

Water Conflict, resources management, and resolution: Trust, Tools, Technology, and Politics

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Introduction

“Our experiences tell us that environmental stress, due to lack of water, may lead to conflict, and would be greater in poor nations.” United Nations General Secretary Ban Ki Moon, speaking at the World Economic Forum in Davos, Switzerland, January 24, 2008.

Over the last 60 years there have been more than 300 international water agreements and only 37 cases of reported violence between states over water. We need to continue to nurture the opportunities for cooperation that transboundary water management can provide. World Water Day 2009, www.unwater.org/worldwaterday/flashindex.html

Water conflict is the result of groups of people or institutions believing that they are unfairly being denied adequate water resources to meet felt needs or wants. Much has been written about the topic. The risk of growing water conflict has increased as population and development have put ever greater pressure on water resources. As Secretary General Ban Ki Moon stated at the 2008 World Economic Forum about the need to act to avert a world water crisis, “Population growth will make the problem worse. So will climate change. As the global economy grows, so will its thirst. Many more conflicts lie just over the horizon.”

Water is, of course, the very essence of life on earth. Without it, it is estimated that we could live no more than three days. Indeed, anyone who has attempted a day or more of fasting during the Muslim holy month of Ramadan (when one abstains from food and water from sunrise to sunset) understands that as humans we are weakened by prolonged periods without water. Water’s vital importance also has led many religions and cultures to view this resource as sacred. The Christian Baptism and the Hindu ritual bathing in the Ganges are but examples of the importance of water in religion.

The paradox is that, while our earth is a blue planet, made up mostly of water, 99 percent of that water is salt water, unusable in its natural state for human hydration. People are dependent on fresh water to sustain life. Almost all human societies use fresh water in three ways – as drinking water, in sanitation (bathing and toilets), and in economic or productive processes (agricultural, industrial, domestic). In as much as fresh water has traditionally come from rivers, lakes and ponds, fresh water has always contained a paradox. While the waters of the river traditionally provided food, water, and inputs for agriculture, the rivers would also swell and flood, leaving untold destitution.

Further, the same water that provided the ability to drink, produce food, and eat also provided water for disease-carrying creatures. William McNeill's 1980 book *Plagues and Peoples* describes how China's population was controlled for centuries until that society figured out how to contain the river both from flooding and from providing water to the cesspools that would produce yellow-fever carrying insects. Development processes such as improved sanitation, irrigation, and increased industrial extraction and production utilize water resources. Technologies, ranging from earthen and concrete dams, to center-pivot irrigation systems harness water and direct it toward greater production and increased accumulation of public health and wealth.

These very tools, however, are the source of water conflicts – both domestic and international. Not only has the ability to harness water from surface and groundwater sources upstream, limited those who live downstream, but effluent from sanitary and industrial processes has diminished the quality of water that flows downstream. Below, I will briefly address the critical issues in water conflict: hydrologic flows; values inherent in water use; the perception of water scarcity; the role of technology; and power and the social processes and institutions that ensure water rights.

Hydrologic Flows

Conflicts over water use tend to be concentrated over water basins. Water flows in natural basins by gravity. Those who live upstream control the flow of water. This can be the basis for water conflicts. For instance, the Rio Grande River is shared by the United States and Mexico. The headwaters of the river are in Colorado and flow downstream through New Mexico and Texas. Because water is siphoned off to support agriculture, industrial and urban development, only rarely does a significant amount of that water reach Mexico, where irrigated farming communities have long suffered drought conditions.

Likewise, the famous Jordan River empties from the Sea of Galilee. Israel gained control of the "Sea" (known in Israel as "Lake Kinneret") in 1948 and soon dammed the lake to siphon off water for the Israeli National Water Carrier. This supply of water has largely been responsible for Israeli agricultural and urban development. It rendered the downstream Jordan River, however, "a fetid trickle" according to Palestinian scientist Jad Isaac (2000). Jordanians and Palestinians have both claimed harm through this diversion. Indeed, part of the peace settlement between Israel and Jordan in 1994 involved water transfers to compensate for this harm.

In Africa there are multiple shared rivers. The most explosive to date has been the Nile. Egypt, which sits at the base of the river system has made clear its willingness to use military force to prevent upstream diversions of its waters. Egypt maintains monopoly use of the river on the basis of the 1929 Nile Basin Treaty and a 1959 agreement with Sudan. It is further said to have sponsored destabilizing insurgencies in Somalia, Ethiopia and Sudan to ensure that upstream

riparians to the river would not have the resources to “develop” the river and divert water for irrigation or other purposes. The upstream nations of Sudan, Ethiopia, Eritrea, Kenya, Tanzania, Uganda, Rwanda, Burundi and Congo have come together in more recent years arguing that Egypt must relinquish some of its control over the river, as they all see this resource as vital for future development. (For more information, see McGrath and Inbaraj 2004.)

The questions of water rights are always exacerbated by real or perceived water scarcity. As we will see below, scarcity, while having natural elements, is socially constructed.

Water Scarcity

"At the moment, I project the scarcity of water within 5 years...I can promise that if there is not sufficient water in our region, if there is scarcity of water, if people remain thirsty for water, then we shall doubtless face war." Meir Ben Meir, Former Israeli Water Commissioner, quoted in a BBC report on Water Conflict (Welch 2000).

Water conflict is generally thought of as the result of biophysical, or natural, scarcity. When there is not enough to go around, certain actors will take measures to ensure that they get theirs. But scarcity is not only biophysical. Scarcity may, in fact, have environmental conditions and social constructions including regulations, institutional initiatives, and perceptions.

Environmental conditions involve low annual precipitation, decreasing precipitation over time, diminishing availability of resources, and high variability of resources. Situations of drought involve rainfall below the recorded average. This may persist over multiple years. In places like Africa, climatologists talk of 20 year drought cycles. Indeed, processes of climate change and global warming may have the effect of decreasing rainfall over time. On the other hand, it is thought that in the Southwestern United States, treaty based allocations of resources among states (mostly codified in the middle of the last century) occurred during an historically wet period. As a result, negotiations over the allocation of shared rivers such as the Rio Grande or Columbia between American Indian tribes, states, farming communities, municipalities and others (such as the government of Mexico) have been highly contentious – and have included discussion of the distinction between “wet water” (rights to an actual amount of acre feet of water) and “paper water” (rights to acre feet that the river system could produce in theory).

Social constructions of scarcity involve regulations that can limit access to water resources. For instance, Palestinians have limits on allowable depth of wells placed on them from the Israeli authorities. This impacts both the Palestinian agricultural production potential and Palestinian community development potential. While Israel claims to offset this with domestic water supplied by Israel’s National Water Carrier, this source is restricted in the driest part of the year and Palestinians complain that they are asked to pay more than Israeli consumers for the same water (Abu Eid 2007).

While the case of Israel is egregious, water regulations in many places play the role of privileging access by some at the expense of others. The recently signed Great Lakes Compact between the United States and Canada, which regulates the extent to which water may be withdrawn within, discharged into, or transferred out of the Great Lakes Basin, is an example of how regulations may protect natural resources and people who currently depend on them.

Social constructions of scarcity may also include incentives to use more or less water. Arguably, the overuse of water in the Ogallala aquifer in the US Great Plains is the result of years of incentives from the U.S. Government to farmers to plant irrigated corn, soybeans and cotton. The same may be said of the water used in California's Central Valley to grow fruit and vegetables with transferred Columbia River surface water. While the production incentives have not disappeared, the U.S. Government now offers a set of programs to incentivize farmers to conserve water in response to inter-user and interstate conflicts over water rights.

Cultural presumptions and perceptions may also influence the perception of scarcity. For years, the governments of Las Vegas and Phoenix, both desert communities, did little to constrain water use. Businesses flaunted use of water (think of the famous fountains of Las Vegas) and residences had lawns and swimming pools. While there was little natural water in the area, these were certainly not situations of scarcity—indeed these cities became symbols of the misuse of water in the southwestern United States. (See, for instance, Postel (1992) and Reisner (1979)).

The perception that water scarcity is biophysical in nature, has been reified by those immersed in conflict. In the Middle Rio Grande, the residents of Albuquerque, New Mexico believed that while there was little precipitation, they lived on top of an “underground Lake Superior.” For years, Albuquerque and the surrounding area grew as fast as it could. Residents had green lawns and municipal parks with turfgrass irrigated at high noon. In the mid-1980s, the US Geologic Survey released a report on the reassessment of available groundwater resources. This report documented that available groundwater was far less than previously believed. Within 10 years, significant education efforts by Albuquerque's officials and citizens had changed the discourse from talk of underground Lake Superior, to acknowledgement of scarcity. New housing developments now routinely are xeroscaped (planted to use minimal water), rather than having lawns.

The upshot is that while scarcity is often highlighted as the biophysical process that drives water conflict, as Indian Scholar Lyla Mehta states, “scarcity is not a natural condition. Instead, it is usually socially mediated and the result of socio-political and institutional processes.” (Mehta 2007: 654)

Technology and Water Allocation

“Even the Great Lakes aren't great enough to sustain North Americans' reckless water use in the event of a continentwide water shortage, “I think we have to stop considering the Great Lakes as

the thing that's going to irrigate the Red River Valley and supply water to the dry American southwest,” David Schindler, University of Alberta Hydrologist. (Bouzane 2009)

Technology and technological development plays a major role in water conflicts. The ability to construct large dams that hold back and divert water for use by upstream users is precisely the cause of disgruntlement by those downstream. The proposed GAP project in Turkey nearly led to war on several occasions with Iraq, which worried that the project would restrict water to the Nile and Euphrates. Likewise, concern has been raised that a Chinese proposal to dam the Mekong River would lead to downstream water shortages and conflict in East Asia.

In the United States, the development of center-pivot irrigation in the 1970s (which can tap wells as far as 500 feet underground to feed circular irrigation systems), vastly increased irrigated acres of corn and bean production in Nebraska and Colorado. It also led to significant water conflicts among the Great Plains states, as the groundwater that fed irrigation systems would have enhanced the flow of rivers in the region. A similar diversion of water for irrigation from the Aral Sea has created an ongoing conflict over water management in Tajikistan, Kazakhstan, Turkmenistan and Uzbekistan. (For more on this point see Linn, 2008)

The ability to drain swamps and other water has likewise created conflict. The draining of the Hula wetlands to open fertile agricultural land in what is now Israel displaced thousands of “Marsh Bedouins” who had made their life in the wetlands (Rabinowitz and Khawalde 2000). The draining of the Mesopotamian Marshlands by the Iraqi government in the early 1990s led to the internal displacement of half a million “Marsh Arabs”, with an additional 40,000 fleeing to refugee camps in Iran (U.N. Chronical n.d.).

The draining of seasonal wetlands for agriculture in the Mississippi River Basin, specifically Iowa, Illinois, Minnesota, and Missouri has led to the development of the Hypoxic Dead Zone in the Gulf of Mexico, where high nitrogen and phosphorus loading has led to the growth of algae that block sunlight and oxygen, killing all fish that can't swim away. The Dead Zone has been exacerbated by the flooding of recent years, as industrial waste and sewage have been added. Mexican and U.S. fishers alike have protested the loss of livelihood from this condition. (For a good description of this issue see Achenbach 2008.)

Technology may also play a role in resolving water conflict. Most frequently, proposals are put forward to increase supply. One example would be the proposed Red-Dead Canal. As a Congressional Research Service report notes, the proposal

“is to construct a canal from the Red Sea to the Dead Sea to pump sea water into the salt lake while generating hydroelectric power for use in desalination. The governments of Israel and Jordan have been enthusiastic proponents of the “Peace Canal,” and are calling on the international community, including the United States, to support its multi-billion dollar construction. However, opponents of the canal claim that it may do more

environmental harm than good and suggest that the Dead Sea be naturally restored by allowing the Jordan River to flow southward unimpeded” (Sharp 2008: 1)

Values and Water Use: Water for Life, Water for Food, Water for Profit?

A critical and often underappreciated aspect of water conflict is that of values. Values may be taken in both its forms: monetary and cultural. Both of these aspects are critical.

Tony Allen (2002) argues that the Middle East water conflicts could be solved if the parties recognized the relative value of activities. For Israel, he argues, there is little merit in continuing to produce and trade “virtual water” through irrigated agriculture. The value of the water is worth more than products such as citrus, tomatoes, rice, and cotton. The same is true of many of the other conflicts. By true costing the relative value of water, the cost of irrigation in normal years for corn or cotton is likely to seem exorbitant. Thus there would be a built in disincentive to irrigate for export in dry regions. This same value system is increasingly leading to the development of water markets to create incentives to take irrigated land out of production or implement practices to minimize impairment of water bodies.

The other values that are important are those that respect water as a critical part of the web of life. There are increasing movements to better conserve water. Even in the water-abundant state of Michigan, there are movements to use this resource more thoughtfully. Who lives downstream? What other human or animal communities might utilize this resource? What might we do to preserve and protect this resource for present and future generations? These values will be critical to overcoming water conflict. As a UNDP conference on Water Values and Rights stated, there are increasing calls to: “develop a new water mentality by which water use is prioritized as vested human rights and is managed in an economical and ecological sustainable manner instead of being handled as solely a political issue and commercial commodity” (International Conference 2005).

Power, social processes and water rights

Half the world's population lives in river basins shared by two or more countries. As there is increased demand for water, there are bound to be more potential conflicts. Thus, it makes sense that peace building is the focus of 2009 World Water Day on March 22, titled “Shared Water: Shared Responsibility.” Indeed, there are many truisms that should lead to right sharing of water resources. We all live downstream. There is but one well.

Yet, water is precious as capital as well. Investing in water development has the potential to produce drinking water, energy, industrial and agricultural production. For powerful nations and groups within nations, it is tempting to proceed on this path to enrich their citizens. Perceived scarcity may be alleviated: but at what cost? Who lives upstream or downstream that might have needed access to those water resources? Further, as the Sardar Sarovar (Narmada) dam project

in India has so clearly demonstrated, large water infrastructure projects often disproportionately benefit some citizens at the expense of others (Mehta 2007).

International systems exist for negotiations of water rights. And there is largely a good record. It is notable that the Middle East has not yet entered a shooting war explicitly because of water. Nor, for that matter, has the Nile Basin or the Mekong Delta. There have been tense international negotiating sessions, long processes of adjudication, and difficult moments, but the big water wars to date have been averted. Given growing population, increased climatic and pollution pressure on fresh water resources, significant efforts will need to be exerted to ensure this remains the case in the future. This must include more adequate attention to concerns about water rights.

Conflict	Resolution
Distrust	Negotiation
Adversarial relationships	Collaboration
Zero sum game/gain	Positive sum game
Negative outlook	Win-win

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