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Sharing Earth's Most Valuable Resource: Cooperation in Transboundary Water Management

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Preface

The importance of water for human survival is indisputable. This most essential of all natural resources is critical for agriculture, industry, livelihood and general human well-being. Having completed a variety of International Affairs, Anthropology and Geography courses at The George Washington University in 2010 and 2011, I have developed a profound interest in the availability of natural resources and how that relates to development or underdevelopment. Upon arriving in Geneva, Switzerland, I had the opportunity to hear Gyula Csrugai speak about the geopolitical implications of access to water resources. His talk intrigued me and prompted me to explore the pressing issue of water scarcity and its relationship to transboundary water management, political stability and economic and social development.

Acknowledgements

I would like to acknowledge first Professor David Shinn and his knowledge and dedication in teaching the intricacies of international affairs and for nurturing my passion for the study of international development, especially in Africa and for continuing to share his expertise both in the classroom and out. I would also like to thank my parents, without whose dedication and support, very few of my accomplishments would have been possible. Lastly, I would like to acknowledge Aline Amman, Gyula Csurgai and Alexandre Lambert for their tireless knowledge and guidance throughout this semester.

Abstract

Natural resources in general and water in particular are undeniably essential to human growth and development. However, in recent years, with rising demands for freshwater, sky-rocketing population growth rates, climate change, shrinking water resources and poor water management, scarcity of this critical resource is a growing problem around the world. A high percentage of the most severe water scarcity is due primarily to mismanagement and ineffective allocation of water resources. There is an overarching legal framework to govern the management of water internationally. The *UN Watercourses Convention* and the *UNECE Water Convention* are the two most important documents that govern global water management as it relates to International Water Law. However, their application has proven to be extremely difficult even at the local level. Furthermore, the 263 transboundary water resources that flow across political borders make water management in these regions even more challenging. Managing transboundary water resources entails harmonizing policies in several states, equalizing power structures and mitigating competition for a shared resource. Transboundary water resources have the capacity to either exacerbate tensions, increasing the threat of conflict or to foster effective and positive cooperation. However, if the relationship between states is ineffective, as in parts of the Middle East, the consequences can be catastrophic, even leading to full-blown wars. Therefore, fostering efficient and successful cooperation between riparian states is essential to their stability and future development. In regions vulnerable to conflict over transboundary water resources like the Mekong, building cooperative institutions is not an easy task. However, legal agreements, community programs and Integrated Water Resources Management mechanisms all represent tools that leaders can utilize to foster the necessary collaboration. This cooperation for transboundary resource management can in turn promote

political stability and legitimacy, human security, economic growth and peaceful negotiations not only in water resource management but in general conflict resolution. The international community as a whole needs to approach the global population's insatiable thirst for water by focusing on shared responsibilities as well as shared benefits.

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Introduction

Water is the most essential resource for livelihood. For humans to survive without water would be impossible, and yet scarcity of this precious resource is painfully prevalent in the 21st century. Furthermore, in the near future, that scarcity will affect a growing number of people around the world. In 2003 the United Nations declared access to water a human right, but acknowledged that growing scarcity threatens that human right[1]. The United Nations defines "water scarcity" as "the point at which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully"[2].

Water scarcity often has roots in a growing shortage in the supply of water, which is increasing faster than the growth in population. In his book, *Resource Wars*, author Michael Klare cites population growth and higher standards of living as two of the causes of a rising global demand for water[3]. The main root, however, of water scarcity is found in, "power, poverty and inequality, not in physical availability"[4]. The World Bank estimates that the minimum amount of water one human needs to survive is 100-200 liters per day[5]. If the earth's water were to be divided evenly among the world's seven billion people according to this formula, it would easily meet the demands of the population[6]. However, an ever-increasing number of people are

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[1] Watkins, Kevin. *Human Development Report 2006*. Rep. New York: United Nations Development Programme, 2006. Print. 3
[2] *Coping with Water Scarcity: A Strategic Issue and Priority for System-Wide Action*. Publication. UN-Water Thematic Initiatives, 2006. Print.
[3] Michael Klare. *Resource Wars*. New York: Owl Books, Henry Holt and Company, 2001. Print. 29.
[4] Watkins, 3
[5] Klare, 126
[6] Klare, 128

already living on less than the minimum requirement. If the pattern persists, total human usage will approach 100% of the accessible supply by the mid-twenty-first century[7].

This growing phenomenon of water scarcity leads countries to exploit new water resources and protect the ones they control. However, many countries today are dependent on water resources that they share with other states. Transboundary water resources make management and development of water use more complex as they traverse political borders. Water, as a fluid resource, has the astounding capacity to create discord and conflict or partnership and collaboration. To avoid the escalation of tensions to full-blown conflict, states must implement positive, cooperation mechanisms to manage transboundary water resources. By fostering cooperative relationships among states, governments can effectively mitigate competition.

Unfortunately, there is no blueprint for a path to cooperation. Community standards, local norms, legal agreements, ethnic tensions and many other factors need to be taken into account when developing cooperative mechanisms and agreements for water management. There are countless tools countries can utilize to achieve cooperation for transboundary water resource management. Countries around the world like those sharing the Nile Basin and the Mekong River need to develop more effective transboundary water management agreements.

Thesis

Regions experiencing severe water scarcity could mitigate the effects of this phenomenon by cooperating for transboundary water resource management. The global water crisis is affecting more people with every passing day and the global community needs to take action to nurture collaboration and stability. Noncooperation carries the threats of conflict and instability.

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[7] Klare, 127

The path to cooperative water management is a long and difficult one, but in the long-term, there is no alternative. The development of a collaborative framework is directly linked to the political legitimacy of a country, the human security of a country's population, the economic growth of that country as well as the level of peace and stability within the region. It is crucial that states exploiting shared water resources develop agreements based on shared benefits as well as shared responsibilities.

This paper will examine several questions regarding transboundary water resource management and the bearing that it has on stability and development. Why do transboundary water resources complicate management to such a great extent? What specific challenges do states face when developing management mechanisms for transboundary water resources? What implications does noncooperation have for states? What tools are available to states seeking to foster cooperation for transboundary water resource management? How is cooperation for transboundary water resource management essential to stability and development?

Definitions

Integrated Water Resources Management (IWRM)

Several major authorities in international water management have recently defined Integrated Water Resources Management. The Global Water Project defines this strategy as "a process, which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems"[8].

Transboundary Water Resources

[8] Brachet, Christophe, and Daniel Valensuela, comps. *The Handbook for Integrated Water Resources Management in Transboundary Basins of Rivers, Lakes and Aquifers*. Publication. International Network of Basin Organizations (INBO) and the Global Water Partnership (GWP), 2012. PDF.

"Transboundary Water Resources" are "any surface or ground waters, which mark, cross or are located on boundaries between two or more States".[9]

Riparian States

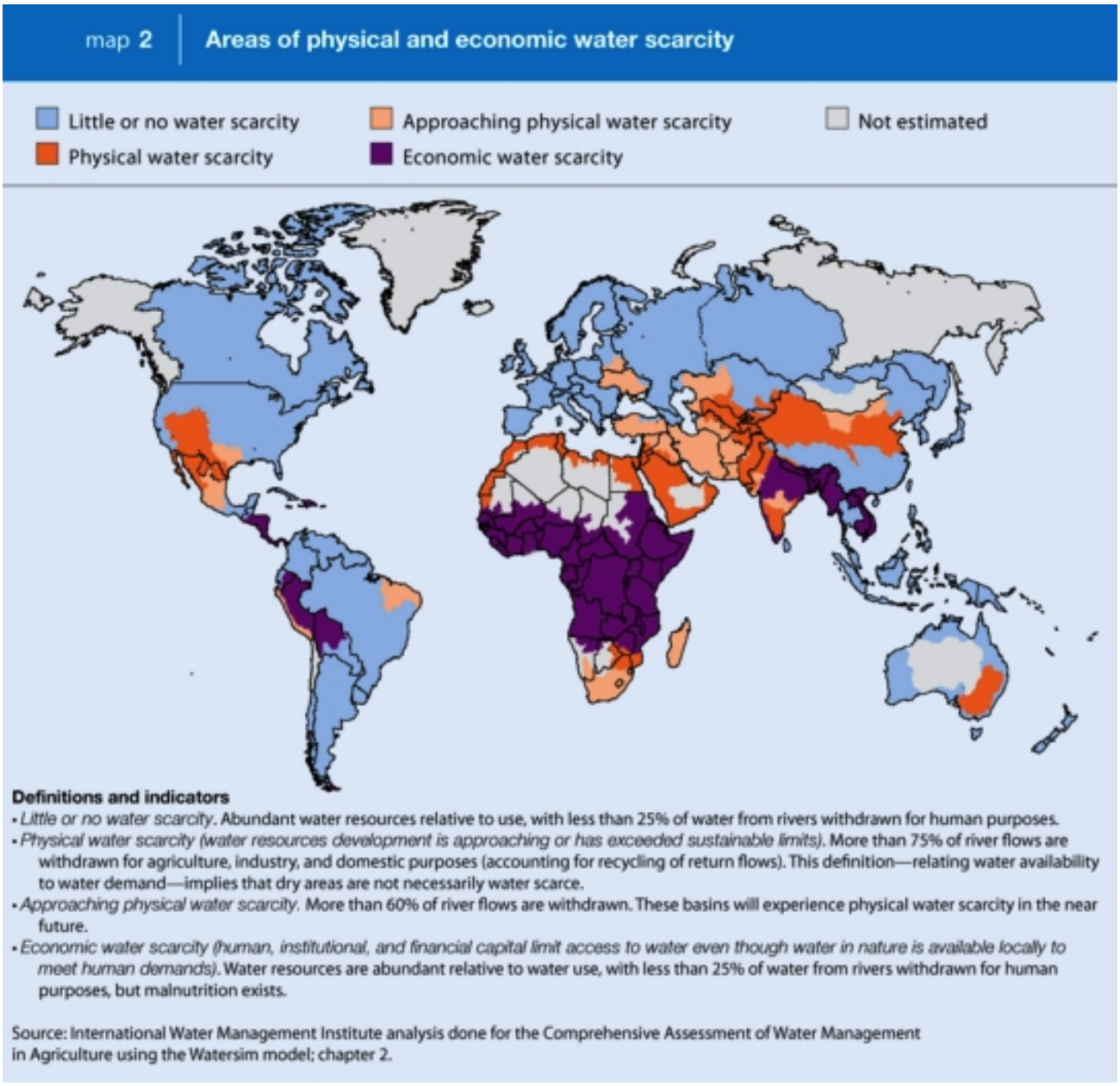
"Riparian states" are nations that border the same transboundary water resources. Riparian states also have "riparian rights" which are "the rights of the owner of the land forming the bank of a river or stream to use water from the waterway for use on the land, such as for drinking water or irrigation".[10] Additionally, a riparian owner may not act to deny riparian rights to the owner of downstream properties.

1. **Factors of the Global Water Crisis**

The map below indicates the areas of the world in which water scarcity is the biggest problem as well as those regions where there is little to no water scarcity.

[9] UNECE. *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*. Helsinki. Helsinki: UNECE, 1992. PDF. <http://www.unece.org/fileadmin/DAM/env/water/pdf/watercon.pdf>.

[10] *The Free Dictionary*. West's Encyclopedia of American Law, 2008. Web. 3 Apr. 2012. <http://legal-dictionary.thefreedictionary.com/Riparian+Rights>.



http://www.grida.no/graphicslib/detail/areas-of-physical-and-economic-water-scarcity_1570

1.2 *Rising Demand for Freshwater*

The major question today is: does the world have the capacity to produce the water that its population demands? The earth's surface is composed largely of water, 70% is salt water with freshwater making up only 3% of the surface water. Moreover, two-thirds of that is locked away

in glaciers, polar ice caps, in soil water and groundwater[11]. Therefore, only about 1% of the world's fresh water is accessible today. With ever-growing industrial sectors, trade, transport, agriculture and rising standards of living, the global population's demand for this small percentage of freshwater will only continue to increase. Today, water is mainly used for irrigation. Increasingly however, water is being used for industrial purposes and as the world becomes richer and more industrialized, each person has been using more water.[12]

1.3 *High Population Growth Rates*

A spike in population growth rates recently also places a major strain on the freshwater available for human consumption. In the last century, water use has been growing at more than twice the rate of the population increase[13]. Population growth is especially high in developing countries and regions like Sub-Saharan Africa that are already experiencing severe water scarcity[14]. As more and more countries that are experiencing water stress simultaneously experience very high population growth rates, per capita availability is shrinking[15]. Additionally, as population grows so does the need for greater food production, and so the demand for water used for agricultural irrigation.

1.4 *Climate Change and Shrinking Water Resources*

Unlike any other natural resource, water is infinitely renewable. Through the natural "water cycle", rainwater falls and after traveling through freshwater rivers returns to the seawaters to then evaporate and fall once again. However, climate change threatens to distort these rainfall patterns, leaving some regions without rain and others with too much. Many countries depend solely on natural phenomena like rainy seasons or flooding for their year-round

[11] Klare, 127
[12] UN Human Development Report 2006, 5
[13] *ibid.*
[14] Adam Rogers, UN Development Programme
[15] UN Human Development Report 2006, 136

water resources. Climate change could affect these patterns and make rainfall more erratic and less dependable for agriculture and other uses.[16]

1.5 *Management of Water Resources*

Another factor that affects water scarcity for many citizens of the world, especially those in less developed countries, is mismanagement of water resources. In many regions of the world there is a general lack of cooperative relationships for the management of water resources. The competing needs and uses for water make such management a complex task. Governments face the challenge of monitoring water sources as well as fostering cooperation between the major water-use sectors – agriculture, industry, energy, navigation and water supply and sanitation.[17] Within their own areas of political responsibility, governments have good reason to implement Integrated Water Resources Management (IWRM) to use water sustainably. However it is a challenge to reconcile the demands of different sectors for development and often a lack of political infrastructure leads to mismanagement and inefficient use of water resources.[18]

The complexities of national water management are further compounded when a country or countries share water resources with neighboring states. Today there are 263 transboundary lakes and river basins that cross one or more national boundaries covering about 45% of the Earth's land surface. With a total of 145 states including territories within such basins, about 40% of the world's population lives within these shared water resource regions[19]. These basins and aquifers link populations from different countries and regions through livelihoods as well as

[16] Personal Interview: Vicente Yu, The South Centre
[17] Kalinin, Mikhail. *Transboundary Waters: Sharing Benefits, Sharing Responsibilities*. Issue brief. UN Water, 2008. Print. 3
[18] ibid. 3
[19] ibid.

survival[20]. As the United Nations Development Programme's 2006 Human Development Report asserts, "transboundary waters extend hydrological interdependence across national borders"[21].

1.6 *International Water Law*

All comprehensive transboundary basin policy and agreements between states concerning transboundary water resources must fit into the framework of international law.[22] The rule of international law, especially as it pertains to water, can be an integrating mechanism in fostering transboundary cooperation for water resource management. There are several framework treaties that deal with transboundary water resource management and since they demand the compliance of all states, those international law principles provide a strong and concrete foundation for effective cooperation regarding water resources[23]. Treaties are "formal agreements agreed to and binding upon national governments in their bilateral or multilateral arrangements for managing transboundary water resources".[24] Treaties usually include transboundary institutions and processes to implement the rules and principles outlined in the document.[25]

UN Watercourses Convention (1997)

This is the only universal agreement covering the development and management of shared transboundary watercourses. The full title is the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses. After almost 30 years of research on the topic, the UN General Assembly adopted the convention on May 21, 1997. However, this agreement requires ratification of 35 parties before it enters into force. As of November 2011, only 24 parties had ratified the convention. However, according to Annukka Lipponen of the

[20] ibid.
[21] UN Human Development Report 2006, 150
[22] Lipponen, Annukka. UNECE. "Cooperation for Transboundary Water Resource Management." Personal interview. 4 Apr. 2012.
[23] Vicente Yu, The South Centre
[24] Brachet, 23
[25] ibid.

UNECE, the convention, although not yet ratified, still plays an important role in outlining a water management plan that incorporates the major accepted principles of international law.[26] As its main governing rule, the convention uses "equitable and reasonable utilization" as it relates to transboundary water resources. The convention is also supplemented by practical procedures like the duty to cooperate in the management and development of international watercourses and a series of steps to follow in planning measures, like information sharing and prior notification before the development of new or increased uses of water.[27]

UNECE Water Convention (1992)

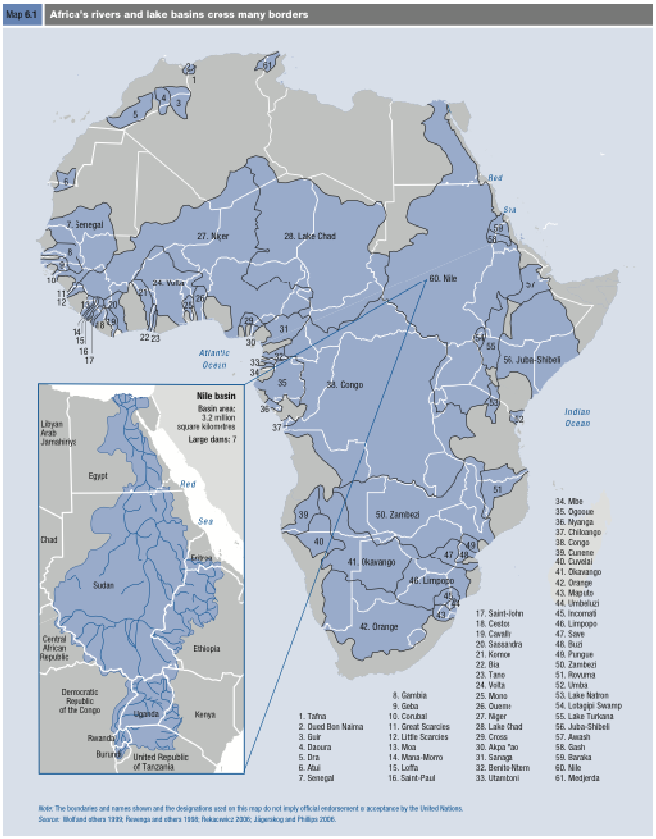
The UNECE Water Convention or The Convention on the Protection and Use of Transboundary Watercourses and Internaional Lakes was adopted in Helsinki, Finland on March 17, 1992 and entered into force in 1996. That Convention aims to strengthen measures to protect and effectively manage transboundary surface waters and groundwaters. The document takes a holistic approach to transboundary water management, addressing most of the difficulties previously discussed. The key obligations of the agreement include the obligation to: prevent, control and reduce transboundary impacts like adverse effects on the environment, and their socioeconomic implications, to ensure a reasonable and equitable use of transboundary waters and to cooperate in the use and management of such waters. In 2003, the Water Convention was amended to allow accession by countries outside the UNECE region. This provided the rest of the world with the opportunity to benefit from the strong legal framework of the UNECE Convention. The strength of this particular agreement is that along with the clearly outlined obligations, the UNECE Water Convention includes an institutional framework which enables continued progress. Furthermore, this agreement has proven to be very effective because it

[26] Annukka Lipponen, UNECE
[27] Brachet, 25

includes a Meeting of the Parties where established bodies that are party to the convention continue to develop new tools for water management. Although the convention's application to groundwaters has been slightly less successful, the UNECE is striving to improve implementation of obligations regarding groundwaters.[28]

2. **Transboundary Water Resources**

The nature of transboundary water resources clearly links populations, governments and development across national borders. Therefore, the presence of these transboundary water resources demands deeper cooperation and integration of water management policies between countries and regions that share water basins. One region in which this interdependence is especially prevalent is in Africa where 90% of all surface water is in transboundary river basins (refer to the map on the left)[29]. Transboundary water resources foster the highest levels of interdependence, competition, and possibility for conflict but also an opportunity for cooperation and compromise between riparian states. The management of shared water resources could either lead to stabilizing agreements and cooperative relationships or major discord and instability[30]. Many of the regions where transboundary water resources are especially prevalent prove to be the most vulnerable and volatile, making cooperative management difficult but essential to socio-economic development.



[28] Annukka Lipponen, UNECE
[29] ibid.
[30] Annukka Lipponen, UNECE

2.1 *Inherent Challenges of Managing Transboundary Water Resources*

> "Differences between riparian countries – in terms of socio-economic development, capacity to manage water resources, infrastructure, political orientation and institutional as well as legal contexts – represent challenges to effective and coordinated development as well as to the joint management and protection of transboundary water resources". – UN Water Thematic Paper Transboundary Water Resources[31]

Transboundary water management is not based solely on the framework of established international water law framework; it also includes geographic factors and the balance and distribution of power that comes with geographic position.[32] Since transboundary water resources management requires the coordination of several states, the demands of policy-makers of each of the states might be divergent or even conflicting. Additionally, there is no international structure for providing mechanisms to address policy-makers' choices like there is at the national level. Another challenge that governments face when addressing management of transboundary water resources is the larger, global factors at play. National policy-makers and governments have to take into account national security, economic opportunities, environmental sustainability and equity when managing transboundary water resources. Furthermore, national sovereignty plays a predominant role in the management of shared water resources. Historically countries have fiercely protected their national resources as well as their borders from intruders. Therefore, many countries are reluctant to enter into any agreements that might hinder their ability to make decisions in their nation's interest[33]. Another one of the fundamental challenges of managing transboundary water resources is that doing so requires a deeper level of cooperation and a recognition of interdependence than does national water management. It requires that countries move beyond inward-looking national strategies and unilateral action to

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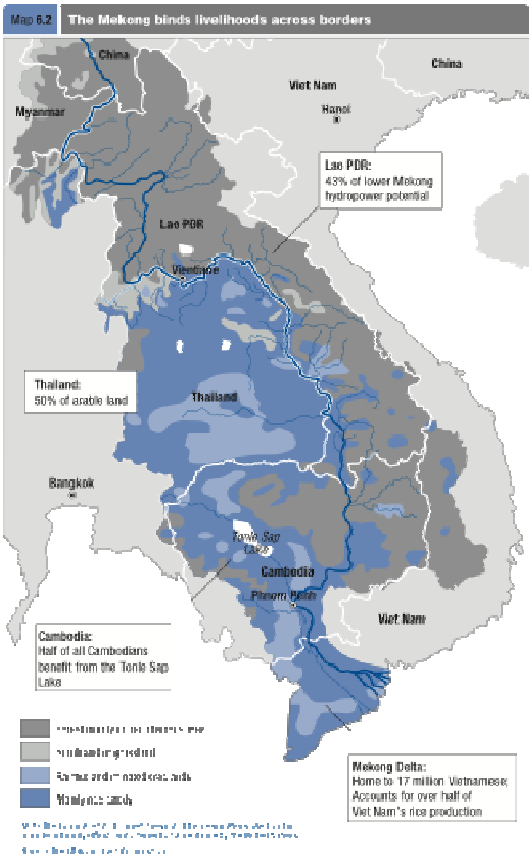
[31] Kalinin, 2

[32] Hamro-Drotz, Dennis. "Water Management, Water Scarcity and Conflict." Personal interview. 20 Mar. 2012. UNEP Post-Conflict and Disaster Management Branch.

[33] Biswas, Asit K., Cecilia Tortajada, and Olli Varis, eds. *Management of Transboundary Rivers and Lakes*. Berlin: Springer-Verlag, 2008. Print. Water Resources Development and Management.

shared strategies for multilateral cooperation[34]. To achieve this deeper, more interconnected level of cooperation, riparian states as well as the global community must place overall human development at the center of transboundary cooperation and governance[35].



Another complexity of managing transboundary water resources is that unlike with national water resources, one upstream riparian state's action can affect the amount or quality of water coming to a downstream state. Therefore, riparian states that depend on shared water resources experience a heightened interconnectedness that demands caution and tact in the management, allocation and distribution of their water resources. Additionally, the power structure in the region might have major implications for the management of shared water resources. One example of the challenges of upstream-downstream relationships is in the Mekong River region.

The Mekong River has its source on the Tibetan Plateau but then drops and flows across six countries before reaching its delta. At least one-third of the populations of Cambodia, Laos PDR, Thailand and Vietnam are in the Lower Mekong Basin while China and Myanmar benefit from those waters as well. Not only is China the most upstream country benefitting from the Mekong River, but it is also the most powerful country in the region. In 1995, the downstream countries of Cambodia, Laos PDR, Thailand and Vietnam signed an agreement for the sustainable

[34] UN Human Development Report 2006, 203
[35] ibid.

development of the Lower Mekong River Basin. Those countries later realized that China was constructing a dam on a major tributary of the Mekong River upstream that decreased the water that flowed downstream. They created the Mekong River Commission, however, China refused to become a member[36]. Clearly this is an example where one large country, in this case China, pursues management of the transboundary resource unilaterally, to the detriment of the smaller, downstream states. The growing use of hydropower by China and private companies operating there has also led to severe shortages in the region[37].

2.2 *Competition for Transboundary Water Resources*

The example of the Mekong region demonstrates the immense interdependence that transboundary water resources foster. Cooperation is the ideal outcome of this deep interdependence however it is not always the result. Discord and competition can also grow out of tensions created by the struggle for water from shared resources. As water shortage becomes an increasingly common phenomenon in many countries around the world, especially in regions with transboundary water resources, competition for a shrinking resource will undoubtedly swell. Many countries perceive transboundary water resources as "national water" even if the water originates outside of the country[38]. The priorities of separate countries regarding the economy, agriculture, energy and the countless other uses of water for their own people might not be compatible with priorities of other riparian states. In the Mekong region, China views its industrial and economic development as more important than cooperation with downstream states on the sustainable use of their shared resource. Another example where competition is prevalent is in the Nile River Basin region.

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[36] Biswas, *Management of Transboundary Rivers and Lakes*, 25
[37] Molle, Francois, Tira Foran, and Mira Kakonen, eds. *Contested Waterscapes in the Mekong Region*. London: Earthscan, 2009. Print. 76
[38] UN Human Development Report 2006, 211

Ten sovereign states share the Nile basin and lay claim to a portion of its waters. While some of the nations depend completely on those waters and others do not, it is becoming increasingly clear, especially with growing water scarcity, that the waters of the Nile basin will not fulfill all future demands.[39] As Waterbury expresses in his book entitled *The Nile Basin*, the challenge is "…understanding under what circumstances ten sovereign riparian states would ever voluntarily agree to manage their shared Nile water resources for the greater good of all the inhabitants of the watercourse".[40] Taking into account high rates of population growth, some of the highest levels of poverty in the world and ever-present underlying political differences, the Nile basin is one area of the world where competition will grow. However, with the creation of The Nile Basin Initiative in 1999, nine out of the ten riparian states recognized the major benefits that cooperation can yield in terms of water use and management. As a result of this multilateral organization, the states also developed a Strategic Action Program that promotes a Shared Vision Program and fosters many other ongoing research and development projects in the region.[41] Although the Nile Basin Initiative is a positive step, there is still much work to be done by the riparian states and certainly by the international community, as immense competition for water resources continues to prevail.

3. **The Possibility of Conflict: Costs of Noncooperation**

This immense competition developing as a result of transboundary water resources has the potential to spur conflict in some instances. While there are few examples of conflicts where water scarcity was the single cause, and it certainly will not be the only cause of international

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[39] Waterbury, John. *The Nile Basin: National Determinants of Collective Action*. New Haven: Yale UP, 2002. Print. 7

[40] ibid. 8

[41] Mohamed, Yasir, and Makonnen Loulseged. *The Nile Basin Water Resources: Overview of Key Research Questions Pertinent to the Nile Basin Initiative*. Working paper no. 127. Colombo, Sri Lanka: International Water Management Institute, 2008. <http://www.iwmi.cgiar.org/Publications/Working_Papers/working/WOR127.pdf >.

conflicts in the future, it is an increasingly important factor. With rising scarcity comes increased competition for a shrinking resource that is vital to survival. In January 2008 at the World Economic Forum in Davos, Switzerland, former UN Secretary Ban Ki-Moon warned that, "water scarcity could spell an increase in future conflicts," adding that "population growth will make the problem worse. As the global economy grows, so will its thirst. Many more conflicts lie just over the horizon"[42].

Three major factors contribute to growing water scarcity and the conflicts it can incite: first, the relentless expansion in worldwide demand; second, the emergence of significant resource shortages; and third, the proliferation of ownership contests. Logically, transboundary water resources amplify this competition for water, making areas where there are shared resources more vulnerable to conflicts. As Klare asserts, "What makes this situation so precarious from a security standpoint is the fact that many of the key water sources in the areas experiencing the most severe water scarcity are shared by two or more countries".[43] Therefore, water remains a "conflictual resource" because of its unique characteristic of mobility without regard for political, ethnic or social borders[44]. Ten countries share the Nile River and three, along with the territories under the control of the Palestinian Authority share the Jordan River[45]. As the demand for water as a resource grows along with the population, the shared water sources could become a point of contention between the states vying for control and access. Water is the only means of survival for countless people around the world through agriculture. Therefore, when

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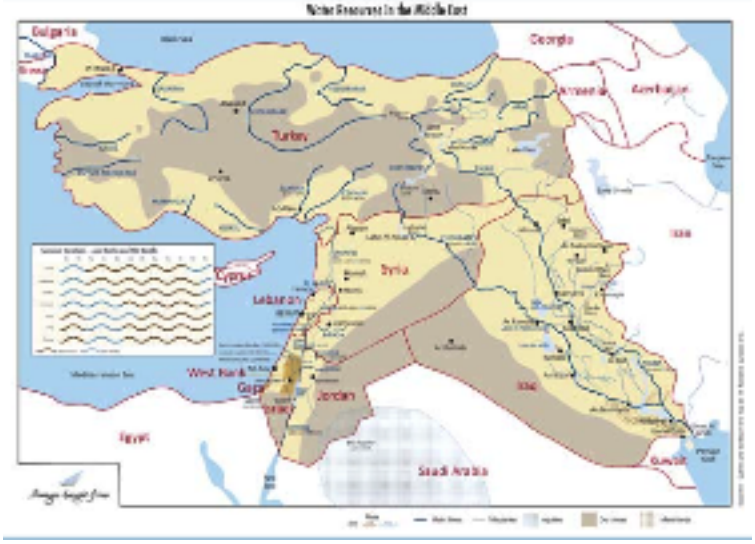
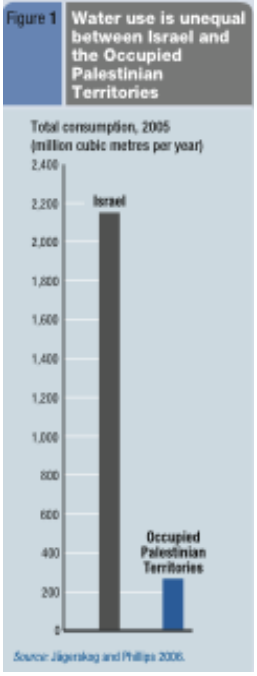
[42] Gabriel Eckstein. "Water Scarcity, Conflict, and Security in a Climate Change World: Challenges and Opportunities for International Law and Policy." *Wisconsin International Law Journal* 27.3 (October 15, 2009): 409-61. EBSCO*host.* Index to Legal Periodicals & Books Full Text (H.W. Wilson). Accessed: 8 February 2012.
[43] Klare, 29
[44] Karin R. Bencala and Geoffrey D. Dabelko. "Water Wars: Obscuring Opportunities." *Journal of International Affairs* 61.2 (2008): 21-33. Print.
[45] *ibid.*



conflicts arise surrounding control of water resources, they are fighting for survival[46], which is a basic human instinct. In following this logic, the possibility for conflict over water resources is a concrete and feasible one.

As discussed previously, differences between riparian states add to the complexity of management of transboundary water resources but also increase the volatility of a region and in turn make it more vulnerable to conflict. In addition to the challenges previously discussed, competition over shared water resources can ignite political tensions within a region. Inevitably hydrological interdependence translates into economic, political and social interdependence also. If ethnic or political differences are apparent between countries that also share water, the allocation of the precious resource could be the catalyst for conflict. One quintessential example of how competition for water can exacerbate existing tensions and lead to conflict is in the Middle East. Of the conflicts caused by access to water, most of them have taken place in the Middle East region (See map above). Access to water resources has always been among the crucial issues of dispute in the region. As former Israeli Prime Minister Moshe Sharett said, "Water for Israel is not a luxury…It is not a desirable and helpful addition to our natural resources. Water is life itself".[47] While this is also the case for many other countries throughout the world, the long-standing ethnic and political tensions in the Middle East make the region especially vulnerable to stress and potential conflict over water scarcity. A second former Israeli Prime Minister Yitzhak Rabin cautioned that, "If we solve every other problem in the Middle

[46] *ibid.*
[47] Klare, 31



East but do not satisfactorily resolve the water problem, our region will explode".[48] This telling quotation demonstrates the potential for calamitous effects should water scarcity in the region become progressively worse.

However, nowhere are the problems of water scarcity and management as critical as in the Occupied Palestinian Territories. Tensions between Israelis and Palestinians only exacerbate the problem of water scarcity there.[49] In Gaza, 150,000 Palestinians have no access to tap water at all and several vital wells have been destroyed by Israeli offensive military operations. On a per capita basis, individuals living in the Occupied Palestinian Territories have access to 320 cubic meters of water annually, one of the lowest levels in the world and well below the threshold of absolute water scarcity[50]. Furthermore, following the collapse of an irrigation system within Gaza, only three out of the eighty trucks carrying supplies to repair the water system were allowed in by Israeli authorities.[51] This presents yet another example of what a powerful and deadly weapon control of and access to water can be and how willing many states are to wield that weapon to further their national interests.

Uneven distribution and sharing of water between Israelis and Palestinians is reflected in drastic discrepancies in water use, which in turn causes vast water scarcity. Although the population of Israel is not quite twice the size of the Palestinian population, its total water use is seven and a half times higher (as seen in figure 1). Because Palestinians do not have rights to the waters of the Jordan River, they have to depend on underground aquifers for their water.

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[48] Klare, 32
[49] Haddadin, Munther J. "Water in the Middle East Peace Process." *The Geographical Journal* 168.4 (2002): 324-40. Web. 4
[50] UN Human Development Report 2006, 217
[51] "Palestinian Water Crisis Deepens". *BBC News*. 2009. Accessed: 8 February 2012. <http://news.bbc.co.uk/go/pr/fr/-/2/hi/middle_east/8007801.stm>.

Restrictions of utilizing these aquifers further decrease the amount of freshwater available to citizens of the Occupied Palestinian Territories. For example, Israeli representatives on the Joint Water Committee strongly regulate the quantity and depth of wells that Palestinians operate. This lack of access to water is stunting Palestinian agricultural growth and development.[52] Jordan and Syria, which are located downriver from Israel, also depend on the water of the Jordan River Basin for survival. Historically, Israel has obstructed the water flow in the upper part of the Jordan River, keeping Jordan from extracting its due share of the resource. During the 1960's, Jordan destroyed an Israeli dam. During the 1967 war involving the two countries, Israel led a raid against Jordanian water facilities in retaliation.[53]

4. **Establishing Cooperation for Transboundary Water Resource Management**

The historical as well as contemporary presence of tension and conflict, regarding the management of transboundary water resources, whether armed or unarmed, speaks to how essential it is to the global community that states establish transboundary cooperation for water resource management. To move forward in the process toward peace and mend many of the broken ties in places like the Middle East as well as avoid further discord and conflict over water distribution, cooperation is a necessity. As expressed earlier, water, with its unique characteristics of fluidity and its irreplaceable nature, inherently links people together across political, ethnic and geographic borders. If cooperative principles, agreements and forums for discussions do not play a bigger role in the management of water resources, water allocation will only lead to greater conflict and instability in places like Africa and the Middle East.

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[52] UN Human Development Report 2006, 216-17

[53] Libiszewski, Stephan. *Water Disputes in the Jordan Basin Region and Their Role in the Resolution of the Arab-Israeli Conflict*. Tech. 13th ed. Zurich: Center for Security Policy and Conflict Analysis and the Swiss Peace Foundation, 1995. PDF. 2

There is unfortunately no simple formula for fostering cooperation in transboundary water resource management. There is no single path to cooperative water management. Instead, each region needs to have a unique approach depending on the various environmental, hydrological, political, social, economic and cultural characteristics and circumstances of the region. The first step to cooperation in all cases however is to create conditions that are conducive to collaboration[54]. The water policies that governments implement need to be coordinated with other natural resource policies and policies in the areas of land-use management and spatial planning[55]. Another prerequisite for cooperation for transboundary water resource management is the presence of political will at all levels of the government to implement and enforce the agreed-upon policies and accords. There are many different factors that can be used to develop the states' political will to cooperate on a transboundary river basin.

For example, studies or projects that several riparian countries carry out in a specific area as a joint venture can foster political will and basin level transboundary cooperation. One example of this is the participatory approach that governments used in the Guadiana River Basin. The basin is located in the western and southern parts of the Iberian Peninsula and the Spanish section encompasses three autonomous regions of Andalusia, Castilla and Extremadura as well as the Portuguese district. Under the Albufeira agreement, the Spanish and Portuguese parts jointly carried out many agreements and studies regarding hydrological planning. These technical information activities have been promoted since 2007 through meetings, public awareness campaigns and cooperative dialogue. The two geographical regions have made several important agreements regarding the delimitation of shared water bodies, typology, ecological status, protected areas, monitoring networks and measurement programs. As part of the

[54] Brachet, 15
[55] ibid.

agreements, separate groups engage in dialogue in established forums. Seven specific meetings of the Guadiana basin were held and the WFD Working Group held several meetings between 2007 and 2011. In addition, negotiations and actions have been taking place within the Spanish-Portuguese Transboundary Cooperation Programme 2007-2013 related to the environmental and recreational boating in the Alqueva reservoir located in Portugal, near the Spanish border.[56]

International associations can also work as catalysts for creating political will of states wishing to forge cooperation in the same basin. This type of cooperative action is manifested in the case of Lake Prespa. Lake Prespa is located between Albania, Greece and the former Yugoslav Republic of Macedonia. The Prime Ministers of the three countries signed the Declaration for Prespa Park Conservation with the ultimate goals of enhancement of living standards for the inhabitants and peace and cooperation between the three countries. With the support of the Convention on Wetlands of International Importance the Prespa Park Coordination Committee (PPCC) was established in 2001. Another important aspect of cooperation that fosters political will is clear definition of the precise action objectives in the agreement. For example in creating the Great Lakes – St. Lawrence River Water Resources Regional Body the American states established specific and concrete objectives within the agreement to effectively manage the shared water resource.[57]

5. **Tools of Transboundary Water Resources Management**

5.1 *Integrated Water Resources Management*

There are countless tools that governments and states can utilize to construct effective transboundary water resources management and cooperation. Integrated Water Resources Management is a popular mechanism that governments use when developing water management

[56] Brachet, 16
[57] ibid. 17

tactics in this decade of water scarcity. However, with the additional complexities of transboundary or shared water resources, Integrated Water Resource Management internationally differs from national IWRM in several ways. First, state sovereignty influences the dynamics of water management to a much greater extent when dealing with a water resource that traverses two or more states. Second, water resource management usually responds to national legal and institutional policy frameworks rather than the international frameworks that pertain to transboundary water resource management. Third, the interests and objectives of water management differ across states, making coordination of policy harder on the inter-state scale.[58] Fourth, the proportion of a country that is in the basin area might determine their willingness to cooperate and take part in negotiations. Fifth, conflicts regarding water allocation and benefit sharing are much more complicated because the risks and benefits affect not one state but many. Finally, the exchange of information or data between two or more states is much more difficult than it would be within a single state[59].

5.2 *Regional Dynamics and Community Structure*

Regional frameworks such as the European Union Water Framework Directive (EU WFD) or Southern African Development Community (SADC) Revised Protocol on Shared Watercourses can provide platforms for management of transboundary water resources. Organizations like these can encourage riparian states to seek dialogue and build an effective basin management policy. Additionally, the WFD regional framework for the member countries of the EU also plays a role in the countries surrounding the EU, especially if they share water with EU countries. Since 2000, the EU WFD has been a basic legal document that governs water management and asserts, “in the case of an international river basin district extending beyond the

[58] Personal Interview: Dennis Hamro-Drotz UNEP
[59] ibid. 11

boundaries of the Community, Member States shall endeavor to produce a single river basin management plan". This principle was applied in the cooperation in the Danube River Basin. The EU member states that share the Basin, with the consent of all other countries party to the Danube River Protection Convention, which entered into force in 1998, nominated the Commission for the Protection of the Danube River (ICPDR) as the coordination body for the development of this plan. All states that are members of ICPDR have agreed to participate in the preparation of the Danube River Basin Analysis (DRBA). This cooperation fostered positive communication and dialogue with other countries and between EU and non-EU members.[60]

Another example in which regional action can positively impact and create an incentive for cooperation for transboundary water resource management is the actions of the UNECE. The actions of this economic organization have supported improvement of monitoring systems and greater harmonization of systems with neighboring countries in Southern Africa (SADC) and also West Africa (ECOWAS). In September 2011, the UNECE launched The Second Assessment of Transboundary Rivers, Lakes and Groundwaters.[61] This assessmemt included data collection and fostering supportive exchange between riparian countries through the organization of cooperative workshops. The report indicated that transboundary management of water resources is improving but still poses many problems for riparian states as well as the international community.[62]

5.3 *Progressive Enlargement*

Small-scale cooperation and agreements can also be used as a tool to foster larger-scale agreements and collaboration for transboundary water resource management. By beginning

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[60] ibid. 18

[61] ibid.

[62] *Second Assessment of Transboundary Rivers, Lakes and Groundwaters*. Publication. 2nd ed. Geneva: United Nations Economic Commission for Europe, 2011. Web. <http://www.unece.org/index.php?id=26343>. 39

perhaps with local cooperation or by implementing policy focused on a specific portion of the river, governments can then expand the policy to encompass the entire basin and collaborate with all riparian countries. For example, in Central Asia, cooperation regarding the use of the Syr Darya River began at the local level. There is a concentrated area of Small Transboundary Tributaries (STTs) to the main stem of the Sry Darya that is situated in the Ferghana Valley, between Tajikistan, Kyrgyzstan and Uzbekistan.[63] With the collapse of the Soviet Union, the region split into several different countries and began to pursue separate water policies. These policies included establishing irrigation systems and local-level institutions for exploiting the water in the region.[64] These factors are working to heighten the potential for conflict in these STTs, making cooperation crucial. In 2002, the International Water Management Institute (IWMI) and the Scientific Information Center of the ICWC established the Integrated Management in Ferghana Valley project to create pilot grassroots transboundary institutions on two small STTs. In 2007 the project was expanded with the goal of rearranging the existing operational water management bodies.[65]

Initiating a project or policy that focuses on a specific portion of the river strongly affected by a problem then extending the effort to the entire basin is another way that small-scale cooperation can be expanded. The cooperation regarding the Rhine River Basin is a good example of this. The two Conventions on the Protection of the Rhine are limited to the river and not its tributaries in most aspects of the agreement. However, when the EU WFD came into force in 2000, it was necessary to cooperate in the whole river basin and include the tributaries. This need led to the creation of a more informal structure called Coordination Committee to implement the EU WFD. Austria, Italy, Liechtenstein, the Walloon Region of Belgium and

[63] Brachet, 20
[64] Personal Interview: Annukka Lipponen, UNECE
[65] Brachet, 20

Switzerland are parties to this agreement. Therefore, this new structure effectively expanded cooperation from a specific region to the entire, fostering transboundary water resource management.[66]

Legal Agreements as Foundations for Transboundary Water Resource Management

SADC Revised Protocol on Shared Watercourses (2000) and the UNECE Protocol on Water and Health (1999) also contribute to the growing body of legal frameworks for transboundary water resource management and policy. Clearly this international legal framework is crucial to the development of cooperation for transboundary water resource management. These legal documents like the UN Water Convention and the UNECE Water Convention can be used as templates for domestic or multilateral integrated transboundary water management policies. Some governments have adopted legal regimes that are similar to the UN Watercourses Convention and other international legal regimes. Although there is still great progress to be made to mitigate the threat of conflict and foster cooperation, many governments and international organizations have made great strides in supporting effective cooperation. These cooperative measures, however, can be improved and adapted to pursue further cooperation between riparian states, making stability in the region more attainable.

Although the Mekong River region is at great risk for continued water scarcity, competition and possibly conflict, the adoption of the Basin Development Strategy is a step toward fostering cooperation, stability and sustainable development of the shared water resources. The Lower Mekong Basin Countries adopted the agreement in 2011 under the framework of the Mekong River Commission (MRC), of which China is not a member. There is a growing demand by private sector entities to meet rising demands and needs for water. As the recent Global Water Partnership report claims, "…the river can provide if effective regulatory

[66] Brachet, 21

systems are in place".[67] The Strategy outlines a holistic basin development process that the parties will review every five years, assuring that capacity development continues into the future. The agreement includes, among other provisions, environmental objectives, basin-wide and national, strategies defined for water-related sectors and options for sharing benefits and risks.[68] However, many experts in the field believe that the agreements and provisions adopted by the MRC will not be truly effective and beneficial to the member states without the cooperation of China as the most politically and economically powerful country in the region.[69]

Another vulnerable region where governments have tried to implement cooperative measures is The Nile Basin region. With ten countries, Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Congo, Rwanda, Burundi, Eritrea and now the new country of South Sudan[70], having some portion of their territories in the Nile Basin, many different political, social and economic agendas must be merged into one regarding water management to effectively maintain and develop the water resources there. For decades the relationships between these riparian states have been plagued with mutual distrust, competition, confrontation and accusations of water diversion.[71] The Nile Basin Initiative was adopted in 1999 in an effort to maximize the benefits of cooperative transboundary water resource management while pursuing a shared vision and a set of agreed-upon policy guidelines. However, there are still tensions and disagreements between riparian states like Kenya, Uganda, Egypt, Sudan and the recently-created South Sudan.

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[67] Brachet, 83
[68] ibid.
[69] Backer, Ellen Bruzelius. *The Mekong River Commission: Does It Work, and How Does the Mekong Basin's Geography Influence It's Effectiveness?* Rep. 2007. Web. http://www.fni.no/doc&pdf/ebb-mekong-2007.pdf
[70] Shinn, David. "Comments on the Nile Basin." Water and Security in Africa: Conference Hosted by the U.S. Department of State and AFRICOM. Arlington, Virginia. 21-22 July 2011. Lecture.
[71] Maitra, Sreya. *Nile Basin Initiative: Choosing Cooperation over Conflict*. Tech. 2009. Web. <http://www.globalindiafoundation.org/nile%20river%20basin.pdf>. 3-4

The stability in the region depends on the NBI and how effectively it continues in pursuing its joint goal and policy guidelines.[72]

Cooperation for Transboundary Water Resource Management – Stability and Development

According to author Samuel Luzi, "Societal developments have been linked with the management of ecosystems, and among them transboundary rivers, throughout human history".[73] Effective transboundary water management creates stability and an environment that is conducive to political, social and economic development. The efficient management of transboundary water resources has an immense impact on water scarcity and consequently stability in many regions of the world. Access to water has tremendous implications for human, socio-economic and political development in a given region. Furthermore, fostering cooperation for transboundary water resource management bolsters interdependence, decreasing incentive for conflict and social unrest. As Biswas writes in his article entitled *Cooperation or Conflict in Transboundary Water Management: Case Study of South Asia*, by implementing more effective transboundary water management tools, "…both water professionals and policy-makers are likely to focus their attention on…collaboration between the countries, not only with respect to water but also in terms of a whole spectrum of development issues…".[74] Although there are infinite ways that integrated transboundary water management positively impacts development, the major effects include the political, social and economic ones.

Political Factors – Stability & Legitimacy

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[72] ibid.
[73] Luzi, Samuel. *International River Basins: Management and Conflict Perspectives*. Rep. Zurich: Swiss National Centre of Competence in Research North-South (NCCS North-South). Print. 1
[74] Biswas, Asit K. (2011): Cooperation or conflict in transboundary water management: case study of South Asia, Hydrological Sciences Journal, 56:4, 662-670. Web. <http://dx.doi.org/10.1080/02626667.2011.572886>.

Chronic water scarcity and mismanagement undercuts the legitimacy of governments and creates rampant political instability.[75] If a citizen's government is able to provide him or her with access to clean, potable water, it fosters a relationship of trust and confidence between the citizen and his or her political leaders. Furthermore, when the United Nations declared water to be a basic human right, it fell under the jurisdiction of Human Rights Law, making it one right that governments are bound to uphold. Therefore, by cooperating with other riparian states' governments and effectively managing transboundary water resources, governments could more effectively supply their citizenry with water, increasing their political legitimacy.

China provides a profound and recent example of a situation in which the government shirked its responsibilities to provide water to its citizens, leading to poor governance, corruption and perceptions of illegitimacy. The Tibetan Plateau is the headwater of major rivers that flow into India, Bangladesh, China, Nepal, Pakistan, Thailand, Myanmar and Vietnam. With factors associated with climate change and water scarcity increasing, water availability and management is becoming a greater concern in the Tibetan Plateau region. In many countries such as China, water availability is linked directly to governance. Thus far, although the cost of providing water has been increasing, the Chinese government has refrained from implementing increases in the price of water, for fear of uprisings by farmers and factory workers.[76] This situation mandates a change in the Chinese government's approach to water management. It requires a shift away from their protectionist stance and toward a more global perspective. According to a report prepared by Environmental And Development Desk in the Department of Information and

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[75] Solomon, 449

[76] Environmental and Development Desk, Department of Information and International Relations Central Tibetan Administration, comp. *Water Security and Environmental Management on the Tibetan Plateau*. Rep. Dharamsala, India: Environmental and Development Desk, Department of Information and International Relations Central Tibetan Administration, 2012. Web. <http://www.uscc.gov/hearings/2012hearings/written_testimonies/12_01_26/12_1_26_CTA_testimony.pdf>. 4

International Relations for the United States-China Economic and Security Review Commission, to meet desired targets, "requires a massive build-up of trust in common people and most of all, a huge upfront investment for new infrastructures and upgrading of existing water treatment plants…"[77] In the past, changes regarding water management often fail because of corruption and/or bureaucracy. Therefore, poor governance could have dire effects on the water management in China and by updating existing water management facilities and improving water management in general; the government might increase its political legitimacy.

Human Security – Social Development

"Human security" highlights the mutual interdependence of national security and the individual's freedom from both 'immediate' threats and chronic threats such as hunger, disease and repression. Human security is one of the overarching goals and requirements for human and social development. Water security is an overwhelming part of human security. Access to water can have positive impacts on nutrition, equality and overall human well-being.[78] For example, with water scarcity running rampant, many women and children have to travel long distances to gather water for home and agricultural use. This time-consuming activity compels these women and children to forgo education and productive work and thus the opportunity to create better lives for themselves and their families.[79] Furthermore, when billions of people do not have access to clean drinking water or water for hygiene and sanitation, they cannot live their lives with dignity, clearly negatively affecting their human security. Another way that inefficient water management affects human security is through health. Without access to clean drinking

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[77] Ibid. 5

[78] Manara, Regasa E., Munir A. Hanjra, Gina E. Castillo, Helle Munk Ravnborg, Lawrence Smith, and Barbara Van Koppen. "Agricultural Water Management and Poverty Linkages." *Agricultural Water Management* 97 (2010): 520-27. Web. 5 Apr. 2012. <http://agecon.nmsu.edu/fward/age384/spring-2010/readings/water-poverty-links-in-ag.pdf>. 523

[79] Solomon, Steven. *Water: The Epic Struggle for Wealth, Power, and Civilization*. New York: HarperCollins, 2010. Print. 57

water many people, especially those in developing countries, suffer from diseases like diarrhea, dysentery, malaria, dengue fever, schistosomiasis and cholera. This drives down the productivity and human capital of any country or region that experiences severe water scarcity. Therefore, by fostering cooperation and improvement of transboundary water management, water security will increase and in turn human security.[80] This improvement in security will eventually lead to greater human development in the region.

The connection between access to water and human security and development is manifested in one case in Africa. For example, in Kenya, an irrigation scheme in the Gambia increased food security for households in the region and through increasing income, increased food consumption and in turn reduced poverty. Additionally, after adopting an effective water management plan, Nepalese and Indian citizens increased their intake of fruits and vegetables, effectively improving their nutrition and health.[81] Access to water also reduces rampant inequality on a smaller scale as well as a more global one. By fostering cooperation for water resource management, the incomes of the poor will increase, as it did in Kenya, decreasing local inequality and possibly shrinking the gap between developing and developed countries in the world today.

South Asia is another region in which the correlation between effective water management and poverty reduction becomes apparent. It is a little known fact that the Ganges-Brahmaputra-Meghna (GBM) basin region has a higher concentration of absolutely poor people than in all the countries of sub-Saharan Africa combined.[82] The biggest players in the region are India, Bhutan, Nepal and Bangladesh. Positive collaboration between India and Bhutan has

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[80] ibid.

[81] Manara, 523

[82] Biswas, *Cooperation or Conflict*, 663

resulted in major improvements in human development throughout the region. The collaborative development framework effectively utilizes water development as a catalyst for economic growth and poverty alleviation.[83] Being the smallest country in the region Bhutan chose to collaborate very closely with India in their efforts to sustainably develop transboundary water resources. However, cooperation between Nepal, India and Bangladesh was not as successful due to mistrust and the power structure in the region.[84] If the cooperation framework were to be improved, further poverty reduction is possible.

Socio-economic Factors

Not only does effective water management prove to be an important factor in poverty reduction and human security, but also in economic development. Water scarcity often manifests itself in the form of food scarcity, decreased food production as well as stunted industrial and agricultural development. For the 850 million rural poor who are primarily engaged in agriculture for survival, water is essential to their income. Especially in many developing countries, water scarcity is a major factor hindering agricultural output, and consequently the income of the world's rural poor. Therefore, water is an essential underpinning of economic development.[85] Effective and peaceful transboundary water management could improve the socio-economic situations of many countries. Access to water increases production and productivity, enhances employment opportunities as well as stabilizing income.[86] Cooperation for transboundary water resource management can also foster cooperation in other, economic areas and increase trade with neighboring countries.

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[83] ibid. 666
[84] ibid. 668
[85] Vapneck, Jessica, Bruce Aylward, Christie Popp, and Jamie Bartram, eds. *Law for Water Management: A Guide to Concepts and Effective*. Issue brief no. 101. Rome: Food and Agriculture Organization of the United Nations, 2009. Print. 50
[86] Manara, 522

The correlation between effective water management and employment is demonstrated in southern Palawan in the Philippines. Irrigation increased the intensity of labor use in the region and increased farm output also drove up the local demand for labor in the poverty-stricken community.[87] Dependability of water not only increases output but decreases the variability of output between growing seasons as well. For example, in Brazil, the measure of yield variability for rice crops has declined in irrigated areas compared to rain-fed areas.[88] All of these factors surrounding cooperation for transboundary water resource management create an environment that is conducive to not only social development but economic development as well.

Conflict – Water and Conflict Resolution

Finally, cooperation for transboundary water resource management and the stability that it creates is essential to conflict resolution. Peace building processes, in many respects are closely linked to cooperation for transboundary water resource management. Shared water resources can be used as a tool to mitigate conflict and also to provide incentive for conflicting countries to resolve the discord and share both the benefits and risks of transboundary water resource management. Effective cooperation, water policy and allocation of water also removes incentives for factions and citizens to riot and clash within countries.[89]

One powerful example is the role that water management needs to play in the peace resolutions regarding the conflict between India and Pakistan. On one hand, water scarcity and competition in the region can work to exacerbate the political and ethnic tensions, however water management also provides an opportunity for the players in the conflict to cooperate. The Indus Basin originates at Lake Ngangla Rinco and flows 3,000 km to the Arabian Sea. It is the main

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[87] ibid.
[88] ibid.
[89] ibid.

source of water for Pakistan but India has significant control over the resource.[90] The conflict between India and Pakistan dates back to the partition of the two countries but is exacerbated by conflicting claims of flows of the Indus River and shifting political borders.[91] The Indus Water Treaty (1960) addressed the concerns of both countries and set forward specific guidelines and mechanisms for effective water management. There are clear implications in water management that have bearing on the political and social situation in the region. First, the shifting political borders exacerbated already existing tensions regarding water, adding to the complexities of the conflict. Second, power inequalities and the power superiority of India in the region needed to be taken into account when negotiating. Third, positive, active and continuous involvement of a third party, the World Bank in this case, is vital to overcome conflict. Fourth, this negotiation process indicates that sensitivity to each party's particular hydrologic concerns is essential to reaching an agreement.[92] In fostering effective cooperation regarding water management and separating water management from other possible points of contention, India and Pakistan were able to cooperate in developing the transboundary water resources. The process of cooperation for water management also has the potential to give way to further interdependence and negotiations in the future.

Recommendations

Focus on Shared Benefits

The problem of water scarcity is a collective one, which requires a collective solution. Many of the countries currently experiencing severe water scarcity have water management

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[90] IUCN, comp. *The Lower Indus River: Balancing Development and Maintenance of Wetland Ecosystems and Dependent Livelihoods*. Rep. IUCN. Web. <http://cmsdata.iucn.org/downloads/indus.pdf>.

[91] Wolf, Aaron T., and Joshua T. Newton. *Case Study of Transboundary Dispute Resolution: The Indus Water Treaty*. Rep. Oregon State University, 2008. Web. <http://www.transboundarywaters.orst.edu/research/case_studies/Indus_New.htm>.

[92] ibid.

policies that contradict those of the neighboring countries. These inefficient policy frameworks could be eradicated through cooperation that benefits all riparian states. Additionally, upstream countries, while situated geographically in a more beneficial position, have a responsibility to allocate downstream countries their due share of the water resources.

Forum for Discussion

To foster effective cooperation, the mechanisms of management need to address the grievances of all parties involved. As Annukka Lipponen, UNECE pointed out, it is essential that riparian states and the general international community have a forum where the many different parties can come together to discuss strategies, agreements and institutions for transboundary water resource management. In the future, discussion forums will need to play a more prominent role in transboundary water resource management both on the national and international level. Although several effective, legitimate conventions exist that include an institution to facilitate discussion surrounding transboundary water management, more governments need to engage in discussion in order to more effectively enforce the international and national agreements regarding transboundary water resource management.

Prioritizing by the International Community

Because of the sensitive nature of shared water resources, the international community and its collective organizations have been reluctant to prioritize transboundary water management as a primary point on the global agenda. Effective transboundary water resource management and cooperation could determine the future of water scarcity and its effects but also political stability, human development and conflict in the future. Instead of calling attention to the global water crisis and the threats that water scarcity poses to the global population; the

international community needs to shift its focus toward fostering cooperation for transboundary water resource management, which will consequently mitigate the threats of water scarcity.

Conclusion

Water scarcity is becoming a more prevalent phenomenon everyday for an increasing number of people throughout the world. With mounting population growth rates, climate change, rising demand for freshwater and inefficient water management policies, the pressing problem of water scarcity will only become more urgent in the future. Mismanagement of transboundary water resources is one of the many causes of water shortage in countries around the world and one of the gravest threats to security, development, productivity and human livelihoods today. The promotion of cooperation for transboundary water resource management is essential going forward in order to achieve poverty reduction, economic development and reduce the chaos and devastation that conflict that can result from increased competition for scarce resources. By focusing on the shared benefits of cooperation regarding the utilization of transboundary water resources, fostering more open discussion and negotiation and placing transboundary water resource management high on the international agenda, the global community has the ability to combat water scarcity and its potentially catastrophic effects as well as promoting general cooperation among competing states. Ultimately, there is no other option; water scarcity is a reality that demands cooperative solution that will be peaceful and lasting.

Bibliography

Ahmed, Osman Yussuf. *Water Scarcity in Kenya's Rahole Drought Migration and Flood Control Canal (Inter-basin Water Transfer) A Step Toward The Solution*. Tech. UNESCO, 2008. Print.

Bayon, Jean-Philippe. United Nations Development Programme. "Water Scarcity and the UNDP." Personal interview. 3 Apr. 2012. International Environment House Geneva, Switzerland.

Bencala, Karin R., and Geoffrey D. Dabelko. “Water Wars: Obscuring Opportunities.” *Journal of International Affairs* 61.2 (2008): 21-33. Print.

Biswas, Asit K., Cecilia Tortajada, and Olli Varis, eds. *Management of Transboundary Rivers and Lakes*. Berlin: Springer-Verlag, 2008. Print. Water Resources Development and Management.

Biswas, Asit K. (2011): Cooperation or conflict in transboundary water management: case study of South Asia, Hydrological Sciences Journal, 56:4, 662-670. Web. <http://dx.doi.org/10.1080/02626667.2011.572886>.

Brachet, Christophe, and Daniel Valensuela, comps. *The Handbook for Integrated Water Resources Management in Transboundary Basins of Rivers, Lakes and Aquifers*. Publication. International Network of Basin Organizations (INBO) and the Global Water Partnership (GWP), 2012. PDF.

Coping with Water Scarcity: A Strategic Issue and Priority for System-Wide Action. Publication. UN-Water Thematic Initiatives, 2006. Print.

Csurgai, Dr. Gyula. "Geopolitical Analysis." SIT Study Abroad Geneva Lecture. SIT Office, Geneva, Switzerland. 23 Jan. 2012. Lecture.

Eckstein, Gabriel. "Water Scarcity, Conflict, and Security in a Climate Change World: Challenges and Opportunities for International Law and Policy." *Wisconsin International Law Journal* 27.3 (2009): 409-61. *EBSCOhost*. Index to Legal Periodicals & Books Full Text (H.W. Wilson), 15 Oct. 2009. Web. 8 Feb. 2012.

Giordano, Meredith, Mark Giordano, and Aaron Wolf. "The Geography of Water Conflict and Cooperation: Internal Pressures and International Manifestations." *The Geographical Journal* 168.4 (2002): 293-312. *JSTOR*. The Royal Geographical Society, 2002. Web. 8 Feb. 2012. <.>.

Haddadin, Munther J. "Water in the Middle East Peace Process." *The Geographical Journal* 168.4 (2002): 324-40. Web.

Hamro-Drotz, Dennis. "Water Management, Water Scarcity and Conflict." Personal interview. 20 Mar. 2012. UNEP Post-Conflict and Disaster Management Branch.

Hepburn, Jonathan. ICTSD. "ICTSD Interview." Personal interview. 27 Mar. 2012. International Environment House 2. Geneva, Switzerland.

International Crisis Group, comp. *Central Asia: Water and Conflict*. Rep. no. 34. Brussels: International Crisis Group, 2002. Print.

Kalinin, Mikhail. *Transboundary Waters, Sharing Benefits and Sharing Responsibilities*. UN-Water Thematic Paper, The United Nations Office to Support the International Decade for Action 'Water for Life' 2005-2015, Zaragoza, Spain: 2008.

Klare, Michael. *Resource Wars*. New York: Owl , Henry Holt and, 2001. Print.

Libiszewski, Stephan. *Water Disputes in the Jordan Basin Region and Their Role in the Resolution of the Arab-Israeli Conflict*. Tech. 13th ed. Zurich: Center for Security Policy and Conflict Analysis and the Swiss Peace Foundation, 1995. PDF. 2

Lipponen, Annukka. UNECE. "Cooperation for Transboundary Water Resource Management." Personal interview. 4 Apr. 2012.

Luzi, Samuel. *International River Basins: Management and Conflict Perspectives*. Rep. Zurich: Swiss National Centre of Competence in Research North-South (NCCS North-South). Print.

Maitra, Sreya. *Nile Basin Initiative: Choosing Cooperation over Conflict*. Tech. 2009. Web. <http://www.globalindiafoundation.org/nile%20river%20basin.pdf>.

Manara, Regasa E., Munir A. Hanjra, Gina E. Castillo, Helle Munk Ravnborg, Lawrence Smith, and Barbara Van Koppen. "Agricultural Water Management and Poverty Linkages." *Agricultural Water Management* 97 (2010): 520-27. Web. 5 Apr. 2012. <http://agecon.nmsu.edu/fward/age384/spring-2010/readings/water-poverty-links-in-ag.pdf>.

Mohamed, Yasir, and Makonnen Loulseged. *The Nile Basin Water Resources: Overview of Key Research Questions Pertinent to the Nile Basin Initiative*. Working paper no. 127. Colombo, Sri Lanka: International Water Management Institute, 2008. <http://www.iwmi.cgiar.org/Publications/Working_Papers/working/WOR127.pdf >.

Molle, Francois, Tira Foran, and Mira Kakonen, eds. *Contested Waterscapes in the Mekong Region*. London: Earthscan, 2009. Print.

"Palestinian Water Crisis Deepens". *BBC News*. 2009. Accessed: 8 February 2012. <http://news.bbc.co.uk/go/pr/fr/-/2/hi/middle_east/8007801.stm>.

Partow, Hassan. UNEP Post-Conflict and Disaster Management Branch. "Water Scarcity and Development." Personal interview. 7 Mar. 2012.

Responding to Drought and Famine in the Horn of Africa, Senate Foreign Relations

Subcommittee on African Affairs Cong. (2011) (testimony of Principal Deputy Assistant Secretary for the Bureau of African Affairs, U.S. Department of State). Print.

Rogers, Adam. United Nations Development Programme. "Water Scarcity and Development." Personal interview. 2 Apr. 2012. International Environment House Geneva, Switzerland.

Salim, Dr. Nidal. Executive Director for Global Institute for Water Environment and Health. 3, rue de Varembé- C.P. 116□1211, Geneva, Switzerland. 14 February 2012.

Shinn, David. "Comments on the Nile Basin." Water and Security in Africa: Conference Hosted by the U.S. Department of State and AFRICOM. Arlington, Virginia. 21-22 July 2011. Lecture.

Solomon, Steven. *Water: The Epic Struggle for Wealth, Power, and Civilization*. New York: HarperCollins, 2010. Print.

The Free Dictionary. West's Encyclopedia of American Law, 2008. Web. 3 Apr. 2012. <http://legal-dictionary.thefreedictionary.com/Riparian+Rights>.

The Global Institute for Water Environment and Health. GIWEH. Accessed: 15 February 2012. <www.giweh.ch>.

UNECE. *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*. Helsinki. Helsinki: UNECE, 1992. PDF. <http://www.unece.org/fileadmin/DAM/env/water/pdf/watercon.pdf>.

Vapneck, Jessica, Bruce Aylward, Christie Popp, and Jamie Bartram, eds. *Law for Water Management: A Guide to Concepts and Effective*. Issue brief no. 101. Rome: Food and Agriculture Organization of the United Nations, 2009. Print.

Waterbury, John. *The Nile Basin: National Determinants of Collective Action*. New Haven: Yale UP, 2002. Print.

Watkins, Kevin. *Human Development Report 2006*. Rep. New York: United Nations Development Programme, 2006. Print.

Wolf, Aaron T., and Joshua T. Newton. *Case Study of Transboundary Dispute Resolution: The Indus Water Treaty*. Rep. Oregon State University, 2008. Web. <http://www.transboundarywaters.orst.edu/research/case_studies/Indus_New.htm>.

Yu, Vicente. The South Centre. "Water Scarcity and Development." Personal interview. 8 Mar. 2012. The South Centre Geneva, Switzerland.