

Water and Conflict

Events, Trends, and Analysis (2011-2012)

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Violence over freshwater has a long and distressing history. For nearly two decades, the Pacific Institute has been tracking, analyzing, and cataloging instances of conflict over water resources (see box WB 3.1).

In recent years, there has been an increase in reported cases of water-related disputes and violence. Figure WB 3.1 shows the average number of events per year from 1931 to 2012, averaged over two-year reporting periods. Part of this increase is almost certainly due to improvements in reporting; new Internet tools that permit more comprehensive collection and dissemination of news, data, and information; and more widespread awareness of the issue. But it is also possible that part of the increase is due to growing tensions and disputes over limited freshwater resources and the unresolved political challenges associated with “peak water”—the limits imposed on the availability of both renewable and nonrenewable water resources (Gleick and Palaniappan 2010). Without more information and a more comprehensive analysis, we are not able at this point to make any definitive statement about how to attribute the observed trends in this field, but we put forward the hypothesis, subject to better data and analysis, that the risks of water-related disputes involving violence are increasing. Others have also expressed this hypothesis, based on estimates of growing absolute and per capita scarcity of water, water contamination, and the extensive reliance of agriculture and some urban uses on nonrenewable sources of water that are rapidly being depleted (see, e.g., CSIS and Sandia National Laboratories 2005; US DIA 2012; Leurig 2012).

This idea is also at odds with some academic and popular writing that argues that the fear of water wars is overblown (Kramer et al. 2013). Part of that argument is based on the observation that there are substantial numbers of historical agreements and political treaties over shared interstate water systems and a long history of cooperation and negotiation when disputes develop. But the argument against water “wars” is different from the broader issue of water-related conflicts. And it is somewhat of a “straw man” argument: the “water wars” discussions are almost always found in the popular media, not academic analyses, and while wars are almost never solely or primarily about water, water-related violence, at many different scales, does occur.

Furthermore, much of the discussion and analysis of water wars focuses on *transnational*, or *interstate*, disputes, while there appears to be a growing threat of *subnational*, or *intrastate*, water conflicts. This distinction is further discussed and analyzed below, but we note that the prevalence and availability of international mechanisms to reduce the risks of interstate conflicts may offer little or no help in the area of intrastate conflicts.

BOX WB 3.1 The Pacific Institute Water Conflict Chronology

The Pacific Institute maintains a comprehensive database, the Water Conflict Chronology, at <http://www.worldwater.org>. An update is also provided every two years in this biennial water report, *The World's Water*, published by Island Press. Using these data, the Pacific Institute produces theoretical research papers, historical reviews, and regional case studies on water conflicts. We have organized workshops on lessons from regional water disputes in the Middle East, Central Asia, and Latin America. We have brought together experts from the fields of traditional and nontraditional arms control and helped coordinate a workshop on the role of science and religion in reducing the risks of water-related violence, which was held at the Pontifical Academy of Sciences of the Vatican.

The full Water Conflict Chronology includes integrated Google Maps; time, location, and subject filters; and a separate searchable bibliography.* The nature of entries in the chronology can be described and categorized in different ways. The Institute has split the categories, or types, of conflicts as follows, though other groupings and distinctions can also be useful:

Military tool (state actors): water resources, or water systems themselves, are used by a nation or state as a weapon during a military action.

Military target (state actors): water resources or water systems are targets of military actions by nations or states.

Terrorism or domestic violence, including cyberterrorism (nonstate actors): water resources or water systems are the targets or tools of violence or coercion by nonstate actors. A distinction is drawn between environmental terrorism and ecoterrorism (see Gleick 2006).

Development dispute (state and nonstate actors): water resources or water systems are a major source of contention and dispute in the context of economic and social development.

The Water Conflict Chronology has appeared in every volume of *The World's Water* since 1998. It continues to be one of the most popular features of the Pacific Institute's work, and it is used regularly by the media and by academics interested in understanding more about both the history and character of disputes over water resources (Zakaria 2013).

*Water Conflict Chronology, <http://worldwater.org/chronology.html>.

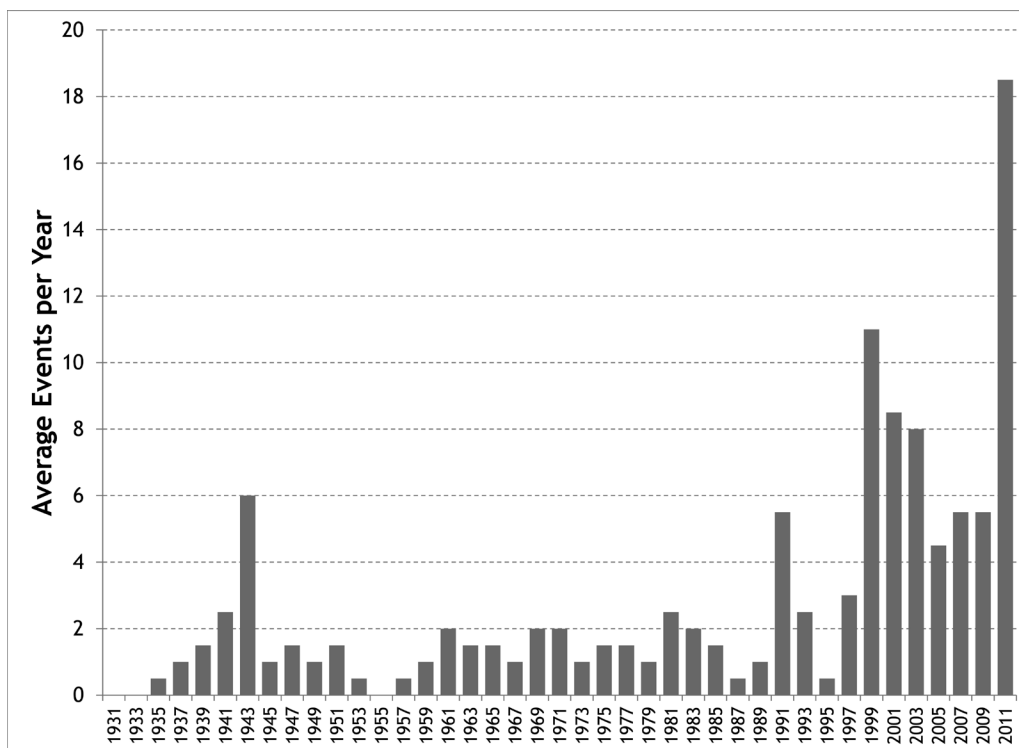


FIGURE WB 3.1 NUMBER OF REPORTED WATER CONFLICT EVENTS PER YEAR, 1931–2012 (AVERAGED OVER TWO-YEAR PERIODS TO SMOOTH FOR CROSS-YEAR EVENTS AND UNEVEN REPORTING)

As shown here, it is precisely these subnational conflicts that appear to be increasing in scope and severity. In that sense, it is not water wars that the international community must address but the far broader lethal causes of water conflicts overall, especially conflicts over equitable access to water, strategies for sharing during shortages, and water contamination.

There is also evidence of a shift in the nature of these conflicts, away from water disputes between nations and toward subnational and local violence over water access. Figure WB 3.2 shows the changes in the number and proportion of reported events at the transnational and subnational levels. The growing risk of subnational water conflicts was noted as far back as 1998 in the first volume of *The World's Water* (Gleick 1998, 105):

Traditional political and ideological questions that have long dominated international discourse are now becoming more tightly woven with other variables that loomed less large in the past, including population growth, transnational pollution, resource scarcity and inequitable access to resources and their use.

Part of this shift is almost certainly due to improved local reporting of water conflicts, but part is also likely to reflect the greater availability of diplomatic and political tools at the international level that permit disputing parties to move toward cooperation rather than conflict. Such tools are notoriously weak at the local level, especially in countries with young or weak political institutions. And the greater prevalence of international

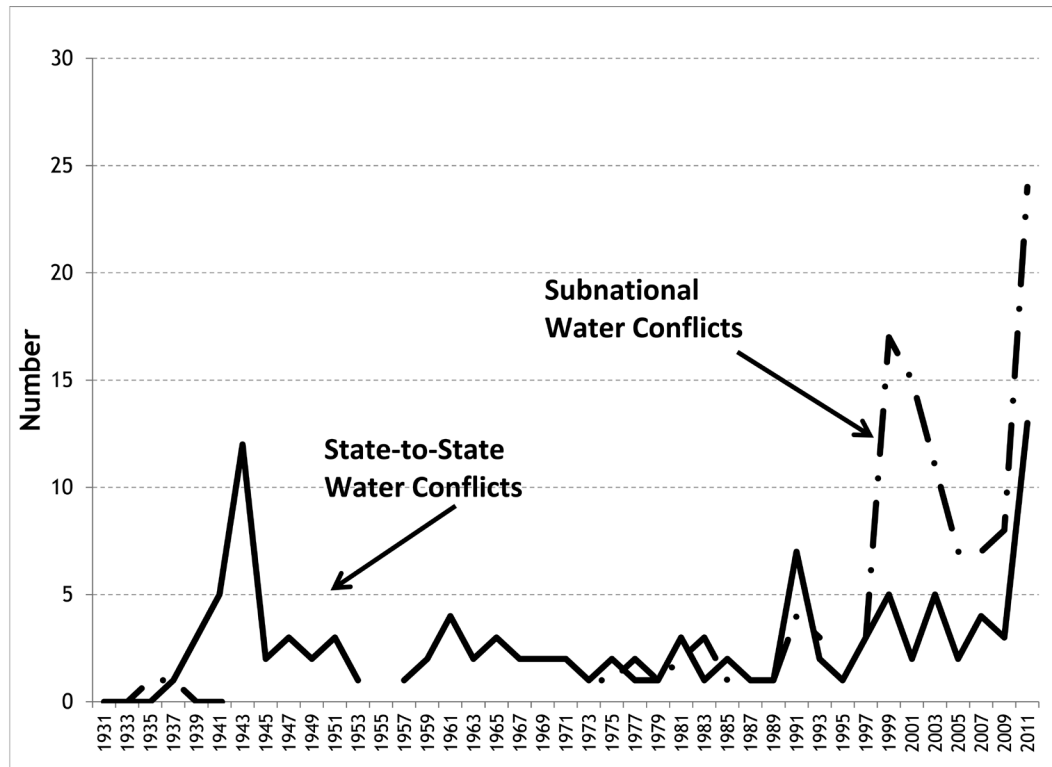


FIGURE WB 3.2 INCIDENCE OF REPORTED WATER-RELATED CONFLICTS FOR TRANSNATIONAL EVENTS (SOLID LINE) AND SUBNATIONAL EVENTS (DASHED LINE). IN THE PAST TWO DECADES, WATER CONFLICTS HAVE BEEN DOMINATED BY SUBNATIONAL DISPUTES.

mechanisms to reduce the risks of interstate conflicts over water does little or nothing to reduce the risks of intrastate, or subnational, violence.

The latest version of the Water Conflict Chronology includes events from 2011 and 2012 plus new events from other years added by our research, submissions from colleagues and researchers, and contributions from the public. We continue to welcome such contributions.

2011 and 2012 Update

In 2011 and 2012, violence over water was reported in every major developing region of the world, especially the Middle East, Africa, and Asia, with additional important examples in Latin America. Below, we provide an update with key examples from this two-year period. The full chronology and list are available online.¹

1. Corrections, additions, and modifications are welcome. Send full citations and supporting information to pgleick@pacinst.org.

Southern and Western Asia (India, Afghanistan, Pakistan, Iran)

In Afghanistan, three separate events were reported, in April, July, and December 2012. In mid-April, 150 schoolgirls were reported to have been sickened by poison in their school water supply in an intentional attack thought to have been carried out by religious conservatives opposed to the education of women (Hamid 2012). In July, seven children were killed by a bomb thought to have been intended for Afghan police and planted at a freshwater spring in the Taywara District of western Ghor Province (Shah 2012). In December, in a sign of broader tensions over water between Afghanistan, Iran, and Pakistan, which share several rivers, Afghans defending the Machalgho Dam were killed. The dam is being developed for irrigation and local power supply. This dispute is just one of several surrounding the international waters of the region (Mashal 2012).

The year 2012 also saw a series of water-related conflicts within and between India, Pakistan, and Afghanistan. India has long experienced internal (state-to-state) disputes over water, especially between Karnataka and Tamil Nadu over the Cauvery River in a dispute that has been going on since at least 1991. At that time, court rulings allocating water from Karnataka to Tamil Nadu led to riots in Bangalore that killed twenty-three people, mostly Tamils. In 2002, a farmer in Karnataka jumped into a reservoir, killing himself, to protest water deliveries to Tamil Nadu (Circle of Blue 2012). Violence broke out again in 2012 when the state of Karnataka stopped the flow of water to Tamil Nadu, in violation of an order by the Supreme Court of India. In October 2012, thousands of farmers in Karnataka tried to prevent the release of water from two dams (Krishna Raja Sagar and Kabini Dams) on the Cauvery River. Injuries to protestors and police were reported (Circle of Blue 2012). The water releases were ordered by the Indian Supreme Court, which required that Karnataka meet deliveries to the downstream state of Tamil Nadu despite severe drought. The dispute continued later in the year when Karnataka again stopped releases downstream (*Indian Express* 2012).

Separately, scuffles and protests broke out around New Delhi during the summer of 2012 as residents surrounded water delivery trucks and fought over water (Reuters 2012a). That summer was the hottest in thirty-three years, leading to extensive energy and water shortages.

In an international dispute between Pakistan and India, Pakistani militants were reported to have attacked and sabotaged water systems, flood protection works, and dams in the Wullar Lake region of northern Kashmir. In August 2012, water engineers and workers were attacked and explosives were detonated at the unfinished Tulbul Navigation Lock/Wullar Dam, which Pakistan claims would violate the Indus Water Treaty with India by cutting water flows to Pakistan (Hassan 2012).

The Middle East and North Africa (MENA) Region

Serious examples of the use of water as a target and weapon of war were reported in Libya, during the civil war there, and in the long-standing dispute over borders, land, settlements, and water control in Israel and Palestine in 2011. Cross-border and subnational disputes over water were reported in northern Africa in 2012 involving Egypt, Ethiopia, and Sudan, and separately, within both Sudan/South Sudan and Egypt over water allocation and scarcity.

Libya

During the 2011 Libyan Civil War, forces loyal to dictator Muammar Gaddafi took control of a water operations center, cutting off the water supply to Tripoli. The system controls Libya's so-called Great Manmade River—a system of pumps, pipes, and canals that brings water from distant aquifers to Tripoli and other cities. Half the country was left without running water, prompting the United Nations and neighboring countries to mobilize tanker ships to deliver water to coastal cities (Circle of Blue 2011; UPI 2011).

Sudan, Egypt, and Ethiopia

Continuing violence in Sudan had displaced hundreds of thousands of refugees, leading to an increase in deaths from water shortages. Violence broke out in March 2012 in refugee camps, where large numbers of people faced serious water scarcity. Fighting was reported at the limited water points in the Jamam refugee camp (McNeish 2012). The international aid group Médecins Sans Frontières reported in June 2012 that as many as ten refugees were dying daily as water ran out in refugee camps in South Sudan (Ferrie 2012).

Within Egypt, farmers from the Abu Simbel region held over two hundred tourists hostage in June in a protest over the inadequate provision of irrigation water for local farms. The farmers captured the tourists after they had visited famous attractions in the region but released them after officials agreed to a temporary release of water (*Egypt Independent* 2012). Shortly after this, a series of public protests over shortages of drinking and irrigation water took place, extending across seven Egyptian governorates. Some of these protests were violent: in Beni Suef Governorate, one person was killed and many were injured during a conflict over irrigation water; in Minya, villagers clashed with officials over water shortages and water pollution; in Fayoum, hundreds of people protesting water shortages blocked a highway and set fires (Ooska News 2012).

In a transnational dispute involving Egypt, Ethiopia, and Sudan in September and October 2012, information was released about a possible secret agreement between Egypt and Sudan about an airfield that could be used to attack a major Ethiopian dam under construction. The dam, now known as the Grand Ethiopian Renaissance Dam (GERD), has also been called the Millennium Dam or the Hidase Dam. If built, GERD will be one of the largest dams in the world and the largest hydroelectric facility in Africa, located just upstream of the Ethiopian-Sudanese border on the Blue Nile. Egypt has expressed concerns about reductions in water flows reaching its citizens. The claim in 2012, strongly denied by Egypt, was that Egypt and Sudan had reached an agreement to permit Egypt to use Sudanese territories to launch attacks on GERD if diplomatic efforts failed to resolve water-sharing disputes between Egypt and Ethiopia. The allegations originated in an internal 2010 e-mail made available by WikiLeaks (*Sudan Tribune* 2012; Al Arabiya News 2012).

Yemen

In September 2011, political violence in Yemen's capital, Sana'a, led to secondary impacts on access to water. Damage to infrastructure contributed to "acute water and power shortages, forcing residents to rely on power generators and buy water extracted from wells and sold on a thriving black market" (AP 2011). The violence arose during the Yemeni uprising that followed the Tunisian Revolution in early 2011 and coincided with mass protests in Egypt and other parts of the Middle East. During the violence, gov-

ernmental soldiers shelled neighborhoods and destroyed many traditional rooftop water tanks, worsening the problem of water access.

Israel and Palestine

Two separate incidents involving conflicts and violence over water were reported in 2011 in Israel and Palestine—a region with an especially long history of water disputes. In the first, Israel's military was reported to have destroyed nine water tanks in the Bedouin village of Amniyr in the South Hebron Hills in the West Bank, Palestine. Later, soldiers destroyed pumps and wells in the Jordan Valley villages of Al-Nasaryah, Al-Akrabanyah, and Beit Hassan (Abuwara 2011). In the second incident, Israeli settlers near Qasra, a West Bank village of 6,000, were reported to have destroyed crops—including olive trees—and a water well (Bsharat and Ramadan 2011).

Syria

In a period (2011–2012) in which there were a large number of water-related conflicts, one particularly disturbing event occurred with a complicated but direct connection to water: the unraveling of Syria and the escalation of massive civil war there (see In Brief 2). Syria's political dissolution, like almost all conflicts, is the result of complex and inter-related factors, including an especially repressive and unresponsive political regime, the erosion of the economic health of the country, and a wave of political reform sweeping over the entire Middle East and North Africa region. But in hindsight, factors related to drought, agricultural failure, water shortages, and water mismanagement appear to have played an important role in nurturing “seeds of social unrest” as well; see the separate In Brief on this topic in this volume.

Latin America

Violence over water was reported widely in Latin America in 2012. Incidents involved Brazil, Bolivia, Chile, Peru, and Guatemala. Three events were reported in Brazil in 2012: one associated with a controversy over control and management of indigenous lands, one during a dispute over dam construction, and violence associated with ongoing drought and water shortages. In the first instance, Brazil's federal police were investigating reports that water used by an indigenous tribe had been poisoned by nearby landowners who were attempting to gain control over disputed land. Since 2009, three men from this tribe had been reported killed in this dispute (AP 2012). In November 2012, work on the controversial \$13 billion Belo Monte Dam was halted after protesters burned buildings at three dam sites. Several local groups and environmentalists fear that the dam across the Xingu River, a tributary of the Amazon, will damage local communities and their way of life, but the conflict also has economic roots (Phys.org 2012). Northeastern Brazil also saw growing conflicts after severe drought reduced water availability. News agencies report that on average, one person a day was being killed as a result of “water wars” that involved locals fighting over scarce supplies (Catholic Online 2012).

There is a growing dispute over water from the Silala/Siloli River, which originates in Bolivia in the highlands of the Andes and flows to Chile. Bolivia recently linked an ongoing argument about access to the Pacific coast with the flows of water in a shared river:

the Silala/Siloli (*The Economist* 2012a). In Guatemala, human rights activists protesting the impacts of mining on local water quality and water rights were attacked. In June 2012, a local activist was shot, mirroring another incident in 2010 when an activist had been shot while protesting the impacts of mining on water quality and local water rights (Amnesty International 2012).

In Peru, several incidents involving protests, injuries, and deaths were reported in regions with opposition to large-scale mining operations because of concerns over water quality and water rights. In July 2012, four people were reported to have been killed in clashes between protestors and police over the proposed multibillion-dollar Minas Conga gold mine (Yeager 2012). Protests focused on pollution, concern about water supplies, and economic issues have significantly slowed, and temporarily completely halted, all work at the mine (Reuters 2012b). A similar protest over the Xstrata Tintaya copper mine in May 2012 led to two deaths and fifty injuries (Reuters 2012c).

Central Asia

Central Asia, including the former Soviet republics, where almost all of the major rivers cross international borders, has been the scene of long-simmering tensions over water (Water Politics 2012). In this region, there are especially clear links between water and energy—a growing concern in other parts of the world as well. In 2012, a major dispute developed over water allocation and management among the Central Asian countries of Tajikistan, Kyrgyzstan, and Uzbekistan. Tensions among countries in the region have been growing for some time because of water scarcity, rivers that cross political borders, dam construction and management, and a lack of cooperative institutional agreements or institutions. In April 2012, Tajikistan protested that Uzbekistan had stopped deliveries of natural gas because of a disagreement over a hydropower dam. Uzbekistan cut gas deliveries needed by Tajikistan because of concerns over efforts to build a hydroelectric power station that Uzbekistan said would disrupt water supplies for its citizens. Gas flow was resumed after a new contract was signed (Kozhevnikov 2012).

This event was perceived to be part of a larger long-standing dispute over two major proposed hydropower dams in Kyrgyzstan and Tajikistan.² These dams would be the largest ever built in Central Asia and would potentially affect water deliveries and availability to the downstream nations of Uzbekistan, Turkmenistan, and Kazakhstan, all of which have expressed their concerns. By some estimates, the Rogun Dam would significantly reduce summer water availability and increase winter flows, depending on operations. There is concern that if the dams are built, economic and political tensions among the countries will escalate. Uzbekistan has the ability to cut off natural gas exports to both Kyrgyzstan and Tajikistan, and as noted above, it has actually done so. In September 2012, the leader of Uzbekistan, Islam Karimov, stated that the Rogun Dam could lead to “not just serious confrontation, but even wars” (*The Economist* 2012b). This regional dispute is further complicated by political relationships with Russia. Russia has strategic interests in the region and has supported Kyrgyzstan and Tajikistan in return for an agreement to host Russian military bases for several decades to come (Borisov 2012).

2. The Kambarata-1 hydropower plant, proposed by Kyrgyzstan for the Naryn River, a tributary of the Syr Darya; and the Rogun Dam, proposed by Tajikistan for the Vakhsh River, a tributary of the Amu Darya.

Other Regions in Africa

Several instances of violent clashes over access to water between pastoralists and farmers were reported in many parts of Africa in 2012. The worst cases occurred in Kenya, but additional conflicts were reported between communities in Mali and Burkina Faso, in Mali and Mauritania, in Kenya and Uganda, in Kenya and Somalia, and within Tanzania.

Somalia/Kenya

In September 2012, Kenyan military officials reported that Al-Shabaab insurgent fighters had poisoned a water well and damaged water infrastructure for another well near the port city of Kismayu in an effort to counter the participation of Kenyan troops as part of the African Union Mission in Somalia (AMISOM) (Wabala 2012).

Kenya

Extensive violence over water was reported in Kenya in 2012, with more than one hundred deaths in clashes between farmers and cattle herders over land and water (*New York Times* 2012). This conflict is part of a long-running dispute between the Pokomo people—mostly farmers near the Tana River—and the Orma, seminomadic cattle herders. In 2001, at least 130 people were killed in a string of clashes in the same district and between the same two communities over access to land and a river (Google News 2012a). There is some indication, however, that the current conflict is being exacerbated by Kenyan and foreign investment in vast tracts of land for food and biofuel cultivation, putting pressure on local resources (BBC 2012). Additional violence, including deaths, was reported in 2012 in disputes over access to water in the poorest slums around Nairobi (Njeru 2012).

Mali/Burkina Faso, Mali/Mauritania, Kenya/Uganda, Kenya/Somalia, and Tanzania

The past few years have seen a series of increasingly violent clashes over access to water and land between nomadic herders, pastoralists, and settled villagers. In May 2012, a clash along the border between Dogon tribesmen from Mali and nomadic Fulani herders from Burkina Faso killed at least thirty people after the revocation of an earlier agreement to share water and pastureland (Xinhua News 2012b).

The conflict in Mali is also having repercussions in neighboring Mauritania, with protests and violence over water shortages reaching the capital, Nouakchott. By July 2012, over 70,000 Malian refugees were seeking asylum in Mauritania, putting added pressure on scarce food and water supplies. This led to protests in the capital over “the lack of water” (Taha 2012).

In August 2012, fighting between two clans in the Lower Jubba region of South Somalia killed at least three people and wounded five. Reports from the village of Waraq (near the border with Kenya) indicated that the dispute originated with a disagreement over the ownership of new water wells (Shabelle Media Network 2012).

Cross-border tensions are also growing between Uganda and Kenya after Kenyan Pokot herdsman crossed the border in search of water and pasture. Borders are often ignored in the region, where traditional pastoralists move herds to follow rains and grazing opportunities. In October 2012, the Ugandan government deployed more than 5,000 soldiers to the region in order to contain armed conflict among pastoralists from the two countries (Bii 2012).

Violence between farmers and pastoralists has also expanded in Tanzania's southeastern Rufiji River valley, a region hit by drought. In May 2012, a farmer was killed in a conflict with a herdsman in a dispute over access to water in the southern regions of Lindi and Mtwara. Five more people died and many more were injured in subsequent violence. According to local sources, the violence has been worsened in the past five years by prolonged drought (Makoye 2012).

South Africa

Protesters in Cape Town, South Africa, rioted over local failure to deliver adequate water and power to poor communities. Hundreds of protesters burned tires, destroyed cars, and threw rocks at police in August 2012 after continued disappointment and anger over the lack of basic services (Xinhua News 2012a).

Asia-Pacific Region

Amnesty International reported in 2011 that women in the slums of the Solomon Islands are "continually harassed, attacked, and raped" when they are forced to walk long distances in unsafe areas in order to find clean water. A survey showed that 92 percent of households do not have a tap in their home and that local water sources are often polluted (Amnesty International 2011). Violence over access to a water source was reported in Maluku, Indonesia. Clashes in early 2012 led to several deaths and injuries (*Jakarta Globe* 2012).

Conclusions

Water-related violence has a long history and continues to be a global and regional problem. The past several years have seen an increase in the total number of reports of violent conflict over water. Unlike the situation in the early and middle parts of the twentieth century, an increasing proportion of reported cases have to do with subnational disputes, terrorism, and local violence rather than transnational incidents. Many are small in scale, involving local violence over water allocations and use or violence over local development decisions that affect environmental and economic conditions at the community scale. But more and more of the reported cases have their roots in water scarcity and competition for a fixed resource that is reaching peak limits (Gleick and Palaniappan 2010).

Much has been written in recent years about the nature of water-related conflicts and the need for improved international cooperation. Far less attention has been given to what appears to be the more significant risk: subnational violence and competition. Some of this violence has been, and will remain, local. But some may spill over into the international arena: the ongoing civil war in Syria (at the time of this writing) is a critical example in which water shortages, mismanagement, drought, and subsequent economic and population dislocations appear to have contributed directly to the political unraveling of that country.

The data suggest that the challenges of water conflicts are growing, not shrinking, es-

pecially at the subnational scale. Far better mechanisms and far greater efforts are needed to address these kinds of conflicts.

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