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Design and Impact of Water Treaties

Managing Climate Change

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Matthew Zentner

Design and Impact of Water Treaties

Managing Climate Change

Doctoral Thesis accepted by
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Supervisor's Foreword

International cooperation around water has a long and successful history; some of the world's most vociferous enemies have negotiated water agreements. The institutions they have created are generally resilient, even when relations are strained. Despite the importance of treaties, there has not been a concerted effort to empirically and substantially explore the relationship between the design of treaties and their impact on relations. In this study, a literature review extracts core concepts commonly used to explain the success of treaties in managing hydrologic stress. These are summarized as seven treaty mechanisms categories (specificity, uncertainty management, enforcement, communications, flexibility, integrativeness, and scale) and are hypothesized as important for shaping the institutional resiliency of a treaty.

Water and conflict are undergoing slow but steady changes. Increased variability of rainfall and flow from climate change has the potential to stress existing transboundary water sharing agreements and make meeting the needs of all riparians difficult. The general mechanisms provided in this analysis are used to evaluate specific treaties and their capability to manage projected changes in climate in five case study basins: the Nile, Jordan, Tigris/Euphrates, Indus, and Helmand. The case studies illustrate the difficulties in pinpointing the importance and impact of each mechanism, and the overall treaty design, on water relations. Treaty mechanisms certainly play an important role in de-escalating tensions when stresses occurred within each basin. However, this research illustrates that conflict de-escalation is not a direct cause and effect relationship between the capabilities of the water institutions and the amount of stress to the system. Instead, there is a complex relationship between change to the system and management efforts that involves a series of feedback loops and influence from non-water related sectors.

This study presents a unique way to utilize the existing literature to explain the success of treaties in managing hydrologic stress. Analysis of the seven mechanisms and the five case studies provides several summary explanatory concepts that include: treaty design and mechanisms exert an influence not just on the management capability (institutional resilience) aspect of relations, but also help to shape the political context of the problem; complaints are not necessarily an

indicator of decreased institutional resiliency, weak, or ill-designed treaties, but in some cases illustrate that a treaty is functioning properly; and ambient poor relations are important for shaping many complaints. What is better understood through this research is how treaty design has a relevant and important role in shaping basin management so that nations may better achieve their goals in a changing climate.

Having Matt in our program has been a real pleasure, and it was a joy to be his advisor. Few scholars bring such a rich combination of technical expertise, interest in human dimensions, and experience in real world applications. The reader will note this nexus of capabilities in the work presented here, and I trust that we will continue to see this kind of creativity coming from Matt in the years to come.

Aaron T. Wolf

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Chapter 1
Introduction

Projecting the changes to water supplies, and our ability to manage those changes, is a worthwhile endeavor given recent data on climate change. The exacerbation of seasonal rainfall variability in a changing climate, as outlined by the Intergovernmental Panel on Climate Change (IPCC), will likely have considerable effects on freshwater systems and aggravate other existing stresses to water supplies. Based on projected increases in water variability, current management practices may not be robust enough to cope with the impacts of climate change on water supply, flood risk, ecosystems, health, energy supply, and agriculture (Bates et al. 2008). Transboundary rivers, where water resource management is already a delicate and complicated balance of myriad needs and decision processes, will be especially challenged.

Increased variability of rainfall and flow from climate change has the potential to stress existing transboundary water sharing agreements and make meeting the needs of all riparians difficult.[1] For some shared international rivers, a shift may occur from all needs being met and no history of disagreement to unfulfilled treaty requirements and, perhaps, an elevated potential for conflict (Zeitoun and Allan 2008; Cooley 2009). Basins with extreme changes in climate will certainly have the resiliency of any relevant treaty tested.[2] Some authors have predicted that treaties will fail, with potentially extreme political-economic consequences (Amery 2002; Gleick 2010; Homer-Dixon and Blitt 1998).[3]

> Climate changes will inevitably affect water resources around the world, altering water availability, quality, and the management of infrastructure. New disputes are already arising in transboundary watersheds and are likely to become more common. The existing agreements and international principles for sharing water will not adequately handle the strain of future pressures, particularly those caused by climate change (Gleick 2010).

[1] Water sharing agreements are defined synonymously with institutions as binding arrangements, typically called treaties or conventions.

[2] Resiliency is defined as the ability to mitigate conflict or adapt to stress (in particular, hydrologic) or changing circumstances.

[3] Failure in this study is defined as the measurable exhibition of conflict, especially when directly attributed to climate-related stress within a system.

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Will treaties indeed fail and conflict ensue due to growing stresses, including those from climate change? Perhaps. Unless institutions and agreements have mechanisms robust enough to respond to changing local and global situations (including hydrologic), the stresses associated with climate change may outpace the capacity of the agreement to manage the changes (Giordano et al. 2005).

Most transboundary treaties are uniform in their ostensible goal to enable countries to manage shared waters without conflict. However, international water law does not provide explicit rules and procedures, but rather suggests guiding principles based on legal precedence. Consequently, nations are often left on their own in determining how to best design and implement an agreement.

While recognizing that water treaties are non-uniform and each institution is unique, some treaty designs may be better able to manage external stresses to the agreement, such as allocation of unforeseen inter-annual variability in river flows. However, empirically derived analyses that quantify the impact of specific mechanisms on mitigating conflict are lacking in general. An analysis of a large number of basins ($n > 5$) that generalizes the extent to which many common and dissimilar institutional characteristics may influence the success or failure of a treaty has not been undertaken. Consequently, the general principles and conditions under which international river treaties are most effective are not well understood.

Using a comprehensive, quantitative approach with multiple basins ($n = 52$) and treaties ($n = 146$), this research suggests mechanisms and general treaty components which best explain why some water treaties have been more resilient to past hydrologic stress. The mechanisms are empirically tested with historical observations of hydrologic stress and response, made across multiple basins/treaties over time. The results show which types of mechanisms are most important for managing seasonal and interannual variability of flows. With an understanding of treaty mechanisms and their response to past water stresses, models of future hydrologic scenarios associated with climate change are used in several case studies to estimate the treaty's capability to manage the scenarios. The results are used to develop a model for considering strategies in transboundary water law formation, which can mitigate the negative impacts of variability on riparian relations.

The literature is first examined to determine a general set of principles that are most commonly cited as critical to effective water treaties. The literature review in Chap. 2 discusses how water scarcity and fluctuations in availability impacts national stability and security, which in turn determines the priority that nations place on the management of water. The projected impacts of climate change are discussed, as well as its potential to cause multiple, often indirect changes to water supplies that will affect internal stability as well as the relations between nations. The literature review identifies many of the principles most often cited as important for mitigating hydrologic stress related conflict.

In Chap. 3, seven treaty mechanisms are used to categorize and quantify the extent that treaties contain the literature principles. These mechanism categories are: *specificity*, *uncertainty management*, *enforcement*, *communications flexibility*, *integrativeness*, and *scale*. Hydrologic fluctuations (drought/flooding) and differences in power (political, economic, internal stability) are also considered

important for shaping the interactions between riparians. Three hypotheses are presented: (1) increased hydrologic stress increases the likelihood of complaints or state grievances involving a shared water resource; (2) water sharing agreements that have mechanisms in place will have less conflict and fewer grievances; and (3) all mechanisms have added benefit, but some mechanisms are more important to providing increased institutional capacity.

In Chap. 4, a methodology for observing and quantifying each of the seven treaty mechanisms is discussed. Treaty, drought, power, and conflict data is then used to estimate treaty strength, or institutional resiliency in four basic steps:

1. Treaties are assessed for a total of 38 treaty measurements from Oregon State University and International Water Management Institute (IWMI) databases that are used to quantify the mechanisms that play a role in managing hydrologic stress. From this, a preliminary strength based on the number of mechanisms is estimated for each treaty (called the Literature Review strength).
2. The amount of hydrologic stress that treaties have managed in the past is quantified using the Palmer Drought Severity Index (PDSI) for the period 1950–2005.[4]
3. The presence and severity of conflict/complaints is used to measure the success of the treaty in managing hydrologic stress applied to the system. This study utilizes the Transboundary Freshwater Dispute Database (TFDD) Basins at Risk (BAR) dataset, which estimates intensity of conflict, as an indicator of the overall health of the system. A total of 388 complaints are segregated, based on their description, into climate related (85 total complaints) or non-climate related (303 total complaints).
4. The relative importance of each treaty mechanisms towards responding to hydrologic stress is quantified using a multiple linear regression (MLR) analysis.[5] From the coefficients for each mechanism, another treaty strength is calculated (called the MLR strength).

Results of the above analysis are presented in Chap. 5. Surprisingly, drought does not occur any more frequently in basins that have reported climate related conflict than it does in other basins. However, for treaties that do have climate related conflict, complaints are shown to be much more likely during periods of greater drought and hydrologic stress, indicating that for a certain subset of treaties, climate fluctuations are a driver of conflict. It was also unexpected that the stronger treaties (based on the Literature Review strength that emphasizes the number of treaty components) have a higher instance of both climate and general

[4] The PDSI was selected from three different modeling approaches (PDSI, remotely sensed surface wetness, and water balance) with the aim of simulating past hydrological time series. Each was analyzed for their suitability for this study, with the PDSI selected as the most appropriate.

[5] Several combinations of independent and dependent variables are used to extract regression coefficients. Generally, the dependent variable incorporates the conflictive events within the BAR, while the independent variables are formed from the seven treaty mechanisms, power differences between the signatories, and hydrologic stresses to the system.

conflict. A comparison of the quantity of mechanisms per treaty for treaties with climate complaints, any type of complaint, and no complaints indicates that treaties with more mechanisms had an increased likelihood of having complaints. The coefficients obtained from regression analysis indicate that an increase in *flexibility*, *scale*, and *enforcement* within a treaty result in less conflict. The MLR analysis also indicates that *communications*, *specificity*, and *integrativeness* are indicators of decreased likelihood of a complaint being filed.

In Chap. 6, case studies for the Nile, Indus, Tigris/Euphrates, Jordan, and Helmand Rivers show how the study's findings regarding general treaty mechanisms can be used to help explain and shape riparian relations within specific basins. The treaty mechanism results are combined with future climate projections to estimate whether specific treaties are likely resilient enough to manage hydrologic stresses from climate change. The case study results provide some confirmation of strengths/weakness as estimated by the MLR. The MLR results indicating that an increase in *scale*, *flexibility*, and *enforcement* within a treaty result in fewer or better managed complaints were confirmed in all case studies. MLR results for *communications* and *integrativeness* that indicate these mechanisms result in more conflict were not reflected in the cases studies.

The conclusion from the mechanism and case study analysis is that political, economic, and social influences and factors that are often only indirectly related to water are a key factor in determining the effectiveness of a treaty and the quantity and severity of water complaints. Complaints have typically occurred where water is important for national stability and where nations have placed extra emphasis on the treaty creation process resulting in treaties that are on average more robust (have more mechanisms) than treaties without complaints. Design elements can positively or negatively influence the treaty capabilities for managing stresses to the system. Complaints are not necessarily an indicator of decreased institutional resiliency, weak, or ill-designed treaties, but in some cases illustrates that a treaty is functioning properly.

This research does not use past treaty non-compliance as a predictor of future non-compliance. It also does not intend to predict conflict in any given basin nor to predict the specific impacts of climate change, many of which will be unprecedented and perhaps impossible to gauge. This research does use past treaty successes and failures in managing hydrologic stress as a means of determining the importance of treaty design parameters, which can then be used to estimate treaty capabilities for managing stresses, such as those from climate change. It also assumes that treaties in general improve resiliency and intends to provide direction for basins without a treaty or for those that wish to develop institutions to better account for climate change. The power of this analysis is that the results can be used to explain success across multiple basins and to guide the design of future basin agreements.

This dissertation is part of a larger project funded by the World Bank that includes several collaborators investigating basin and treaty vulnerability. While the author has been involved in all aspects, and data from the larger project is utilized, the primary focus of this research is on the treaty analysis.

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Chapter 2
Literature Review

2.1 Climate Change, Fluctuations in Water Availability and Security

The focus of this review is to examine the relationships between international conflict and changes in climate (with shifts in water availability being a key factor in these changes). There is a vast amount of literature touching on the issues of climate and conflict, and by extension on environment and natural resources and their influence on societal and political stability (Brown et al. 2007; Eckstein 2010; Swart 1996). Global warming has raised concerns that changes to climate will pose unique challenges to many nations' security interests. Several studies have examined how already stressed systems that are vulnerable could be driven past a tipping point by shifts in climate (Barnett 2003; Dabelko 2008; Mabey 2007).

The 2007 IPCC report summarizes the scientific understanding of climate change's impact on both air temperature and water resources, including far-reaching changes in the intensity and variability of precipitation and increases in the risk of flood and drought in many areas of the world (Bates et al. 2008; IPCC 2007).[6] Models indicate that changes in climate will vary significantly in time and in space and, consequently, international river basins, and the stability of the treaties that govern them, will not be impacted uniformly. Those areas that are already vulnerable to drought may have its frequency and intensity increased. Likewise, areas that have floods may receive higher intensity flooding more often. For many locations, the IPCC projects that the changes in water resources are likely to be dramatic. Historically, long-term fluctuations in water supplies have typically occurred on a relatively limited scale, with usually only localized areas impacted. However, climate change will likely intensify the global hydrologic cycle, impacting multiple regions at the same time (Fowler et al. 2003). When

[6] Such climate shifts are predicted with fairly good certainty at the global level, but this certainty is reduced as scales decrease to the national and local level.

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stresses to a basin are severe or long-term (such as from shifts in climate patterns), sometimes second, third, and fourth order changes must develop before a new equilibrium is attained. Putting a finger on the causes and responses to change that are often indirect and at multiple scales requires an understanding of the social and physio-chemical dynamics within these ecosystems that is undoubtedly a daunting challenge.

Many of the impacts of climate change, both positive and negative, will coincide with fluctuations in water resources that in many areas are already scarce. Twenty-one countries fell below the threshold for water scarcity in 2000 and "another 14 will join them by 2030. This represents 55% of the world's population" that will have insufficient domestic water (Falkenmark 1990; World Economic Forum Water Initiative 2009).[7] Changes in precipitation and temperature from climate change create uncertainty regarding the timing, quality, and quantity of current water resources. A change in absolute water resources also has an impact on the relative wealth of countries and causes changes in relative power. Allan (2007) notes that contemporary conflict theory postulates that "conflict and social change originate from shifts in relative deprivation, from absolute deprivation, where the availability of even the lowest quality of life is uncertain, to a state of relative deprivation, which raises an awareness that others have more." Migration could result from both the increased appeal of areas with abundance or from shifts to scarcity that can make areas less habitable. Such rapid shifts have been proposed as causes of conflict in the past, especially in areas where governance structures are not robust and institutional resiliency is low (Giordano et al. 2005; Lee 2010).

Fluctuating or inadequate water resources, such as those predicted by the IPCC, have been cited by many scholars as a potential major factor in political conflict and even war (Starr 1991). Despite a lack of historical precedent, some studies continue to revert to environmental determinism, with a linear relationship between climate change induced resource scarcity and resulting conflict (World Economic Forum Water Initiative 2009). While recognizing that the relationship between resource scarcity and conflict is complex and non-linear, climate-related stresses can certainly complicate relations (UNEP 2004; Giordano et al. 2005).

Conflict over transboundary water resources, when it has occurred, has usually been associated with rapid change and the introduction of stress to a system such as from drought, dam construction, or shifting political boundaries, as well as negative overall political relations (Wolf 2007). When such stresses to the status-quo are beyond the available water management capabilities of nations, often incorporated in institutions such as treaties, they have often struggled to find satisfactory solutions that fulfill both their own requirements and the needs of neighbors who share the water. The complexities of nations sharing a vital, valuable, and

[7] Although water requirements are highly variable depending on the demands of an individual country, 1,000 m^3/capita/year water scarcity in this case is used as a measure of where water becomes a limitation to economic development (Falkenmark 1990). Many countries exist and flourish on much less than this amount, while other countries lack the infrastructure or management capacity to utilize their abundant existing resources.

increasingly variable natural resource cause water management to blend more into international diplomacy and conflict management (Odom and Wolf 2008).

Internal instability within states often carries over into the international realm and must also be considered. For example, the Darfur conflict at least partially stemmed from local pastoral and agricultural groups fighting over access to scarce resources that then grew to have international aspects. The current UN General Secretary Ban Ki-Moon has made such connections, stating that the Darfur crisis "grew at least in part from desertification, ecological degradation, and a scarcity of resources, foremost among them water" (UNEP 2010).

The interaction between environmental stresses, responses at various scales, and state stability have been described by scholars through the lens of securitization (Allan 2007). Buzan (2000) considers security from different scales to describe how people or societies construct or "securitize" threats. The three levels used to describe interactions at different scales are individuals, states, and international systems (Buzan and Waever 2009). Starting at the individual level, security can be considered as a factor of "life, health, status, wealth, freedom" (Stone 2009). While defining individual security can be complicated by personal differences, Maslow's Hierarchy type-requirements generally hold true (Maslow 1943). However, the concept of security at the individual level does not directly translate and apply to national security (Stone 2009). For the level of state security, Buzan (2000; Buzan and Waever 2009) considers that states are larger, more complicated entities with a constantly shifting hierarchy of requirements in often overlapping sectors of Political, Military, Economic, Societal, and Environmental. Each sector impacts security, but also is linked to all the other sectors in often intricate and complex ways so that a discussion of each sector on its own does not adequately address the issue of security (Stone 2009). It is necessary to decipher where one sector ends and another begins to determine how each sector individually affects overall security.

Buzan (2000, 2001) discussion of security and stability at different scales and for different sectors is especially useful in the context of climate change. The impacts of climate change will be largely in the Environmental sector, but it will arguably be as much of a factor and influence in other sectors, with consequences that are largely unpredictable. As opposed to most problems, climate change is unique as an environmental stressor since it has the potential to have a varying degree of impact on the Political, Military, Economic, Societal, and Environmental sectors at the same time and at all three scales (individuals, states and international systems). Allan (2001) builds on Buzan's ideas and notes that contentious issues arising over shared freshwater resources occur when extreme circumstances temporarily elevate the 'normal' lower status of water to the 'high' level of 'security politics.' With climate change and added scarcity, this increased importance has the potential to become permanent.

Many of the impacts of climate change will have little to do with the actual, realized environmental shifts within their borders, but instead are based on responses to the perceptions of projected change and the international political and economic ramifications of change in other areas. Nations are taking notice of and are already planning for the security implications of climate change. Many

countries' actions for mitigating or taking advantage of climate change are already having second and third order impacts on both national and international stability. In India, approximately 2.6% of the country's 2006–2007 GDP was spent on adaptation to climate variability, likely intended to protect the 18.6% of their GDP and 60% of their employment that originates from agriculture (Paskal 2010). "All countries will need to attain a reasonable measure of water security to compete effectively in global markets" (World Economic Forum Water Initiative 2009). Perhaps in response to climate change projections, water-scarce, developed countries seeking their own water solutions are causing changes in the geopolitical landscape by securing agricultural land overseas from less developed nations. Wild fluctuations in global food prices associated with the 2008 crisis coupled with forecasts for future water demand has led many countries that were previously willing to rely on 'virtual water' in the form of food and other imports to now believe that "rapidly industrializing economies across South Asia, the Middle East and North Africa" (supporting approximately 2.5 billion people) will need to acquire additional water resources, including in the form of water-rich agricultural land outside their borders (World Economic Forum Water Initiative 2009). Countries with more natural water resources will become more attractive locations for investments, and instability could be exacerbated in less developed countries willing to mortgage long-term water scarcity for immediate financial gains (World Economic Forum Water Initiative 2009). Many countries have already taken steps towards this.[8] In this way, the projections (and not the documented impacts) of physical scarcity from climate change are driving and influencing changes in geopolitical and socio-economic scarcity both between and within nations.

Conflict often has indirect and multiple causes, and similarly the path from changes in climate to conflict between nations, if it is to occur, will not be a direct one (Lee 2010). Conflict is not a linear response to stresses and changes from a shifting climate. Lee (2010) proposes three pathways for climate change to lead to conflict: sustained trends, conflict triggers, and intervening variables. Sustained periods of divergent weather leads to decreased national management capabilities and increased vulnerability to any additional stress. Lee's second pathway is conflict triggers, which include events that spark conflict such as assassinations, extreme natural events, or acts of violence. Climate change can create conditions where the threshold is lowered in order for conflict triggers to incite international conflict. Intervening variables include a degradation in adaptive abilities originating from factors other than climate change such as poverty, inequities between groups, weapons availability, ethnic tension, and institutional resilience. From Lee's analysis we see that

[8] Saudi Arabia considered its options to continue growing sufficient wheat for the country. In 2008, they gave up being self-sufficient and instead chose to "set up an investment fund to acquire land overseas to grow crops, possibly in Pakistan or the Horn of Africa. China is acquiring agricultural land in Southern Africa for similar purposes" (World Economic Forum Water Initiative 2009). South Korea was looking to lease land from the government of Madagascar to grow food until protests occurred, which may have had some influence on a regime change in 2009 (African Economic Outlook 2010).

the institutional resilience that treaties help to engender is only one of a number of determining factors for climate change related conflict. Treaties may be especially important, though, from the international aspect of managing climate stress. Paskal (2010) states that treaties should be considered not only for their equity and legality, but also for their ability to adapt to changing environmental circumstances.

2.1.1 Environmental and Water Institutions

Institutions can take on a number of different appearances and designs, but are generally understood as agreements or procedures intended to establish a protocol for enhancing mutually beneficial political or technical interaction. Institutions can be formal or informal, and can be applied across a wide variety of scales from the individual to regional to global. Dombrowsky (2008) states that institutions make up international regimes which in turn are the "implicit and explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations."

Institutions are often regarded as an important explanatory variable with regard to conflict or cooperation, with most studies indicating that institutions have helped to prevent disputes over shared water resources and increased cooperation between riparian states (Mitchell 2006; Wolf 1997). Under regime theory, treaties act as tools intended to better manage and share natural resources, such as water (Daoudy 2008; Jagerskog 2003). Institutions represent a nation's means to manage environmental stress and the "will, wit or capacity to change (a) state of knowledge, social goals, cultural modes, and technological mixes, or form of economy" (Selby 2006). Treaties can define acceptable behavior and direct political interactions, and thus enhance stability. Recognized rights that have been previously established in a treaty can limit the potential for conflict since the likelihood of conflict generally decreases with "explicitly stated rational goals; and when there are norms and legal channels available for resolving conflict" (Allan 2007, p. 231). If all parties have agreed upon limits, transgressions are easier to avoid and redress. Transgressions of a well-designed treaty with clear definitions can often be solved with simple objections or communication without broaching the larger, perhaps more volatile subjects that were tackled at the time of the treaty signing (Hamner 2008, p. 40).

Mitchell (2006) notes that institutions can help with compliance and with conflict management through processes that include "facilitative intervention in the form of good offices, mediation, conciliation, and fact finding, and binding intervention in the form of arbitration or adjudication." Many bilateral and regional water sharing agreements incorporate the overarching principles or general concepts of international law, but do not include specific mechanisms designed to facilitate negotiations and interactions between nations. In other words, the means to "not only solve disputes between states, but facilitate negotiation and positive interaction to resolve minor points of disagreement before they become legal disputes" (Subedi 2003, p. 35).

While the establishment of a comprehensive regime is almost universally recognized as a positive, the effectiveness of specific principles (with the principles within the 1997 UN treaty most often cited) during the application of the treaty has not been empirically determined (Tanzi and Maurizio 2001). Research concerning the impacts of institutional design on the management of international rivers remains limited and the mere creation of an international water regime "does not provide any guarantees that it will ultimately contribute towards problem solving" (Dombrowsky 2008). With regards to environmental institutions in general, there have been many explanatory models/variables proposed in an effort to account for their success/failure [e.g. (Gerlak 2004, 2007; Gerlak and Heikkila 2006, 2007; Heikkila and Gerlak 2005; Young 2006, 2002)]. Chasek and Brown (2006) discuss how regime effectiveness is tied most closely to three main factors: first, regime design, which includes enforcement, reporting, and monitoring; second, implementation, which includes the "extent to which actors adopt formal legislation and other regulations to enact the agreement."; third, compliance, or how much actors actually observe the treaty and regulations. Chasek then notes several obstacles to implementing/complying with conventions. These include transition from regime laws to domestic laws, lack of capacity to implement laws, lack of respect for the law, compliance costs, and lack of funding.

Treaties are often considered for their perceived impact without any knowledge of their inner workings. Blomquist et al. (2004) notes that additional investigation of institutions is warranted to determine how they affect the outcome by prompting people to change their management practices, easing or hindering change, and shaping the management alternatives that water uses and organizations consider and adopt. The next step for treaty research is to go beyond a generic view of their positive nature towards an examination of the design and application that determines how and why they matter.

2.1.2 International Water Law

A review of international law reveals very few accepted general rules and guidelines for governing water resources. International water law is still in its formative state and nations have generally been solving their water sharing issues on an ad hoc basis with very few specific internationally recognized, overarching principles. An examination of the world's inter-state water agreements shows a wide array of mechanisms used to manage flow variability and minimize disagreement with varying degrees of effectiveness. According to the Oregon State University Transboundary Freshwater Dispute Database (TFDD 2008), there are over 450 international treaties that govern river basins worldwide. Interpretations vary among the global community regarding which mechanisms are most important and the extent to which they have contributed to a successful agreement. Consequently, there is a lack of uniformity in the broad range of principles and prescriptions found within the world's water treaties.

Perhaps prompted by the limits of established international water law, nations have employed a wide variety of tools to facilitate compliance. The extent to which nations agree to enforce their treaties is sometimes described in terms of 'hard' or 'soft' law. Both terms have broad definitions that can refer to a number of processes, but the common thread generally used to segregate them is the binding nature of an agreement. Soft law sometimes refers to codes of conduct or is explained as 'customary law' that is not formally binding. There is not usually a set protocol for enforcing soft law; instead, the opinion and feedback from funding agencies, donors, and other nations is perhaps the greatest force for applying pressure.[9] Hard law includes some sort of obligation, sanctions, and/or an *enforcement* mechanism (Trubek et al. 2005). International hard law provides the greatest leverage to enforce a state's or community's desired impact. Abbott and Duncan (2000) describe the international use of hard and soft agreements, finding merit for both types of agreement. They state, "private actors generally seek hard legal arrangements that reflect their particular interests and values." However, hard laws "often conflict with those of other private actors or of government." For this reason, "soft legalization helps balance competing considerations, offering techniques for compromise among states, among private actors, and between states and private actors."

International water law, which is shaped by and includes the treaties themselves, almost always falls under the category of soft or customary (Vinogradov et al. 2003). The most comprehensive, widely referenced summary of customary law for international water management is in the United Nations 1997 Convention on the Law of the Non-Navigational Use of International Watercourses.[10] The convention states its intent is to lay a widely-applicable "codification and progressive development of rules of international law" and framework that "will ensure the utilization, development, conservation, management and protection of international watercourses" (U.N. 1997). The convention builds on the International Law Association's Helsinki Rules on the Uses of the Waters of International Rivers and summarizes many of the core concepts found in treaties at the time of its signing (McCaffrey 2007).[11] Negotiations for the 1997 UN Convention began in 1981 and had participation from all UN member states. "Adopted by a large majority on May 21, 1997, the Convention has not entered into force since…35

[9] Soft, or customary law, enforcement tactics can include 'naming and shaming' those parties that are not in compliance with an agreement (McCaffrey 2007).

[10] The convention was constructed by the International Law Commission, which is a "UN body composed of legal experts nominated by states, elected by the United Nations General Assembly, and tasked with the codification and progressive development of international law" (Salman 2007).

[11] The 1997 Convention is based in large part on the Helsinki Rules. "Concepts such as equitable utilization and the consideration of all beneficial uses, as well as using the international basin as the primary unit of analysis, were laid out in the Helsinki Rules" (McCaffrey 2007).