the next chapter, we shall compare the Indus River Basin with the Mekong River Basin and take a closer look at China's role.

Chapter 4

Case Comparison: Indus versus Mekong



Figure 4. Map of the Tibetan Plateau showing Indus and Mekong regions. *Source:* Brahma Chellaney, “Map 3.1 The Major Asian Rivers Originating in Tibet,” *Water: Asia’s New Battleground*, (Washington DC: Georgetown University Press, 2011), 106.

Overview

The Mekong and Indus are two of 261 river basins with each basin serving multiple countries. “Some 45 per cent of the world’s land territory lies within international river basins, and 40 per cent of the world’s population shares water across

borders by living in such basins.”¹⁴⁶ In their article entitled, “Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention,” Juha I. Uitto and Alfred M. Duda discuss the importance of managing transboundary water resources to avoid conflict and encourage international cooperation in sharing the water supply. Though they focus on other parts of the world in their research, information from this article pertains to the Indus and Mekong River dependence as well. Any lack of water to support citizens demand can contribute to conflicts between riparian countries. Many river basins on earth are governed by more than one nation and this is the case with the Indus and Mekong basins. Next, we shall look at a framework of the two basins and how China fits into the equation.

Framework of the Two Regions

The Tibetan Plateau is Asia's main source of freshwater. It stands 2,400 kilometers (km) from East to West, and 1448km from the North to the South. The plateau is the highest in the world and is the home to Mount Everest. The Tibetan Plateau feeds rivers in China, India, Bangladesh, Thailand, and Vietnam and it contains the third largest platform of ice. Additionally, the Indus and Mekong rivers flow out from this Plateau.¹⁴⁷ Not only is the Tibetan Plateau a giant water reservoir to many Asian

146 Philip Hirsh, “Issues of scale in governing water as a common good: The Mekong River Basin,” in *Water, Sovereignty and Borders in Asia and Oceania*, ed. Devleena GhoshDouglas Hill, “Boundaries, scale and power in South Asia,” Heather Goodall and Stephanie Hemelryk Donald (Routledge: 2009), 125.

147 Chellaney. *Water*, 95.

countries, it is also rich with other valuable resources such as minerals.¹⁴⁸ “Political control over the 2.5 million-square-kilometer Tibetan Plateau has armed China with tremendous leverage, besides giving it access to Tibet's vast natural resources.”¹⁴⁹

Because of its control of Tibet and the natural resources residing there, China plays a vital role in the water security of the Mekong and Indus regions. Because of its control of the many river headwaters there, China has the potential to be a “water power in the way Saudi Arabia is an oil power” to the world in Chellaney's view.¹⁵⁰ Power is key in the management of water resources when multiple countries are involved. Let's compare the water management areas (taken from the case studies) in the Indus against those in the Mekong basin.

In table 1, we see how the Indus River Basin compares with the Mekong by using five of the eight “design principles” listed in Ostrom's, *Governing the commons*.¹⁵¹ She defines a “design principle” as “an essential element or condition that helps to account for the success of these institutions in sustaining the CPRs and gaining the compliance of generation after generation of appropriators to the rules in use.”¹⁵² I have customized these five categories to better suit them to this study, but, the essence of her principles remains. My intention is to show how the two basins stand up to these principles and, by comparing them, expose possible competition and conflict factors involving water as the CPR. The last column in table 1 is a simple evaluation of the institutions involved in

148 Ibid.

149 Brahma Chellaney, *Water*, 105.

150 Ibid.

151 Ostrom, *Governing the commons*, 178-181.

152 Ostrom, *Governing the commons*, 90.

each basin based upon the results of each category comparison. Now let's take each category comparison in turn starting with *Boundaries*.

Site	Boundaries	Monitoring	Sanctions	Conflict resolution mechanisms	Institutional performance
Indus River Basin	yes	yes	yes	yes	robust
Mekong River Basin	no	not enforced	no	not enforced	failure

Table 1. Comparison of the Indus and Mekong river basins. The table is based on the source. *Source*: Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, (Cambridge University Press, 1990), 180.

By using “clearly defined boundaries,” Ostrom shows that “individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.”¹⁵³ In applying boundaries to this study, we can see that the Indus Waters Treaty has set clear boundaries for India and Pakistan to follow in the proper distribution of Indus River Basin water resources.¹⁵⁴ The Mekong River Commission, on the other hand, sets boundaries for water use by all of the Lower Mekong riparian nations. However; because China has elected not to participate in the Commission, the boundaries do not apply to them. The lack of water authority over the entire length of the Mekong River Basin renders the MRC decisions impotent over actions that take place on the Upper Mekong River.

When the predecessor to the MRC, the Mekong River Committee, was created by the United Nations in 1957, and when rules were first being established for management

153 Ibid.

154 India and Pakistan, “The Indus Waters Treaty 1960,” Article I.

of the Mekong waters, China was unable to participate because it was not a member of the UN. Jacobs explains,

The organization was limited to membership of the lower Mekong nations only, as China was not a member of the United Nations in the early 1950s and Burma was simply not interested in participating (Mekong Secretariat 1989). The Mekong Committee was created as part of the United Nations' Economic Commission for Asia and the Far East (ECAFE) and represented the UN's first direct involvement in international river basin planning.¹⁵⁵

In 1995, when the MRC was established, China had the opportunity to become a member nation. In fact, the 1995 Legal Agreement of the MRC (also known as the Mekong Agreement) made China membership possible, but China has elected not to join as of this writing.¹⁵⁶ So, the MRC cannot control or monitor China's industrialization of the Upper Mekong and this leads in to the next category in the comparison table – *Monitoring*.

India and Pakistan are bound by treaty to monitor and report water flow data in accordance with the provisions of Article VI in the IWT.¹⁵⁷ The riparian nations of the Lower Mekong follow the provisions of the Mekong Agreement by sharing water flow data.¹⁵⁸ China is not party to this agreement and therefore decides the type and scope of reporting that it will volunteer to the lower riparian countries. Chellaney explains that,

just as it has agreed to share limited hydrological data with India on the Brahmaputra and Sutlej rivers to help deal with flooding, China is committed through a 2002 accord to supply data on the upper Mekong water levels to downstream states during the flood season, although from only two monitoring stations.¹⁵⁹

155 Jeffrey W. Jacobs, "The Mekong River Commission: transboundary water resources planning and regional security," 369.

156 Jacobs, "The Mekong River Commission," 361.

157 India and Pakistan, "The Indus Waters Treaty 1960," Article VI.

158 Mekong Agreement, "Agreement on the cooperation for the sustainable development of the Mekong river basin," *Mekong River Commission, Chiang Rai* (1995).

159 Chellaney, *Water*, 271.

The accord mentioned was a historic event and is a step in the right direction for further China cooperation but falls short of full commitment to the overall well-being of the Mekong River Basin nations.¹⁶⁰ Because China refuses to fully commit to the Mekong Agreement, it renders the MRC ineffective in auditing appropriator behavior on the river and it eliminates accurate monitoring of water flow changes.¹⁶¹ The countries who are members of the MRC are accountable to each other through the Mekong Agreement because they have adopted the “ASEAN Way” form of cooperation. This leaves China and Burma outside the Commission to do what they will and without penalty for water diversion. This point emphasizes the importance of sanctions to keep CPR appropriators actions within the boundaries of their mutual agreements.

Graduated sanctions are an effective design principle if used properly to maintain water agreement expectations. Depending upon the severity of the violation, violators are assessed sanctions that are gradually increased, as appropriate, to achieve compliance. In the table, we can see that Indus Basin countries are held in compliance by the IWT. The Mekong Basin has no enforceable sanctions that it can levy against Burma or China for violations of MRC operational rules, so, if one looks at the Mekong Basin as a whole, sanctions cannot be equitably enforced. The individual governments of the MRC nations have agreed to abide by its rules, but the government of China will not subject itself to

160 “China signs data-sharing agreement,” *Mekong News: The newsletter of the Mekong River Commission*, April-June, 2002, <http://www.mrcmekong.org/assets/Publications/Mekong-News/issue2002AprJun.pdf>, (accessed March 2, 2014).

161 Ostrom, *Governing the commons*, 90.

the operational rules of the MRC.¹⁶² Such inequities can cause contention between those countries which are subject to the rules and those which are not. In the case of the Mekong Basin, China is causing conflict with its downstream neighbors by remaining outside of MRC rules for freshwater appropriation. That brings us to our last design principle – *Conflict-resolution mechanisms*.

What are the *Conflict-resolution mechanisms* for the Indus and Mekong river basins and how do they compare? Ostrom defines these mechanisms as rapidly accessible “low-cost local arenas [that are used] to resolve conflicts among appropriators or between appropriators and officials.”¹⁶³ India and Pakistan have access to the Permanent Indus Commission to resolve questions, differences, and disputes as prescribed by the IWT:

India and Pakistan shall each create a permanent post of Commissioner for Indus Waters, and shall appoint to this post, as often as a vacancy occurs, a person who should ordinarily be a high-ranking engineer competent in the field of hydrology and water-use ... the two Commissioners shall together form the Permanent Indus Commission ... the purpose and functions of the Commission shall be to establish and maintain co-operative arrangements for the implementation of this Treaty, to promote co-operation between the Parties in the development of the waters of the Rivers¹⁶⁴

The MRC uses cooperation channels between the lower Mekong governments to resolve differences the “ASEAN Way.” Because there is lack of enforcement, the riparian countries respond to each others actions in areas like dam building. Since China does not participate in the MRC, it is free to build an unlimited number of dams. The result is that

162 Ibid.

163 Ostrom, *Governing the commons*, 90.

164 India and Pakistan, “The Indus Waters Treaty 1960,” 15-16.

the downstream countries react to China's actions and build dams of their own. So, how do the two cases in this study score in design principle comparisons in table 1?

The table shows that the Indus River Basin has “robust” performance, due in large part to the precepts of the IWT, compared to the failing performance of the Mekong River Basin. Though China has indirect influence in the Indus region, it plays a major role in the well-being of the Mekong River and its riparian countries.

China has been looking after its own interests by capturing minerals and damming the Mekong river waters within its borders. Some of this human industrialization is causing accelerated melting of “Tibet's permafrost” and depleting the “natural forest cover in the Tibetan watersheds.”¹⁶⁵ The Chinese dam projects are also taking their toll on the water flow. According to a New York Times article from 2009,

China has built three hydro-electric dams on the Mekong (known as the Lancang in Chinese) and is halfway through a fourth at Xiaowan, in Yunnan Province, which when completed will be the world's tallest dam, according the United Nations Environment Program.¹⁶⁶

These dams unfortunately block the natural migration of fish to spawning areas to the upper portion of the Mekong River. Time will tell whether or not the fishing industries in Cambodia, Laos, Thailand, and Vietnam will be destroyed as a result of the dams that are springing up all along the Mekong River. Each dam along the river causes a buildup of silt downstream due to a reduction in water flow. China is not the only country that is damming up this river, but its actions have caused a domino effect downstream.

Because of China's industrialization, the downstream riparian nations have been

165 Brahma Chellaney, *Water*, 115, 118.

166 T. Fuller, “Dams and development mar mekong mystique,” *New York Times*, December 18, 2009.

forced to build dams to protect their own water supply. These downstream countries, specifically Laos and Cambodia, are following their own interests by constructing dams to generate electric power. Since some countries are naturally blessed with existing freshwater resources and others are dependent upon waters that originate upstream and outside of their borders, what can be done to ensure the alimentation of all of the Mekong riparian states?

To answer the question, China and the other Mekong River countries can take example from international cooperation efforts involving distribution of trans-boundary water resources, for example, the accomplishments of India and Pakistan. As discussed earlier, the Indus Waters Treaty has remained in effect for over five decades. China's actions have not caused a negative impact on the IWT, so far, and this is in line with John Bursa's commentary. To reiterate what John Bursa stated about his experience in Pakistan, "the Chinese factor here is not a concern as it is on the Mekong."¹⁶⁷ But is this the case for India as well?

India and China essentially share a border via Tibet. There is historical contention between China and India along the border that still exists today. Challaney explains,

Tibet itself remains at the heart of the China/India divide. The tallest mountain peaks in the world are in the Great Himalayan Range, the scene of a thirty-two-day China-India war in 1962 and continuing military tensions to date between the two demographic titans.¹⁶⁸

So, we can see that China holds influence and has caused contention in both South and Southeastern Asia because it maintains sovereign control over the Tibetan Plateau.

167 John Bursa, e-mail message to author, October 6, 2013.

168 Brahma Chellaney, *Water*, 107.

China's control of river headwaters will continue to have a major effect on competition over the limited water resources in both the Mekong Basin in the future. While it has not disturbed the effectiveness of the IWT between India and Pakistan, China continues to keep the Mekong riparian countries divided by remaining outside of the influences of the MRC. This isolation brings into question China's willingness to cooperate with the international community and what this could mean for the Mekong Basin going forward. Despite its apparent reticence to join any commission that manages Mekong water distribution, China has engaged with and participated in international institutions in recent history.

Beginning with Deng Xiaoping in the 1970's, "China expanded its international profile by significantly increasing its participation in intergovernmental and nongovernmental organizations, especially financial ones, and China gradually began to emerge from its Mao-era isolation."¹⁶⁹ But, this transformation has been a slow process for China. Evan S. Medeiros and M. Taylor Fravel in, "China's New Diplomacy," write about the evolution of China's international cooperation:

Deng's transformation was only partial, however, and Chinese participation in the international community remained thin during his tenure. Indeed, Beijing sought many of the rights and privileges of a great power without accepting most of the attendant obligations and responsibilities. This dynamic was especially obvious in intergovernmental organizations such as the UN ... The changes represent an attempt by China's recent leaders to break out of their post-Tiananmen isolation, rebuild their image, protect and promote Chinese economic interests, and enhance their security; they also demonstrate an attempt to hedge against American influence around the world ... The more recent transformation began in the early 1990s, with Beijing's drive to expand its bilateral links. Between 1988 and 1994, China normalized or established diplomatic relations with 18 countries, as well as with the Soviet

169 Evan S. Medeiros and M. Taylor Fravel, "China's New Diplomacy," *Foreign Affairs*, Volume 82, No. 6 (November/December 2003): 24.

successor states. Then, in the 1990s, it began to build on these new relationships, establishing various levels of “partnership” to facilitate economic and security coordination and to offset the United States’ system of regional alliances. The pinnacle of this process was the Treaty of Good-Neighborliness and Friendly Cooperation that China signed with Russia in 2001 ... During this period, Beijing also began to abandon its previous aversion to multilateral institutions, which Deng had always feared could be used to punish or constrain China. Chinese leaders began to recognize that such organizations could allow their country to promote its trade and security interests and limit American input.¹⁷⁰

So, China has been engaging in international agreements as long as these advance its economic and security interests and keep United States' influence at bay. ASEAN is one of the associations that China has supported in the past including ASEAN +3 (ASEAN plus China, Japan, and the Republic of Korea) and ASEAN + 1 (ASEAN plus China).¹⁷¹ Additionally, in 2003, China worked through the ASEAN Regional Forum to propose “forming a conference to increase communication among Asian militaries. This gesture represents a marked departure from China’s posture only a decade ago, when it shied away from any security discussions with ASEAN.”¹⁷²

To summarize, a comparison can be made between the Indus and Mekong river basins and the way that each region is managing transboundary water resources. We can see from table 1 how each basin matches up in the categories of Boundaries, Monitoring, Sanctions, and Conflict-resolution mechanisms. When compared, these categories show where the Indus River Basin outperforms the Mekong. To avoid conflict and encourage international cooperation in sharing the water supply, the Mekong can learn from the successful implementation of the IWT and its benefits to Indian and Pakistani water security. But, in order for the countries of Mekong River Basin to improve water

170 Ibid., 24-25.

171 Medeiros and Fravel, “China's New Diplomacy,” 25.

172 Ibid., 26-27.

management, China will need to cooperate.

CONCLUSION

In summary, the study has shown the importance of water to both mankind and to the plants and animals that we consume. The research study has attempted to provide an answer to the question, “what factors have led to state competition and conflict over diminishing water resources and what are the resulting consequences?” To this end, the study has explored the scarcity of water and the factors that can cause competition and cooperation amongst riparian neighbors. Two of the reasons behind water scarcity are natural hazards and industrialization.

Over time, the effects of climate change and the effects of past conflicts have taken their toll. Effects like ice melt, salinization, drought, and desertification, have all posed severe challenges in maintaining freshwater supply throughout the two regions in this study. Because of these natural hazards, water flow in both the Indus and the Mekong rivers is not consistent. Nations in both regions have tried to compensate for this inconsistency by using industrialization in the form of water diversion and storage mechanisms like dams. As downstream riparian countries react to the actions of their upstream neighbors, competition over water ensues.

The study has covered and compared two cases – the Indus River Basin in South Asia and the Mekong River Basin in Southeastern Asia. Water has always been a point of contention and cooperation between India and Pakistan in the Indus River Basin, and between China, Burma, Thailand, Laos, Cambodia, and Vietnam in the Mekong River Basin. Water also has the potential to cause further competition or conflict if freshwater supply levels are not properly managed and sustained.

The current contention over water between India and Pakistan and the effects of upstream dam construction have created cross border conflicts and contention over Kashmir, but these events have not derailed the Indus Waters Treaty. Chapter 2 described the IWT, the role of the Neutral Expert in mediation, and actions taken to manage the contention over water in the Indus basin. One reason the IWT has worked for India and Pakistan is that it provides water rationality for both countries. Water rationality provides a way for each country to have long term water security. The key to water rationality for the Indus Basin is the Permanent Indus Commission that was built in to the IWT. The PIC has shown resilience and maintained water security for both nations through several testy conflicts during the lifespan of the IWT. But, research has shown that water rationality has yet to come to the Mekong. Chapter 3 examined the relationships of the riparian nations of the Mekong River Basin.

The Mekong River has two parts; upper and lower. The entire upper portion is under China's control. The lower Mekong riparian nations, have formed groups over time to help sustain the life-giving river flow from the Mekong that feeds and supports their populations. The current Mekong Agreement, created by the MRC, includes all of the riparian nations with the exception of China and Burma. China continues to refuse to participate and Burma does not participate because it is not directly effected by the Mekong water flow. China has control over the Tibetan Plateau; the source of the Mekong River. Because of this control, China has the potential to cause great harm to its downstream neighbors by continued dam construction and water diversion.

Most of the riparian countries involved have put priority on their own economic

interests at the expense of neighboring countries by following the example of China. These countries see the benefits of generating power for their own populations but they do not concern themselves with the impact that dams have on downstream countries. These effects include lack of fresh water for human consumption, decreased fisheries, and salt water contamination. Eventually, with the help of climate change, the impact of diminished water supply to each of the Mekong states has the potential to create conflict. To control this type of industrialization and to reduce the potential for conflict, groups have been formed (like the MRC and GMS) to manage water distribution and foster economic cooperation along the Mekong River.

Unfortunately, the MRC and GMS have fallen short in their quest to solve the water distribution problems because their decisions lack enforcement. The lack of enforcement comes from the absence of participation by one key country – China. One organization that has worked with China in the past and has the potential to improve and enforce regulation of the Mekong River waters is the ARF.

The ARF consists of all the Mekong riparian countries, as well as, other key ASEAN nations like India and Pakistan. By incorporating “preventative diplomacy,” ARF could be the solution to the Mekong water dilemma before it becomes a crisis that leads to conflict.¹⁷³ ARF combines the “ASEAN way” (which is the same as the “Mekong spirit”) with political enforcement of rules to potentially produce lasting sustainability for the Mekong water supply to all of the Mekong riparian nations. The Indus Waters Treaty is a possible collaborative tool that could be the model used by ARF

¹⁷³ About the ASEAN Regional Forum, <http://aseanregionalforum.asean.org/about.html>, (accessed in September, 2013).

for future Mekong River Basin cooperation between its riparian countries.

The Indus Waters Treaty has remained in force since 1960 and remains in place to this day. India and Pakistan have an opportunity to share lessons learned, through the medium of the ARF, with the Mekong region member nations including China. Since China is a member of the ARF, there is also the opportunity for other member countries to pressure China to be more cooperative in sharing water. Additionally, the ARF could incorporate the tenets of the *Water Convention* to assist in developing binding solutions to water competition problems between the riparian nations on the Mekong. Utilizing a commission like that of the MRC that would emulate a successful commission like the PIC, the ARF would quite possibly have the necessary tools to bring water security to all of the Mekong riparian states.

Actors like China have significant influence in both regions and any move to change the current dynamics will require China's cooperation. Short of maximum cooperation from the Peoples Republic of China, with all of its dependent riparian nations, freshwater coming from the Tibetan Plateau may eventually be exhausted due to a combination of human industrialization and natural climate change.

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This report provides regional security reviews from sixteen country participants covering July 2012 to July 2013. It provided me some background on countries like Cambodia and China.

ASEAN Regional Forum. "Preventive Diplomacy Work Plan (draft as of 2010)."
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ASEAN Regional Forum. "Seminar on Preventive Diplomacy." (Paris, 7-8 November 1996). <http://aseanregionalforum.asean.org/component/content/article/3-public-library/137-seminar-on-preventive-diplomacy-paris-7-8-november-1996.html> (accessed October 12, 2013).

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“Climate Change Security - Climate Lab.” http://climatelab.org/Climate_Change_Security (accessed April 23, 2012).

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EM-DAT: The OFDA/CRED International Disaster Database—<http://www.em-dat.net>—Universite’ Catholique de Louvain. Brussels, Belgium. (Accessed May 9, 2012).

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EM-DAT: The OFDA/CRED International Disaster Database – Additional Disaster Data Sources—<http://www.emdat.be/additional-disaster-data-resources> (accessed May 10, 2012).

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<http://www.humanitarianfutures.org/content/scenario-5-multihazard-risks-ferghana-valley> (accessed April 23, 2012).

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incorporate this region as a water resource and show the current competition amongst the countries which have to share it.

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Bannon, Ian and Paul Collier. *Natural Resources and Violent Conflict: Options and*

Actions. Washington DC: World Bank Publications, 2003.
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This source explains how negative effects from civil war within a country over resources can spill over into other states. I shall use this source to show the impact from natural hazards on competition over resources to include both intrastate and interstate competition. The source also shows how a lack of resources in one region can be detrimental to foreign and domestic populations.

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Braithwaite, Alex. *Conflict Hot Spots : Emergence, Causes and Consequences*. Ashgate Publishing Group, 2010.
<http://site.ebrary.com.ezproxy.hpu.edu/lib/hpu/docDetail.action?docID=10395017>

The e-book provides statistical evidence linking interstate warfare with geography. The study focuses on three main regions including the Great Lakes in Africa, the Balkans, and the Middle East. Geographical processes can be directly affected by natural hazards like earthquakes and *Desertification*. I shall use this book to research whether or not resources along with geographical processes are the cause of competition between states that could lead to military conflict.

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Bessette, Guy. *Natural resources -- Management. Communication in economic development*. Ottawa, Canada: IDRC Books, 2006.
<http://site.ebrary.com.ezproxy.hpu.edu/lib/hpu/docDetail.action?docID=10146731&ppg=292&p00=%22natural%20disaster%22%20%22natural%20resource%22> .

This source provides a hypothesis that conflict hot spots are more likely to occur in areas that have valuable resources. For example, two state with a common border that sits on a region that is resource rich. I shall take information gained from the hypothesis to add to the study of resources and how they bring security to populations.

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freshwater per capita than any other continent.”

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Coppola, Damon P. *Introduction to international disaster management*. New York: Elsevier, 2007.

This source is a great reference for the various phases of disaster management. I shall refer to it to better understand how hazards and disasters effect populations. The last chapter in the book focuses specifically on international disasters and the special considerations they invoke. It could provide further evidence of the relationship between natural hazards and state competition for resources.

Cullen, Heidi M., Alexey Kaplan, Phillip A. Arkin, and Peter B. Demenocal. "Impact of the North Atlantic Oscillation on Middle Eastern climate and streamflow." *Climatic Change* 55, no. 3 (2002): 315-338.

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Dannreuther, Roland. *International Security: The Contemporary Agenda*. Cambridge: Polity Press, 2007.

Dutt, C. Bala Subrahmanya, et al. "Assessment of tsunami and anthropogenic impacts on the forest of the North Andaman Islands, India." *International Journal Of Remote Sensing* 30, no. 5 (March 10, 2009): 1235-1249. *Academic Search Premier*, EBSCOhost (accessed May 15, 2012).

The article provides information about forest resources. Taking the view of forests being a resource to sustain human livelihood, the study shows how populations and natural disasters like tsunamis are major causes of deforestation. The assessment may shed light on the consequences of diminished resources.

Dyer, Gwynne. *Climate Wars: The fight for survival as the world overheats*. Oxford, England: Oneworld Publications, 2011.

This book is a fictional work that gives us a picture of what might happen to the

world if climate change is not addressed. The author uses historical information to build his case. Though fictional, the work provides the reader a sense of realization and urgency to mitigate the impact of climate change for the good of mankind.

Ede, Piers Moore. "Fueling tensions with water." *Earth Island Journal* 18, no. 4 (Winter 2004): 46-47. *Academic Search Premier*, EBSCOhost (accessed February 25, 2013).

Elhance, Arun P. "Conflict and Cooperation Over Water in the Aral Sea Basin." *Studies In Conflict & Terrorism* 20, no. 2 (April 1997): 207. *Academic Search Premier*, EBSCOhost (accessed February 17, 2013).

This reference was used to define *hydropolitics* for the purposes of this study.

Ember, Carol R. and Melvin Ember. "Resource Unpredictability, Mistrust, and War : A Cross-Cultural Study." *Journal of Conflict Resolution* 36, no. 2 (1992): 242-262. DOI: 10.1177/0022002792036002002.

Farajalla, Nadim. "Water Resources and Conflict in Lebanon." In *Losing Paradise: The Water Crisis in the Mediterranean*, edited by Gail Holst-Warhaft and Tammo Steenhuis, 107-120. Farnham, Surrey, GBR: Ashgate Publishing Group, 2010. (ebrary book thru HPU)

Fra Paleo, U. *NATO Science for Peace and Security - E Human and Societal Dynamics : Building Safer Communities. Risk Governance, Spatial Planning and Responses to Natural Hazards*. IOS Press, 2009.
<http://site.ebrary.com.ezproxy.hpu.edu/lib/hpu/docDetail.action?docID=10375719>

This source discusses hazard risk assessment and how poor risk assessment may be putting populations in harms way. So the book focuses mainly upon *risk governance*. I'll use this reference to better understand what influence natural hazards and resources have on political decisions for populations to remain in place or to relocate safer locations.

Gazdar, Haris. "Baglihar and Politics of Water."
[http://www.indiarightsonline.com/Sabrang/ethnic4.nsf/497e9bbd711b61eee5257713005d0872/54fdee8e419dbeaf88256fbd0074c509/\\$FILE/aaa265470.rtf](http://www.indiarightsonline.com/Sabrang/ethnic4.nsf/497e9bbd711b61eee5257713005d0872/54fdee8e419dbeaf88256fbd0074c509/$FILE/aaa265470.rtf)
(accessed January 20, 2014).

The article provides a deeper discussion of the division of the Indus River Basin between Pakistan and India during the period 1948-1960 when the Indus Waters Treaty was enacted.

Ghosh, Devleena, Heather Goodall and Stephanie Hemelryk Donald, ed. *Water, Sovereignty and Borders in Asia and Oceania*. (Routledge, 2009). Hill, Douglas. "Boundaries, scale and power in South Asia." In Ghosh, 87-103.

Goldsmith, Benjamin E. "A Liberal Peace in Asia?" *Journal of Peace Research*, Vol. 44, No. 1 (January 2007): pp. 5-27. (Accessed November 11, 2012).

Hain, Terry. "Resource Distribution and Its Consequences."
<http://geography.about.com/od/urbaneconomicgeography/a/Resource-Distribution-And-Its-Consequences.htm> (accessed May 10, 2012).

In this article to About.com Geography, Mr. Hain explains the purpose of resources to humans and the disparity in resource distribution throughout the world. He explains that resource availability directly contributes to a population's standard of living. He contends that this unequal distribution is due to human activity and not natural causes. This will be a quick reference to keep me focused should I drift off topic.

Haddadin, Munther J. "Water in the Middle East Peace Process." *The Geographical Journal*, Vol. 168, No. 4, *Water Wars? Geographical Perspectives* (Dec., 2002): pp. 324-340. Wiley on behalf of The Royal Geographical Society (with the Institute of British Geographers). <http://www.jstor.org/stable/3451475> (accessed February 23, 2013).

Hartnack, Christiane. "Roots and Routes: The Partition of British India in Indian Social Memories." *Journal Of Historical Sociology* 25, no. 2 (June 2012): 244-260. *Historical Abstracts with Full Text, EBSCOhost* (accessed December 23, 2013).

Hensengerth, Oliver. "Vietnam's Security Objectives in Mekong Basin Governance." *Journal of Vietnamese Studies*, Vol. 3, No. 2 (Summer 2008): pp. 101-127. University of California Press. Stable URL: <http://www.jstor.org/stable/10.1525/vs.2008.3.2.101> (accessed November 11, 2012).

Hess, Charlotte and Elinor Ostrom. *Understanding Knowledge As a Commons : From Theory to Practice*. Cambridge: MIT Press, 2005. <http://site.ebrary.com/lib/hpu/docDetail.action?docID=10173555> (accessed September 7, 2013).

This book provided more emphasis to the importance of managing water as part of the *commons*.

Hill, Douglas. "Boundaries, scale and power in South Asia." In *Water, Sovereignty and Borders in Asia and Oceania*, edited by Devleena Ghosh, Heather Goodall and Stephanie Hemelryk Donald, 87-103. Routledge, 2009.

Hirsch, Philip, Kurt Mørck Jensen, Naomi Carrard, Stephen FitzGerald, and Rosemary Lyster. *National interests and transboundary water governance in the Mekong*. University of Sydney: Australian Mekong Resource Centre, 2006.

Hirsh, Philip. "Issues of scale in governing water as a common good: The Mekong River Basin." In *Water, Sovereignty and Borders in Asia and Oceania*, edited by Devleena Ghosh, Heather Goodall and Stephanie Hemelryk Donald, 125-133. Routledge, 2009.

Homer-Dixon, Thomas F. "Environmental scarcities and violent conflict." *International Security* 19, no. 1 (Summer 1994): 5. *Academic Search Premier*, EBSCOhost (accessed February 24, 2013).

Homer-Dixon, Thomas F. *Environment, Scarcity, and Violence*. Princeton University Press, 1999.
<http://site.ebrary.com.ezproxy.hpu.edu/lib/hpu/docDetail.action?docID=10035907>

The author discusses *environmental scarcity* and how it can be responsible for various forms of violence; both intrastate and interstate violence. This ties in to diminished resources and possibly competition over them. This source should provide more insight to my topic and provide additional sources that will add to the study.

Howard, Roger. "Russia's New Front Line." *Survival* (00396338) 52, no. 2 (April 2010): 141-156. *Academic Search Premier*, EBSCOhost (accessed April 2, 2013).

Jacobs, Jeffrey W. "The Mekong River Commission: transboundary water resources planning and regional security." *Geographical Journal* 168, no. 4 (December 2002): 354. *Academic Search Premier*, EBSCOhost (accessed December 8, 2012).

Klare, Michael T. *Resource wars: the new landscape of global conflict*. New York: Henry Holt and Company, LLC, 2001.

This resource Michael Klare espouses that world power will come from those who control vital resources like petroleum, natural gas, and water. "While water, oil, and natural gas have sparked the most intense competition, trouble is also brewing over access to minerals, gems, and timber, particularly in developing nations that harbor few domestic sources of wealth."

Klare, Michael T., Barry S. Levy, and Victor W. Sidel. "The Public Health Implications of Resource Wars." *American Journal Of Public Health* 101, no. 9 (September 2011): 1615-1619. Academic Search Premier, EBSCOhost (accessed October 16, 2012).

This article may not seem to apply to the hypothesis, but it actually discusses public health problems resulting from competition and conflict over resources like petroleum.

Kraska, James. "Sharing Water, Preventing War—Hydrodiplomacy in South Asia." *Diplomacy & Statecraft* 20, no. 3 (September 2009): 515-530. *Academic Search Premier*, EBSCOhost (accessed November 22, 2012).

This article discusses climate change and how it can affect national security and be a source of possible conflict between states. The author uses the tensions between India and Pakistan over water-sharing. He goes on to suggest that conservation and cooperation can improve security and help to stabilize regions where resource conflicts occur.

Kolmannskog, Vikram, and Lisetta Trebbi. "Climate change, natural disasters and displacement: a multi-track approach to filling the protection gaps." *International Review Of The Red Cross* 92, no. 879 (July 14, 2010): 713-730. *Academic Search Premier*, EBSCOhost (accessed February 14, 2013).

Kugelman, Michael and Robert Hathaway. *Running on empty: Pakistan's water crisis*. Woodrow Wilson International Center for Scholars, 2009.
http://www.wilsoncenter.org/sites/default/files/ASIA_090422_Running%20on%20Empty_web_0.pdf#page=123. (Accessed January 10, 2014).

Li, Shaojuan and Daming He. "Water Level Response to Hydropower Development in the Upper Mekong River." *Ambio* Vol. 37, No. 3 (May, 2008): 170-177.

This article provides a counter-argument to the consensus that upstream damming inhibits water and silt flow to river deltas. The authors express that environmental conditions and climate change complicate the conclusion.

Lowi, Miriam R. "Bridging the Divide: Transboundary Resource Disputes and the Case of West Bank Water." *International Security*, Vol. 18, No.1 (Summer, 1993): pp. 113-138. *The MIT Press*. <http://www.jstor.org/stable/2539034> (accessed February 24, 2013).

Lusthaus, Jonathan. "Shifting Sands: Sea Level Rise, Maritime Boundaries and Inter-state Conflict." *Politics* 30, no. 2 (June 2010): 113-118. *Academic Search Premier*,

EBSCOhost (accessed April 25, 2012).

This article is a significant reference for my case studies. Rising sea level is believed to be caused by climate change and therefore will contribute to this thesis. This source argues that rising sea level has the potential to induce competition and conflict between states over resources.

Morris, Mary E. "Water and conflict in the Middle East: Threats and Opportunities." *Studies In Conflict & Terrorism* 20, no. 1 (January 1997): 1. *Academic Search Premier*, EBSCOhost (accessed February 22, 2013).

Martin, Susan. "Climate Change, Migration, and Governance." *Global Governance* 16, no. 3 (July 2010): 397-414. *Academic Search Premier*, EBSCOhost (accessed February 4, 2013).

The author talks about natural disasters and environmental hazards and how they relate the challenge of forced human migration. The article's main focus is the global need to protect refugees; those displaced persons segregated within and those who are forced to seek refuge outside their native country's borders. Human migration can lead to competition for resources as groups move into foreign territory for survival. I'll use this source for background on human migration and its causes.

Masci, David. "Emerging India: Can it remain an open and tolerant society?" *CQ Researcher* Volume 12, no. 15, Issue Number (April 19, 2002): 329-360. <http://library.cqpress.com.ezproxy.hpu.edu/cqresearcher/getpdf.php?id=cqresrre2002041900>.

Medeiros, Evan S. and M. Taylor Fravel, "China's New Diplomacy," *Foreign Affairs*, Volume 82, No. 6 (November/December 2003): 22-35.

Mehta, Uday S. "Gandhi and the Burden of Civility." *Raritan* 33, no. 1 (Summer 2013): 37-49. *Academic Search Premier*, EBSCOhost (accessed January 5, 2014).

This article discusses *satyagraha*, a form of nonviolent civil disobedience instituted by Gandhi. *Satyagraha* raises the question of about the reason for the hasty withdrawal of Britain from India.

Morris, Mary E. "Water and conflict in the Middle East: Threats and Opportunities." *Studies In Conflict & Terrorism* 20, no. 1 (January 1997): 1. *Academic Search Premier*, EBSCOhost (accessed February 22, 2013).

This article provide a comparison reference to Middle Eastern water sharing.

Nel, Philip, and Marjolein Righarts. "Natural Disasters and the Risk of Violent Civil Conflict." *International Studies Quarterly* 52, no. 1 (March 2008): 159-185. *Academic Search Premier, EBSCOhost* (accessed April 25, 2012).

The author contends that there is a direct link between the risk of civil conflict and sudden-onset disasters. Earthquakes are an example. The source will provide more insight into the relationship between disasters and competition over resources.

Nordas, Ragnhild, and Nils Petter Gleditsch. "Climate Change and Conflict." *Political Geography* 26 (2007): pp. 627 -38.

The article discusses the gaps in research involving climate change and its relationship to conflict. The authors attempt to identify difficulties and opportunities in research on the subject.

O'Lear, Shannon. "Resources and Conflict in the Caspian Sea." *Geopolitics* 9, no. 1 (Winter2004 2004): 161-186. *Academic Search Premier, EBSCOhost* (accessed April 23, 2013).

A short reference is may to this work to illustrate the importance of EEZ's.

O'Meara, Donna. "LAOS: The Mekong River." *Faces (07491387)* 17, no. 2 (October, 2000): 6. *MasterFILE Premier, EBSCOhost* (accessed February 9, 2014).

This article discusses a brief history of the relationship between the people of Laos and the Mekong River. It was helpful in establishing the importance of the Mekong waters to Laos.

Ostrom, Elinor. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, 1990.

This book is a key component to the research study. Her work defines terms like *common-pool resources* and *appropriators*. The book also describes some successful water management methods in various regions.

Qian Tan, et al. "AN INTEGRATED GAME-THEORY BASED MODEL FOR TRANS-BOUNDARY WATER RESOURCES MANAGEMENT IN NORTH CHINA:: A CASE STUDY IN THE GUANTING RESERVOIR BASIN (GRB), BEIJING." *International Journal Of Software Engineering & Knowledge Engineering* 18, no.

4 (June 2008): 461-483. *Academic Search Premier*, EBSCOhost (accessed May 16, 2012).

The article talks about fresh water and how supplies of this precious resource are diminishing. Guanting Reservoir basin in northern China has been a point of contention amongst the peoples of that region because it can only supply a limited amount of fresh water. Though the article is not directly related to my topic, it provides some perspective on the importance of water as a natural resource.

Pech, Sokhem and Kengo Sunada. "Population Growth and Natural-Resources Pressures in the Mekong River Basin." *Ambio*, Vol. 37, No. 3, Mekong at the Crossroads (May 2008): pp. 219-224.

Phillips, David JH, Shaddad Attili, Stephen McCaffrey, and John S. Murray. "The Jordan River Basin: 1. Clarification of the allocations in the Johnston plan." *Water International* 32, no. 1 (2007): 16-38.

Phillips, David JH, Shaddad Attili, Stephen McCaffrey, and John S. Murray. "The Jordan River Basin: 2. Potential Future Allocations to the Co-riparians," *Water International* 32, no. 1 (2007): 39-62.

Re, V., and G. M. Zuppi. "Influence of precipitation and deep saline groundwater on the hydrological systems of Mediterranean coastal plains: a general overview." *Hydrological Sciences Journal/Journal Des Sciences Hydrologiques* 56, no. 6 (August 2011): 966-980. *Academic Search Premier*, EBSCOhost (accessed April 25, 2013).

Sarfraz, Hamid. "Revisiting the 1960 Indus Waters Treaty." *Water International*, 38:2 (2013): 204-216. DOI:10.1080/02508060.2013.784494.

Sempris, Emilio. "CLIMATE CHANGE CONSEQUENCES FRESHWATER in Latin America and the Caribbean." *UN Chronicle* 46, no. 3/4 (June 2009): 36-38. *Academic Search Premier*, EBSCOhost (accessed May 10, 2012).

Lack of fresh water has caused "consequences to ecosystems and society" in South America and the Caribbean. This situation is producing disputes over territory close "transboundary watersheds" where most of the populations have settled. I will use this article to demonstrate the consequences of resource depletion and how it effects competition over this resource.

Shaojuan, Li, and He Daming. "Water Level Response to Hydropower Development in the Upper Mekong River." *AMBIO - A Journal Of The Human Environment* 37, no. 3 (May 2008): 170-177. *Academic Search Premier*, EBSCOhost (accessed November 27, 2012).

Shindell Drew. "Estimating the Potential for Twenty-First Century Sudden Climate Change." *Philosophical Transactions: Mathematical, Physical and Engineering Sciences* Vol. 365, No. 1860. *Climate Change and Urban Areas* (Nov. 15, 2007). *The Royal Society* <http://www.jstor.org/stable/25190615> . (accessed February 24, 2013).

Stallings, Robert A. "Conflict in Natural Disasters: A Codification of Consensus and Conflict Theories." *Social Science Quarterly* 69, no. 3 (1988): 570-86.

Sultan, Cathy. "Water Wars and Land Grabs: the Litani River and the Shebaa Farms." In *Tragedy in South Lebanon: The Israeli-Hezbollah War Of 2006*, 73-88. Minneapolis, MN, USA: Scarletta Press, 2008. (ebrary books thru HPU).

Taniguchi, Nobuhiko, et al. "Genetic diversity of wild Mekong giant catfish *Pangasianodon gigas* collected from Thailand and Cambodia." *Fisheries Science* 73, no. 4 (August 2007): 792-799. *Academic Search Premier*, EBSCOhost (accessed November 29, 2012).

Uitto, Juha I. And Alfred M. Duda. "Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention." *The Geographical Journal*, Vol. 168, No. 4, *Water Wars? Geographical Perspectives* (Dec., 2002): pp. 365-378. *Introduction to international disaster management*. New York: Elsevier, 2007. Blackwell Publishing on behalf of The Royal Geographical Society (with the Institute of British Geographers) Stable URL: <http://www.jstor.org/stable/3451478> (accessed May 13, 2012).

This source talks about the growing scarcity of water in a world that has an increasing need for water. This need is due in part to an increasing global population. Competition over water resources is a cause for conflict according to this source. The article goes on to discuss the prospect of sharing water resources to prevent conflict. The article will contribute to my research and provide needed perspective on conflict over resources.

Van Evera, Stephen. *Causes of War: Power and the Roots of Conflict*. Cornell University Press, 2013.

W. Kloppmann, et al. "The Water Crisis in the Gaza Strip: Prospects for Resolution." *Ground Water* 43, no. 5 (September 2005): 653-660. *Academic Search Premier*, EBSCOhost (accessed April 25, 2013).

Wassmann, Reiner, Nguyen Xuan Hien, Chu Thai Hoanh, and To Phuc Tuong. "Sea level rise affecting the Vietnamese Mekong Delta: water elevation in the flood season

and implications for rice production." *Climatic Change* 66, no. 1-2 (2004): 89-107.

Wirsing, Robert G. "The Kashmir Territorial Dispute: The Indus Runs Through It." *Brown Journal Of World Affairs* 15, no. 1 (Winter2008 2008): 225-240. *Academic Search Premier*, EBSCOhost (accessed November 22, 2012).

Zawahri, Neda A. "India, Pakistan and cooperation along the Indus River system." *Water Policy* 11, no. 1 (2009): 1-20.