



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

## **THESIS**

**THE SECURITY IMPLICATIONS OF WATER:  
PROSPECTS FOR INSTABILITY OR COOPERATION IN  
SOUTH AND CENTRAL ASIA**

by

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March 2010

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**THE SECURITY IMPLICATIONS OF WATER: PROSPECTS FOR  
INSTABILITY OR COOPERATION IN SOUTH AND CENTRAL ASIA**

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## **ABSTRACT**

This thesis will explore the security implications of water scarcity through an examination of the politics of water in South Asia (India and Pakistan) and Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan). The thesis will argue that when water is viewed in terms of security interdependence (as in South Asia) rather than economic interdependence (as in Central Asia), states are more inclined to successfully cooperate. The cases of South and Central Asia investigated in this thesis illustrate the advantages and disadvantages of being geographically an upstream or downstream state and the means by which governments in the two regions have attempted to forge cooperation and reciprocity.

In order to assess the potential for conflict over water resources, the thesis relies heavily on cooperation theory—that states will continue to cooperate assuming the long-term benefits of cooperation on water sharing outweigh short-term benefits of non-cooperation to meet domestic water demands. The South and Central Asia cases vary with respect to the positions of relative power between upstream and downstream states and the tenor of post-independence relations. While the majority of water disputes in both regions (with less success in Central Asia) have been resolved through diplomacy and treaties, the next ten to twenty years will likely present unparalleled challenges of greater complexity to water sharing efforts. The two case studies present contrasting regions at different stages of cooperative development over water.

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## I. INTRODUCTION

In recent years, global issues surrounding environmental strains and diminishing natural resources have come to light on the international stage. While debate progresses on the future effects of global warming, states are left with the sobering prospect: In the near and long term, the struggle to provide basic essentials such as water and energy will become only more difficult as populations increase and environmental degradation continues. Even when focusing on water alone, as this thesis does, the problems arising from shortages can branch off into a plethora of domestic problems—from basic sanitation to energy production shortfalls. The issues compound further when states share the same source of water and are forced to balance international sharing agreements against the benefits of its population. A government is likely to choose to take action to ensure its population is provided for; however, what does a state risk if such action exacerbates tensions with neighboring states? How far will states go to provide for its population, or reciprocally punish a state for breaching its promise? At what point is the value of future cooperation less than the present needs of states?

This thesis will explore the security implications of water scarcity through an examination of the politics of water in South Asia (India and Pakistan) and Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan). The thesis will argue that when water is viewed in terms of security interdependence (as in South Asia) rather than economic interdependence (as in Central Asia), states are more inclined to successfully cooperate.

The last official “water war” took place 4,500 years ago, between two Sumerian city-states over irrigation rights.<sup>1</sup> While no outright declared wars over water have occurred between sovereign states since then, several disputes and armed conflicts have erupted over water rights and control.<sup>2</sup> Presently, due to increased shortages of water

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<sup>1</sup> “Water Wars Loom? But None in Past 4,500 Years,” Reuters News Wire, 17 September 2006.

<sup>2</sup> Recent water-based disputes include the Maavilaru waterway in Sri Lanka and the Mekong River Delta. See “Water and War in Sri Lanka,” [http://news.bbc.co.uk/2/hi/south\\_asia/5239570.stm](http://news.bbc.co.uk/2/hi/south_asia/5239570.stm) and “Asia’s Coming Water Wars,” [http://www.pinr.com/report.php?ac=view\\_report&report\\_id=545&language\\_id=1](http://www.pinr.com/report.php?ac=view_report&report_id=545&language_id=1).

resources, the probability of state-to-state tensions over water resources appears higher in cases where there are shared rivers and one state controls the downstream flow. Although the sharing of water resources is common in state relations, the once taken for granted practice may become more tenuous as water resources shrink. This scarcity is due to the combination of increased demand—in the form of population growth and increased economic development—and fluctuating supply, arising from environmental degradation and the normal irregularity in natural production of water resources. For states attempting to maintain a consistent level of development, increasing scarcity poses a threat to nascent or historical water-sharing agreements. With the growing demand on an increasingly limited and fluctuating resource, the pressures on these agreements and consistent reciprocity will continue to be tested.

The cases of South and Central Asia investigated in this thesis illustrate the advantages and disadvantages of being geographically upstream or downstream, and the means by which governments in the two regions have attempted to forge cooperation and reciprocity. Independent of its upstream location, India has had the strategic advantage in light of its overall conventional military dominance and superior economic achievement in comparison to downstream Pakistan. Since partition, India and Pakistan have found multiple reasons to stir and escalate tensions, but the Kashmir territorial dispute remains the central contentious wedge, illustrated through wars in 1947 and 1965, and the 1999 Kargil conflict.<sup>3</sup>

While Kashmir will likely remain an unresolved and contentious issue, focus has shifted towards economic development in both countries and, in the case of Pakistan, financial solvency. India must keep up with its own economic development by fulfilling its growing energy demands, with hydroelectric generation as an important and necessary option for the country.<sup>4</sup> However, India's development of new hydroelectric dams could have serious consequences for the downstream flow of rivers that run towards Pakistan's

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<sup>3</sup> Stephen Philip Cohen, *The Idea of Pakistan* (Washington DC: Brookings Institute, 2004), 51–54.

<sup>4</sup> Prior to the 2007 global financial crisis, India and Pakistan have both maintained a steady 9.0 percent and 6.7 percent GDP growth rate respectively in recent years. See *The Economist* (July 2006-7) spanning the past 12 months.

agricultural heartland. Given the already tenuous relationship between India and Pakistan, rife with paranoia, the mere possibility of India manipulating its strategic control and potential economic strangulation through river flow dominance is a cause for deep concern in Pakistan. Pakistan has already clarified that economic strangulation is one of its supposed “red lines,” which, if crossed, would result in escalatory conflict.<sup>5</sup> Pakistani officials believe such economic coercion could be carried out through the manipulation of essential water supplies. Therefore, the ongoing damming and hydroelectric development in Indian Kashmir, is seen by Pakistan as a potential threat to its water supply. India, meanwhile, sees the dam development as an inherent right and necessity to provide energy through waters to which India has lawful claim.<sup>6</sup> In February 2008, the World Bank concluded its arbitration, reinforcing the legality of India’s Baglihar Dam construction on the Chenab River; this result increased concern in Pakistan over Indian dominance of water resources. Chapter II will investigate the complaint, arbitration, and resolutions of the World Bank’s decision on the Baglihar Dam. The chapter will explore how the security interdependence developed over the decades has resulted in consistent cooperation to resolve water disagreements.

In Central Asia, in contrast, it is the upstream riparian states of Kyrgyzstan and Tajikistan that are at a disadvantage in comparison to their water-dependent yet resource-rich neighbors Uzbekistan and Kazakhstan, which have supplies of natural gas and crude oil. No longer under Soviet authority, the Central Asian Republics (CARs) have had to develop regional resource-sharing agreements as independent nations. Shaky agreements between the CARs have consistently collapsed, as indigenous needs have trumped pre-established water arrangements. The challenge for these countries is to form binding treaties while at the same time allowing each state to develop and capitalize on their internal resources and industries. How will this relatively new cluster of independent

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<sup>5</sup> Quote from Lt. General Khalid Kidwai, Strategic Plans Division, Pakistan Army. He describes the possibility of using nuclear weapons “when deterrence fails in the event India proceeds to the economic strangling of Pakistan.” See, “Nuclear safety, nuclear stability and nuclear strategy in Pakistan: A concise report of a visit by Landau Network - Centro Volta” (Italy: Landau Network-Centro Volta, 21 January 2002), Section 5.

<sup>6</sup> *Indus Water Treaty* (1960), Article III, Section 2.



states establish working reciprocity without a central managing authority? Will the weak economic interdependence formed over past decades lead to ongoing cooperation failure? Chapter III examines these questions.

## **A. THEORETICAL FRAMEWORK AND SOURCES**

In order to assess the potential for conflict over water resources, the thesis relies heavily on cooperation theory—that states will continue to cooperate assuming the long-term benefits of cooperation on water sharing outweigh short-term benefits of non-cooperation to meet domestic water demands. The thesis relies on the game theoretic concept of prisoners’ dilemma to understand the dynamics of states’ cooperation and defection from international water-sharing agreements. Robert Axelrod, a proponent of cooperation theory, argues defection among players and the ability to develop sustainable cooperation is dependent on keeping the value of future cooperation greater than the benefits of defection in the present.<sup>7</sup> With Central Asia, a bloc of relatively new nations is struggling to reconcile economic interdependence without Soviet decision-making authority. Without the risk of security consequences, energy-deficient, upstream controlling states of Kyrgyzstan and Tajikistan choose annual defection in order to maintain essential energy production.

Since partition in 1947, India and Pakistan have fought primarily over territorial rights, but both sides still view each other with a strong sense of mistrust and paranoia on a wide range of topics. However, the anticipation of conflict has led to relative stability in cooperation over water. Robert Keohane argues, “cooperation should not be viewed as the absence of conflict, but rather as a reaction to conflict or potential conflict. Without the specter of conflict, there is no need to cooperate.”<sup>8</sup> In the case of South Asia, this “specter” manifests itself through security interdependence—that non-cooperation with the likely consequences of armed conflict is far more costly than continued cooperation. While South Asia has maintained relative stability over water, tensions and harsh rhetoric

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<sup>7</sup> Robert Axelrod, *The Evolution of Cooperation* (New York: Basic Books, 1984), 126.

<sup>8</sup> Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 2005), 54.

continue to grow, but the water continues to flow. Future cooperation between India and Pakistan is likely because the consequences of conflict over a strategically important resource would lead to disaster for both sides. However, as resources strains develop, the cost of cooperation for both sides will continue to rise.

Additional perspectives on environmental conflict and riparian issues focus on the following themes: scarcity in natural resources, and its effects on state stability; state-to-state historical disputes over water resources; and emerging water disagreements.<sup>9</sup> As a single issue, water will likely not be the sole cause of conflict between states, but will contribute to stress and relations in conjunction with existing political, economic, and cultural causes of conflict.<sup>10</sup> Additionally, environmental conflicts can manifest themselves as political, social, economic, ethnic, religious or territorial conflicts, reasserting the argument that water is a component and catalyst to other issues, leading to conflict.<sup>11</sup> The governments in South and Central Asia are attempting to formulate new and adaptive measures to manage water resources to find and increase long-term benefits and thereby solidify the incentives for long-term and stable water cooperation. The thesis will examine whether the adaptive measures taken in the two regions have succeeded or failed towards improving the chances for long-term cooperation on water.

## **B. SOURCES**

The thesis relies on public statements and news reports of government statements regarding water, academic and news articles on riparian issues focusing on the dilemmas facing upstream and downstream states, and official government reports and treaties as

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<sup>9</sup> For broad ranging literature on future implications of natural resources on state stability see, Thomas Barnett, *The Pentagon's New Map: War and Peace in the Twenty-First Century* (New York: Penguin Group, 2004), 202–6. Also see, Mike Davis, *Planet of Slums* (New York: Verso, 2006), 203–204.

<sup>10</sup> Thomas F. Homer-Dixon, *Environment, Scarcity, and Violence* (Princeton: Princeton University Press, 1999), 105–106.

<sup>11</sup> “Environmental Conflicts are characterized by the principal importance of degradation in one or more of the following fields: overuse of renewable resources; overstrain of the environment’s sink capacity (pollution); impoverishment of the space of living.” Stephen Libiszewski, “What is an Environmental Conflict,” in *International Security: Challenges in a Changing World*, eds. Kurt Spillmann and Joachim Krause (Zurich: Center for International Relations and Security Network, 2004), 14.

sources of data for analysis.<sup>12</sup> Specifically, the text of the Indus Water Treaty and United Nations and World Bank reports on the regions are used. In addition, works by Robert Axelrod and Robert Keohane on international cooperation theory form the foundation of the theoretical framework explaining the actions of states in regards to water decisions.

### **C. RESEARCH DESIGN**

The South and Central Asia cases vary with respect to the positions of relative power between upstream and downstream states and the tenor of post-independence relations. While the majority of water disputes in both regions (with less success in Central Asia) have been resolved through diplomacy and treaties, the next ten to twenty years will likely present unparalleled challenges of greater complexity to water sharing efforts. The two case studies present contrasting regions at different stages of cooperative development over water.

The South Asian region presents uniform power asymmetries between the two regional powers that have historic tendencies towards conflict, but that have displayed relative foresight on how they have dealt with water disputes. In South Asia, upstream India is predominately seen as militarily and economically superior to downstream Pakistan, although both states are nuclear powers. However, the relationship is governed by a seemingly robust international agreement, the Indus Water Treaty. The case study analyzes how India and Pakistan approach disputes over water and the strengths and weaknesses associated with the means the two nations use to resolve water disagreements.

The Central Asian case study offers a contrasting example of states that are still trying to establish consistent cooperation over water disagreements in the wake collapsed Soviet-imposed sharing agreements. In contrast to the South Asian case, the upstream states of Tajikistan and Kyrgyzstan are militarily and economically weak in comparison to their downstream neighbors Turkmenistan, Uzbekistan, and Kazakhstan. While

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<sup>12</sup> Ian Small et al., "Safe Water for the Aral Sea Area: Could It Get Worse?" *European Journal of Public Health* 13, no. 1 (2003), 87; Aaron Wolf, "Water Scarcity and the Risk of Conflict with Countries," in *Water Scarcity and Conflict*, ed. Leif Ohlsson (Zurich: Center for Security Studies, 1995), 232.

Tajikistan and Kyrgyzstan control the downward flow into greater Central Asia, downstream states are able to exert pressure on these upstream governments to provide the same water distribution levels during Soviet control through desperately needed energy supplements. The upstream states, lacking indigenous energy resources, depend on these downstream energy supplements in combination with indigenous hydroelectric generation to maintain their energy needs. Cooperation, however, consistently fails during the winter months, when more energy is necessary; the Central Asian upstream states are forced to release more water for energy generation, leaving less available for the downstream states in the summer months, which rely on the downstream flow for their agricultural industries. Energy shortfalls among the upstream states during the winter months have caused the upstream states to break numerous water sharing agreements. In response, the downstream states have cut off natural gas supplies to Kyrgyzstan and Tajikistan, leaving them in a worsening energy dilemma that compromises the agricultural industries of the downstream as well as upstream states.

#### **D. CHAPTER OUTLINE**

Chapter II covers historic and current South Asian river rights and dam construction, which has become an irritant in Indo-Pakistani relations. At the heart of the water relationship between the two countries is the Indus Water Treaty. Chapter II explores whether cooperation over water is likely to be maintained and future disputes are likely to be restricted to rhetoric because of the developed security interdependence. Will both sides continue to respect the Indus Water Treaty and heed international arbitration? Is it likely that water will be used as coercive tool when other issues are straining the relationship or are the costs of choosing defection over ongoing cooperation too high?

Chapter III examines current issues surrounding Central Asian water rights, the strategic power of upstream states, and their ability to position themselves toward dependent downstream states. The chapter assesses the prospects for cooperation along the lines of Soviet-era agreements and whether the new context of economic interdependence and development make cooperation failure more likely. It analyzes the

behavior of the CARs to address whether cooperation failure is inevitable if upstream states threaten to commoditize their water while downstream states threaten to withhold natural resources.

## II. SOUTH ASIA

*The water crisis in Pakistan is directly linked to relations with India. Resolution could prevent an environmental catastrophe in South Asia, but failure to do so could fuel the fires of discontent that lead to extremism and terrorism.*<sup>13</sup>

—Pakistan President Asif Ali Zardari, 28 January 2009

### A. INTRODUCTION

India and Pakistan have faced a number of contentious issues since partition in 1947. Territorial disputes over Kashmir, religious and ethnic strife, language conflicts, or asymmetric attacks and retaliation, have constantly fed instability in the region. In each case defeat, coercion, or deterrence, and in some cases a blending of all three play a role in eventual resolution of South Asian conflicts.<sup>14</sup> While these conflicts yield short-term resolutions, a shadow of conflict lingers largely due to the symbolic question of control over Kashmir. However, despite multiple conflicts in the region in the past 60 years, water-sharing issues, in comparison, remain a conflict restricted to rhetorical clashes, largely due to the Indus Water Treaty (IWT) of 1960 and security interdependence that has developed over time. Considering that Indo-Pakistani relations are historically consumed with enmity and paranoia, the stability surrounding this essential resource of such strategic and economic importance is a surprise. However, the pressure to maintain economic development in India and remain fiscally solvent in Pakistan will increasingly test this trend of dormancy. India and Pakistan stand at a crossroads, where the two states will need to build off and evolve from the successes of the IWT and approach water in a regionally cooperative manner.

First, this chapter describes the history of Indo-Pakistani water sharing rights from partition to the eventual signing of the IWT. The second section focuses on recent strains

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<sup>13</sup> Asif Ali Zardari, “Partnering With Pakistan,” The Washington Post, 28 January 2009.

<sup>14</sup> The concept of coercion in South Asian affairs is addressed in, Verghese Koithara, “Coercion and Risk-Taking in Nuclear South Asia,” (Stanford: Stanford University Press--CISAC Working Paper, March 2003).

on the IWT, specifically arising out of India's construction of the Baglihar dam in Jammu Kashmir. The third and fourth section addresses the trends towards marketization of water and future prospects for water issues in South Asia. These sections connect the central argument that while India and Pakistan historically followed and accepted established treaties, development and growth pressures, degradation of fresh water resources, increased Pakistani economic dependence on shared water, and historical enmity will test and strain the IWT. However, due to India and Pakistan's history of reliance on treaties towards resolving water disputes, the region will likely adapt better to interstate water crises because of these lessons learned and the very high cost of cooperation failure—leading to potential armed conflict—for either state.

## **B. HISTORIC WATER RIGHTS ISSUES AND THE INDUS WATER TREATY OF 1960**

Water distribution and allocation rights concerns are not new to South Asia. The British administration from 1860 to 1947 made large investments into the Indus basin irrigation system, making it the largest continuous irrigation system in the world, with a command area of roughly 20 million hectares and annual irrigation capacity of more than 12 million hectares.<sup>15</sup> The Government of India Act of 1935 placed the distribution and control of water under provincial rule for the first time.<sup>16</sup> Prior to the Act, the central British authority settled disputes over water irrigation, but as a precursor to eventual independence, water rights were localized as an element of the Government of India Act. Once water rights became localized, disputes immediately occurred on areas of extensive irrigation, including the provinces of Punjab and Sindh.<sup>17</sup>

After the Radcliffe Lines were hastily drawn in 1947, resulting in the partition of Pakistan and India, much of the region fell into disarray because of the resulting mass cross-border migration. While the British focus was on fair distribution in terms of population, the Radcliffe Lines complicated the distribution of water in the Indus river

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<sup>15</sup> Ashok Swain, "Environmental Cooperation in South Asia," eds. Ken Conca and Geoffrey D. Dabelko (Washington, D.C.: Woodrow Wilson Press, 2002), 66.

<sup>16</sup> "Indus Water Treaty," Oregon State University, Department of Geosciences.

<sup>17</sup> Ibid.

system. Before partition, as Figure 1 illustrates, “the Indus irrigation system was envisaged to alleviate the water shortage in the Sutlej Valley Project (a primary tributary river for the Indus) by the addition of canals to bring water from the west, together with a dam and large storage reservoir to be built at Bhakra on the Sutlej. However, partition left Bhakra in India and thus aggravated the problem of shortages in the Sutlej Valley Canals (in West Pakistan).”<sup>18</sup> Due to high agricultural development in the region, the state was forced to look towards the Upper Bari Doab for additional water. It built links of up to 63 miles in order to bring water from the Ravi and Chenab rivers in 1951 and 1954.<sup>19</sup>

The borders—quickly drawn without a genuine understanding over water distribution—led to disputes almost instantly after independence. In 1948, a serious dispute over shared water occurred when India halted water supplies to some Pakistani canals at the start of the summer irrigation season.<sup>20</sup> India halted the water supplies because of the ambiguity surrounding water distribution after partition and to fulfill water needs of the time.<sup>21</sup> Immediate negotiations did not resolve the issue and the action by India led to the deprivation of water from approximately 5.5 percent of Pakistan’s agricultural area.<sup>22</sup> While violent confrontation did not ensue, such provincial disputes foreshadowed eventual problems and the need for a binding treaty to settle upstream and downstream water distribution disputes. After the first Kashmir War of 1947, India and Pakistan had set a path towards hostile relations that would not be resolved in the near-term, therefore, a binding water distribution agreement needed to be established to stymie a potential flash point in relations.

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<sup>18</sup> Pieter Lieftinck, *Water and Power Resources of West Pakistan: A Study in Sector Planning* (Baltimore: The Johns Hopkins Press, 1968), 10. Before 1971, Pakistan was divided between East Pakistan (modern Bangladesh) and West Pakistan (modern Pakistan). References to West Pakistan refer to modern Pakistan.

<sup>19</sup> Ibid., 10.

<sup>20</sup> G. T. Keith Pitman, “The Role of the World Bank in Enhancing Cooperation and Resolving Conflict on International Watercourses: The Case of the Indus Basin,” in M. A. Salman and Laurence Boisson de Chazournes, eds., *International Watercourses: Enhancing Cooperation and Managing Conflict*, World Bank technical paper no. 414 (Washington, D.C.: World Bank, June 1998). Cited in Swain, “Environmental Cooperation in South Asia,” 66.

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.



The issue of upstream river control versus downstream water usage lies at the heart of the IWT. Once the borders were drawn, West Pakistan found itself in a precarious position of negotiating with an upstream power that needed to look towards its own national interests. As Ken Conca notes,

Balancing upstream and downstream rights and responsibilities is the most contentious aspect of bargaining over watercourse conventions. As several analysts have pointed out, and as the negotiating parties clearly understood, there are potentially profound tensions between the principle of equitable and reasonable use and the principle of no significant harm to other watercourse states. The principle of no significant harm is generally seen to favor downstream states, in that upstream development of water resources may deny water to human and natural uses downstream, thereby causing significant harm. The principle of equitable use, in contrast, is generally seen to favor upstream states seeking to develop water resources, in the sense that it gives them a legal basis for claiming and using their fair share of the water.<sup>23</sup>

The IWT, therefore, was an attempt to accommodate the interests of both upstream India and downstream Pakistan.<sup>24</sup> In Article III, Section I of the IWT, the section on “Provisions Regarding Western Rivers” specifically states that, “Pakistan shall receive for unrestricted use all those waters of the Western Rivers which India is under obligation to let flow...”<sup>25</sup> Furthermore, Article III of the treaty clarifies four conditions in which India can “interfere” with the Indus, the Jhelum and the Chenab: (1) Domestic Use; (2) Non-Consumptive Use; (3) Agricultural Use; and (4) Generation of hydro-electric power.<sup>26</sup> As seen in the treaty, the articles leave room for interpretation in the usage of rivers by the upstream power for its national domestic interests.

International distribution concerns can only exacerbate the domestic pressures within each country. Water distribution arguments are not just an international issue between India and Pakistan but have also become domestic disputes that place pressure

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<sup>23</sup> Ken Conca, *Governing Water: Contentious Transnational Politics and Global Institutions Building* (Cambridge: MIT Press, 2006), 100.

<sup>24</sup> While The Indus Water Treaty refers to water resources of both West and East Pakistan, the paper will only refer to Pakistan in terms of the agreement with Western or present-day Pakistan.

<sup>25</sup> *Op Cite.*, Indus Water Treaty, Article III, Section 1.

<sup>26</sup> *Ibid.*, Article III, Section 2.

on their respective governments. In Pakistan, disputes continuously arise over fair water distribution between the Punjab and Sindh provinces.<sup>27</sup> In January 2010, The Sindh Assembly passed a joint resolution opposing the construction of a proposed power plant at the Chashma-Jhelum Link canal on the grounds that it is likely to compound the water situation in the province and would only add to continuous mistrust between the provinces.<sup>28</sup> In India, inter-state disputes are a routine occurrence and when resolutions cannot be easily resolved, they are then moved to tribunal arbitration according to the Inter-State Water Disputes Act of 1956.<sup>29</sup> Even without international distribution issues, water allocation has a tremendous effect on domestic stability. Especially in Pakistan where the Sindh and Balochistan provinces face multiple water choke points before it reaches their territory domestic unrest can easily be fomented—whether blame is due to international or domestic reasons.

India faces a growing dilemma regarding its obligations to the IWT and its demographic challenges. India is home to one-sixth of the world's population while only endowed with one-twenty-fifth of the world's available water resources.<sup>30</sup> The language of the IWT calls for “equitable utilization” of the Indus Water System by both sides, however, Pakistan is allocated 75 percent of water distribution; as India continues to develop economically, exploitation of Indian water resources will likely lead to water distribution disputes and heavier reliance on the IWT (through the World Bank) to redefine the term “equitable utilization.”<sup>31</sup>

Pakistan already faces a projected water crisis due to overexploitation of its indigenous ground and surface water supplies. According to a World Bank report “Pakistan is close to using all of its available water resources in most years. The bottom line is clear -- Pakistan is currently close to using all of the surface and groundwater that

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<sup>27</sup> Cohen, *The Idea of Pakistan*, 212.

<sup>28</sup> The News, “Sindh Assembly Rejects Punjab Canal Project.” 29 January 2010.

<sup>29</sup> Historic and pending water disputes within India can be viewed at [http://india.gov.in/sectors/water\\_resources/river\\_water.php](http://india.gov.in/sectors/water_resources/river_water.php) (accessed on 10 January 2010).

<sup>30</sup> United Nations Environment Programme, “Fresh Water Under Threat: South Asia.”

<sup>31</sup> World Bank, “Pakistan: Country Water Research Assistance Strategy,” 7, 14 November 2005.

it has available, yet it is projected that over 30 percent more water will be needed over the next 20 years to meet increased agricultural, domestic and industrial demands.”<sup>32</sup> As Pakistan continues to struggle through economic hardships, the dependence on water will increase in order to maintain economic sustainability. Any cuts in allocation will likely have significant ramifications for these water dependent sectors. To put in perspective, Pakistan can only store up to 30 days worth of water (as compared to the 900 days capacity for the United States), therefore the country is extremely reliant on the output originating from India.<sup>33</sup>

While one of the functions of the IWT is to allow fair distribution of water to include guaranteed downstream access to Pakistan, the presence of four conditions ((1) Domestic Use; (2) Non-Consumptive Use; (3) Agricultural Use; and (4) Generation of hydro-electric power) in the IWT are broad enough to allow reinterpretation.<sup>34</sup> Additionally, Annexe F of the treaty contains conditions under which a neutral representative can be brought in “to determine the component of water availability for the use of Pakistan.”<sup>35</sup> Once a neutral representative is brought in by the World Bank to hear testimony and expert opinion, the representative can determine whether the treaty is being adhered to properly. The question rests on whether the decision will be accepted without objection or if future cooperation will be considered more costly than defection from the treaty.

### **C. THE CHENAB RIVER AND BAGLIHAR HYDROELECTRIC PROJECT**

In Indian administrated Kashmir, the Chenab River flows downstream from the mountains crossing the border into Pakistani Punjab. In 1999, India initiated the construction of the Baglihar plant in the Doda district of Kashmir and according to Indian officials, the purpose of the project was to supply power (up to 450 MW) to Indian

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<sup>32</sup> World Bank, “Pakistan: Country Water Research Assistance Strategy,” 7, 14 November 2005, 26–7.

<sup>33</sup> Ibid., xii.

<sup>34</sup> Ibid. Article III, Section 2.

<sup>35</sup> Ibid. Annexure F, Section 1, Sub-Section 1.

administrated Kashmir.<sup>36</sup> The Indian argument is fairly straightforward: India constantly needs energy, and the dam will provide an essential energy supply to Kashmir.<sup>37</sup> In all respects, India is adhering to Article III, Section one of the IWT, under which hydroelectric damming, which restricts water flow, is deemed acceptable under proper guidelines.

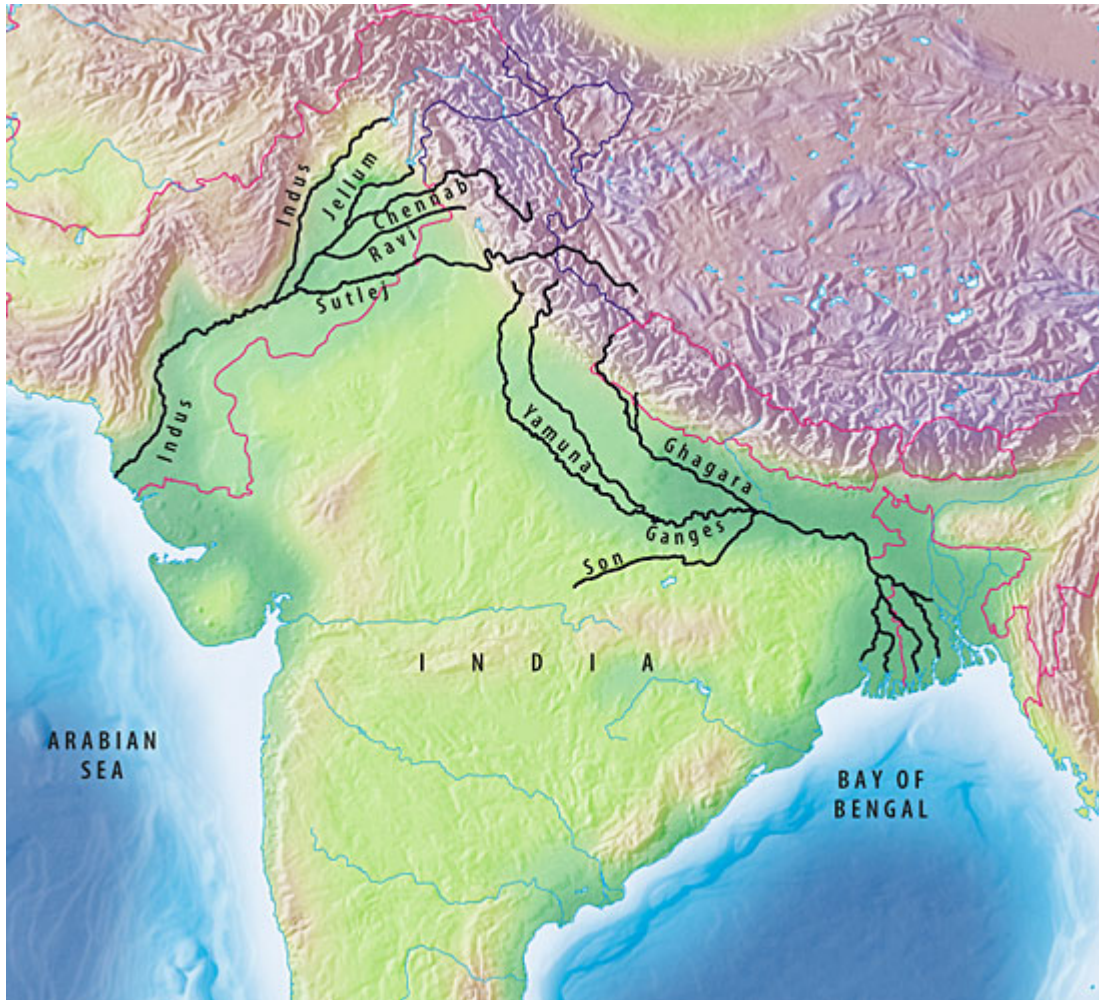


Figure 1. Map of Indus Rivers<sup>38</sup>

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<sup>36</sup> BBC News Online, “Pakistan Team Views Kashmir Dam,” July 25, 2005.

<sup>37</sup> *Ibis*.

<sup>38</sup> Figure from Woods Hole Oceanographic Institution.

Pakistan, however, feels threatened by the dam and its potential to significantly reduce the downstream water flow. The Chenab River flows through most of Pakistan and eventually connects with the Indus. The Chenab River is a critical water artery for irrigation and sustains the agricultural industry in western Punjab. In the last several years, the increased draught conditions in both Pakistan and India limits their water supplies. Pakistan claims that the new dam provides India with the ability to restrict the water flow or possibly submerge the area based on the design of the release gates.<sup>39</sup> Whether the claims are valid or not, Pakistan is genuinely concerned about Indian posturing and ability to control a vital component of its agricultural sustainability—making this not only an economic and a security concern.

On 15 January 2005, Pakistan formally requested World Bank arbitration and for a Neutral Expert (NE) to be appointed according to Article IX of the IWT to resolve its concerns over the Baglihar Plant. The following was one of three claims submitted by the Pakistani government to the World Bank for arbitration. “Pakistan is of the considered view that the design of the Baglihar Plant on Chenab Main does not conform to criteria (e) and (a) specified in Paragraph 8 of Annexure D to the IWT and that the Plant design is not based on correct, rational and realistic estimates of maximum flood discharge at the site.”<sup>40</sup> The Indian government formally disagreed with any Pakistani claimed violations. Over the course of two years, the World Bank made multiple visits to the dam site and set about its interpretation of the IWT versus the claims of violation.

In February 2007, after months of delay, the World Bank NE, Mr. Raymond Lafitte, came to a decision over the Baglihar dam in which both India and Pakistan claimed victory.<sup>41</sup> The decision satisfied India because the overall design of the dam remained intact with some minor changes, which would not affect its energy production goals.<sup>42</sup> Pakistan came away with a perceived victory because India was forced to reduce

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<sup>39</sup> Deutsche Welle, “Baglihar Dam Controversy Further Exasperating Pak-India Ties,” 12 January 2005.

<sup>40</sup> World Bank, “Executive Summary: Baglihar Hydroelectric Plant,” 12 February 2007.

<sup>41</sup> Ibid.

<sup>42</sup> BBC News Online, “World Bank Rules on Kashmir Dam,” 13 February 2007.

the height of the release gates on the dam, deeming India in violation on certain counts.<sup>43</sup> However, within several months, new contentious issues arose in which the opposing needs of India and Pakistan once again tested the treaty. The World Bank decision appeased both sides temporarily, but inflammatory rhetoric resurfaced over perceived Indian manipulation.

In October 2008, Pakistan accused India of blocking water flow into the Chenab River, causing significant agricultural damage to the Punjab region.<sup>44</sup> According to Pakistan's Indus Water Commissioner, India completely blocked the supply of regular water (23,000 cubic feet per second (Cusec) a day) to Pakistan from the Chenab River, affecting Pakistan's share of irrigation water.<sup>45</sup> After the allegations in the press, Pakistan confronted India officially over the dispute, demanding compensation for the loss in which India rejected the claim. While Pakistan's request for compensation was denied by India, and the complaint did not move forward to the World Bank, the dispute over water rights reached an argumentative level between the Prime Minister of India and the President of Pakistan. Pakistani President Asif Ali Zardari stated, "Pakistan would be paying a very high price for India's move to block Pakistan's water supply from the Chenab River."<sup>46</sup> President Zardari further noted that any violation of the 1960 IWT by India "would damage the bilateral ties the two countries had built over the years."<sup>47</sup> In contrast, Prime Minister Manmohan Singh refuted any potential IWT violation and noted during the inauguration of the Baglihar project that "electricity is crucial for the development of industry and the project will give a push to the industrialization of [Kashmir]."<sup>48</sup> This reinforces the evolving divergence of Pakistani concerns over inequitable distribution versus Indian pronouncements of needing to continue its national development.

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<sup>43</sup> BBC News Online, "World Bank Rules on Kashmir Dam," 13 February 2007.

<sup>44</sup> Dawn Online, "Pakistan to seek compensation for Chenab losses," 12 October 2008.

<sup>45</sup> Ibid.

<sup>46</sup> BBC News Online, "Zardari warning over Kashmir dam," 13 October 2008.

<sup>47</sup> Ibid.

<sup>48</sup> Ibid.

The statements by the two leaders reveal the divided priorities and evolving stresses on the IWT. Pakistan fears India's control of the water output, while India wants to maintain its progressive developmental stride. With the expanding needs of the Pakistani agricultural industry to consistently deliver, the need for India to generate more energy, and an ever-growing population in the region, fresh water will only become more and more scarce. Compounding this problem, water in South Asia is widely seen as a strategic and "symbolic capital," connected to the larger dispute over Kashmir.<sup>49</sup> As recently as June 2009, Pakistani Foreign Minister Shah Mahmood Qureshi accused India of continuous IWT violations that could "lead to heightened tensions between the two countries if ignored."<sup>50</sup> Rhetorical jabs are not uncommon between the two states, however, as South Asia continues to develop, the IWT's ability to evolve with and continue to be the primary method towards water dispute resolution will be critical in halting any escalations of tensions over water in the region.

#### **D. MARKETIZATION OF WATER**

While the IWT provides guidelines for water allocation as required during the 1960s, the first glimpses of these evolving problems can be seen through the Baglihar dam disputes and its water marketization value. According to Conca, "When applied to water, structural adjustment conditionality and neoliberal policy reform have produced pressures [towards] the marketization of water. The result is a set of strong pronouncements as to how water should be managed, emphasizing its character as a natural resource good with economic value."<sup>51</sup> This is highly relevant when applied to South Asia's allocation of the region's limited resources. Looking at the Baglihar dam, India views the resource as an opportunity to expand its energy production in the area bolstering industrial capabilities in the region, while Pakistan views the dam as a threat to its already draught ridden agricultural economy.

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<sup>49</sup> Uttam Kumar Sinha, "Water Security: A Discursive Analysis," in *Strategic Analysis* 29, no. 2 (Institute for Defence Studies and Analysis, April–June 2005), 138.

<sup>50</sup> Dawn Online, "Indus Water Treaty Violations Taken Up With India: Qureshi," 7 June 2009.

<sup>51</sup> Conca, *Governing Water*, 29.

Applying Conca's terminology to South Asia, India would be a "leader" because of its need to further capitalize on its resource and Pakistan the "laggard" for contesting India's use of water as a market commodity and fearing that any hindrance in existing water supplies will have dire effects on its economic relevancy.<sup>52</sup> Because of already overstretched water supplies, Pakistan plays the role of the laggard due to its dependency on Indian originated water and sensitivity that any perceived or potential disruption in its flow is a threat to its sustainability. Pakistan in a sense has 'failed' due to the inevitability of the Baglihar construction, completion, and potential towards marketization.

The important point of the terminology when applying to South Asia is at what point does the marketization of water elicit a response more than opposition or harsh rhetoric, but conflict or violence? In the case of South Asia, this would be when Pakistan perceives it no longer has control over its own water resource distribution and further feels India is directly responsible for the "strangulation of its economy."<sup>53</sup> Lt. Gen. (ret.) Khalid Kidwai, Director General of Pakistan's Strategic Plans Division, specifically notes that one of Pakistan's potential redlines towards nuclear deployment is the condition of economic strangulation and specifically "the stopping of the waters of the Indus River."<sup>54</sup> Kidwai's statement is meant as a check against Indian aggression and potential usage of water as a persuasive tool; however, the question that arises from Kidwai's statement is whether Pakistan can differentiate between Indian hostile actions against Pakistan versus decisions aimed towards fulfilling Indian domestic water needs. The prospect of Pakistan defending itself with nuclear assets to stop water manipulation is extremely low, but in tandem with other sources of conflict, water manipulation as a set of persuasive tools could lead to Pakistan perceiving itself as being pushed against a wall.

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<sup>52</sup> Conca, *Governing Water*, 29.

<sup>53</sup> Quote from Lt. General Khalid Kidwai, Strategic Plans Division, Pakistan Army, in which he describes the possibility of deploying nuclear weapons "when deterrence fails in the event India proceeds to the economic strangling of Pakistan (economic strangling)." See, "Nuclear safety, nuclear stability and nuclear strategy in Pakistan: A concise report of a visit by Landau Network - Centro Volta" (Italy: Landau Network-Centro Volta, 21 January 2002), Section 5.

<sup>54</sup> Ibid.



Until now India and Pakistan have illustrated restraint in terms of water rights and distribution. This stability, however, will be tested as resources begin to become more and more scarce in the region as in the rest of the world. In India, quantitative supply problems are increasing. “India will enter the ‘stress zone’ by 2025. Water scarcity due to ground water depletion is already a major problem. To complicate matters, water quality is also deteriorating. For example, 80 percent of the fourteen perennial rivers in India are polluted. Organic pollutants from industrial activities are a major cause of degradation of water quality throughout the region. India, for instance, is the third biggest emitter of organic water pollutants with 1,651,250 kilograms per day.”<sup>55</sup> With the growing scarcity of water in the region, India will have to apply a conciliatory approach towards its water resources and how it affects its neighbors, including Pakistan.

In consideration of how water is distributed through the rivers downstream towards Pakistan, India needs to anticipate that Pakistan (as the laggard) will likely react strongly towards potential manipulation of the rivers. As Peter Gleick notes “it very clear that ‘water resources have rarely been the sole cause of conflict’ but should be viewed as a ‘function of the relationships among social, political, and economic factors, including economic development.’”<sup>56</sup> This is increasingly important when viewing the persistently paranoid relationship between India and Pakistan. While violent conflict has not occurred over water, if there comes a time when water resources are stretched thin in conjunction with other conflicts, confrontation may occur with conceivably no way to impede escalation. It is therefore a testament to the IWT that, even during violent conflicts and wars between India and Pakistan, the water continued to flow. This reaffirms the necessity of maintaining and strengthening the IWT to keep pace with the continually complex region.

## **E. WATER’S FUTURE IMPLICATIONS IN SOUTH ASIA**

The premise that water may be used as symbolic or even strategic capital is not a new concept in South Asia. What sets South Asia apart from other regions dealing with

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<sup>55</sup> Sinha, “Water Security,” 325.

<sup>56</sup> Ibid., 322.

water sharing issues is how broader historical conflict between India and Pakistan has allowed the two states to anticipate potential tension over the strategic resource. As seen with the recent arbitration over the Baglihar Dam, contentious rhetoric was the extent of tensions between India and Pakistan. Both the countries largely accepted the IWT ruling. While cooperation is likely to become more difficult as the IWT tries to keep pace with evolving economic, environmental, and security pressures dependent on water usage, the cost of cooperation failure will continue to be too great because of the security interdependence that has developed in the region. Cooperation failure over water has the potential to affect hundreds of millions of Pakistanis and Indians, leaving cooperation the only reasonable approach without risking escalatory conflict.

The pattern of water supplies is one of an unstable and independent physical necessity that is in excess one year and scarce the next. With global climate change, the prospect for vast fluctuations in water supplies will place more pressure on already strained resources. Further, not only is the quantity of water important, but additionally, the quality itself plays a critical role in judging a state's resources, especially for developing states such as Pakistan or India, which do not have advanced water processing facilities for general consumption.<sup>57</sup> Because of these compounding problems, shortfalls in energy production could stymie Indian GDP growth (7.1 percent projected in fiscal year 2009<sup>58</sup>). For Pakistan, a shortfall in water allocation could cripple its already weak GDP growth (2.0 percent projected in fiscal year 2009<sup>59</sup>). One of the few bright spots for Pakistan is its agricultural growth.<sup>60</sup> Therefore, shortfalls in water distribution would have detrimental affects on each state's economies as applied to sustaining GDP growth.

Applying water as a security concern in South Asia, a look at the history of conflicts within the region points to tremendous energy spent by the two countries over patches of land with little physical or strategic value. Specifically, the two nations

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<sup>57</sup> Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed* (New York: Penguin Group, 2005), 53.

<sup>58</sup> The Times of India, "India's GDP Growth to Stabilize around 7%" 16 March 2009.

<sup>59</sup> Forbes Online, "Pakistan GDP Growth Seen at 2 Percent in 08/09 – Government Official."

<sup>60</sup> Ibid.

focused on and sacrificed numerous lives on areas of symbolic importance, such as the Siachen Glacier War in 1984, and the Kargil Conflict in 1999.<sup>61</sup> However, ever since the introduction of nuclear weapons into the region's security posture, armed conflicts have either remained limited in scope (Brasstacks in 1986, Kargil in 1999) or prevented altogether (India Parliament Attack and Military Standoff in 2001-2, Mumbai Terrorist Attack in 2008).<sup>62</sup> A conflict over water has the potential of affecting hundreds of millions of people in the region, while historic conflicts in Kashmir have had limited affects on the region's population. Therefore, if either India or Pakistan chose present day defection over future cooperation, large populations would likely suffer direct consequences and each side would risk conflict difficult to contain.

The Kashmir region has several dimensions keeping the two states at odds, which include Pakistani perception of India as occupying Muslim territory, India's frustration with Pakistani support of Islamic militants. A long history of low-intensity conflicts and intrusions by both states has not helped—most notably the Kargil War of 1999 that saw Kashmiri militant and Pakistan military incursions into Indian controlled outposts.<sup>63</sup> When these issues are taken into consideration along with the fact that many of the rivers flowing down into Pakistan, originate in Kashmir, it is fortunate India and Pakistan have realized the potential dangers of water dispute. The IWT has allowed potential tit-for-tat retaliation to be arbitrated by a third party and thus minimizing the risk of violent conflict.

This foresight on water disputes, however, is being tested as both states strive to maintain and expand their respective wealth and power. Indian construction of the Baglihar dam and Pakistan's response illustrates the problems of realizing common interests in national pursuit of greater wealth and power.<sup>64</sup> Until now, Indian and

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<sup>61</sup> Time Magazine Online, "War at the Top of the World," 4 May 2005.

<sup>62</sup> Vipin Narang, "Posturing for Peace? Pakistan's Nuclear Postures and South Asian Stability," *International Security* 43, no. 3 (Winter 2009): 38–64.

<sup>63</sup> Feroz Hassan Khan, "Comparative Strategic Culture: The Case of Pakistan" *Strategic Insights*, Center for Contemporary Conflict (October 2005).

<sup>64</sup> Robert Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 2005), 22.

Pakistani disputes over water involve harsh rhetoric, resolution through the IWT, and eventual cooperation. However, as the variables of resource scarcity and national development continue to grow, stability will continue to depend largely on continual cooperation outweighing the costs of present day defection. According to Axelrod, “A second reason that the future is less important than the present is that individuals typically prefer to get a given benefit today rather than having to wait for the same benefit until tomorrow.”<sup>65</sup> As domestic pressures continue to mount, disputes become more complex, and water resources are stretched, the IWT will likely need to take a greater role in resolving present day needs in order to sustain future cooperation. Because cooperation failure would significantly destabilize the region’s security interdependence, the cost of conflict would likely be too high not to first exhaust all avenues of cooperation.

## **F. CONCLUSION**

This above analysis not meant to be a wholly pessimistic vision of India and Pakistan. On the contrary, despite historic violence and hostility, the two countries historically illustrate responsible behavior when it comes to water sharing because of the anticipated disagreements over the resource. Additionally, with the introduction of nuclear weapons into the strategic posture of both states the cost of non-cooperation and escalatory conflict are too high for either state to risk. The issue now is whether they can adapt this responsible behavior to new stresses on its water supply and maintain the treaty’s integrity.

This chapter is an examination of how historic agreements and security interdependence have kept water a cooperative issue between India and Pakistan. Historically, India and Pakistan’s mostly non-confrontational behavior in regards to their water issues can be explained by the fact that the issues have been solvable. With the current dam issues at the Chenab River, and the recent decisions by the World Bank expert, it is critical that both sides adhere to the treaty. They also should recognize that

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<sup>65</sup> Axelrod, *The Evolution of Cooperation*, 126–127.

the 1960 treaty has been a success in fostering cooperation and in addressing grievances, however, the IWT must adapt in order to anticipate population and economic growth along with environmental stresses in the region.

India and Pakistan have been rife with conflict since partition, however, despite this conflict the two states, were able to anticipate the necessity of cooperation over water because of the heavy costs both populations would incur if they did not. As Axelrod notes, “what makes it possible for cooperation to emerge is the fact the players might meet again. The future can therefore cast a shadow back upon the present and thereby affect the current strategic situation.<sup>66</sup>” In the early decades of post-British South Asia, India and Pakistan seemed to grasp that while land conflicts could be contained on a limited scope, water is an essential strategic resource that in the short term can cause severe consequences on large populations if not resolved reasonably. Even more importantly, in the past several decades the security interdependence and integration of nuclear weapons to both countries militaries leaves non-cooperation over an essential resource a costly risk.

India and Pakistan’s greatest challenge in the near future is evolving cooperation towards an integrated Indus water system despite other issues that surround them.<sup>67</sup> If India and Pakistan continue to look at water as it relates to the individual state, the movement towards non-cooperation is more plausible. However, if India and Pakistan can add to the historical success of the IWT, continue to restrict hostilities to rhetoric, and move towards a more regional approach towards water, water will remain a dormant issue.

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<sup>66</sup> Axelrod, *The Evolution of Cooperation*, 12.

<sup>67</sup> Ashok Swain, “Environmental Cooperation in South Asia,” 82.

### III. CENTRAL ASIA

#### A. INTRODUCTION

Since independence in 1991, the states of Kyrgyzstan and Tajikistan have sought to translate their position as the source of the Amu Darya and Syr Darya rivers into political and economic strength in order to improve both their domestic and foreign policy situation. Fundamentally, however, these states are restricted by their own water requirements. Kyrgyzstan and Tajikistan need water primarily for hydroelectric power (especially during the winter) and secondarily for irrigation. In contrast, the downstream states Kazakhstan, Turkmenistan, and Uzbekistan are already rich in fossil fuel energy supplies and require less hydroelectric power. They therefore use water almost entirely for irrigation purposes (especially during the summer).<sup>68</sup> Befuddling the entire situation is the fact that the Central Asian Republics (CARs) current water sharing arrangement is based on Soviet era reciprocity agreements meant to be enforced by a central hegemonic presence that no longer exists. In post-independence Central Asia, water issues are still weakly institutionalized, creating “a domestic political context marked by uncertainty and short time horizons.”<sup>69</sup>

In the short post-independence history of the CARs, direct violent conflict has not arisen over water disputes. Governments in these states, however, have resolved disputes with weak agreements that are consistently bent, and eventually collapse. The purpose of

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<sup>68</sup> Stuart Horsman, “Water in Central Asia: Regional Cooperation or Conflict?” In *Central Asian Security: the New International Context*, edited by Roy Allison and Lena Jonson. Washington: Brookings Institution Press, 2001, 74. As the World Bank noted, “Under these circumstances the continuation of the irrigation regime of the operation of the Toktogul reservoir, involved the Kyrgyz Republic generating electricity far in excess of its needs in summer and facing serious shortages for power and heat in winter when its electricity needs were substantially higher in summer. Winter electricity demand grew much faster than in the Soviet days since the consumers (being unable to afford the high cost of fossil fuel based heating) switched to electric heating. The country was seriously disadvantaged since it simply could not afford to pay the higher prices (and, especially, in hard currency) and import enough fuels for its winter needs.” And, The World Bank, “Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin,” *World Bank Report* (Washington D.C., World Bank, January 2004), 11.

<sup>69</sup> Erika Weinthal, “The Promises and Pitfalls of Environmental Peacemaking in the Aral Sea Basin”, in *Environmental Peacekeeping* eds. Ken Conca and Geoffrey D. Dabelko (Washington DC: Woodrow Wilson Press, 2002), 90.

this chapter is to address how water in Central Asia has moved from a shared resource under Soviet oversight to a commodity exploited for short-term individual state interests—leading to cooperation failure. Specifically, with the absence of Soviet control and state economies heavily dependent on limited water resources, what is the probability that intertwined political, economic, and ecological problems of Central Asian waterways will cause instability in the region? Unlike South Asia’s security interdependence and history of armed conflict, the CARs interdependence is largely based on domestic economic pressures, leading to cooperation breakdown and an inability to forge trust over water. This chapter argues that as long the CARs view water in terms of domestic economics and not regional stability, the region will continue to produce hollow international agreements with little staying power.

The first section provides a general historical understanding of riparian usage in the CARs Aral Sea basin, including a discussion of the demographic challenges and geographical dynamics that have created interdependence amongst riparian states. The second section will examine how the Soviet Union managed riparian distribution among the Central Asian Soviet republics. The third section describes water distribution issues immediately after the fall of the Soviet Union. The fourth section of the chapter will provide an overview of the economic needs of and arguments among the upstream states (Kyrgyzstan and Tajikistan) and the downstream states (Kazakhstan, Uzbekistan, and Turkmenistan). It also examines how the varying needs of each state has led to broken agreements, exploitation of natural resources, and increased tensions between the respective governments. The chapter concludes with discussion of how current riparian conditions in the Aral Sea basin will factor in Central Asian stability over the short and long-term.

## **B. CENTRAL ASIAN WATER HISTORY**

### **1. Geographical and Demographic Dynamics**

The riparian geography of Central Asia consists of two major rivers that feed into the Aral Sea basin, providing for nearly all water consumption in the region.<sup>70</sup> The two

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<sup>70</sup> Horsman, “Water in Central Asia,” 70.

main rivers, which feed into the Aral Sea and provide ninety percent of all fresh water resources to Central Asia, are the Amu Darya River that originates in Tajikistan, and the Syr Darya River that begins in Kyrgyzstan.<sup>71</sup> “The Aral Sea basin encompasses nearly all of Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, the Kazakhstani *oblasti* of Qyzylorda and Shymkent, and parts of Afghanistan.”<sup>72</sup>

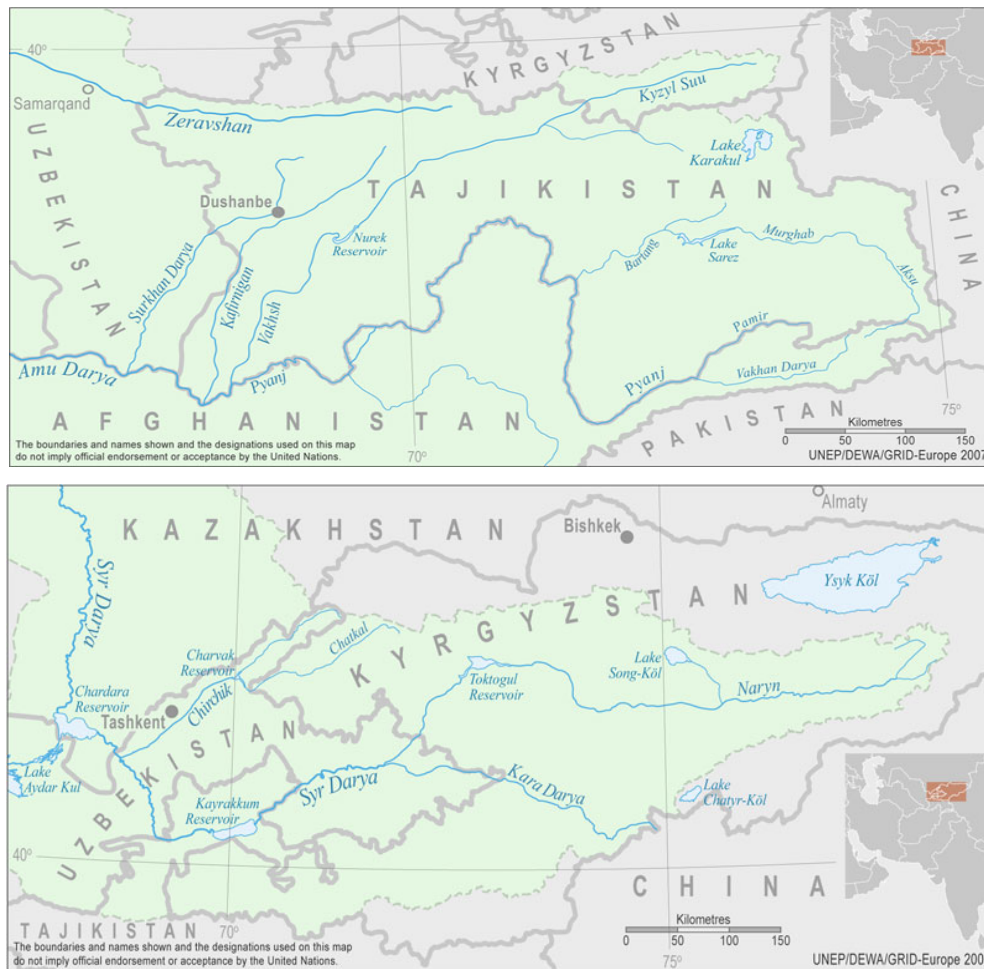


Figure 2. The Amu Darya and Syr Darya<sup>73</sup>

<sup>71</sup> Horsman, “Water in Central Asia,” 70.

<sup>72</sup> Ibid.

<sup>73</sup> Images from United Nations Environment Programme.



The Amu Darya headwaters form in the Pamir Mountains, which is at the tri-junction of Tajikistan, China, and Afghanistan, forming a border between Tajikistan and Afghanistan, and a partial border with Uzbekistan.<sup>74</sup> Along the river flow from Tajikistan to Uzbekistan, there are multiple canals and reservoirs that effect the eventual water distribution to Uzbekistan.<sup>75</sup> Additionally, tributary rivers feeding the Amu Darya are overdrawn, straining the downward flow towards the Aral Sea, and compounding the already exploited river system.<sup>76</sup>

The Syr Darya River is similar in its geographical profile. The river originates in the Tian Shen Mountains of Kyrgyzstan along with seven tributary rivers that eventually cross into Kazakhstan. The Naryn River, which is the most significant tributary river along the Syr Darya, is controlled by several dams and canals in Kyrgyz territory—most importantly the Toktokul dam which will be further described later on in the chapter. The two rivers both feed into the Aral Sea. However, because of the heavy exploitation by both the upstream states for hydroelectric use, and the downstream states for agricultural needs, the Aral Sea has shrunk to half of its original size since 1960, one of the most globally noted ecological and environmental disasters.<sup>77</sup> This is event is largely due to the partitioning and exploitation of the river basin.

Before Soviet heavy industrialization in the 1960s, the Aral Sea region was a flourishing ecological land base. Yet even under conservative estimates, historical evidence demonstrates that the ecological degradation in the past several decades has been catastrophic. The Sarykmysh depression, which lies between the Aral and Caspian Seas, was once the Sarykmysh Lake at depths of over 100 meters and was densely populated along its shore.<sup>78</sup> The rivers in the past were key economic and strategic assets

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<sup>74</sup> Timur Dadabaev, “Water Politics and Management of Trans-Boundary Water Resources in Post-Soviet Central Asia,” in *Prospects for Democracy in Central Asia*, ed. Birgit N Schlyter (Istanbul, Swedish Research Institute in Istanbul, 2005), 170.

<sup>75</sup> Ibid.

<sup>76</sup> Abdujalil Abdurasulov, “Kyrgyztan Rations Electricity,” 17 September 2008, *Business Week*.

<sup>77</sup> “Central Asia’s Water Worries in Spotlight,” 30 August 2003, BBC News.

<sup>78</sup> Igor Lipovsky, “The Deterioration of the Ecological Situation in Central Asia: Causes and Possible Consequences,” *Europe-Asia Studies* 47, no. 7 (November 1995), 1112.

for the populations and economies. During Genghis Khan's conquest of Central Asia, the Mongols were able to break through local resistance by destroying the dams on the Amu Darya, allowing the river's waters to surge and flood the region.<sup>79</sup> Soviet placed agricultural economies forced increased pressures on the integrated riparian system—turning the Sarykmysh Lake into a dry depression.<sup>80</sup>

Demographics of the area only exacerbate the strains on water resources in Central Asia. Irrigated lands provide for approximately ninety percent of all crops in the region and Central Asian provinces derive fifty percent of their water supply from outside sources.<sup>81</sup> The three downstream states of Turkmenistan, Kazakhstan, and Uzbekistan consume 73 percent of all water in Central Asia, have a combined population of over 47 million, and are dependent on the downstream flow of the Amu Darya and Syr Darya. Singling out Uzbekistan (which has the highest CAR population at 27 million), it is already estimated that current strained water resources will be insufficient come 2030, due to probable increases in populations and global climate changes.<sup>82</sup> Further, a United Nations team reported that water shortages in 2001, and the affects on agricultural outputs, severely affected some 550,000 to 600,000 people in Uzbekistan.<sup>83</sup> The upstream states of Kyrgyzstan and Tajikistan have a combined population of over 12 million and are only allocated 0.4 percent and 11 percent of their own water supplies, respectively.<sup>84</sup> These numbers and demographic challenges are important to understand the disparity between consumption, control, and overall reliance that the downstream states have on this fluctuating resource.<sup>85</sup>

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<sup>79</sup> Lipovsky, "The Deterioration of the Ecological Situation in Central Asia."

<sup>80</sup> Abdurasulov, "Kyrgyzstan Rations Electricity."

<sup>81</sup> Ibid., 70–71.

<sup>82</sup> "Irrigation water shortage could mean disaster for Uzbekistan," 12 May 2008, Ferghana.ru Information Agency.

<sup>83</sup> Johannes Linn, "The Impending Water Crisis in Central Asia: An Immediate Threat," The Brookings Institute.

<sup>84</sup> CIA World Factbook July 2009 Population Estimates for Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan, and Turkmenistan.

<sup>85</sup> Paul Williams, "Global (Mis) Governance of Regional Water Relations," *International Politics* 40, no. 1 (March 2003): 149.



Each state, both upstream and downstream, has different requirements for their water usage. With tremendous ecological damage done to the Aral Sea basin, the downstream states have become nearly exclusively dependent on the riparian system.

### **C. THE SOVIET ERA**

Soviet mismanagement profoundly impacted the Amu and Syr Darya rivers, so much so that by the mid-1980s, the flow from both rivers was reduced to a trickle barely capable of reaching the Aral Sea.<sup>90</sup> The Soviet era push towards agricultural development in Central strained the region's water resources due to a focus on water-intensive crops and an unprecedented diversion of natural water flow from extensive infrastructural changes.

The Soviet Union introduction of cotton and rice to the CARs produced one of the world's greatest economic development programs and ensuing regional environmental disasters. In the 1950s, the USSR Ministry of Land Reclamation and Water Resources managed agricultural output and water distribution, and focused exclusively on water-thirsty crops such as cotton and rice. In the post World War II era, the Soviet leadership designated the "virgin lands" of Central Asia as the primary location for the Soviet cotton industry. This designation precipitated the construction of canals and inter-basin diversion canals throughout the Central Asian region.<sup>91</sup> The rush to construct and divert water resources during Soviet rule led to hastily constructed canals that allowed salty runoff into ground water and consequentially into the soil—tripling the salt concentration between 1960–1990.<sup>92</sup> In only 30 years, the heightened salinity levels and river diversions for cultivating cotton collapsed a fishing industry that had existed for centuries.<sup>93</sup>

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<sup>90</sup> Ian Small, et al., "Safe Water for the Aral Sea Area: Could It Get Worse?" *European Journal of Public Health* 13, no. 1 (2003), 87.

<sup>91</sup> Gunilla Bjorklund, "People, Environment, and Water Security in the Aral Sea Area," in *Prospects for Democracy in Central Asia*, ed. Birgit N. Schlyter (Istanbul: Swedish Research Institute, 2005), 187.

<sup>92</sup> Ibid.

<sup>93</sup> Weinthal, "The Promises and Pitfalls of Environmental Peacemaking in the Aral Sea Basin," 86.

These infrastructural changes, in the form of reservoirs, irrigation canals, pumping stations, and field canals, in Central Asian waterways expanded irrigated areas by 150 percent in the Amu Darya region and 130 percent in the Syr Darya region.<sup>94</sup> Large portions of the population moved to these newly irrigated lands to farm. As a result, agriculture was and remains an important sector of the modern day economies of Central Asia. Currently, agriculture contributes 11 percent to the GDP in Kazakhstan, 19 percent in Tajikistan, 27 percent in Turkmenistan, 33 percent in Uzbekistan, and 38 percent in Kyrgyzstan.<sup>95</sup> Important segments of the Central Asian population quickly became dependent on a thriving agricultural industry, and expected the state to maintain that level of prosperity.

The increases in agriculture and population in Central Asia produced corresponding increases in the demand for and consumption of water that have had catastrophic consequences for the Aral Sea basin's ecological system. Irrigation processes now entirely consume the flow output of the tributary rivers (the Zeravshan, Tedzhen, Kashkadarya, and Murgab) that once flowed into the Amu Darya and from there into the Aral Sea. As a result, the Amu Darya, whose annual discharge into the Aral Sea not long ago was nearly 75-78 cubic kilometers, now contributes nothing at all to the Aral Sea. All of the water has been diverted for irrigation purposes, feeding the demands of the cotton fields.<sup>96</sup> The situation with the Syr Darya is almost as dire. The Syr Darya used to have a flow output into the Aral Sea of nearly 34 cubic kilometers of water per year and as of now contributes less than 3 cubic kilometers of water.<sup>97</sup> Not only are the waters being highly stretched to capacity usage, the water itself, once it passes through the irrigation process downstream, is unfit for human consumption. "The Aral Sea at the present state is an ecological disaster that is far from repair, not to mention that the waters

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<sup>94</sup> "Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin," *World Bank Report*, 10.

<sup>95</sup> All statistics are attributed from Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin," *World Bank Report*, 10.

<sup>96</sup> Ibid.

<sup>97</sup> Lipovsky, "The Deterioration of the Ecological Situation in Central Asia," 1110.

of the Amu Darya and Syr Darya have been repeatedly found to contain chemical fertilizers, and high concentrations of harmful components from heavy metals, carcinogens, and dangerous bacteria.”<sup>98</sup>

The water consumption and distribution problems in the Aral Sea basin will only become more complicated in the next several decades, even putting aside the environmental problems associated with the degradation of the Aral Sea. The limited supply of water needed to irrigate an unnaturally sustainable amount of agricultural land, and to meet the energy and consumption requirements of growing populations in the region as well as the agreed access to water of neighboring states provided for in international law are all growing concerns for the regions’ leaders.<sup>99</sup> As leaders in each respective state look to expand and grow their economies, there will be continued strain on how to manage and distribute this natural resource that fluctuates from year to year.

#### **D. CURRENT DYNAMICS**

The water issues that Central Asia faces today are largely due to Soviet influence on the region through the movement towards water-draining crops such as cotton and rice. Before the Soviet Union’s collapse, its centralized institutions were able to manage the water distribution system in a manner that took into account the needs of upstream states versus downstream states. “Power grids in the region were integrated under a single network so that upstream states could export electrical power to downstream states during the winter, and import from them during the summer when water was drawn for cotton production.”<sup>100</sup> Priorities were not established by the individual Soviet republics, but rested solely with Moscow and the Ministry of Land Reclamation and Water Resources. With the collapse of the Soviet Union, states had to barter agreements on a new basis of what was best for the good of each individual state, rather than for the Union as a whole. The CARs were thrust at independence into unfamiliar territory where each state was

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<sup>98</sup> Lipovsky, “The Deterioration of the Ecological Situation in Central Asia,” 1009.

<sup>99</sup> United Nations, “The Right to Water (Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights)” 29 November 2002.

<sup>100</sup> “Asia’s Coming Water Wars,” *Power and Interest News Report*, 22 August 2006.

unfamiliar with how to engage in cooperation without a central authority. In such conditions, it was unclear whether the CARs would meet the expectation of reciprocity that underpins cooperation theory.

After the fall of the Soviet Union, there was a sense of optimism over how water would be distributed. Kyrgyzstan and Tajikistan—the weakest politically and economically—inherited most of the dams and reservoirs in the system and control of the headwaters, while the economically stronger states of Kazakhstan, Turkmenistan, and Uzbekistan lay downstream.<sup>101</sup> Each of the states in 1992 adopted the Almaty Agreement, which retained Soviet-period water allocations, and which called on signatories to refrain from entering into projects that infringed on other states and to openly exchange information.<sup>102</sup>

Subsequently, the republics established numerous institutional structures including the Interstate Coordinating Water Commission (ICWC) and the subordinate Amu Darya and Syr Darya Basin Management Authorities (BVOs), which have signed over 300 agreements regarding basin management.<sup>103</sup> The problems with these organizations are their lack of substantial influence over each state's water policies. Mostly, these institutions allow each side to vent their frustrations, but agreements are largely ignored based on the state's short-term interests. These institutions have failed to maintain any lasting reciprocity, causing consistent defection amongst the upstream and downstream states to the detriment of lasting cooperation.<sup>104</sup>

In 1998, a Long Term Framework Agreement explicitly recognized that annual and multi-year irrigation water storage has a cost and that it needs to be compensated (to the upstream states) through a barter exchange of electricity, fossil fuels, or in cash.<sup>105</sup>

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<sup>101</sup> Ben Hogan, "Central Asian States Wrangle Over Water," *Eurasianet*, 5 April 2000.

<sup>102</sup> S. O'Hara, "Managing Central Asia's Water Resources: Prospects for the 21st Century," ICREES Seminar on Environmental Issues in Central Asia, University of Nottingham, 9 December 1998. Cited in Horsman, "Water in Central Asia," 72.

<sup>103</sup> Horsman, "Water in Central Asia," 73.

<sup>104</sup> Axelrod, *The Evolution of Cooperation* (New York: Basic Books, 1984), 118.

<sup>105</sup> "Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin," *World Bank Report* (Washington D.C., World Bank, January 2004), 5.

The problem is that the agreements that are enacted do not contain the status of international law nor are they recognized by the national legislatures.<sup>106</sup> Good intentions have led to hollow arrangements that consistently collapse under domestic needs and pressures. This has resulted in each state venturing into self-sufficiency as applied to water usage and power generation, even at the expense of other state's needs.

These poor institutional results confirm the predictions of cooperation theorists. Cooperation is easier to achieve in the presence of a powerful state, a hegemon, which can enforce the rules, as was the case during the Soviet period. However, as Robert Keohane explains, without a hegemonic presence, "the rules of international regimes cannot be reliably enforced through centralized organizations. If we view international regimes, and their international organizations, as attempts to construct hierarchies, or quasi-governments, they will appear weak to the point of ineffectiveness."<sup>107</sup> In the absence of a hegemon, cooperation must rest on robust expectations of reciprocal behavior, and most crucially, on a calculation that the net benefits of future cooperation outweigh the net benefits of not cooperating today.

In the end, the optimism after the collapse of the Soviet Union of cooperation over water distribution resulted in the formation of regional organizations that possess little clout to influence or regulate. As Central Asia continues to move beyond Soviet era rule (while governed by weak institutions or near dictatorial administrations) the region is attempting to establish a stable form of reciprocity in order to avoid potential conflicts. However, as the remainder of this chapter suggests, there are no indications the region is adapting to its failures that would allow actual sustained cooperation.<sup>108</sup>

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<sup>106</sup> "Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin," *World Bank Report* (Washington D.C., World Bank, January 2004), 5.

<sup>107</sup> Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton, Princeton University Press, 2005), 237.

<sup>108</sup> Axelrod, *The Evolution of Cooperation*), 118.



## E. THE UPSTREAM AND DOWNSTREAM DILEMMA

### 1. The Amu Darya

Tajikistan relies heavily on the Amu Darya headwaters to supply most of its energy needs.<sup>109</sup> Tajikistan has and continues to rely significantly on its hydropower production (nearly 85 percent); however, this still leaves a gap to be filled by outside sources.<sup>110</sup> Further, an energy-swap agreement between Uzbekistan and Tajikistan promises a “mutual supply of energy, which is also irregular because of the capacities of the Tajik dam.”<sup>111</sup> Tajik officials, as a result, have suggested restarting the Rogun Dam project, which was begun under the Soviets in 1976.<sup>112</sup> The Rogun Dam project seeks to provide an additional 3 million hectares for irrigation downstream, while also providing additional hydropower generation.<sup>113</sup> Kyrgyzstan, a fellow upstream state, is the only state to support this project, because Kyrgyzstan, along with Tajikistan, promotes the idea of upstream water commoditization. Uzbekistan, on the other hand, views the project as one of Tajikistan’s “various and ambiguous approaches.”<sup>114</sup> As the Uzbekistan Foreign Minister noted, “Uzbekistan believes that all decisions on the use of watercourses of trans-boundary rivers, including the construction of hydro-energy facilities, must in no way inflict damage to the ecology and infringe upon the interest of the populations of countries on the neighboring territories.”<sup>115</sup> With Tajikistan looking to fill its energy gap,

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<sup>109</sup> Timur Dadabaev, “Water Politics and Management of Trans-Boundary Water Resources in Post-Soviet Central Asia,” in *Prospects for Democracy in Central Asia*, ed. Birgit N Schlyter (Istanbul: Swedish Research Institute in Istanbul, 2005), 177.

<sup>110</sup> Ibid.

<sup>111</sup> Dadabaev, “Water Politics and Management of Trans-Boundary Water Resources in Post-Soviet Central Asia.”

<sup>112</sup> For extensive background on the original Rogun project, see Ibid., 177–178. On recent updates, see Deirdre Tynan, “Tajikistan: Agitating for a Central Asian Water-Management Framework, *Eurasianet*, 11 October 2007.

<sup>113</sup> Ibid.

<sup>114</sup> Uzbek Foreign Minister Vladimir Norov quoted in Tynan, “Tajikistan: Agitating for a Central Asian Water-Management Framework.”

<sup>115</sup> Ibid.

and Uzbekistan wishing to ensure its current water allocation without commoditizing, a middle ground is yet to be determined on either side.

As a midstream state Turkmenistan relies on the downward flow from the Amu Darya, originating from Tajikistan and ending in Uzbekistan. While Uzbekistan is larger in terms of population and territory, both countries are allocated the same amount of 22 cubic kilometers of water per year. Moreover, due to inefficiencies in its water infrastructure, Turkmenistan withdraws as much as 30 cubic kilometers of water per year.<sup>116</sup> In addition to Turkmen water inefficiencies, relations with Uzbekistan have suffered because of Turkmenistan's decision to continue construction of the Kara Kum Canal, doubling the original Soviet capacity and threatening increased Amu Darya water deficits.<sup>117</sup> The Amu Darya presents a compounded problem with three states along the river, each utilizing the river for their own economic advantages and incapable of adjusting to a post Soviet era of river cooperation.

## **2. The Syr Darya**

The Naryn River presents another example of the CARs failing to adhere to Soviet hydro-management practices. Originating in Kyrgyzstan, the Naryn River is a major tributary of the Syr Darya where five hydroelectric power plants (HPPs) are located (Tokotogul, Kurasi, Tashkumyr, Shamaldysai and Uch-Kurgan).<sup>118</sup> The Tokotogul reservoir, the largest of the five, has an active storage of 14 billion cubic meters (BCM) and firm annual yield (i.e., releasable water) of nine BCM on which the two downstream states of Kazakhstan and Uzbekistan rely heavily.<sup>119</sup> Before 1991 and the breakup of the Soviet Union, a strict irrigation regime was in place that limited water

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<sup>116</sup> Dadabaev, "Water Politics and Management of Trans-Boundary Water Resources in Post-Soviet Central Asia," 177–178.

<sup>117</sup> Dadabaev, "Water Politics and Management of Trans-Boundary Water Resources in Post-Soviet Central Asia," 177–178.

<sup>118</sup> World Bank Report, "Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin," *World Bank Report* (Washington DC: World Bank, January 2004), 36.

<sup>119</sup> Ibid.

release to 180 cubic meters per second during non-vegetation periods (October–March), corresponding with the natural flow of the river, while allowing minimum electricity generation.<sup>120</sup>

With the breakup of the Soviet Union, Kyrgyzstan was no longer bound to the irrigation regime, but this also meant that downstream states were no longer beholden to provide supplemental fossil fuel resources. Consequentially, in order to maintain energy levels, Kyrgyzstan operated its Naryn cascade in hydropower mode for a longer period of time during the winter months to offset the shortages in downstream state energy imports, which has led to lower water levels during the summer months and shortfalls for agricultural use for downstream states.<sup>121</sup> Kyrgyzstan is left in a precarious position where in order to provide energy during the winter months it needs both energy supplements from other states and high domestic hydroelectric generation.<sup>122</sup>

Kyrgyzstan is left in a situation where it is forced to either release higher quantities of water in order to generate necessary energy for its people—causing deficiency in water supplies for downstream state agricultural industries—or rely more heavily on downstream states to provide energy supplementation that are not guaranteed. Given its energy shortfalls, Kyrgyzstan is consistently faced with uncertainty regarding downstream states' willingness to sufficiently provide energy supplements.<sup>123</sup> As reports have acknowledged, the more Kyrgyzstan is forced to release during the summer months, the higher opportunity costs it incurs.<sup>124</sup> The World Bank concluded, “Prices charged for fossil fuels by Uzbekistan and Kazakhstan are somewhat arbitrary and high and are explicable only on the basis that the price paid for electricity in the Kyrgyz Republic includes a significant element for water storage services. The downstream countries,

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<sup>120</sup> World Bank Report, “Water Energy Nexus in Central Asia: Improving Regional Cooperation in the Syr Darya Basin,” *World Bank Report* (Washington DC: World Bank, January 2004), 36.

<sup>121</sup> Ibid.

<sup>122</sup> Nikola Krastev, “UN Water Report Takes a Hard Look At Central Asia,” Eurasianet, 12 March 2006.

<sup>123</sup> World Bank Report, 11.

<sup>124</sup> Ibid., 36–37.

however, believe that they are being forced to buy during summer, unneeded power from the upstream country at a cost substantially higher than the cost of their own generation.”<sup>125</sup>

While the downstream states may take issue with the necessity of purchasing higher cost electricity, the fears stemming from the upstream states are valid if they release the necessary amount of water during the summer, creating an energy gap in the winter months. Further, costs for maintaining hydroelectric facilities rests solely on the upstream states, while the downstream states consume roughly 80 percent of the water.<sup>126</sup> The downstream states, however, feel little need to provide facility compensation since it was the upstream states that converted the Toktogul reservoir’s main purpose from irrigation to hydroelectric generation.<sup>127</sup>

The problem in Central Asia hangs on uncertainty over reciprocity. Will the downstream states deliver on their promise of compensation through energy or fiscal compensation? According to the World Bank “Once the Kyrgyz Republic releases the agreed volume of water in summer and exports electricity, it has to wait till the ensuing winter for the compensatory supply of fossil fuels with uncertainties relating to the quantity, quality and price. The Kyrgyz Republic believes that it faces a major risk in this regard.”<sup>128</sup> In Kyrgyzstan, this has forced the movement towards making water a “commodity” and has only exacerbated regional tensions. Through international regimes, the CARs are called upon to facilitate non-simultaneous exchange (i.e. the upstream states hold sufficient water in its reservoirs during the winter and the downstream states will provide energy supplements), in order for balanced reciprocity.<sup>129</sup> In striving for this balance, the regimes or agreements have broken down (as recently as 2008) because of excessive drought in Central Asia, high-energy costs and the weakness of upstream economies. The spokeswoman for Kyrgyzstan’s national power company stated,

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<sup>125</sup> World Bank Report, 18.

<sup>126</sup> Abdurasulov, “Kyrgyzstan Rations Electricity.”

<sup>127</sup> Ibid.

<sup>128</sup> World Bank Report, 11.

<sup>129</sup> Keohane, *After Hegemony*, 129.

“Kyrgyzstan has to purchase energy at world prices from neighboring countries, and as a result, we had to transform the water regime to maintain our own energy security.”<sup>130</sup>

## **F. POLITICAL DYNAMICS**

Looking at current Central Asian dynamics, each state is still trying to establish its own identity outside of the sphere of Soviet control. With relatively new responsibilities of providing basic infrastructural needs for their respective citizens, governments now have to be concerned with generating and maintaining sufficient economic development for the population, particularly as the new regimes are either authoritarian and/or unstable internally (as evidenced by Kyrgyzstan and the Tulip Revolution, The Tajikistan Civil War, etc.)<sup>131</sup> Therefore, as long as a competing neighboring state is seen to exploit or manipulate basic environmental resources necessary to economic growth and development, the policy climate will continue to promote only selfish interests, likely resulting in unstable water supplies and cooperation failure.<sup>132</sup>

Central Asian leaders have and continue to deal with “staggering economies, collapsing social welfare systems, high levels of corruption, disgruntled populations, an increase in Islamic ‘fundamentalism,’ and growing political opposition.”<sup>133</sup> These are issues that threaten the stability of the CARs, however, they are largely internal state issues that are not dependent on neighboring states. Unlike India and Pakistan where the interdependence is based on security (the state’s survival is dependent on the other) the CARs interdependence is economically based, leaving room for bartering, negotiations, and in the end, a trend of cooperation failure. In India and Pakistan, such cooperation failure over a strategic resource would likely threaten state survival; in the CARs there is more room for argument and disagreement over water without the looming threat of harsh international retribution.

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<sup>130</sup> Abdurasulov, “Kyrgyzstan Rations Electricity.”

<sup>131</sup> Dadabaev, “Water Politics and Management of Trans-Boundary Water Resources in Post-Soviet Central Asia,” 177.

<sup>132</sup> Ibid.

<sup>133</sup> Weinthal, “The Promises and Pitfalls of Environmental Peacemaking in the Aral Sea Basin,” 95.

Kyrgyzstan and Tajikistan, while weaker economically and smaller in population than their neighbors, control the water flow of the two main rivers. These two countries, however, can only provide for their own resources through increased hydroelectric generation and supplemental energy from downstream states rich in natural resources such as oil, and natural gas. “In recent years, Uzbekistan and Kyrgyzstan have feuded over water, borders, and the conduct of a counter-insurgency campaign against Islamic radicals. Uzbekistan, which is Central Asia’s largest country in terms of population, has not hesitated to exert pressure on its much smaller and poorer neighbor, Kyrgyzstan.”<sup>134</sup> Indeed, water can and has been used as leveraging device by both sides of the stream.

Consistent with a pattern of retaliation, Uzbekistan halted all deliveries of gas to Kyrgyzstan, RFE/RL reported on October 18. Uzbekistan formally accused Kyrgyzstan of failing to honor an agreement signed in December 2000, under which Kyrgyzstan would provide Uzbekistan with 2.2 billion kilowatt-hours of hydroelectricity in return for oil and gasoline. Kyrgyz Prime Minister Kurmanbek Bakiev has acknowledged this failure. Uzbek officials also said Kyrgyzstan had failed to meet a \$1.75 million debt obligation. Some observers say the Uzbek gas cut-off was aimed to pressure Bishkek into reversing its water decision. Kyrgyzstan last winter endured a similar gas cut-off, which provoked a severe energy crisis.<sup>135</sup>

Already the CARs have displayed little diligence in abiding by resource agreements bilaterally or regionally. Leaders of the downstream states of Uzbekistan, Kazakhstan, and Turkmenistan have flatly objected to Kyrgyzstan’s plan to sell water as a commodity because international law strictly states that water must be made available for drinking and sanitation purposes.<sup>136</sup> While downstream states have specific rights under international law to water for drinking and sanitation, there is certain validity in the upstream state’s assessment that they should be entitled to compensation for management

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<sup>134</sup> Alisher Khamidov, “Water Continues to be Source of Tension in Central Asia,” Eurasianet, 23 October 2001.

<sup>135</sup> Rustam Mukhamedov, Geopolitical Approaches: Gas Policy of Uzbekistan,” Central Asia-Caucas Institute, 24 April 2002.

<sup>136</sup> Gregory E. Heltzer, “Stalemate in the Aral Sea Basin: Will Kyrgyzstan’s New Water Law Bring the Downstream Nations Back to the Multilateral Bargaining Table?” *Georgetown International Environmental Law Review* 15, no. 2 (Winter 2003): 306. Also see United Nations, “The Right to Water (Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights)” 29 November 2002.

and distribution of Central Asia's vital water resources.<sup>137</sup> The downstream states continually reiterate that they will not pay for water; however, these states refuse to accept the argument that such payments would not pay for water, but would be paying for infrastructure upkeep and compensating Kyrgyzstan and Tajikistan for lost hydropower use.<sup>138</sup> The CARs are slow to realize that any possibility towards regional cooperation rests upon a flexible (ability to adjust to seasonal and environmental variables) water and energy distribution system. If the trend towards short-term, loosely observed agreements continues to be the norm, the water issue will only continue to infect existing relations with tension.

Without the central Soviet authority to mandate and oversee cooperation within Central Asia, the newly minted independent states have entered into unrealistic and routinely violated agreements. At root is the lack of agreement on the value of future cooperation versus present-day non-cooperation. Robert Axelrod would argue defection among players and the ability to develop sustainable cooperation can be improved by keeping the value of future cooperation greater than the benefits of defection in the present.<sup>139</sup> As seen in the examples presented, the upstream states choose cooperation failure because the consequence for not providing sufficient energy to its population during the winter still outweighs any potential reaction from the downstream CARs. What this also points to is the water cooperation process does not hold up to changing state conditions and needs. The next section will present some ideas for reducing cooperation failure.

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<sup>137</sup> Gregory E. Heltzer, "Stalemate in the Aral Sea Basin: Will Kyrgyzstan's New Water Law Bring the Downstream Nations Back to the Multilateral Bargaining Table?" *Georgetown International Environmental Law Review* 15, no. 2 (Winter 2003): 306. Also see United Nations, "The Right to Water (Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights)" 29 November 2002.

<sup>138</sup> *Ibid.*, 307.

<sup>139</sup> Axelrod, *The Evolution of Cooperation*, 126.

## **G. CONCLUSION: POTENTIAL FOR SUCCESSFUL COOPERATION AND CONCLUSION**

While this case study is an example of cooperation failure, it also shows the region is attempting to cooperate; however, this trend of defection cannot continue in the long run without regional instability occurring. “Former World Bank Vice President for Europe and Central Asia Johannes Linn urged Central Asian countries to settle political and economic disputes, including that concerning water use. The region’s long-term stability would depend greatly on the ability of Central Asian states to cooperate.”<sup>140</sup> Because the individual CARs have defected from long-cooperation in order to sustain domestic requirements, global actors such as the World Bank and United Nations need to take a more active role in negotiating cooperation and arbitrating disputes when needed -- similar to the IWT in South Asia. The following is a four-point approach to assessing, managing, and arbitrating water issues from Johannes Linn, a former World Bank vice president for Europe and Central Asia.

1. An expert assessment of the Central Asian water and energy shortage and its impacts is needed. The international agencies that have the capacity to carry out such an assessment (the Asian Development Bank, the UN Food and Agriculture Organization, the UN Economic Commission for Europe and/or the World Bank) should organize such an assessment on a priority basis in cooperation with the governments in the region and with regional water agencies.
2. Depending on the outcomes of such an assessment, regional governments and international agencies need to plan emergency responses, similar to those delivered during the drought of 2000-01, but possibly at higher and more sustained levels.
3. The UN, the international financial institutions and bilateral international partners engaged in Central Asia (including the European Union, China, Russia and the United States) should use available diplomatic mechanisms

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<sup>140</sup> Khamidov, “Water Continues to be Source of Tension in Central Asia,” 23 October 2001.



to ensure that possible inter-state tensions over the management of scarce water and energy resources in the region are managed effectively without spilling over into open conflict.

4. The long-term prospects of water and energy balances in the region need to be assessed in the light of changing climatic conditions, both in terms of the apparent widening swings of weather cycles, but also in terms of the likely impact of long-term of global warming on the water and energy resources of Central Asia.<sup>141</sup>

Water, an issue so important to numerous facets of each state's economy and overall stability, must not be left to loosely observed and nonbinding agreements. Tajikistan has even gone as far as to appeal to the United Nations General Assembly to focus on the "Central Asia water dilemma."<sup>142</sup> In a region that is still developing, and where the government's survival rely more on its relations with its people versus its regional neighbors, domestic needs will continue to trump international cooperation. As Linn notes in his plan, the need for global actors to take an active role is likely needed in order for sustained cooperation. Additionally, this also provides an opportunity for Russia to actively insert itself through diplomacy and infrastructural investments, seeing that they still consider the CARs under their sphere of influence.<sup>143</sup>

The chapter presents a contrasting case study to South Asia, as in Central Asia water is not viewed as a regional security issue, but in terms of fulfilling short-term domestic needs. Without the looming threat of conflict or significant retribution from regional neighbors, cooperation is consistently undervalued and abandoned once domestic pressures increase. The problem with this pattern is that resources will likely continue to deteriorate and the CARs will continue to be dependent on each other to

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<sup>141</sup> Johannes Linn, "The Impending Water Crisis in Central Asia: An Immediate Threat," The Brookings Institute.

<sup>142</sup> Tynan, "Tajikistan: Agitating For a Central Asian Water-Management Framework, *Eurasianet*, 11 October 2007.

<sup>143</sup> Maria Golovnina, "Central Asian Leaders to Gather for Water Summit," Reuters Newswire, 28 April 2009.

provide water and energy. Without sustained and flexible cooperation, the region at the very least will see greater stresses on government to provide for their populations, leading to domestic and potential regional instability.

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## IV. CONCLUSION

*The consequences for humanity are grave. Water scarcity threatens economic and social gains and is a potent fuel for wars and conflict.*<sup>144</sup>

—Ban Ki-moon, United Nations Secretary General

### A. INTRODUCTION

The two case studies of South and Central Asia present contrasting examples of how regions manage water-sharing arrangements. Both cases demonstrate existing and potential weaknesses in the arrangements. Additionally, in contrast to what one would expect from South Asia, which is historically disposed to conflict, water sharing has remained a cooperative component of the relationship even during times of hostilities. While Central Asia has not been successful in forging consistent reciprocity over water after Soviet influence, the region continues to work towards cooperation. This trend of cooperation, however, will continue to be tested as independent states struggle with the dilemma of maintaining regional stability versus providing economic growth and comfort for its own population.

This chapter will summarize the key lessons derived from the two regional examples of South and Central Asia. The next section will summarize how the historical trends of cooperation and reciprocity will become increasingly tested by environmental and economic factors, leading to a situation known as “The Tragedy of the Commons.” Lastly, the chapter will describe future implications for the United States in addressing these impending water crises, not just in the two regions described in this thesis, but as disputes over water become a growing global issue.

### B. CASE STUDY SUMMARY

The South Asian (India-Pakistan) case study provides a positive example of how water sharing agreements, and disputes that arise, can be resolved through arbitration.

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<sup>144</sup> Tara Lohan, “Blue Gold: Have the Next Resource Wars Begun?” *The Nation*, 31 March 2009.

Since partition in 1947, the two states have been at odds with each other, mostly regarding the territorial dispute over Kashmir. Even to this day, as Pakistan suffers continuous attacks from extremist elements originating from its Western Frontiers, the military and government sees India as its primary adversary—no differently than it has for the last six decades. Therefore, in the grand scheme of the Indo-Pakistani relationship, it was realized early on that the benefits of establishing water distribution agreements were critical in avoiding conflict. Additionally, because of the foresight by then Prime Minister Jawaharlal Nehru and President Ayub Khan, the IWT was created to address questions of proper water allocation, and if disagreements persisted, the World Bank would appoint a neutral arbitrator. The progress and foresight, however, was created during a time when water amounts and distribution were fairly consistent and could consistently provide for each states needs.

At present, there are no signs that the IWT is losing legitimacy in India or Pakistan. In November 2009, after Pakistan received what it felt as a discouraging response from India over the new Indian Kishanganga Hydropower Project, the Pakistanis moved to petition for a neutral arbitrator from the World Bank.<sup>145</sup> Pakistan's request is a sign of the legitimacy of the institution of the IWT, as is India's and Pakistan's limitation of hostilities over water to strong rhetoric.<sup>146</sup> The key concern now rests on the ability of the IWT to evolve and maintain its relevance as strains on resources are predicted to increase. As Stephan Faris notes,

The treaty's success depends on the maintenance of a status quo that will be disrupted as the world warms. Traditionally, Kashmir's waters have been naturally regulated by the glaciers in the Himalayas. Precipitation freezes during the coldest months and then melts during the agricultural season. But if global warming continues at its current rate, the Intergovernmental Panel on Climate Change estimates, the glaciers could be mostly gone from the mountains by 2035. Water that once flowed for the planting will flush away in winter floods.<sup>147</sup>

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<sup>145</sup> The News, "Pakistan to Move World Bank on Water Issue," 8 November 2009.

<sup>146</sup> BBC News Online, "Zardari warning over Kashmir dam," 13 October 2008.

<sup>147</sup> Stephan Faris, "The Last Straw," *Foreign Policy*, 22 June 2009.

Besides the potential humanitarian and environmental disasters that will likely ensue, the reciprocity and institutions maintained through the IWT will be severely tested if they do not evolve with the changing water dynamics. Realistically, treaties, cooperation, and arbitration can only do so much if populations do not receive an adequate water supply, which potentially reduces the value of future cooperation. Pakistan, according to Faris, is left with three options if this environmental disaster occurs: “It can let its people starve. It can cooperate with India in building dams and reservoirs, handing over control of its waters to the country it regards as the enemy. Or it can ramp up support for the insurgency, gambling that violence can bleed India's resolve without degenerating into full-fledged war.”<sup>148</sup> The first option, he argues, is not plausible for state survival, and the third option is unrealistic as both countries are nuclear-armed powers. Faris regards the second option as unlikely because it entails an already paranoid Pakistan ceding further control over water distribution.<sup>149</sup> Assuming this environmental trend does not reverse, India and Pakistan must continue to work from the basis of their existing institutions and reciprocity to anticipate the change in status quo. India and Pakistan back in 1960 wisely limit their tendency towards conflict over water because of its strategic significance and implications towards regional stability. Additionally, since nuclear weapons were introduced to the region in 1998, an issue (such as water) that is so fundamental to survival for both states is too costly for either side to allow cooperation failure. India and Pakistan's negative history has brought about security interdependence which has pushed them to cooperate, however, the two states, with international oversight, must now anticipate the inevitable change in the status quo and adapt accordingly or risk facing unpalatable consequences.

In Central Asia, the challenges its countries face are not so much centered on the risk of violent escalation, but rather on establishing and maintaining consistent reciprocal cooperation and eradicating persistent failure. The roles here are reversed when compared to South Asia, in the sense that the upstream states of Kyrgyzstan and Tajikistan are economically and militarily less powerful than the downstream states of Uzbekistan and

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<sup>148</sup> Faris, “The Last Straw.”

<sup>149</sup> Ibid.

Kazakhstan. While the downstream CARs rely on the waters from the Amu and Syr Darya for most of their agricultural needs, the upstream CARs are heavily dependent on energy supplementation from the downstream CARs. During years when the upstream CARs required greater energy generation aside from energy supplementation, the upstream CARs were forced to sacrifice water distribution agreements in order to fulfill their short-term energy needs. In response, downstream CARs would punish the upstream states by cutting off the agreed to energy supplements.

Only in the last two decades has the region existed without Soviet oversight over water distribution. As independent states, they have been left with Soviet era expectations of reciprocal cooperation without a hegemonic enforcer. With independence, each CAR is responsible for its own economic development and the defense of national self-interests; however, weak institutions and short-term horizons continue to saddle water issues, leading to consistent cooperation failures.<sup>150</sup> The CARs as newly independent states are struggling to balance the delivery of greater wealth and power to their populations and their attempts towards regional cooperation and reciprocity.<sup>151</sup> Because the CARs continue to view water as an economic issue and are more concerned with fulfilling short-term domestic needs over potential conflict with neighboring states, future cooperation value remains low.

Unlike in South Asia, the specter of armed conflict has not played into the equation of water distribution agreements, which at a certain level has been a disadvantage for the region. The CARs appear to have concluded thus far that international agreements are breakable under appropriate circumstances. While it is unfair to claim that Central Asia is the only region that fails to uphold international agreements, it has had an annual track record of seeing agreements form and eventually dissolve. As in South Asia and noted in Chapter III, a neutral third-party arbitrator and the international community likely needs to become a central component in the process of establishing and maintaining a regional water sharing agreement in order for more

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<sup>150</sup> Weinthal, "The Promises and Pitfalls of Environmental Peacemaking in the Aral Sea Basin," 90.

<sup>151</sup> Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 2005), 22.

successful cooperation to arise; otherwise, as resources continue to be stressed and populations continue to grow in the coming decades, the pattern of failure will not be tenable and could potentially lead to less tolerable water shortages for the region. If the region reaches the point where water is no longer viewed under the guise of economic interdependence, but rather state survival, such cooperation failure will likely place regional stability at risk.

### **C. THE GLOBAL DILEMMA**

On numerous occasions in this thesis, several issues have consistently stood out for their likely negative potential effects on state-to-state cooperation of water sharing: expanding populations, increased energy production needs, agricultural sustainability, and environmental degradation of water supplies. However, even under current conditions in South and Central Asia, the overall trend in the two regions is a tendency toward cooperation over conflict. In the case of Central Asia, however, cooperation has been unsuccessful and will likely require outside assistance in order establish and maintain sustainable cooperation. This trend of choosing cooperation over conflict can be seen in other regions of the world as well, including the Middle East.<sup>152</sup> As the developing problems associated with water sharing become increasingly damaging to state economies and populations, however, governments may well be placed in the precarious situation of acting to provide for their people—or risk catastrophic economic and humanitarian damages. For the trend towards cooperation versus conflict over water to continue, therefore, the international community will likely have to take a larger role in terms of arbitration, assistance, and conflict resolution. As Dan Smith and Janai Vivekananda write,

In most of the countries that face the double-headed problem of climate change and violent conflict, the governments cannot be expected to take on the task of adaptation alone. Some of them lack the will, more lack the capacity, and some lack both. What is required is international cooperation

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<sup>152</sup> K. David Hambright, F. Jamil Ragep, and Joseph Ginat, *Water in the Middle East: Cooperation and Technological Solutions in the Jordan Valley* (Norman, OK: University of Oklahoma Press, 2006), 1–55.



to support local action, both as a way of strengthening international security and to achieve the goals of sustainable development.<sup>153</sup>

Many of these states and regions around the world are slowly coming to grips with the realization that complications over water will continue to grow as resources become increasingly finite. This thesis only dealt with complications as they relate to state-to-state relations. Another entire study could be devoted to the instability water scarcity may cause exclusively within states. As noted in the Chapter Two, in Pakistan, there are constant provincial water disputes between the Southern Provinces (Sindh and Balochistan) and the Punjab. Even within the United States, there are reoccurring tussles over fair water distributions between individual states, so it is no less important for national stability issues.<sup>154</sup>

All evidence examined in this thesis has pointed to a consistent pattern of attempted cooperation and reciprocity pertaining to water sharing. However, if the predictions and trends indicating increase scarcity and higher demand of water are correct, this trend of international cooperation will be tested and tried in a way that has not be planned for or anticipated. In 1968, an article from *Science* magazine was written on the looming threat of global overpopulation, known as “the Tragedy of the Commons.” In the body of the article, one of the components of overpopulation is the anticipated adverse effect on natural resources. The bottom-line states, “[a] finite world can support only a finite population. The laws of our society follow the pattern of ancient ethics, and therefore are poorly suited to governing a complex, crowded, changeable world.”<sup>155</sup> This is no less relevant forty years later. Understandably, regions including South and Central Asia are striving to continue in the direction of economic growth and provide greater comfort and success for larger proportions of their populations.<sup>156</sup> Such individual state necessity to continually grow and advance, as pertaining to water usage,

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<sup>153</sup> Dan Smith and Janani Vivekananda, “A Climate of Conflict of Conflict: The Links Between Climate Change, Peace and War,” *International Alert*, November 2007).

<sup>154</sup> Elisabeth Kaufmann, “The (Water) War Between the States,” *Time*, 7 March 2008.

<sup>155</sup> Garrett Hardin, “The Tragedy of the Commons,” *Science*, New Series, 162, no. 3859 (13 December 1968), 1243–1248.

<sup>156</sup> *Ibid.*

will likely come into conflict with international efforts to manage water resources. In South Asia, there are already inklings of this on the horizon with legitimate Indian expansion of hydroelectric facilities in Kashmir engendering justified Pakistani concerns over the expansion's effects on water distribution. At present, the international arbitration provided to the region is still highly legitimate in both states. The problem that looms is the moment when nature decides to trump human plans for water distribution, economic growth, and, humanitarian sustenance. Governments faced with an impending humanitarian crisis due to water shortages will have to take action and that action will depend on the strength of existing regional institutions for cooperation and the international community's capacity to respond.

#### **D. PREVENTIVE MEASURES FOR THE UNITED STATES**

The United States, in conjunction with the international community, will likely play either a direct or indirect role in maintaining cooperation between states, and if needed, provide humanitarian assistance or conflict resolution over water distribution. The following lays out suggestions for U.S. policymakers on assistance roles the United States can play before a cooperation breakdown between states leads to a humanitarian crisis or armed conflict.

##### **1. Preventive Measures**

###### ***a. Project Assistance from the U.S. Government to States and International Organizations***

The United States already has an international assistance entity through USAID at embassies and consulates. USAID (potentially with the Army Corps of Engineers) and the diplomatic corps are well situated to provide recommendations to states on preventive measures to increase water use efficiency and distribution. While no individual state (including the United States) has the financial capacity for multiple regional infrastructural overhauls, in conjunction with the United Nations, The International Monetary Fund, and the World Bank, projects outside a single state's

assistance capacity could be spearheaded by these organizations through monetary funding and engineering expertise. The United States should take an active role in providing assistance and expertise.

***b. Provide Assistance in Regional Negotiations and Arbitration***

Assuming little can be done to prevent impending strains on water resources in the short-term, the international community (with the United States) will likely play a more active role in arbitrating regional cooperation as resources fluctuate on a yearly basis. Before, treaties were established under the assumption that water levels would remain relatively consistent. This consistency, however, will likely not be the case, and negotiations need to occur on a routine basis to allow flexibility in cooperation. Similar to how the World Bank arbitrates when disputes arise between India and Pakistan, the international community must assume that disputes will occur routinely and must be prepared to intervene before cooperation breaks down.

***c. Identify the Indicators of Potential Water Crises***

While history has shown states tend not to fight over water, the world is likely to see strains on water resources not seen before. While conflict is still unlikely, the international community must be cognizant of potential indicators and warning of humanitarian crises and potential violent conflict due to water distribution shortages.

One potential indicator would be persistent domestic violent uprisings against the state that can be traced to water shortages. If a state government feels it is under siege from its own people, it may deflect some of the hostility by placing blame on another state for the water crisis. In the case of India and Pakistan, this would be fairly easy to accomplish because of their hostile history. Additionally if a state government officially makes inflammatory rhetoric to include making ultimatums against another state, the international community will need to intervene before hostilities escalate outside of harsh rhetoric.

## **E. CONCLUSION**

The intent of this thesis has been to investigate the potential for conflict between states over shared water resources and which conditions might allow for successful cooperation over water. The case studies illustrate that when comparing South Asia and Central Asia, successful cooperation is dependent on the structural nature of state-to-state relations. With India and Pakistan, their interdependence is one based on security. With each side having such potent military capabilities, choosing sustained cooperation is still the more practical choice. To allow cooperation failure over a strategically vital issue puts the survival of both states at risk. Conversely, in Central Asia, water is still viewed through economics and fulfillment of short-term domestic needs. While cooperation has been attempted, state survival is not dependent on sustained cooperation, rather the government's relations with its population. As resources become scarcer, whether due to environmental factors and/or population growth, states will have to consistently weight the risk of inflaming regional hostilities against providing for the growth and needs of its population. If nothing can be done to prevent the environmental consequences on water supplies, it will then be up to the international community and the United States to accept and prepare for their responsibility towards ensuring each state abiding by its promises. Where states could once be trusted to abide by its agreements, in a future world of scarce water, third parties will likely have to assume active roles in fostering cooperation indefinitely.

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