PRIO International Peace Research Institute, Oslo
Institutt for fredsforskning
Institute for European Studies
Vrije Universiteit Brussel
CENTRE FOR SECURITY STUDIES
Collegium Civitas
NTNU
Norwegian University of Science and Technology

Securitizing Water: A Case Study of the Indus Water Basin

J. Peter Burgess (International Peace Research Institute, Oslo)
Taylor Owen (The University of Oxford)
Uttam Kumar Sinha (Institute for Defence and Studies and Analyses, New Delhi)

Introduction: The Four Schools of Water and Conflict Literature

Water resources have long been a standard component of geopolitical scholarship (Sprout & Sprout, 1965). However, the link between water and security has emerged only in the post-Cold War scholarly debate about the scope of the security concept itself (Baldwin, 1997; Tuchman, 1989). The water-security nexus is first and foremost thematized in scholarship dealing with national strategic issues, and, at least initially, in work most relevant for U.S. foreign policy (Allison & Treverton, 1992; Romm, 1993). From the late 1990's it is then extended to scholarship on the scope of international security, finally joining the ongoing debate about the scope and reach of the "new security concept" (Chaturvedi, 1998; Giordano et al., 2002; Gleick, 1990; Gleick, 1993; Homer-Dixon, 1991; Kliot, 1994; Selby, 2005; Tickner, 1995; Ullman, 1983; Wolf, 1995). This evolution in security scholarship has produced work addressing a wide variety of aspects of the security-water nexus. Yet in its diverse threads it displays one common analytic characteristic: It regards water as a simple, discrete and unproblematic object of political analysis and action. It presupposes water to be a concrete good that, like other goods, can be taken up into a predetermined calculus of strategic advantage and disadvantage. Strategic water-security analysis of this kind is carried out without asking what kind of role water plays outside the sphere of geopolitics, that is, in its national, regional, local or personal specificity.

A central strain of the water and conflict literature examines the link between water and violence conflict. This work can be roughly categorized into four schools of thought. While there is some overlap between them, they each assign different ways of correlating the relation

between water and conflict, and thus come to varying conclusions regarding both the strength of the correlation, and the potential triggers for water related conflict.

The first school is represented by the work of Peter Gleick, and is best exemplified by his 1993 study "Water and Security: Resources and International Security." This analysis takes its point of departure in the observation that, "as we approach the twenty-first century, water and water-supply systems are increasingly likely to be both objectives of military action and instruments of war…" (Gleick, 1993: 79). In the age of post-bipolar conflict water as resource slides easily into a discourse of war in which all elements are considered in terms of their contribution to or detraction from the objective aim of the conflict. Thus, "[…] even water can fit into this framework if water provides a source of economic or political strength" (1993: 84). By the same token, in an equally important parallel logic, water is routinely instrumentalized as a simple means to military ends and the use of water and water-resources as "both offensive and defensive weapons" is not unusual. Dams (such as the one on the Yalu River during the Korean War), irrigation water-ways (such as in the Syria-Israel conflict in the 1950's), desalination plants (as seen in the Persian Gulf War of 1990), and sanitation systems (as in the Iraq War) have long been used as means to attain strategic advantage (1993: 86-88).

The relationship posited by Gleick is that the misdistribution of water combined with current population growth and development will result in a scarcity, or stress, that has the potential to lead to conflict. This makes water an increasingly critical aspect of interstate policies, including violent conflict. "Where water is scarce, competition for limited supplies can lead nations to see access to water as a matter of national security." (Gleick, 1993: 79). Gleick defines security in relatively broad terms, including resource and environmental problems that reduce quality of life. However, they are given "security" value in so far as they have they have the potential to result in increased competition, which in turn can cause conflict (1993: 82).

According to Gleick's thesis, the types of conflict that are possible due to this scarcity are broad, including local, regional and national economic, diplomatic or violent events. What is most important for Gleick, however, are the metrics with which potential for this conflict can be assessed. These take four forms: 1) ratio of water demand to supply; 2) water availability per

person; 3) fraction of water supply originating outside a nation's borders; and 4) dependence on hydroelectricity as a fraction of total electrical supply (1993: 83).[1]

The second school of water and conflict research is rooted in a series of projects on environmental security more broadly, led by Tad Homer-Dixon. The research explores three hypotheses: 1) that scarcity of controllable resources could provoke interstate "scarcity conflicts"; 2) that environmentally caused population movements could cause "group identity conflicts"; and, 3) that severe scarcity could cause economic and social unrest, leading to civil conflict and insurgency. The potential drivers of these environmental conflicts are broad, but notably include the depletion and pollution of fresh water supplies (Homer-Dixon, 1994).

While this research extends considerably beyond water, a key finding regarding the scarcity thesis is that simple scarcity conflicts between states are far more likely for non-renewable resources, such as oil, than for renewable resources. The exception, however is freshwater, as it is a critical resource for personal and national survival. Conflict over water, it is argued, is most likely when two countries share a river, when the downstream state is highly dependant on the water flowing from the upstream state, and when the downstream state is more powerful that the upstream state. This can be exacerbated further by the upstream state using the water as a coercive mechanism and the downstream state being prone to the use of military power (1994:18). Examples of such cases could include the relations between South Africa and Lesotho and between Egypt and Ethiopia. Perhaps more importantly, Homer-Dixon's research argues that conflict over water is more likely within states than between them. The building of dams, can cause social unrest and irrigation schemes can disproportionately effect marginalized groups and exacerbate state repression (1994:18). On balance, this research concludes that "in coming decades the world will probably see a steady increase in the incidence of violent conflict caused, at least in part, by environmental scarcity" (Homer-Dixon, 1999: 4).

[1] Critchley and Terriff (1993), who support Gleick's scarcity thesis, propose slightly different metrics. They argue that resources directly result in conflict when: 1) they are becoming increasingly scarce in a region; 2) they are essential for human survival; and, 3) the resource can be physically seized or controlled.

Whereas the Homer-Dixon work points to a link between water scarcity and potential conflict, a third school sees a greater potential for cooperation, particularly through the building of institutions. This perspective is led by Aaron Wolf and his program at Oregon State University.

The Wolf project looks at two aspects of why nations might choose to either fight or cooperate over water. The first, like Homer-Dixon's work, is the resource itself and the correlated supply and demands, and changes and stresses on the physical system. The second deviates from Homer Dixon, and looks to the institutional capacity to absorb the stress caused by either water scarcity or significant change within a watershed. According to this theory, "The likelihood and intensity of dispute rises as the rate of change within a basin exceeds the institutional capacity to absorb that change." (Wolf et al, 2003a: 42 and Wolf et al, 2003b: 2)

In order to assess this hypothesis, the Wolf project evaluated all positive and negative interactions over water between states, between 1950 and 2000, on a scale of -7 to +7. They conclude that while the effects of water degradation, both quality and quantity, can have effects on the stability of a region, there is virtually no record of either causing acute conflict. Rather, there has been an overwhelming record of cooperation, defined as both water management bodies or treaties, or generally positive international relations. All other theoretical indicators of conflict, such as climate, water stress, dependence on hydropower, dams or development, or levels of development, Wolf argues, are only weakly correlated with negative interactions between states (2003b: 4). The inverse of this is that either sudden physical changes, or reduced institutional capacity can lead to a greater chance of negative interactions. This could include: "1) uncoordinated development of a major project that affects flow (such as a dam) in the absence of a treaty or commission; 2) 'internationalized basins' such as in post-Soviet Central Asia; and 3) general animosity among parties (Carius, Dalbeko and Wolf, 2004: 1)."[2]

[2] The importance of institutions in buffering the potential stress of water scarcity is supported by research done by Hensel *et al* (2006), which concludes that while scarcity can cause conflict, it will be greatly mitigated by the efforts of institutions designed to address the challenges of scarcity. The 2006 Human Development Report comes to similar conclusions, listing four obstacles to cooperation over water: 1) competing claims and perceived national sovereignty imperatives; 2) weak political leadership; 3) asymmetries of power; and, 4) nonparticipation in basin initiatives. They place significant emphasis on institutional capacity building as a mitigating mechanism for this potential conflict onset. (Human Development Report, 2006: 223)

A final school of research is based at the International Peace Research Institute, Oslo (PRIO), and is led by Nils Peter Gleditsch. Through a series of large-N quantitative studies, the PRIO group has evaluated many of the theories posited in the aforementioned three schools regarding the historic propensity for countries to go to war over water. While composed of a series of articles, they should best be seen as a single evolving project.

The first of the studies looked at the historic relation between countries that share a river and countries that have had a militarized conflict (Toset, Gleditsch, & Hegre, 2001). They found that a pair of countries that share a river are more likely to have gone to war than two countries which are simply contiguous, although contiguity itself, is a much stronger determinant. This study also demonstrated a correlation between water scarcity and conflict, supporting Gleick and Homer-Dixon's work, particularly when a border is delineated by a river. Shared rivers had a similar effect as regime type, economic development, great power status, and alliances (2001: 990).[3]

The second study factored in the length of the boundary between the contiguous states in order to test whether the relation between shared rivers and conflict was spurious. They determined that it was not (Furlong & Gleditsch, 2003). A third study looked at whether there was difference between countries that shared rivers along their border, or whether the rivers crossed the border. The former would suggests a fight over a border, and the latter would suggest the scarcity scenario. It also factored in the size of the basin that the countries shared. This analysis found that sharing a basin did have an effect on conflict, but the border-demarcating river scenario did not. Also, this study found that dry countries have in the past had more conflict, and that the size of the basin shared is also correlated with past conflict (Gleditsch *et al* 2006).

While these four schools are interrelated, they each use different metrics to assess the link between water and conflict, and in so doing, come to quite different conclusions on the relation (see Figure 1). Gleick and Homer-Dixon find potential for conflict. Wolf and Gleditsch respectively see little history of conflict and an opportunity for collaboration. Gleick and Homer-

[3] A similar study by Sowers (2002) incorporated water usage and renewable water resources into the analysis and found that the likelihood of conflict decreases significantly with access to renewable water resource.

Dixon look at conflict between parties at varying scales, from local to regional to interstate. Wolf and Gleditsch look only at relations between states. Wolf looks at positive and negative interactions, and Gleditsch only at militarized disputes.

Figure 1 – Chart of Water-Conflict 'Schools'

School	Metrics	Scale of conflict	Def of Security	Findings
Gleik	1) Ratio of water demand to supply; 2) Water availability per person; 3) Fraction of water supply originating outside of a nation's borders; and 4) Dependence on hydroelectricity as a fraction of total electrical supply	Local, regional, interstate	Environment and natural resources included in so far as they may cause conflict	Scarcity can drive conflict. Particularly when caused by the combination of a misdistribution of water and high levels of population/development.
Homer-Dixon	Two countries share a river; Downstream state is highly dependant on the water flowing from the upstream state; When the downstream state is more powerful that the upstream state; Upstream state has history of using the water as a coercive mechanism; Downstream state prone to the use of military power	Civil strife and insurgency; Interstate conflict	Environmental Security	Environmental scarcity will in the future cause conflict.
Wolf	Conditions potential leading to negative interactions: 1) Uncoordinated development of a major project that affects flow (such as a dam) in the absence of a treaty or commission; 2) "Internationalized basins" such as in post-Soviet Central Asia; and 3) General animosity among parties	Relations, positive and negative, between states.	Environmental Security	Potential for conflict/cooperation is a function of resource scarcity defined as stress on physical system and institutional capacity. Ie - rate of change versus institutional capacity.
Gleditch	Shared rivers; Shared basins; Basin size; Border demarkating rivers; Scarcity	Militarized conflict between States	State Security	All things being equal, countries that share rivers, basins and are dry, are more likely to go to war than simply contiguous countries.

Human Securitization of Water

While arriving at varying conclusions on the relations between water and conflict, each of these four schools is limited by their use of a traditional, geopolitical interpretation of security. To a greater or lesser degree they each conceptualize water according to a realist logic that regard the control of the resource as an instrumental means to an end, namely the realization of geopolitical interests. In so doing, they bracket entirely the issue of how water comes to be scarce, how its scarcity affects populations, and what it means in terms of life from the point of view of groups and individuals who have immediate contact with the resource.

Gleditsch *et al* focuses entirely on conflict between states. Wolf moves beyond conflict, but remains focused exclusively how water effects interactions between states. Homer-Dixon and Gleick move beyond the state, but are only concerned with resources in so far as they have the potential to cause conflict. In all, the concept of security used is firmly rooted in the propensity for violence and water is given value only in so far as it can be a cause of conflict.

Neglecting the human aspects of water, in both abundance and scarcity, this picture of resource conflict is incomplete. The analytical logic of war takes water as a given, an unproblematic object of contention. The question of its "actual" value is never posed, only the question of its exchange value in the political economy of conflict. Yet due to this core human link, water cannot simply be assimilated to the growing jargon of "resource conflict" such are oil and diamonds.

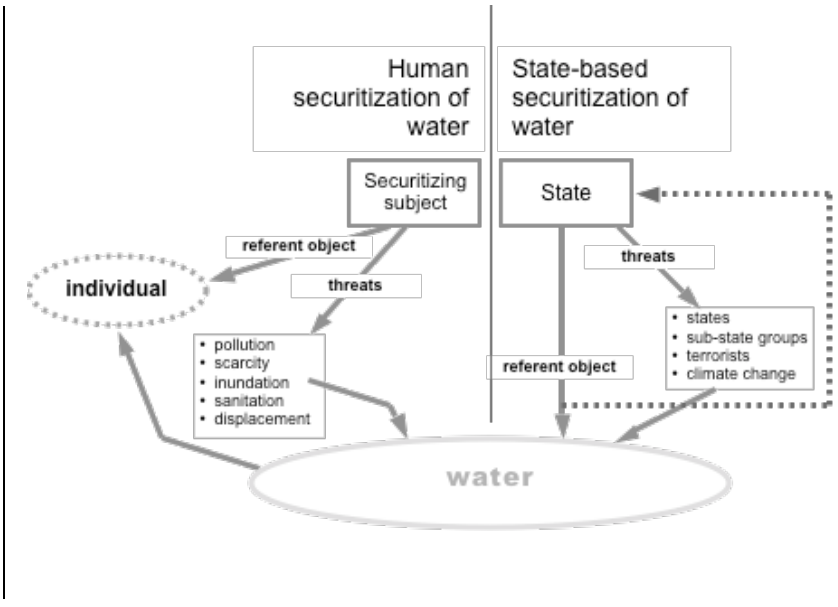
Clearly water is a geopolitical resource, but it is also a human one. A resource both whose use and symbolic and religious value puts it in an intimate relationship to the humanity that would securitize it. None of the four schools of water-conflict analysis capture this human element. If we were therefore to add a fifth school of analysis to the growing literature on the relation to water and conflict, one which focuses on the connection between water and the security of humans, what would it look like, and what questions would need to be asked?

The theory of securitization postulates a security as the production of a speech act. A speaker positioned in relation to a given discourse, its aims, origins and values, its audience and its politics, can, by identifying and object as insecurity, constitute a security threat (Buzan & Wæver, 2003: ; Wæver, 1997a: ; Wæver et al., 1993). In the speech act theory of security the securitizing actor identifies both the referent object of security and the threat that renders it insecure. What does it imply to securitize water? Who is the securitizing actor? What is the referent object? What are the threats to water? In any given analysis this matrix position is to be identified.

In the state-based or geopolitical model of securitization (of the kind that the structures the four schools of analysis reviewed above) the *securitizing actor* is the state or state-anchored actor, whose role it is to raise water to an exceptional level of politics, one which justifies extraordinary political action, armed conflict, etc. Water, according to this model, is identified as threatened, but only in the sense that the threat to water implies a threat to the state. It is in the name of this presumed threat to the state that extraordinary military power is invoked. The alleged *threat* is thus complex, comprising political action, regulation, directly or indirectly target military action, economic factors, malevolent actors such as terrorists, in addition to the naturally occurring threats of scarcity and transport issues.

The tool of securitization theory, however, allows us to discern the ultimate referent of state-oriented geopolitical water securitization, and to differentiate it from what we call a human securitization of water. The latter analysis sees the individual as the ultimate link in the chain of securitization. As in the geopolitical model, water is pointed out as the initial referent object. But the threat to water is defined not as the link to the state security, but to the livelihood of the individual. The politically, socially, economically and culturally situated individual is the end-referent of this analysis (Figure 3).

Figure 3 - Human and water securitization in comparison



The more fine-grained differences between the geopolitical or state-based model of securitizing water and the human security model of securitizing water can be clarified by looking more

closely at the three variables proposed by securitization theory: *securitizing actor*, *referent object*, and *threat* (Figure 4).

First, while the *securitizing actor* of the state-based model is of course the state, or state-like entities, the securitizing actor for the human security model is not immediately determined. The state-based securitizer can be further refined to identify securitizing actors within political systems to permit us to identify ministries, agencies and even individuals who are in a position to place securitizing language into circulation and thus create securitizing effects. In the human security perspective, however, there is no discrete securitizing actor present. The primary attempts at securitizing water stem from UN organizations, NGOs, aid agencies, etc. all of whom for a variety of reasons are more or less adequately equipped to securitize water. As Buzan *et al* point out, there is an important difference between making a securitizing move and successful securitization. An issue is successfully securitized only when the audience "accepts it as such" (Buzan et al., 1998: 25). Thus the ability of a (potential) securitizing actor to securitize is to a large degree determined by its ability to control the discourse involved, in this case the discourse of water. As Buzan *et al* underscore, the global level has no strong political actors, and thus the potential for action is necessarily shifted to the local level resulting in a crucial dependence on the willingness of states, economic actors and local communities to recognize and accept the claims made by the scientific agenda. Consequently, one pitfall in the emphasis on water securitization as far as human security is concerned is that focus is primarily on the actor/enunciator side, privileging those who are capable of "speaking", disadvantaging the voiceless and the weak—precisely those in position to witness the need for securitizing water and who suffer from its inherent lack of securitization (1998: 41; Hansen, 2000).

Figure 4: Components of human and water securitization

	Human securitization	**State Securitization**
Securitizing Actor	The subject of human security	State
Referent object	Individual	Water, (the state itself)
Threats	Pollution, scarcity, inundation, sanitation, displacement, lack of transportation, destruction of agriculture	Other states, sub-state groups, economic climate change, terrorists

Second, the *referent object* of water securitization and human securitization of water are entirely different. In the optic of human security it is the individual who is the referent object. Threats to water are in this sense are salient only to the degree they carry effects for individuals. Clearly, the vulnerability of individuals relative to water supply and quality covers a broad spectrum. Water penetrates individual life in a number of different ways, determined socially, culturally, economically and geographically. Thus a complete analysis of the human security issues requires a careful and complex analysis, one which does not lend itself to the caricaturized forms of communication necessary for successfully securitization. In the state-based model of securitization it is immediately water itself which is securitized as under threat, then by more or less direct transfer it is ultimately the state that presents itself as under threat by virtue of the threat to water.

Third, the two perspectives on securitization produce two distinct referent objects of security as well as two *different sets of threats*. Threats to the individual in the human securitization perspective are causes of fear and insecurity in the realm of everyday life, work, health, and

well-being. In the state-oriented water securitization model the threats are cast as those that might endanger water directly in ways that will have consequences for the territorial integrity, economic and strategic interests of the state itself.

By bringing a securitization approach to the question of water security we are thus able to raise the resolution of the analysis and distinguish more clearly between the aims and consequences of the geopolitical optic and the human security perspective. It helps, first, to identify the security actors and assess the level of voice they have in the discourse of the securitization of the resource. Who is driving the discourse, and who is being left out? Second, the analysis lets us effectively add humans to the calculus of security, rather than only placing resources, or economies, at the center of the analysis. What is the relation that people have to water, and where are the potential human vulnerabilities? Third, it helps to identify the way that threats, both physical and perceptive, exacerbate human vulnerability within the confines of the securitization actors controlling the discourse.

In the following section, we will compare these 'metrics' to those proposed in other four schools of the "water wars" literature in so far as they relate to the Indus Water Treaty negotiation.

Case Study: The Indus Water Treaty

The Indus Water Treaty (IWT) between India and Pakistan came into force in September 1960 after 8-years of negotiations to resolve the dispute over the usage of the Indus River Basin. It is widely regarded as a good example of peaceful international water sharing. Significantly, it has lasted through three wars, including the 1999 Kargil conflict. But as water scarcity increases and both flood and drought create stress, the competition over the shared waters has raised doubts about the sustainability of the treaty.

The IWT divided and structured the use of rivers and canals between the two countries. Pakistan obtained exclusive rights for the three western rivers, Indus, Jhelum and Chenab. India retained rights to the three eastern rivers, namely Ravi, Beas and Sutlej. The treaty also guaranteed ten years of uninterrupted water supply. During this period Pakistan was to build multiple dams, financed partly by long-term World Bank loans and compensation money from India. Under the agreement, three multipurpose dams, Warsak, Mangla and Tarbela were built. A system of eight link canals was also built, and the remodeling of existing canals was carried out. Five barrages and a gated siphon were also constructed under this treaty (Lilienthal: 1951; Khosla, 1958: 234-253; Gupta, 1960; Gulhati, 1973; Biswas, 1992). In many ways, the treaty has been a success. However, it is also possible that the broader delineation contained in the treaty merely reflected the 'unfinished business' of the 1947 territorial division. If so, with addition of increased human and naturally induced stress on the water system, there is increased potential for renewed conflict.

The question that we want to ask is how do the four established theoretical schools of water research apply to the prospects of future conflict, stress and heightened vulnerability surrounding the sustainability of the Indus Water Treaty, and does a securitization approach add anything to these conclusions?

The first school of water conflict, Peter Gleick's scarcity thesis, posits the following hypothesis: that scarcity, particularly when caused by the combination of a misdistribution of water and high levels of population/development, can lead to local regional and international conflict. For Gleick's analysis, this is measured as the: ratio of water demand to supply; water availability per person; fraction of water supply originating outside a nation's borders; and dependence on hydroelectricity as a fraction of total electrical supply.

There is no doubt that river water, with its distribution, utilization, and hydroelectric power projects will increasingly define inter-state relations in the Indian subcontinent. India, given its geographical position and its capacity as both upper riparian (with Pakistan and Bangladesh) and lower riparian (with Nepal) will find hydropolitics at the centre-stage of its bilateral relations with neighboring countries.

On the first metric, in India, the quantitative supply problems are increasing. India is expected to enter a high level of water stress by 2025. Water scarcity due to ground water depletion is already a major problem. Water quality is also deteriorating, with 80% of the 14 perennial rivers in India highly polluted. Organic pollutants from industrial activities are a major cause of degradation of water quality throughout the region. India, for instance, is the third biggest emitter of organic water pollutants with 1,651,250 kg/day.

In Pakistan, the situation is similar. Water shortage and increasing competition for multiple uses have adversely affected the quality of water. In addition, poor access to safe drinking water has led to the high cost of illnesses and loss of working days. The poor and marginalised are vulnerable and suffer the most from water-borne diseases. A study conducted by the Pakistan Council of Research in Water Resources (PCRWR) "National Water Quality Monitoring Program (NWQMP)" says that water resources of Pakistan are facing four major water quality tribulations such as bacteriological contamination (28-100%), arsenic (0-100%), nitrate (0-50%) and fluoride (0-55%).[4] UNICEF study points to an alarming fact that 40% of diseases prevalent in the country are water-borne accounting for 20-40% hospitalisations.

[4] See Pakistan Council of Research in Water website, http://www.pcrwr.gov.pk/NWQMP.htm

Second, the water availability per person in both India and Pakistan is relatively stable, with urban access at 92% and 96% respectively and rural access at 86% and 84%. The per person water availability in India is 1820 cubic meters, which was around 5174 cubic meters per person in 1960s, 690 of which is from surface water (India Water Portal, 2008). The current water availability in India is close to 1700 cubic meters per person per year, a level which is considered stressed. With increasing demand, water availability is expected to decline further to 1340 cubic meters per person per year in the next two decades. In Pakistan the per person water availability has dropped from 5,600 cubic meters in 1947 to 1,200 cubic meters in 2005 with predictions that it may fall to 1,000 cubic meter soon. The per-capita surface-water requirement in 2003 was 115 MAF and availability was 104 MAF with a shortfall of 9%. The availability for irrigation was 5,260 cubic metres per year in 1951 and had reduced to 1,100 cubic metres per year in 2006 (Khan, 2004). Water availability in India is expected to decline to 1340 cubic meters per person per year in next two decades. And that is close to dangerous level of water scarcity of 1000 cubic meters per person per year (India Water Portal, 2008).

Gleick's third metric, fraction of water originating outside of the country, may be important in the India-Pakistan relation over water. In Pakistan, which is the downstream riparian vis-à-vis both India and Afghanistan, roughly 67% of total water resources come from international rivers. The dependency factor is high. From the Indus river system, and as determined by the treaty, Pakistan receives about 80 per cent of water. In India, the dependency factor is less with roughly 34% of total river flow coming from across India's border.[5]

[5] These figures are not officially stated but roughly taken. The Information System Organization (ISO) under the Central Water Commission (CWC), a technical organization under Ministry of Water Resources, Government of India, is responsible for collecting, storing and disseminating statistical data. See http://www.cwc.nic.in/ISO_DATA_Bank/waterrelated2007/contents.doc

Finally, on the relative dependency on hydroelectric power, both countries are moving towards greater reliance. India's installed capacity at 60% load factor is about 15,225 MW which corresponds to 22% of total electricity generated from run-of-river and storage projects. The exploitable potential is far higher (84,044 MW) and the Indus Basin is a critical area for harnessing hydro development with a potential of 19,998 MW (Indian National Power Association, 2005). There are six projects under construction on the Indus Basin and two at the planning stage (NHPC Limited, 2008a; NHPC Limited, 2008b). For Pakistan hydroelectric power is the third most important element in its energy mix accounting for 33.1% of total power generation. Under WAPDA (Water and Power Development Authority) fall all the major hydroelectricity plants with Tarbela generating the maximum (3046 MW); followed by Mangla (1000 MW), Warsak (240 MW) and Chasma (184 MW). This, however, is significantly below the estimated potential of 46,000 MW and not surprisingly various hydropower projects considered to be cost-effective and reliable options are at various stages of operation (Energy Information Administration, 2006; Government of Pakistan, 2008: 257) .

According to Gleick's metrics, therefore, scarcity is something that will increasingly become a concern, although current availability of stable supply in both countries should mitigate this risk in the short term. The high dependency in Pakistan on international ground water is a potential concern, and the increased dependency on hydroelectricity from both countries could place increased tension on cross border river flow.

The second school, Homer-Dixon's more broadly defined scarcity thesis, as it applies to water, asserts that interstate conflict due to stress is possible if: two countries share a river; the downstream state is highly dependant on the water flowing from the upstream state; the downstream state is more powerful than the upstream state; the upstream state has a history

of using the water as a coercive mechanism; and, the downstream state prone to the use of military power. In this framework, increased competition over resources has the potential to create flashpoints subjecting the international system to strains and making the resolution of conflicts exponentially more complex.

On the first metric, India and Pakistan do share many rivers. On the second metric, Pakistan, which is the downstream riparian, does have a high degree of dependency on the Indus Basin. In particular, the agricultural sector in Pakistan, a critical constituency, is highly dependent on water originating outside its international boundaries. 80% of its agricultural output comes from the Indus basin. Exacerbating this, the per capita consumption of water in Pakistan is the highest in the region and 97 per cent of water usage goes to agriculture.

The 1960 IWT was supposed to have allayed some of Pakistan's related fears as a lower riparian, however, the idea of the Indus as a "lifeline issue" continues to find active space in Pakistani politics and its linkage to the Kashmir issue implies that any future settlement between India would have to consider the Indus water system.

Third, and related, the upstream riparian, India, is the powerful actor. The consequence of this is that Pakistan's lower riparian fear or angst will always be a factor in its relations with India. Here it would seem an ideal case of 'asymmetrical cooperation' in which the stronger/powerful country dictates the term. However, the ability of the upper riparian, in this case India, to respect and work cooperatively within the framework of the IWT is well acknowledged but that has not necessarily diluted the perceived fear of the lower riparian, in this case Pakistan. This not only results in an understandable level of lower riparian anxiousness but also a constructed 'sufferer syndrome' ploy to thwart any upper riparian unilateral approach on the usage of river water.

Fourth, water is critical to the agricultural sector and farmers in Pakistan form a principle pressure constituency. Dam constructions and ineffective inter-provincial agreements have sharpened the existing divide between the provinces. For example, for Sindh, the lower provincial riparian vis-à-vis Punjab, there are fears that more water will be diverted to Punjab. Water distribution policies symbolize the domination of Punjab in the politics of Pakistan and while inter-provincial rivalry is high, the space is readily exploited by political actors. The irrigation system of Pakistan is the largest in the world, serving 36 million acres of contiguous cultivated land. The system is fed by the waters of the Indus river and its tributaries. It has 3 major storage reservoirs, 19 barrages, 12 inter-link river canals 45 independent irrigation canal commands and 84 small dams.

Syed Salahuddin, Chairman of the United Jihad Council[6] was quoted as saying, "Kashmir is the source from where all of Pakistan's water resources originate. If Pakistan loses its battle against India, it will become a desert (Strategic Foresight Group, 2008: 2)." A few months later, Sardar Mohamad Anwar Khan, President of Kashmir under Pakistani Control stated, "Pakistanis who believe that they can survive without Kashmir are wrong. The Pakistani economy is dependent on agriculture and hence on water, and therefore on Kashmir (2008: 2)." Prime Minister, Sardar Sikandar Hayat reiterated the point, "The freedom fighters of Kashmir are in reality fighting for Pakistan's water security and have prevented India from constructing a dam on the Wullar barrage (2008: 2)." Correspondingly, a senior officer of the army, Lt Gen Zarar Azim, who was the Corps commander of Lahore in 2003 said, "Kashmir is our lifeline and its importance increases in view of our water quality (2008: 3)." Even for Musharraf the issue of Kashmir and

[6] United Jihad Council (UJC) is an umbrella organization responsible for coordinating the activities in Pakistan of all jihadi groups.

the distribution of the Indus waters are interconnected and he has stated that any lasting peace would be based on the fair distribution of the river.[7]

Finally on whether the downstream state has a history of using military power, Pakistan does. Given the current nuclear balance of power, Pakistan feels that the 'asymmetrical relation' on the Indus water can be corrected. The domestic voices in Pakistan have increasingly become belligerent since the nuclear tests of 1998. There is a fundamental difference in the way both the parties perceive disagreement over the IWT. For India it is a political issue and not a water issue, for Pakistan it is ideological, the 'unfinished business' of the partition.

Assessing the future of the Indus treaty through Homer-Dixon's scarcity-conflict lens, results in a clear stress in the relation, and the likely uses of soft power tactics on both sides, but the conditions do not appear apt for outright conflict.

Following Wolf's school, potential for conflict in a riparian relation is a function of three factors: level of development on the river affecting the flow; the level of internationalization of the basin and the general animosity between the parties.

First, as discussed above, there is a high level of diversionary development on the main rivers of the Indus Basin. India will continue to initiate hydro projects in Jammu and Kashmir (J&K). Such initiatives it is felt will draw Kashmir closer to New Delhi and distance it from Pakistan. River water developmental plans will become an overriding factor in the larger India-Pakistan relation.

---

[7] In 1990, Musharraf, then a brigadier undergoing a year training at the Royal College of Defence Studies in London, wrote a dissertation titled, *The Arms Race in the Indo-Pakistan Subcontinent, Conflicts with the Pressing Requirements of Socio-economic Development. What are its Causes and Implications? Is there a Remedy?* The dissertation argued that Kashmir and water were interdependent and rivers hold the key to any solution (Strategic Foresight Group, 2008: 1).

Second, and a potential mitigating force, the Indus Basin is a highly internationalized basin. As discussed, it has sunset clauses, so will have to be re-negotiated, but does provide a platform for constructive engagement. This is particularly so in addressing the disputes over dams and storages that arise time and again. While the treaty gives the provision for India to undertake projects on the western rivers for 'conservation, flood control, irrigation and hydropower generation', it also clearly stipulates that Pakistan be kept constantly informed. Any objections to the projects become a matter of dispute to be settled either by negotiations (bilateral) or by 'neutral expert or arbitration'. In the case of IWT the World Bank is the third party. India would not like to undertake building of storages arbitrarily and suffer international condemnation and loss of aid. The World Bank has already increased its loans to India for water-related sectors, including water resources management, irrigation, hydropower and water supply from $200 million to $800 million a year for the period 2006-2010. For the lower riparian the third party participation gives a sense of transparency, credence and fairplay. Importantly it helps to keep the issue internationalized.

Third, again, as discussed above, the animosity between the riparians is high. Mounting concerns about the environmental impacts of human activities, potential climatic shifts, expanding populations and river water basin management in an integrated manner will increasingly factor into the hydraulic relations between India and Pakistan.

Following the Wolf model, an assessment would have to be made whether the two negative indicators, high level of interstate animosity combined with increase diversionary development, will outweigh the mitigating variable of the existing robust international institutions.

The fourth school is Gleditsch *et al's* theory that all things being equal, countries that share rivers, river basins and are dry, are more likely to go to war than simply contiguous countries.

India and Pakistan share many rivers. The second indicator, percentage of the basin in the upstream state and basin size, also suggests a higher likelihood of tension. India has only 37% of the Indus Basin (1,138,800 sq kms) and given the scarcity factor and the growing need particularly from its critical constituency in Jammu and Kashmir it would want to maximize its upstream position. However, from the measure used by Gleditsch, average annual rainfall, suggests that India received far higher surface level water, with 1083mm vs Pakistan's 305mm, is difficult to extrapolate a likelihood for conflict. Gleditsch's studies, and the large N analyses of historic international datasets are not suited to individual state prognoses.

Securitization Approach

While the four above schools of water research help identify potential areas of conflict regarding the future of the Indus Water Treaty, it is also important to ask what a securitization approach may tell us about the same socio-political dynamic. To do so, we must do three things. First, identify the security actors and assess the level of voice they have in the discourse of the securitization of the resource. Second, the analysis must determine the relation that people have to water, and where the potential vulnerabilities lie. And, third, threats, both physical and perceptive, that exacerbate human vulnerability must be identified and assessed within the confines of the securitization actors controlling the discourse.

Actors and Voice

The first question that needs to be asked is who is participating in the discourse, and who is being left out? There are essentially four constituencies in India with different perspectives on the IWT today. Each of these constituencies factor into the policy decision-making.

The first constituency seeks to evolve an Indus II under the provisions of Article VII and Article XII of the IWT[8] for an integrated or joint development of the Indus water basin. Such an approach is advocated by experts like BG Verghese who argue that Indus II "should be fed into the current peace process as a means both of defusing current political strains over Indus I and insuring against climate change. It could reinforce the basis for a lasting solution to the Jammu and Kashmir question by helping transform relationships across the LoC and reinventing it as bridge rather than merely as a boundary-in-the making (Verghese, 2005)."

Another constituency, while understanding the merits of a new hydrologic relationship on the Indus, does not see any viability of Indus II and contends that a totally new treaty has to be negotiated. Ramaswamy Iyer argues that IWT was a "partitioning treaty, a coda to the partitioning of the land. How can we build cooperation on that basis? (Iyer, 2005: 3144)." This constituency sees the practicality of working within the existing treaty and hoping for improved political relations to determine the future course.

The third constituency is the domestic pressure group in Jammu and Kashmir which strongly feels that the IWT has restricted the state's overall development by not allowing the unhindered usage of the 'its' rivers waters of Jhelum, Chenab and Indus. Not surprisingly, it has been calling for a complete review of the treaty. The Jammu and Kashmir government has been contending that owing to an untapped hydro-electricity potential of 15,000 MW, the state continues to suffer from acute power shortage and related agro-economic underdevelopment.[9] This

---

[8] Article VII states: the two Parties recognize that they have a common interest in the optimum development of the Rivers, and, to that end, they declare their intention to co-operate, by mutual agreement, to the fullest possible extent. Article XII allows for agreed modification of the treaty.

[9] On April 3, 2002, the J&K Legislative Assembly, cutting across party affiliations, called for a review of the treaty.

constituency raises larger questions as to whether the treaty has served the purpose of buying peace from Pakistan by giving concessions on the Indus waters.

The fourth pressure group emerges prominently when the political climate between India and Pakistan is particularly acrimonious. This group suggests strong arm tactics in dealing with Pakistan and applying water as a coercive tool and a bargaining instrument in the larger politico-strategic objective of India. Three possible reasons can be explained as to why this option remains a 'war of words' and is difficult to accomplish. First, the interval between the 'expression of threat' and the 'execution of threat' can initiate settlement (Swain, 2004: 31-32). For example, the time factor allows the parties to take the issue to international forums and bring in other actors to arbitrate the matter and thus internationalize the issue. In the case of IWT the World Bank is the priciple third party. The World Bank has already increased its loans to India for water-related sectors, including water resources management, irrigation, hydropower and water supply from $200 million to $800 million a year for the period 2006-2010 (The Hindu, 2005: 14). Second, there is a considerable risk attached to building dams/storages that do not abide by the treaty. Such projects run a high-risk and might preempt Pakistan – in a desperate act or irrational moment – to damage the dam; in spite of the fact that it will be flooded. Third, relates to terrorism. Dams, storages and such installations can become targets or tools of violence or counter coercion by non-state actors.

While these are the four categories of actors, when assessing the level of voice they have in the security continuum of the resource it is important to note that leaders in India give higher priority to economic growth than resource management. Herein lies a tension. A dominant stream of thought argues that resource management policies should be blended with market-driven approaches with considerable space for collaborative public policy. A counter argument

suggests an inclusive involvement of a range of stakeholders, particularly at the local-level, including NGOs, to limit the inherent tensions between rapid economic development and resource sustainability. In this conundrum and through the competing interests and power relativities can be explained the security actors and the level of voices. Some of the areas of examination could be the policies of urban and rural water use, increased conflicts between central and state governments (federal strains) and polarization around the building of dams and large-scale irrigation projects.

These actors (at the local-level) are the farmers and the women. They are a critical constituency in the framework of water governance and their roles and responsibilities are of salience in water resource management and development. They not only bare many of the costs associated with increasing water scarcity in the rural areas but also give voice to the local knowledge of dealing with water crisis. For farmers, water is 'a way of life', its accessibility improves agriculture and good agriculture helps animal husbandry. The farmer's prosperity is inextricably linked to water and the lack of it brings economic hardship.

In times of wider national food security challenges, farmers will remain a key element in the food production cycle whether it is through policies to expand land area under major irrigation schemes or improve the productivity of rain-fed land through methods of supplemental irrigation via rain harvesting. As traditional large scale irrigation schemes prove to be increasingly untenable, an emergent mitigating practice builds on the local-knowledge (community based water management initiatives) of the farmers and the women to enhance rain harvesting. As women are the actors in the transmission of knowledge regarding the use and allocation of water, translating their knowledge into an effective voice is the role of the civil

society. Responding to this, civil society has made watershed management a platform for social change.

People and water

Second, a securitization approach must put humans, rather than resources or economies, at the center of the analysis by assessing the relation that people have to water, and where the potential vulnerabilities may lie. For a large number of people water is a 'source' and not a 'resource'; a never-ending 'source of life'. The religious-cultural attachment to water defines the public psyche and sees water as being reverent, holy, also healing. The 'holy waters of the Ganges', for example, have defined the religio-cultural norms of the people of the Gangetic plain. Reinforced by mythological tales of the power and compassion of the Ganga, referred locally along the belt as '*maiya*' (mother), a dip in the holy river is a ritual, symbolic of being cleansed. Likewise, each river belt has its religious-cultural significance. Be it the Godavari (called the Ganga of the South) or the Narmada in the west. Bodies of water – be it a pond in a village or a running stream – all carry a certain religious-cultural importance. Rivers in India have been valued more on cultural lines and not seen in terms of maximizing its utility or harnessing it for the wider national needs. Rivers are localized in their interpretations and feelings. That is why diversion or large-scale irrigation schemes always creates a disturbance, like a child losing his mother; being not only dislocated from the source but also a feeling of being orphaned. It is important to reinforce the cultural and religious aspects in the larger conservation policy of water. Water governance would thus require respecting and even reinforcing the cultural and religious aspects.

Threats and actors

Third, threats, both physical and perceptive, that create and exacerbate human vulnerability must be identified and assessed within the confines of the securitization actors controlling the discourse. India is experiencing rapid changes in the demographic, social and economic spheres. Population growth, urbanization and changes in agricultural practices are bound to have serious implications for ways in which water needs to be allocated and used. The current system is inadequate and showing signs of stress over the growing incidence of severity of water conflict: between states, between cities and farmers, between industry and villagers, between farmers and the environment and within irrigated lands.

Potential vulnerabilities are supply and quality problems, crumbling water infrastructure and depleting groundwater. Supply relates to dwindling water further worsened by climate change; the quality relates to pollution and potable water leading to high rate of health problems; crumbling infrastructure, described as 'build-neglect-rebuild', has resulted in crumbling of dams and canals (leakage) and rusted pipes resulting in wastage of water. Surface and ground water resources play a critical role in agriculture and livestock production. The fact that 72% of India's population lives in rural areas and is dependent on agriculture suggests the value of water to rural and agrarian prosperity.

In order to better assess the human threats linked to the water of the Indus Basin, a three-level threat matrix can be established with water in the human security framework.

The first-level relates to impact of climate change on water resources and a connection to food security. In India floods and droughts are a recurrent feature, the frequency of which is likely to increase with various scientific assessments on climate change. The Indian Meteorological Department's assessment for the period 2001 to 2003 suggests that drought leave a far greater

impact on agriculture than floods. Also the geographical distribution of droughts is much wider than floods and as a result the impact on food security because of lack of water is much more severe. Floods, according to statistics, damage 7.56 million ha annually of which 3.55 million ha is cropped area. The annual damage by floods is Rs. 1,347 crore. With 22% of India's GDP coming from agriculture, droughts and floods have a serious cost. The 2002 drought, according to the Economy Survey of India 2003, accounted for a loss of US$ 6.25 billion resulting in a 3.2% decline in agricultural GDP, a US$ 9 billion loss in agricultural income and the loss of 1.3 billion person-days in rural employment owing to reduced agricultural operations. Spatially and temporally droughts and floods have an enormous environmental and human impact.

The second-level underlines water quality problems and connects to health and irrigation issues. Water quality is graded into five categories (A,B,C,D,E). Grade A is designated for 'drinking after disinfections' and Grade E for irrigation with a 'maximum sodium absorption ratio (SAR) of 26 (Central Pollution Control Board, 2008). At each of these levels, problems of water quality exists. Very few water resources, particularly rivers, meet the classification of Grade A. In Grade E the imbalance of sodium ions leads to soil becoming less permeable and more difficult to till. Methods in agricultural practices such as improving irrigation are vital for reducing vulnerability from the vagaries of the monsoon. Shortage of drinking and irrigation water in drought and flood affected areas of India would cause food shortages and in turn human malnutrition.

The third-level underscores the inappropriate water management decisions which often lead to a marginalization of people and to heightened inter-provincial rivalries. The lessons from the Indira Gandhi Canal, like many others, is a stark example of the problems arising from large-scale transfer of water without incorporating the local ecology and local knowledge in management of water needs. Many of the water transfer projects are besieged with 'feasibility,

desirability and viability' problems. Such projects have been blindly linked to development without prioritizing the impact on environment and human displacement. Any development of water resources will have to factor quantified knowledge from different levels – national, regional and local.

A secure water future would require drastic changes in the way the state functions. Past infrastructure development has to be complemented with adequate attention to water resource and infrastructure management. The state needs to delimit its role in water management, a decentralised process with a bottom-to-top-approach, and build capacity where it can play far greater and effective role where it matters for example flood control and sewage treatment. Competition also needs to be encouraged particularly in the provision of basic public water services, bringing in cooperatives and the private sector. And importantly the state has to formally initiate the formation of user groups at all levels – the river basin, the aquifer, and the irrigation district.

Conclusion

While insight is gained by looking at the future of the Indus basin through the lens of the four established schools of water conflict, adding the securitization approach both demonstrates the limits of the literature, and provides nuance to what is a complex local, national, and regional problem.

Through the lens of Gleick's analysis, we can conclude that conflict may be a slowly growing long term concern, driven by increased scarcity on both sides, high levels of international groundwater dependency in Pakistan and growing hydro-electrical development in both countries. This risk, however, is not acute in the short term. The benefits of this approach are

that multiple scales are incorporated. The central limitation is that environmental factors and resource use are incorporated in the model only in so far as they may drive violent conflict.

Using Homer-Dixon's scarcity thesis, we arrive at a similar conclusion – that despite some worrying indicators, the short term risk of violent conflict is minimal. All of Homer-Dixon's indicators highlight the potential risk: there are many international rivers; there is a relatively high degree of dependence on the basin by the lower riparian; the upper riparian is more powerful, and the downstream state does have a history of using military power. However, these variables must be balanced against the current political reality. Most notably, the nuclear balance between India and Pakistan, and, that under Homer-Dixon's thesis, it is the lower riparian who would start the conflict given current politics in Pakistan, it is hard to imagine them starting a violent conflict with India over water in the foreseeable future. The limits to this thesis are a focus exclusively on violence, and a limited scale, focusing solely on state relations.

Following Wolf's metrics, high levels of diversionary development on both countries, and a high level of animosity between the riparian states, are mitigated by the internationalization of the basin. In his continuum from violence to cooperation, the presence on a robust international institution, on balance, likely to mitigate the risk of conflict. The benefit of this model is that it includes a wider range of potential outcomes, both positive and negative, and thus does not exclusively focus on violent conflict. The central limitation is that it focuses exclusively on states actors.

Finally, the Gleditsch model suggests that given the number of rivers, percentage and size of basin in the upstream state, and scarcity levels in both countries, there is a high risk of interstate conflict. The limits of this analysis are a focus on interstate violent conflict, narrow data input,

and limited predictive potential as the analyses are based solely on a large-N historical databases.

The addition of a securitization approach to these analyses makes three central contributions. First, it puts a clear focus on all relevant actors, not simply those for which we can collect data. This leads to the identification of local actors as being of vital importance to understanding the tensions surrounding the use of the Indus basin. Two core constituencies, in particular, require greater voice going forward – farmers and women, both of whom have the most knowledge of the resource and its core values to end users. Second, a securitization approach provides a wider conception of relations over water. The key to this is going beyond materialistic, or purely utilitarian valuations of the resource. In the Indus basin, there are clear religious and cultural connections to water, which simply must be seen in conjunction with the wide range of material vulnerabilities. Third, the lens of securitization forces us to look at a wider conceptualization of threats. For the Indus basin, this leads to a focus on demographic shifts, social movements, and stresses in the governance systems of both countries. While no approach can uniformly inform the risk of renewed conflict and human vulnerability surrounding the usage of the Indus basin, nor predict whether the future negotiations will be conciliatory or acrimonious, the addition of the securitization approach adds context to the existing theories of water conflict, enriching the analysis and providing a human connection to what is often an overly instrumentalised discourse.

References

Allison, Ghaham and G. Treverton (1992) *Rethinking America's Security: Beyond Cold War to New World Order*. New York: WW Norton & Company.

Baldwin, D (2001) "The Concept of Security," *Review of International Studies,* 23(01): 5-26.

Balzacq, T (2005) "The Three Faces of Securitization: Political Agency, Audience and Context," *European Journal of International Relations,* 11(2): 171.

Barry Buzan, and Waever, Ole, (2004) "Regions and Powers: The Structure of International Security," *Journal of International Relations and Development,* 7: 460-464.

Barry Buzan, Waever, Ole and Jaap de Wilde (1998) *Security: A New Framework for Analysis*. Colorado: Lynne Rienner.

Biswas, Asit, (1992) "Indus Water Treaty: The Negotiating Process," *Water International* 17(4).

Carius, A., Dabelko, G.D., and A.T. Wolf (2004) "Water, Conflict, and Cooperation," *Policy Brief,* 60-66.

Central Pollution Control Board, (2008) *Water*, http://www.cpcb.nic.in/water.php

Chaturvedi, S. (1998) "Common Security? Geopolitics, Development," *Third World Quarterly,* 19(4): 701-724.

Critchley, W.H. and T. Terriff (1993) "Environment and Security." In *Security Studies for the 1990's*, edited by R. Godson R. Schultz, and T. Greenwood, 327-52. Washington, DC: Brassey's.

Energy Information Administration (2006) *Country Analysis Briefs, Pakistan,* http://www.eia.doe.gov/emeu/cabs/Pakistan/pdf.pdf.

Furlong, Kathryn, Gleditsch, N.P., and H. Hegre (2006) "Geographic Opportunity and Neomalthusian Willingness: Boundaries, Shared Rivers, and Conflict," *International Interactions,* 32(1): 790-108.

Giordano, M. and A. Wolf (2002) "The Geography of Water Conflict and Cooperation: Internal Pressures and International Manifestations," *The Geographical Journal,* 168(4): 293-312.

Gleditsch N.P., Furlong, K., Hegre, H., Lacina, B., and T. Owen (2006) "Conflicts Over Shared Rivers: Resource Scarcity Or Fuzzy Boundaries?," *Political Geography,* 25(4): 361-382.

Gleick, Peter (1990) "Environment, Resources, and International Security and Politics." In *Science and International Security: Responding to a Changing World*, edited by E. Arnett, 501-23. Washington, DC: American Association for the Advancement of Science.

Gleick, Peter (1993), "Water and Conflict: Fresh Water Resources and International Security," *International Security,* 18(1): 79-112.

Government of Pakistan (2008), *Economic Survey of Pakistan 2007-2008*, Finance Division, Economic Advisers Wing, http://www.finance.gov.pak/admin/images/survey/chapters/15-Energy08.pdf

Gulhati, N.D. (1973) *Indus Water Treaty: An Exercise in International Mediation*, Bombay.

Gupta, Sisir, (1960) "The Indus Water Treaty," *Foreign Affairs Report,* 9(12).

Hansen, Lene (2000) "The Little Mermaids Silent Security Dilemma and the Absence of Gender in the Copenhagen School," *Millennium: Journal of International Studies,* 29(2): 285-306.

Hensel, P., McLaughlin, M. and T. Sowers (2006) "Conflict Management of Riparian Disputes," *Political Geography,* 25(4): 383-411.

Homer-Dixon, Thomas (1991) "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security,* 16(2): 76-116.

Homer-Dixon, Thomas (1994) "Environmental Scarcities and Violent Conflict: Evidence From Cases," *International Security,* 19(1).

Homer-Dixon, Thomas (1999) *Environment, Scarcity, and Violence*. Princeton, NJ: Princeton University Press.

India Water Portal (2008) *Interview with Devika Mistry of the Strategic Foresight Group,* http://www.indiawaterportal.org/Network/interview/ngos/devika_eng.html.

Indian National Power Association (2005), http://indiahydro.org/home.htm

Iyer, Ramaswamy (2005) "Indus Treaty: A Different View," *Economic and Political Weekly,* 11(9).

Khan, Riaz Ahmed, (2004) *Presentation on Nwsab,* ww.adb.org/water/NWSAB/2004/Pakistan_Presentation.pdf.

Khosla, An (1958), "Development of the Indus River System: An Engineering Approach," *India Quarterly,* 14(3).

Kliot, Nurit (1994) *Water Resources and Conflict in the Middle East*. London: Routledge.

Lilienthal, David (1951) "Another Korea in the Making," *Colliers Magazine.*

NHC Limited (2008) *Projects Under Development*, http://www.nhpcindia.com/English/Scripts/project_underdevelopment_link.aspx?vid=5&id2=0

NHC Limited (2008) *Water Projects Under Construction,* http://www.nhpcindia.com/English/Scripts/Project_Construction.aspx

Romm, J. (1993) *Defining National Security: The Nonmilitary Aspects*. New York: Council on Foreign Relations, 1993.

Selby, J. (2005) "Oil and Water: The Contrasting Anatomies of Resource Conflicts," *Government and Opposition,* 40(2): 200-224.

Sprout, Harold and Margaret Sprout (1965) *The Ecological Perspective on Human Affairs: With Special Reference to International Politics*. Princeton, NJ: Princeton University Press.

Strategic Foresight Group (2008) *Final Settlement,* http://www.strategicforesight.com/finalsettlement/thesecret.pdf

Stritzel, H (2007) "Towards a Theory of Securitization: Copenhagen and Beyond," *European Journal of International Relations,* 13(3): 357.

Swain, Ashok (2004) *Managing Water Conflict*. London: Routledge.

Tickner, Anne (1995) "Re-Visioning Security." In *International Relations Theory Today*, edited by Booth K., and S. Smith, 175-97. Oxford: Oxford University Press.

Toset, H., N.P, Gleditsch, N.P., and H. Hegre (2000), "Shared Rivers and Interstate Conflict," *Political Geography,* 19(8): 971-996.

Tuchman, J.M. (1989) "Redefining Security," *Foreign Affairs,* 68: 162-177.

Ullman, Richard (1983) "Redefining Security," *International Security,* 8(1): 129-153.

Verghese, B.H. (2005) "It's Time for Indus-Ii." *The Tribune*, May 25.

Waever, Ole et al., "Identity, Migration and the New Security Agenda in Europe," *New York,* 1993.

Wæver, Ole, Buzan, Barry, Kelstrup, Morten and Pierre Lemaitre (1993) *Identity, Migration, and the New Security Agenda in Europe.* New York, St. Martin's Press.

Watkins, K., Carvajal, L., Coppard, D., Fuentes, R., Ghosh, A., Giamberardini, C., Johansson, C., Seck, P., Ugaz, C., and S. Yaqub (2006) "Human Development Report 2006," *Beyond Scarcity: Power, Poverty and the Global Water Crisis. United Nations Development Programme (UNDP), New York.*

Wolf Aaron, Yoffe, S.B., and M. Giordano (2003) "International Waters: Identifying Basins At Risk," *Water Policy,* 5(1): 29-60.

Wolf, Aaron (1995) *Hydropolitics Along the Jordan River; Scarce Water and Its Impact on the Arab-Israeli Conflict*. New York: United Nations University Press.

Wolf, Aaron, Stahl, K., and M.F. Macomber (2003) "Conflict and Cooperation Within International River Basins: The Importance of Institutional Capacity," *Water Resources Update,* 125: 31-40.