

## **Relationship Between Freshwater Resources, Socio-Cultural Dynamics, and Geopolitical Stability**

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### **Introduction**

Water security is the availability of the right quality and right quantity of freshwater resources at the right times. The availability is dependent on both physical and human geography. Water security is a prerequisite for human, national and environmental security, as well as economic growth. Use of global freshwater resources can compete between basic needs of individual consumption, subsistence agriculture and ecosystem services, and the economically driven sectors of agriculture, energy, industry and transportation. Due to this complexity, effective and harmonized geospatially relevant policy and management of global freshwater resources is vital for national and international security and instability concerns, now and into the foreseeable future.

Relationships between political and social instability and changes to the physical environment have been postulated by numerous scholars, with shifts in freshwater resource access, quality and quantity often noted as a key influence on societal and political stability.<sup>1, 2, 3, 4</sup> Because

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<sup>1</sup> Brown, O., Hammill, A., & McLeman, R. (2007). Climate change as the 'new' security threat: implications for Africa. *International Affairs*, 83(6), 1141-1154.

<sup>2</sup> Eckstein, Yoram, and Gabriel E. Eckstein (2005). Transboundary Aquifers: Conceptual Models for Development of International Law. *GROUND WATER*. Vol. 43, No. 5, September-October 2005. Pp. 679-690.

<sup>3</sup> Eckstein, G. (2010). Water Scarcity, Conflict, and Security in a Climate Change World: Challenges and Opportunities for International Law and Policy. *Wisconsin International Law Journal*, Vol. 27(No.3), 411-424.

water accessibility interacts with broader security concerns and drives global economics, it can contribute to state instability and social disruptions. Changes in water resources can alter the relative wealth of countries and cause shifts in relative power. Inadequate water supply tempers economic growth in many countries, particularly in developing countries where hydropower serves as a main power source. Unavailability of water during key agriculture seasons poses risks to both local and global food markets. In many ways, freshwater resources hold societies together and when these systems are altered, the myriad connections become evident.

This paper will examine the interaction between environmental stresses, institutional and human system responses at various scales, and state stability (as has been described by scholars through the lens of resilience theory and securitization).<sup>5</sup> Resilience theory applies to both ecological and social systems, and securitization theory describes the two main areas of stability with which governments are concerned. Finally, this paper offers four concepts by which to deal with the problems of individual, national and international security concerns with freshwater resources.

## **Background**

Fresh water as a limited resource is influenced by geophysical conditions, geopolitical agendas, and socio-cultural dynamics on several scales.

### *Geophysical*

Availability of freshwater resources is largely dependent upon an array of regional physical geography characteristics, and the relationship of corresponding human population patterns are typically affected by this availability. People commonly live where fresh water is available for basic and community needs. When this is not the case, communities alter freshwater resources to serve their needs. Freshwater resources are under increased pressure from direct and indirect human alterations and use.<sup>6, 7, 8</sup> Direct alterations of freshwater resources include dams, irrigation project development and contamination, and indirect alterations include changing precipitation and temperature patterns due to global climate change. Global climate change has especially raised concerns that changes to freshwater resources will pose unique challenges to many individual nation and regional security interests.<sup>9</sup> Several studies have examined how

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<sup>4</sup> Swart, R. (1996). Security risks of global environmental changes. *Global Environmental Change-Human and Policy Dimensions*, 6(3), 187-192

<sup>5</sup> Allan, K. (2007). *The social lens: an invitation to social and sociological theory*. Thousand Oaks, California: Pine Forge Press.

<sup>6</sup> Brown (2007), *op. cit.*

<sup>7</sup> Eckstein (2005), *op. cit.*

<sup>8</sup> Eckstein (2010), *op. cit.*

<sup>9</sup> National Intelligence Council (2012), *Intelligence Community Assessment on Water Security*, Washington D.C.

vulnerable systems that are already stressed might be driven past a tipping point by shifts in climate.<sup>10, 11, 12</sup> Shifts in climate can impact water availability due to changes in storage in form of snow and ice, and water quality and flow due to changes in rate of melting snow and ice, and other forms of precipitation.

### *Geopolitical*

Little harmony exists in the arena of international water policy, and of those policies there is even less regarding international groundwater resources.<sup>13, 14</sup> Groundwater is the main water resource used by more than 3 billion people for everyday use.<sup>15, 16</sup> As surface water resources become increasingly polluted, contaminated and diverted, dependence on groundwater increases globally.<sup>17</sup> In the absence of international water policy, uncoordinated use of shared freshwater resources could result in further challenges with quality, quantity and access issues. Though scholars suggest water wars are possible in the near future, there is surprising evidence that international cooperation regarding freshwater resources was more likely than conflict.<sup>18, 19</sup> Where stronger institutional capacity exists in international basins, conflict on all scales is reduced.<sup>20</sup>

International water policy is also influenced by direct foreign investment. These investments may be in the form of development projects, such as building irrigation networks and dams. Recently, these investments have also included land acquisition (the buying or leasing of land in

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<sup>10</sup> Barnett, J. (2003). Security and climate change. *Global Environmental Change* 13 7–17.

<sup>11</sup> Dabelko, G. (2008). An Uncommon Peace: Environment, Development, and the Global Security Agenda. *Environment*, 50(3 (May/June)), 33-45.

<sup>12</sup> Mabey, N. (2007). Security Trends and Threat Misperceptions. In P. Cornish (Ed.), *Britain and Security* The Smith Institute.

<sup>13</sup> Eckstein (2005), *op. cit.*

<sup>14</sup> Eckstein (2005), *op. cit.*

<sup>15</sup> Eckstein (2005), *op. cit.*

<sup>16</sup> Puri, S. and A. Aureli (2005). Transboundary Aquifers: A Global Program to Assess, Evaluate, and Develop Policy. *GROUND WATER*. Vol. 43, No. 5, September-October 2005. Pp. 661-668.

<sup>17</sup> Eckstein (2005), *op. cit.*

<sup>18</sup> Gleick, Peter H. (1993). Water and Conflict: Fresh Water Resources and International Security *International Security*, Vol. 18, No. 1 (Summer, 1993), pp. 79-112

<sup>19</sup> Wolf, A. T. (1997). International water conflict resolution: Lessons from comparative analysis. *Water Resources Development*, 13, 333–365.

<sup>20</sup> De Stefano, L., P. Edwards, L. de Silva and A. T. Wolf (2010). “Tracking Cooperation and Conflict in International Basins: Historic and Recent Trends.” *Water Policy*. Vol 12 No 6 pp 871–884.

one country by another country) often along surface water resources.<sup>21</sup> The land acquisition phenomena increased subsequent to the world food crisis of 2007-2008 and concerns over 227 million hectares of land, largely in sub-Saharan Africa in countries such as Tanzania, and also in developed nations such as Australia.

### *Socio-cultural*

In the international community, freshwater resources are still debated as to whether they are a human right or a global commodity.<sup>22</sup> Worldwide, an estimated 1.2 billion people lack access to safe drinking water and more than 2.4 lack access to sanitation.<sup>23, 24</sup> The problem may have technological and economic solutions, but scholars increasingly see the problem nested in the imbalance of power, lack of agency in marginalized populations, and lack of political will in local or national governments. International interests—through efforts such as commitment to the Millennium Development Goals (MDGs) by world leaders in 2000—seek to reduce this number through international development and aid. Accordingly, global dam development has been increasing over the past 12 years despite warnings of consequent social and environmental costs, including an impact on nearly 500 million people dependent on affected rivers.<sup>25</sup>

Given the complicated nature of water resource systems, there exists substantial need for better understanding of these systems, to learn how to more effectively manage them to ensure a sustainable future.

### *Security and resilience in fresh water*

Resilience theory examines complex system dynamics, and, by describing how systems react to change by reconfiguring into a different state beyond a tipping point, addresses the complexity of human and natural systems in the face of change. Securitization examines social

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<sup>21</sup> Jagerskog, A., Cascao, A. Harsmar, M. and Kim, K. (2012). Land Acquisitions: How will they Impact Transboundary Waters? Report Nr 30. SIWI, Stockholm.

<sup>22</sup> GliECK, P. (2000). A Look at Twenty-First Century Water Resources Development, *Water International*, 25:1, 127-138.

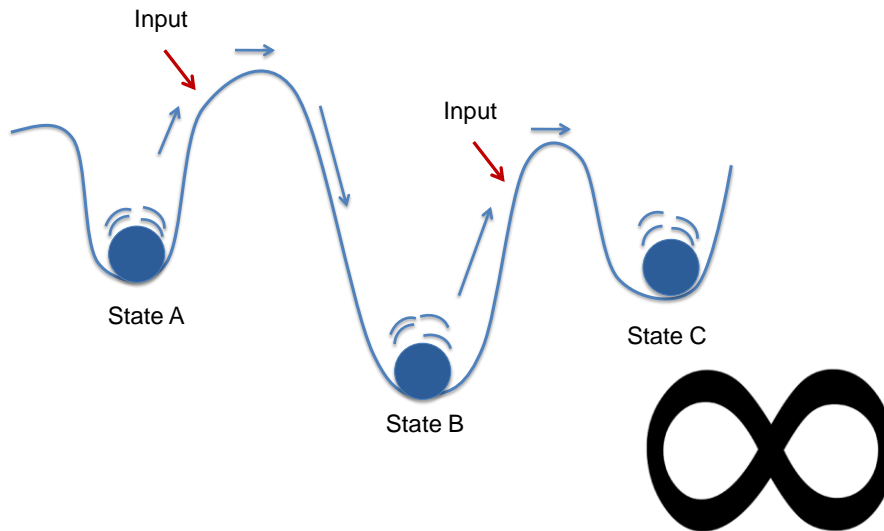
<sup>23</sup> Loftus, Alex. (2009). Rethinking Political Ecologies of Water. *Third World Quarterly*. Vol. 30, No. 5, pp. 953-968.

<sup>24</sup> Robbins, Peter (2003). Transnational Corporations and the Discourse of Water Privatization. *Journal of International Development*. Dev. 15, 1073–1082 (2003)

<sup>25</sup> Richter, B.D.; Postel, S.; Revenga, C.; Scudder, T.; Lehner, B.; Churchill, A. and Chow, M. (2010). Lost in development's shadow: The downstream human consequences of dams. *Water Alternatives* 3(2): 14-42

construction of the concept of security at different scales in order to better predict how different levels of society will react to real or perceived change.

## Resilience Theory



Resilience theory is best known through C.S. Holling's descriptions of ecological systems as adaptive complex systems. The theory has been used by natural and social scientists to describe the adaptive nature of complex human and natural systems as they absorb non-linear inputs of change, and do so continuously in an ongoing cycle. Change is described as an input into a system. There is a point beyond which a system can no longer absorb the input in its current state, say state A in the example, and transforms to another altered state, state B, in which it can continue until another input pushes it beyond some threshold into yet another state, state C.<sup>26</sup> This alteration between different states changing through inputs and driven past a threshold to another state is thought to be an infinite process and is often visually described by the infinity symbol.

Though social sciences struggle to make use of this theory in practical application, it helps to describe the changes happening in both the macro system to include environmental, economic and human system variables, as well as nested systems within each of these categories that

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<sup>26</sup> Peterson, Garry (2000). Political ecology and ecological resilience: An integration of human ecological dynamics. *Ecological Economics*. Vol. 35, pp. 323-336.

also include governance and development. The application of resilience theory when approaching international freshwater resources is useful in identifying potential drivers, inputs, and thresholds to help decide where action could be taken to buffer abrupt change or to build a more resilient response for the nested and overall systems.

Buzan considers security from different scales to describe how people or societies construct or “securitize” threats.<sup>27</sup> The three levels used to describe interactions at different scales are individuals, states and international systems.<sup>28</sup> Starting at the individual level, security can be considered as a factor of “life, health, status, wealth, freedom”.<sup>29</sup> While defining individual security can be complicated by personal differences, Maslow’s Hierarchy type-requirements generally hold true (Maslow, 1943).<sup>30</sup> Maslow proposed that physiological needs, such as water access, form the base level of human motivation and, consequently, stability. However, the concept of security at the individual level does not directly translate and apply to national security.<sup>31</sup> For the level of state security, Buzan 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.<sup>32</sup> Each sector impacts security individually, but these individual sectors are also linked to one another often in intricate and complex ways, making a discussion of individual sectors inadequate to address impacts on security.<sup>33</sup>

Buzan’s discussion of security and stability at different scales and for different sectors is especially useful in the context of freshwater resources and climate change.<sup>34, 35</sup> The impacts of

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<sup>27</sup> Buzan, B. (2000). Security communities. *International Affairs*, 76(1), 154-154.

<sup>28</sup> Buzan, B., & Waever, O. (2009). Macrosecuritisation and security constellations: reconsidering scale in securitisation theory. *Review of International Studies*, 35(2), 253-276.

<sup>29</sup> Stone, M. (2009). Security Discussion Papers Series 1 Columbia University, School of International and Public Affairs.

<sup>30</sup> Maslow, A. (1943). A Theory of Human Motivation. *Psychological Review*, 50, 370-396.

<sup>31</sup> Stone (2009), *op. cit.*

<sup>32</sup> Buzan & Waever (2009), *op. cit.*

<sup>33</sup> Stone (2009), *op. cit.*

<sup>34</sup> Buzan (2000), *op. cit.*

<sup>35</sup> Buzan, B. (2001). Losing control: global security in the twenty-first century. *International Affairs*, 77(3), 696-696.

water stress is largely of concern for the environmental sector, but it will arguably be as much of a factor and influence on all other sectors, sometimes indirectly, with consequences that are largely unpredictable.

## Discussion

The three areas of geophysical, geopolitical and socio-cultural merge together on the platform of freshwater resources. Fresh water can be a component of political and economic stability, as well as influence sustainable development, democracy and equity, but within these sectors its importance fluctuates. Scarcity persists despite the availability of technical knowledge and/or solutions and high profile pledges, such as the MGDs. This is in large part due to politics, power and competing interests rather than technology and/or economics. Specifically, water problems are thought to persist due to the lack of agency in disadvantaged communities, the imbalance of power within and between nation-states, and lack of political will of governments to take action to improve sanitation and freshwater distribution.<sup>36, 37, 38</sup> This may not impact national stability in the short term, but given time, the effects may reverberate through the entire system.

It is only when freshwater issues impact sectors of primary importance to governmental stability and power, such as political stability and economic growth, that nations begin to view fresh water itself as a resource worth political action. Improved freshwater access becomes important in nation-states that are developing and use hydropower to satisfy their energy security such as China, Turkey, India, Tajikistan and Ethiopia.<sup>39, 40, 41</sup> Dams are traditionally thought of as a tangible symbol of modernization and development.<sup>42, 43</sup> Pakistan and Egypt consider fresh

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<sup>36</sup> Loftus (2009), *op. cit.*

<sup>37</sup> Molle, Francois (2005). Elements for a political ecology of river basins development: The case of the Chao Phraya river basin, Thailand. Conference paper presented to the 4th Conference of the International Water History Association. December 2005, Paris.

<sup>38</sup> Robbins, Paul (2004). *Political Ecology*. Blackwell Publishing, Malden, MA.

<sup>39</sup> Zentner, M., Stahl, K., Basist, A., Blankespoor, B., Wolf, A. T., & De Stefano, L. (2008). Estimating Flow Probabilities to Meet Water Treaties Allocation Requirements. . *Draft paper to the World Bank*

<sup>40</sup> Zentner, M. (2012). *Design and Impact of Water Treaties: Managing Climate Change*, Springer Theses Series.

<sup>41</sup> FAO. (2009). *National Investment Brief Sector: Water for agriculture and energy. The Republic of Turkey*. <http://www.fao.org>

<sup>42</sup> Whittlesey, Denvent S. (1935). "The Impress of Effective Central Authority upon the Landscape." *Annals of the Association of American Geographers* Vol. 25 p. 13.

water essential to their agricultural production to provide jobs for the majority of their populations, which in turn provides pacification of the population and stability for the government.<sup>44, 45, 46</sup> The uses of fresh water that many consider most vital—potable fresh water for individual consumption and proper sanitation—are not what drive action for some, if not most, governments. Many nations are generally not interested in freshwater components that make up the UN’s Human Development Index unless it impacts the stability of a populace and in turn the stability of the government. For example, Turkey’s interest in the development of its freshwater resources and efforts to improve quality likely stem from the practical relationship between freshwater resource’s impact on other sectors and GDP, which in turn has the largest impact on its stability.<sup>47, 48</sup>

The specific cases where political stability is impacted by freshwater resources are where conflict at the higher levels of government appears to be most prevalent, in places that have established freshwater-centric economies such as the Nile, Jordan and Indus basins.<sup>49</sup> Water’s relationship to agriculture, land and electric power are of particular importance to a nation’s economic and overall stability.

### **Water, food and land acquisition**

Food price increases in 2008 led some nations to struggle to meet their food demands. Most current projections indicate that global food production capacity will be increasingly challenged. Perhaps in response to price fluctuations and climate change projections, a number of water-scarce, developed countries are seeking their own fresh water solutions by securing agricultural land in developing countries. These land acquisitions have the potential to change the geopolitical landscape. Most of the land acquisitions are taking place on the African continent, in countries with existing food security issues such as Sudan and Ethiopia.

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<sup>43</sup> Wittfogel, Karl A. (1956). “Hydraulic Civilizations.” In *The Structure of Political Geography*, Kasperson and Minghi (eds.), 1969 p.442-449, Aldine Publishing Company, Chicago.

<sup>44</sup> FAO Water (2010). AQUASTAT. Retrieved 18 September 2010, from <http://www.fao.org/nr/water/>

<sup>45</sup> McCaffrey, S. C. (2007). *The Law of International Watercourses* (2nd ed.). Oxford: Oxford University Press.

<sup>46</sup> Whittington, D., Wu, X., & Sadoff, C. (2005). Water resources management in the Nile basin: the economic value of cooperation. *Water Policy*, 7, 227-252

<sup>47</sup> Warner (2008), *op. cit.*

<sup>48</sup> FAO (2009), *op. cit.*

<sup>49</sup> Zenter (2012), *op. cit.*



During the World Economic Forum Water Initiative of 2009, it was stated 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”.<sup>50</sup> Countries with abundant freshwater resources will become more attractive locations for investments, and instability might be exacerbated in less developed countries willing to mortgage long-term freshwater scarcity for immediate financial.<sup>51</sup> In this way, the projections (and not the documented impacts) of physical scarcity are driving and influencing changes in geopolitical and socio-economic scarcity both between and within nations.

### **Water, electric power, and large-scale dams**

Development of freshwater resources for hydropower generation and issues with water access are often intimately connected, and electricity shortages can also create water shortages. Despite the lessons learned over the last 50 years outlined in the *World Commission on Dams Report*, and subsequent alterations to practices of some lending institutions such as the World Bank, countries are continuing construction of large-scale dams. Though the immediate economic impacts of large-scale dam development may be beneficial in general (job creation, electricity generation, water storage for increased agricultural production, flood control), the broader effects of new dams on local communities (to water quality and associated environmental resources) have a negative long-term economic impact (loss of livelihoods, loss of species, degradation of water quality and quantity). In countries such as Tajikistan and Ethiopia, large-scale dam development offers economic development opportunities for crippled national economic systems. For this reason, it is not clear if there is a significant relationship between state security improvements and engineered water projects.

### **Nexus of freshwater and conflict**

Recent research indicates fresh water is of relatively low-level importance to national security (; Ali, 2008).<sup>52, 53, 54</sup> Yet, as is seen in many instances, freshwater issues sometimes extend

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<sup>50</sup> World Economic Forum Water Initiative (2009). *World Economic Forum Water Initiative Managing Our Future Water Needs for Agriculture, Industry, Human Health and the Environment*. Paper presented at the World Economic Forum Annual Meeting 2009.

<sup>51</sup> *Ibid.*

<sup>52</sup> De Stefano (2010), *op. cit.*

<sup>53</sup> Wolf, A. “A Long Term View of Water and International Security.” *Journal of Contemporary Water Research & Education*. Issue 142, pp. 67-75, August 2009.

beyond this low level to become part of the larger, national stability scheme. The National Intelligence Council released an unclassified Intelligence Community Assessment on Water Security in 2012 that summarizes how water can impact other associated sectors such as energy and food, which together can be a driver in national security calculations:

*During the next 10 years, many countries important to the United States will experience water problems—shortages, poor water quality, or floods—that will risk instability and state failure, increase regional tensions, and distract them from working with the United States on important U.S. policy objectives. Between now and 2040, fresh water availability will not keep up with demand absent more effective management of water resources. Water problems will hinder the ability of key countries to produce food and generate energy, posing a risk to global food markets and hobbling economic growth. As a result of demographic and economic development pressures, North Africa, the Middle East, and South Asia will face major challenges coping with water problems.<sup>55</sup>*

This suggests that the primary cause for conflict is a shift in the way a nation views freshwater. Change in water politics occurs for a multitude of reasons including change in weather patterns (hydrologic stress), altered freshwater requirements, shifts in the overall political relations between the treaty signatories of shared waters, changes in economic goals, or changes in the utilization of freshwater resources (engineering projects). Such changes or shifts prompt political action. All shifts are unique, but have an overarching theme: the shifts impact the stability of one of the stakeholder groups in some way.

Freshwater issues arguably become more important, and possibly conflictive, when they are tied to other issues with a higher degree of impact on stability. Countries may be more willing to go through the effort of conflict or issuing a formal complaint to the offending party if it has more of an impact on its stability. Hydrologic stress may only temporarily elevate the importance of fresh water to the level of national-security concerns. Freshwater politics are shaped by other issues that are not easily captured by blanket variables applied to all nations. For example, in the Indus and Jordan basins, many of the freshwater and climate complaints are generated by state relations in general, with hydrologic stresses being inextricably related to geopolitical stresses.

Increased emphasis on fresh water by nations where fresh water has reached a higher level of consideration for stability coincides with areas that have exhibited more conflict in the

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<sup>54</sup> Ali, S. (2008). Water politics in South Asia: Technocratic cooperation and lasting security in the Indus Basin and beyond. *Journal of International Affairs*, 61(2; Spring/Summer), 167-182.

<sup>55</sup> National Intelligence Council (2012), *op. cit.*

past. Conflict or disagreements seem to occur where fresh water use/scarcity has raised the importance of fresh water in the national calculus to become a part of the security and stability calculations. Especially for areas within the Middle East (Jordan, Nile, Tigris-Euphrates) where demand largely outstrips supply, the strategic implications have brought additional focus on fresh water. In these countries, the securitization and importance of fresh water, due to limited supplies, is likely based on the domestic uses captured by stability that in turn reaches the level of consideration for stability.

Freshwater resource issues that challenge under-developed nations, such as flood control and contamination or access issues, may be addressed through international development efforts. One method of development includes dam projects, but dam projects have costs as well as benefits for the environment, economy and socio-cultural systems. Dam impacts have further reaching implications than previously understood, and impacts vary according to scale and sector considered. Also, water development projects inevitably impact geopolitical, geophysical and socio-cultural sectors of a region, nation or basin and may have direct impacts to security through changing both types of stability. Better understanding of these complex interrelationships is necessary prior to implementing foreign direct investments, international development projects and development strategies.

There is a complex relationship between change in a system and the institutional capacity to absorb that change, which involves a series of feedback loops and influence from non-freshwater related sectors. This is well-captured in resilience models. Complaints or conflict associated with freshwater stress are not necessarily indicative of instability or weak governments, but in some cases can illustrate that an organization is functioning properly. Complaints or low-level conflict may not always indicate inability, but rather, in some cases, enhanced ability for stress management. This potential explanation follows the line of Coser regarding the practical utility of conflict and the possibility that conflict (rather than a condemnation or negative indicator) instead shows that a state or organization is functioning as designed. For example, treaties can act to “release pent-up hostilities, create norms regulating conflict, and develop clear lines of authority” and are a means not of avoiding conflict, but provide a way to “facilitate low-level conflict”.<sup>56</sup> Through increased, structured interaction in the form of “low-level and more frequent conflict,” the intended purpose of the treaty can be achieved “without threatening the overall stability of the relationships”. In this way, low-level conflict or disagreement positively impacts stability and prevents the conflict from reaching

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<sup>56</sup> Allan (2007), *op. cit.*

higher levels of severity. “Far from being necessarily dysfunctional, a certain degree of conflict is an essential element in group formation and the persistence of group life”<sup>57</sup>

Determining where Coser’s “certain degree of conflict” stops being positive and enters the realm of negative is difficult to discern. One way to potentially measure this is by determining an elevated increase in severity and the level of government associated with the conflict. However, the severity and level of government are also directly related to the level of national importance and fresh water’s impact on different types of stability and stability. The line where conflict becomes a potential hazard to both stability and stability is nebulous, as illustrated by Buzan’s discussion on securitization:

“The bottom line of security is survival, but it also reasonably includes a substantial range of concerns about the conditions of existence. Quite where this range of concerns ceases to merit the urgency of the “security” label (which identifies threats as significant enough to warrant emergency action and exceptional measures including the use of force) and becomes part of everyday uncertainties of life is one of the difficulties of the concept” (Buzan, as quoted by Stone).<sup>58</sup>

A blanket application of complaints or conflict as negative overlooks the potential nuances of conflict origin and utility. Organizations or nations may facilitate interaction that is sometimes construed as low-level conflict, and discerning between positive conflict and conflict spurred by weaknesses may not be possible without in-depth knowledge of the organization.

## **Conclusions**

Changes to global freshwater resources do not determine where threats to security or instability occur. For example, drought, a severe form of freshwater resource alteration, does not occur any more frequently in areas that have reported climate related conflict than it does in other areas: river basins with climate complaints are in absolute and relative drought less often, have a lower overall drought severity, and have less variability than areas that have no conflict. Therefore, drought is not the primary cause or determiner of whether an area is going to have climate related conflict. Instead, fresh water and the natural environment shape and influence the surrounding socio-cultural, political and environmental situation.

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<sup>57</sup> Coser, L. (1956). *The Functions of Social Conflict*. New York.

<sup>58</sup> Stone (2009), *op. cit.*

Freshwater resource issues that may impact human security related to human consumption needs have to do more with stability (humanitarian concern) than stability (state concern). This then leads policy-makers to make decisions on freshwater resources when they are related to some other sectors with an economic or political tie-in, such as agriculture, energy or employment. In some cases, conflict that is thought to be related to freshwater issues may not be oriented toward the specific issue or intended to produce freshwater-related results. Given the four concepts presented, freshwater resources are complicated with factors that include geopolitical, geophysical as well as socio-cultural dynamics, and there is no blanket answer for how to manage the current situation we are in, nor the future of global freshwater management. Projects such as the MDGs still fail to meet the mark of supplying the world's most impoverished and most in need with adequate access to freshwater supplies. Also, while predictions of climate will likely increase in accuracy and resolution, the impacts from climate change and freshwater issues will continue to be extremely difficult to predict since the effects are dependent on a number of issues that extend beyond just climate. Water as the leading cause of global death, outside of heart disease, is a reality that threatens security on individual, state and international levels.

