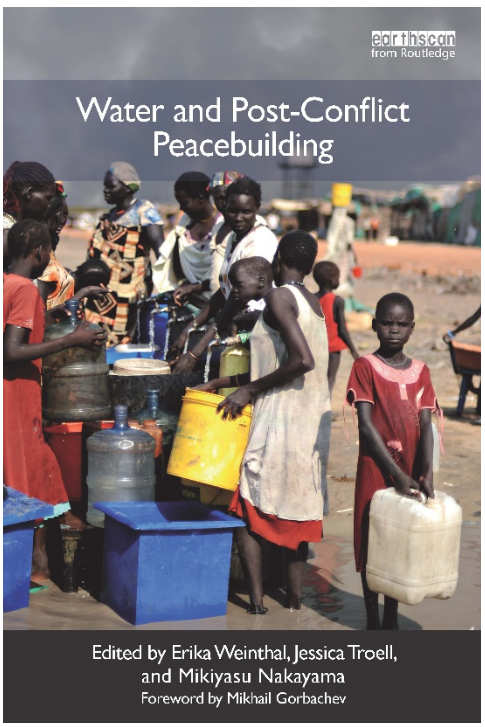

Water security and scarcity: Potential destabilization in western Afghanistan and Iranian Sistan and Baluchestan due to transboundary water conflicts

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Water security and scarcity: Potential destabilization in western Afghanistan and Iranian Sistan and Baluchestan due to transboundary water conflicts

Alex Dehgan, Laura Jean Palmer-Moloney, and Mehdi Mirzaee

Afghan stabilization and reconstruction efforts include agricultural development and water withdrawal, diversion, and containment projects in the middle and lower Helmand River and Hari Rud watersheds of Afghanistan.[1] The Iranian government sees these actions as undermining water security in the eastern part of its country. The concern is particularly relevant in the region known as Sistan and Baluchestan, the most desolate, most marginalized, and least stable of Iran's provinces. This region's instability is Iran's Achilles' heel, and Iran is sensitive to actions that may undermine its hold on the region.

Population growth and consumption patterns are at the root of near-term water challenges in both Iran and Afghanistan, and changes in climate are expected to exacerbate the situation. U.S. and Afghan efforts to harness or divert water from these watersheds without resolution of the water dispute between Afghanistan and Iran—which has festered intermittently since 1870—has encouraged Iran to adopt a paradoxical mixed strategy of destabilization and cooperation in Afghanistan. Its destabilization activities include support for the Taliban and direct action against water diversions. Failure to address water concerns has the potential to increase tensions between the two countries and to slow or prevent stability gains in Afghanistan's western provinces. However, handling water concerns adroitly could encourage closer cooperation on stability and development in Afghanistan, turning the challenge into an opportunity for post-conflict peacebuilding.

This chapter begins with a discussion of water relations between Afghanistan and Iran, focusing on the regional hydropolitics of Afghanistan's transboundary

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[1] *Rud* means "river" in Dari and Farsi, forms of Persian spoken in Afghanistan and Iran, respectively.

water basins; Iran's water insecurity and dependence on water originating from its upstream neighbor, Afghanistan; previous political negotiations over the waters of the Helmand watershed; and factors affecting future water availability in the region, including population growth, agricultural expansion, and climate change. The chapter then highlights how Iran's attempts at balancing its economic and political interests—interests that are conflicting at times—have collided with reconstruction projects for Afghanistan's water sector. Concentrating on Afghanistan's water-based development projects, the chapter concludes by outlining a five-part strategy to address the transboundary water issues. The strategy recommends developing monitoring systems and databases, identifying historic hydrometeorological baseline data, building capacity in water management and irrigation efficiency, creating an international support network for negotiations, and establishing a transboundary commission.

THE WATER DISPUTES BETWEEN AFGHANISTAN AND IRAN

Afghanistan's economic recovery requires reconsidering the definition of traditional security. With 80 percent of the population directly dependent on natural resource management (UNEP 2009), the strategy for reconstruction of the country after three decades of nearly continuous conflict requires incorporating historical resources that were the key to Afghanistan's greatness. This includes water.

Afghanistan's western neighbor, Iran, was forgotten after the initial days of the U.S. invasion of Afghanistan in October 2001 and the subsequent Bonn

Conference, when the United States, Iran, and Afghanistan had productively engaged on Afghanistan's reconstruction.[2] But any solution for post-conflict peacebuilding in Afghanistan requires consideration of its regional security and its economic and environmental context. This is particularly true with regard to Afghanistan's transboundary river basins.

Political hydrology

Worldwide, water is a commodity whose value varies according to locality, purpose, and circumstance (Grimond 2010). Within a specific river basin, it is more valuable in some locations than in others. Each of Afghanistan's five major river basins extends beyond its borders (see figure 1), and water use in each of

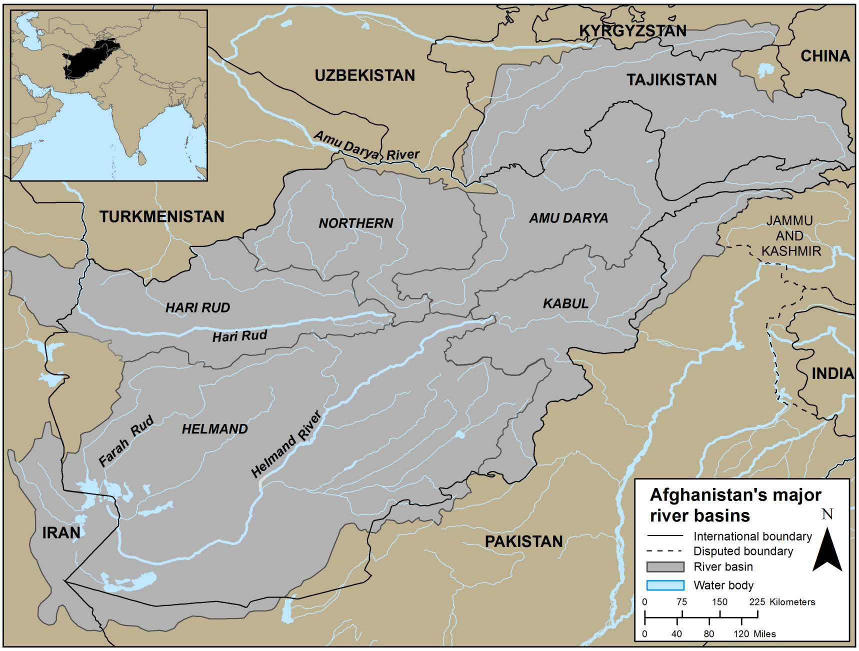

Figure 1. Watersheds of Afghanistan
Source: USACE-ERDC (2011).
Notes: The Helmand Basin, as referred to in this chapter, includes the Helmand, Upper Helmand, and Western Helmand, as shown on the map. The watershed extends into Iran's Sistan and Baluchestan Province, although that province is not shown on the map.

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[2] The Bonn Conference took place in Bonn, Germany, in December 2001, under the auspices of the United Nations. The Bonn Agreement, formally known as the Agreement on Provisional Arrangements in Afghanistan Pending the Re-Establishment of Permanent Government Institutions, was concluded on December 5, 2001, and outlined the framework for the reconstruction of Afghanistan following the U.S. invasion. For the complete text of the agreement, see www.un.org/news/dh/latest/afghan/afghan-agree.htm.

these transboundary basins has sparked tension with its neighbors (King and Sturtewagen 2010; Favre and Kamal 2004).

The Helmand River (known as the Hirmand River in Iran) is the longest river (1,150 kilometers) in Afghanistan, and its basin is among the most strategic of Afghanistan's river basins. With its waters originating in the Sia Koh Mountains in Herat Province and the Parwan Mountains northwest of Kabul, the river flows southwest through the desert of Dashti Margo, where it and the Farah Rud feed into the Sistan Depression at the Afghan-Iranian border (see figure 2). The Sistan Depression is divided into four separate shallow lakes of water—Hamun-i-Saberi, the deepest, is to the north; Hamun-i-Puzak is to the northeast, in Afghanistan; Hamun-i-Shapour is to the south; and Hamun-i-Helmand is a centrally located pool (Mojtahed-Zahed 2006; see figure 3).[3] These separate bodies of water can become one at flood times and can reach an area of approximately 3,200 square kilometers when the level of the combined lake rises (Favre and Kamal 2004). This large complex of wetlands, shallow lakes, and lagoons is world renowned as a haven for wildlife. The international community has designated the region a wetland of international importance under the Ramsar Convention (Ramsar Secretariat 2009).[4] For the past 5,000 years, the Hamun wetlands have been a major source of food and shelter for the people of Central Asia (Kakar 2011).

More than 7 million people inhabit the Helmand Basin, and they use the river and its tributaries extensively for irrigation (Favre and Kamal 2004). Most of the agriculture occurs in the lower reaches of the basin—in Kandahar, Helmand, and Nimroz provinces of Afghanistan, and in the Sistan and Baluchestan Province of Iran, which is part of the Persian granary. Ninety-five percent of the Helmand Basin is located in Afghanistan, but because of a lack of other economically feasible sources of potable groundwater, it is the only water resource for the main cities in Sistan and Baluchestan (van Beek and Meijer 2006).

Though Helmand River is a renewable water resource, it is vulnerable to overuse and seasonal exhaustion. The river and its tributaries are fed annually by melting snow from the highlands of central Afghanistan, and recent below-average snowfall and a reduction of water in the snow pack have led to a reduction of water in the overall drainage system (USACE-ERDC 2010). Two major dams that were constructed circa 1950 (the Kajaki Dam, capacity 2,720 million cubic meters; and the Arghandab Dam, capacity 435 million cubic meters) help control seasonal flooding and release water into the river during the seasonally dry times (FAO 1962; Caudill 1969; USAGC 2009; USACE-TEC 2002).

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3 These lakes are also known as Hamum-i-Saberi, Hamum-i-Puzak, Hamum-i-Shapour, and Hamum-i-Hirmand.

4 For the complete text of the Ramsar Convention, formally known as the Convention on Wetlands of International Importance, see www.ramsar.org/cda/en/ramsar-documents-texts-convention-on/main/ramsar/1-31-38%5E20671_4000_0__.

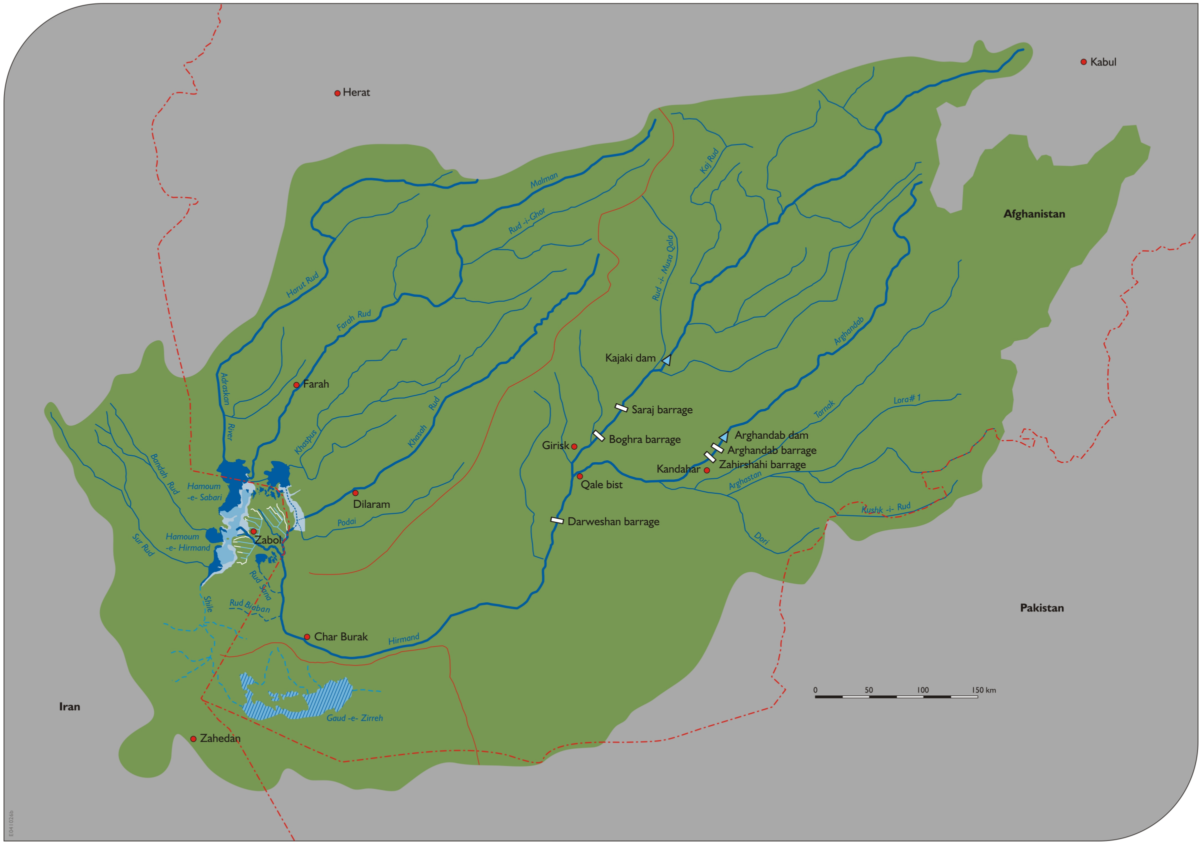

Figure 2. Rivers of Afghanistan and Iran feeding into the Sistan Basin
Source: van Beek and Meijer (2006).
Note: The Sistan Basin is shown in more detail in figure 3.

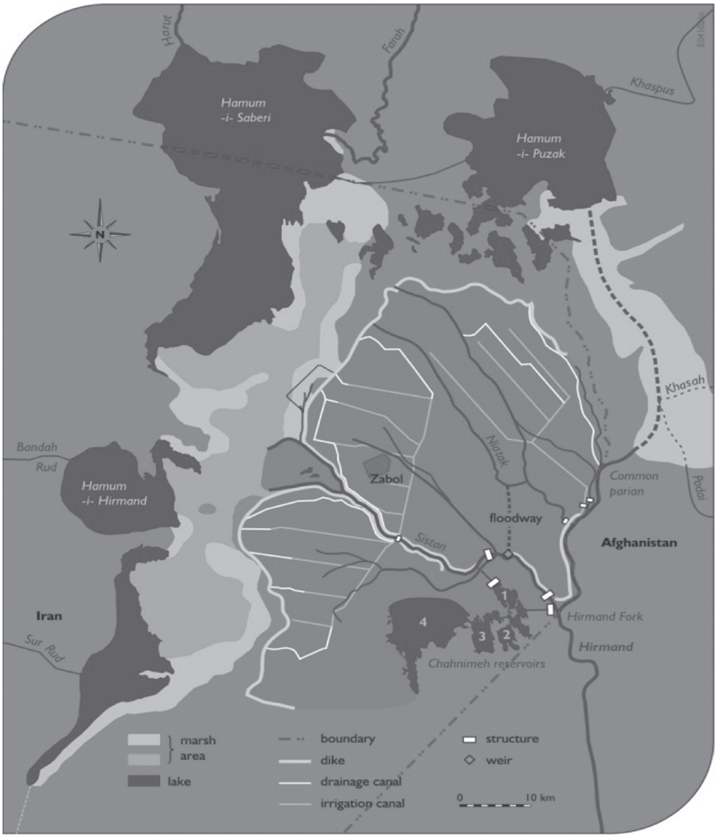

Figure 3. Close-up of the Sistan Basin *hamuns* (lakes), the four Chahnimeh reservoirs, and main irrigation and drainage canals
Source: van Beek and Meijer (2006).

In Iranian Sistan and Baluchestan Province, the four Chahnimeh reservoirs hold water from the Helmand River. With an overall capacity of 700 million cubic meters, these reservoirs are a source of water for consumption in Sistan and Baluchestan (van Beek and Meijer 2006). Their primary function is to secure a public water supply for the cities of Zabul and Zahedan (located along Iran's eastern border with Afghanistan) and surrounding rural villages. However, when there is sufficient water available for public consumption, additional water is released for irrigation. Furthermore, the reservoirs supply water to the river system in times of drought (van Beek and Meijer 2006). This regulatory function is critically important in the lower Helmand and in the wetlands of the Sistan Basin, for if the river does not flow, few things can survive. When wetlands dry out, ecosystems diminish and the livelihoods that depend on the ecosystems vanish with them (Weier 2003).

Surface water in the Helmand system does not meet the basin's demands. Because a predictable year-round flow of surface water is not guaranteed, groundwater drawn from wells is the traditional and most reliable source of water for Afghan communities and agricultural fields in the area. When water is extracted faster than it is replaced, the groundwater level drops (Heath 1983). This situation, referred to as groundwater overdraft, leads to falling crop yields, higher costs (because additional power is needed to pump water out of the ground), and in some cases, greater debts for rural poor.

Water insecurity

Afghanistan's downstream neighbor, Iran, relies heavily on renewable water sources for its agricultural production and economy. More than 90 percent of the country's renewable water resources are used in agriculture (Alizadeh and Keshavarz 2005), but because of low efficiency in irrigation and transport, approximately 50 to 60 percent of the water is lost during the process (Keshavarz et al. 2005). These inefficiencies are not insignificant. Iran's agricultural sector accounts for approximately one-tenth of its GDP (World Bank n.d.), employs one-fifth of its workforce (UN n.d.), and is central to the country's goal of achieving food security.[5]

Strong population growth in recent decades has left Iran unable to grow enough food to feed its population despite the Iranian leadership's goals of achieving food self-sufficiency. Water scarcity continues to be a bottleneck. Urbanization, industrialization, and the development of irrigated agriculture to support population growth have raised the demand for water and simultaneously have reduced the supply (Ardakanian 2005). The increased demand has drawn down Iran's aquifers and has created conditions for water stress. As noted in the 2005 Iranian-American Workshop on Water Conservation, Reuse, and Recycling, sponsored by the U.S. National Research Council and the Academy of Sciences of the Islamic Republic of Iran, serious scientific, technical, ecological, economic, and social issues surrounding water are of concern to Iran now and will be for years to come (Alizadeh and Keshavarz 2005).

Less than 10 percent of Iran's water resources originate outside the country, but those regions dependent on transboundary water resources are highly susceptible to water scarcity (Frenken 2009). Iran uses 80 percent of the Helmand's current downstream flow for agriculture. This region is economically important to Iran, having frequently been referred to in historical documents as the "bread basket" of Central Asia. Remote sensing analysis of satellite images has identified approximately 150,000 hectares of farmland and forests and approximately 500,000 hectares of pastureland in the Helmand transboundary watershed (van Beek and Meijer 2006). Sistan Basin's traditional economic fortune has diminished as a result of the reduction of water flow from the Helmand River.

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[5] See the Iranian Ministry of Agriculture web site, at www.maj.ir/english/main/default.asp.

Iran also has concerns about Indian reconstruction of the Salma Dam on the Hari Rud (also known as the Harut Rud), which forms the border between Iran, Turkmenistan, and Afghanistan. Once reconstructed, the Salma Dam, which was originally built in 1976 but was damaged during the Afghan civil war, will regulate river flow during flood season and reduce the amount of water that flows from the Hari Rud to Iran and Turkmenistan from 300 million cubic meters to 87 million cubic meters per year, a reduction in water flow of 71 percent (Peter 2010). Iran perceives the reconstruction of the Salma Dam and current North Atlantic Treaty Organization and U.S. Agency for International Development efforts to rehabilitate the Kajaki Dam on the Helmand River as a direct security threat (Bagherpour and Farhad 2010; Peter 2010). Iran has put substantial political pressure on Afghanistan and India to halt dam construction (Christensen 2011).

Water is also essential for Afghanistan's stabilization and reconstruction efforts. In Afghanistan, 98 percent of the water being withdrawn from the Helmand Basin is used in the agricultural sector (UNEP 2008). Moreover, 80 percent of the Afghan population is directly dependent on natural resource management, primarily in animal husbandry and agriculture (UNEP 2009). Future agricultural development—a key portion of U.S. president Barack Obama's strategy to rapidly increase economic activity as a bulwark against the insurgency and the opium trade that helps fund it—will depend on the availability of sufficient water resources for expansion (Wegerich 2010; USG 2010).

Although Afghanistan theoretically has sufficient water for its needs, the country is hampered by poor infrastructure that has been damaged by thirty years of conflict. The Soviet invasion and civil wars, coupled with a weak central government, also have damaged traditional systems of management through the undermining of social norms and institutions; this has increased internal water stress and conflict (Kakar 2011). Finally, Afghanistan loses approximately two-thirds of its water to Iran, Pakistan, Turkmenistan, and other neighbors because it does not harness its rivers (Peter 2010; Babakarkhail 2009).

From 1999 to 2009, the Helmand Basin region in Afghanistan and Iran intermittently experienced drought conditions that lasted long enough to cause an imbalance in hydrologic processes (Mousavi 2005). The droughts greatly increased the fragility of the population and increased tensions between the two countries. Drought played an important role in the displacement that was prevalent in southwestern Afghanistan. According to the Kabul office of the United Nations High Commissioner for Refugees (UNHCR), the majority of Afghanistan's internally displaced persons—166,153 out of 235,833 individuals—were displaced for two reasons: the conflict in the period prior to and after the fall of the Taliban in 2001, or the drought of the 1990s, which severely affected Kuchi (nomads) in the north, west, and south (UNHCR 2008).

In 2002 alone, UNHCR registered 5,000 displaced persons from Nimroz who were arriving in other Afghan provinces (Ghashtalai 2003). Lack of potable water caused the population of Zaranj, Nimroz's capital city, located on the Helmand River at the Afghan-Iranian border, to plummet from 100,000 in 1997 to 60,000 in 2002. As water from the Helmand River vanished and wells dried up, residents who remained in the border city were faced with having to buy water imported from Iran to survive (Ghashtalai 2003; Sabir 2008).

The Taliban-led Afghan government's decision from 1999 to 2001 to cut off the flow of the Helmand River to Iran in the midst of the drought exacerbated tension with Iran (Press TV 2011). As a result of natural drought and human actions, Iran's *hamuns* (lakes) dried up, and sandstorms buried dozens of villages and destroyed farmland (Weier 2003; NASA MODIS 2003).

The drought has had direct and indirect effects on farmers in Afghanistan and Iran (Weier 2003). The direct effects include decreasing production in agriculture and rangelands; groundwater depletion; low flows in rivers and streams, which exposes all ecosystems to destruction and contamination; soil erosion; and mortality of livestock and wildlife (Grimond 2010; Asian Development Bank 2009; Bates et al. 2008; Mousavi 2005). Indirectly, the drought has lowered farmers' income, decreased the government's tax income, increased the cost of water and forage transport, and increased migration of farmers to small and big cities (Mousavi 2005). The drought also reduced yields and quality of grain and increased incidence of pests and diseases, exacerbating the impact to the agricultural sector.

The decreased surface water flow and decreased available water in the Helmand River system may have also led to increases in desertification (UN-Water and FAO 2007). Sandstorms that scoured southwestern Afghanistan from early June through September 2003—called the worst in living memory by residents of the area—buried villages, filled waterways, destroyed crops, and killed livestock (NASA MODIS 2003). Though locally strong winds known as the Wind of 120 Days occur annually (Whitney 2006), wind-generated sandstorms persisted longer than expected during the drought. Most of the windblown dust originated in the Sistan Basin wetlands, in the beds of dried out hamuns. Persistent drought conditions coupled with increased withdrawal of Helmand River water for irrigation have quickly turned these wetlands into arid salt pans (IRIN 2007; UNEP 2003, 2006).

Political negotiations over the Helmand

Although the headwaters of the Helmand watershed are within Afghanistan's territorial boundaries, Afghanistan's rights to the use of that water are limited under international law, state practice, and long-standing water-sharing agreements with Iran. Under customary international law, no riparian state has the exclusive right to the use of a transboundary river; instead each state's sovereign right to develop a river is limited by the rights of equitable apportionment and equitable utilization of other states. In relation to allocation of the waters of the Helmand River, these principles are supported by specific agreements in the region.

On August 19, 1872, the Goldsmid Arbitral Award allocated equal shares of the water in the lower reaches of the river to Afghanistan and Iran. A key portion of the award language states: “It is, moreover, to be well understood that no works are to be carried out on either side calculated to interfere with the requisite supply of water for irrigation on both banks of Hirmand” (Goldsmid 1876, 414). After the Helmand River changed its course in 1896 and after a severe drought in 1902, the two governments attempted through arbitration to reach new agreements in 1905 and again in 1938, but both attempts were unsuccessful.[6]

On September 7, 1950, the Afghan and Iranian governments signed the Terms of Reference of the Helmand River Delta Commission, which established the Neutral Technical Commission for the Helmand River Delta, with the assistance of the U.S. Department of State. This commission was designed to elaborate on the technical methods for sharing waters of the Helmand River and was to be composed of three technical experts from disinterested states who would have powers of recommendation only.[7] Afghanistan and Iran rejected the 1951 report of the commission at the Washington Conference of 1956, and the dispute over the division of water continued.[8] The variability in the course and seasonal flows of the river made division of the river’s water challenging, even without considering the political pressures for control of its resources.

The building of the Kajaki Dam in 1953 increased instream flow during the dry season but reduced the flood waters on which pastoralists were dependent for fertilization. Removing water from the river system upstream from the historical point of measurement at Kamal Khan Dam complicated the water-sharing dialogue and alarmed Iran. In 1956, the government of Iran proposed that Iran be allotted 51.7 cubic meters per second, moving away from allotment by percentage to allotment by quantity. Afghanistan responded with a proposal that Iran be entitled to 22 cubic meters per second.[9] Iranian prime minister Amir Abbas Hoveida and Afghan prime minister Mohammad Musa Shafiq signed an accord in 1973 that was based on the Afghan counterproposal: Iran was allotted 22 cubic meters per second, with an option to purchase an additional 4 cubic meters per second in “normal” water years.

The 1973 agreement was never fully implemented due to the distractions caused by the Afghan coups d’état in 1973 and 1978, the Soviet invasion of Afghanistan, the Islamic revolution in Iran, and subsequent tensions between the Wahhabist Taliban and the Shia government in Tehran. Iran has held discussions with the Karzai government under the framework of the 1973 agreement, but these discussions have been inconclusive (King and Sturtewagen 2010). A common Afghan refrain is that Iran is taking as much as three-fourths of the water

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[6] The McMahon Arbitration of April 10, 1905, recommended a one-third share for Iran; it was rejected by Iran. The Temporary Agreement for Distribution of Water of 1938 recommended a return to equal shares; it was rejected by Afghanistan.

[7] Helmand Commission Report, unpublished (on file with authors).

[8] John G. Laylin, counselor to the Iranian Minister of Foreign Affairs, unpublished working papers of the arbitration (on file with authors).

[9] John G. Laylin, unpublished working papers of the arbitration.

of the Helmand River by way of illegal canals and diversions (Babakarkhail 2009; Rasooli 2011).

The future of water availability

Predicted population growth, increased agricultural expansion, and climate change conditions are likely to exacerbate existing tensions between Afghanistan and Iran over dams and other water-control features on the Helmand River but may also provide opportunities for peacebuilding and for engagement that would prevent such tensions from escalating or provoking new conflicts that could impinge on Afghanistan's economic recovery and stability.

The region's climate is changing, and the exact impact of these changes is difficult to predict. According to a study by the Water Governance Facility of the United Nations Development Programme (UNDP), Afghanistan's glaciers have shrunk by as much as 50 to 70 percent (Granit et al. 2010). Although the shrinking of glaciers may increase runoff in the short term, the long-term effect is a decrease in water availability (U.S. Senate Committee on Foreign Relations 2011). Variability in the timing of water movements through the system may be as important a stressor as changes in the quantity of water moving through these river basins (van Beek and Meijer 2006).

Decreases in precipitation and increases in temperature will exacerbate changes that are already caused by glacial melt. Climate projections from the Intergovernmental Panel on Climate Change, coupled with downscaled modeling of its global predictions for the region, suggest that water stress caused by above average temperatures and below average rainfall will continue to increase in southeast Iran and southwest Afghanistan (Lawrence Livermore National Laboratory 2009; Alcamo, Florke, and Marker 2007; see figure 4). These estimates have been supported by the International Research Institute for Climate and Society (IRI 2011).

This situation has been made worse by the post-conflict reconstruction efforts in Afghanistan. On the recommendation of the U.S.-led coalition and with its assistance, Afghanistan is seeking to capture and use an increasing share of the Helmand River, Farah Rud, and Hari Rud and various tributaries through agricultural projects, new dam construction, and revitalization. It is doing so without conducting a comprehensive study on how these projects will affect overall water flow and availability, recharge rates for aquifers in Afghanistan, and transboundary water management and historical water negotiations (USAID 2008; USG 2010).[10]

Three decades of intermittent conflict in Afghanistan caused nearly one-third of the land in the country to be placed out of agricultural usage and many

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[10] For further discussion on the water projects in Afghanistan, see Laura Jean Palmer-Moloney, "Water's Role in Measuring Security and Stability in Helmand Province, Afghanistan," in this book.

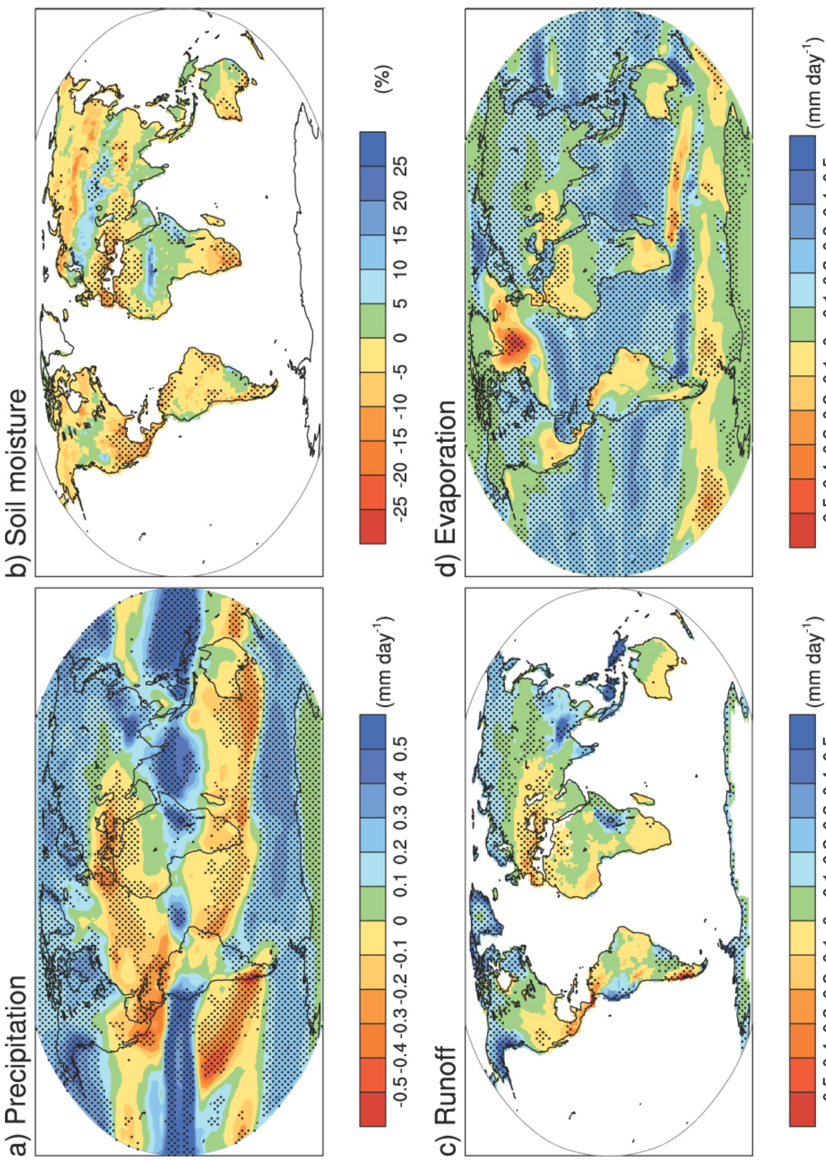

Figure 4. Projected percent change in precipitation, soil moisture, runoff, and evaporation in 2080–2099 relative to 1980–1999

Source: Bates et al. (2008).

development projects to be placed on hold, and current reconstruction efforts could increase the amount of water used on the Afghan side just to bring agriculture back to pre-conflict levels through irrigation (Wolf and Haack 1993). These irrigation efforts may become a primary reason for decreased water supply in the future (van Beek and Meijer 2006). Population growth will be an additional stressor: as the population in the lower Helmand Basin grows, it will place more demands on water supply for domestic consumption, business, and food production.

The Afghan water sector projects have raised concerns in Tehran, Iran's capital, over the geopolitical use of water (Peter 2010). Iran is sensitive, given its past tensions with the Taliban and its concern over U.S. containment of its regional aspirations. Moreover, Baluchestan is one of Iran's most volatile regions, and Iran fears foreign interference that would destabilize the Baluch population. Sistan and Baluchestan Province is heavily Sunni in a majority Shia nation-state and remains Iran's most marginalized and least educated region. The population feels strongly that it has been disenfranchised by Tehran, and its isolation was made worse by the results of Iran's June 2009 elections (Cyrus 2010).

The marginalized Sunni population has reacted in radical ways against the central government. Since 2004, Sistan and Baluchestan Province has witnessed regular attacks, bombings, and kidnappings at the hands of Jundullah (soldiers of God), an ethnic Sunni Baluch group that Iran has accused the United States of supporting. One such attack was a double-suicide bombing, on December 12, 2010. The bombing targeted Shia worshipers at Imam Hussein Mosque in Chabahar, and it killed forty-one people, including women and children (Cyrus 2010).

Shared data and modeling is needed to increase understanding of the future impact of climatic and human-driven change in the water regime on management of the transboundary conflict, as well as on stabilization, reconstruction, and development efforts (U.S. Senate Committee on Foreign Relations 2011). There is insufficient systematic monitoring of groundwater tables, salinization, water flow, snowpack, and rainfall to establish baselines and understand how water flow and availability is changing in the Helmand Basin. Similar problems exist for the other Afghan river basins. The thirty-year gap in Afghanistan's hydrometeorological data will continue to undermine Afghanistan's ability to manage its water resources wisely (Kakar 2011; Williams-Sether 2008; Whitney 2006).

IMPACTS ON WATER SECTOR FROM CONFLICTING ECONOMIC AND POLITICAL INTERESTS

The water tensions between Iran and Afghanistan have led to a paradox. On one hand, Iran has sought to support development in Afghanistan, particularly where such funding would lead to benefits for Iran, such as improved efficiency in water use and transport, and in the past it has opposed the Taliban, which has historically been hostile to the Iranian government and Shiites. On the other hand, Iran provides ongoing support for multiple Taliban insurgent groups in Afghanistan, which have slowed or prevented U.S. reconstruction projects, including those around the water sector. It is difficult to determine whether this paradox is a reflection of the different interests in the cacophonous Iranian leadership or a manifestation of an Iranian hedging strategy toward Afghanistan that seeks to improve the efficiency of Afghanistan's water systems in amity while simultaneously undermining any attempt by the Afghans to divert a greater share of the water. Iran's interests are balanced between the political and the economic.

Iran has repeatedly tried to negotiate the status of the Helmand River, Farah Rud, and Hari Rud with Afghanistan—for example, it has called for the formation of a trilateral commission between Afghanistan, Tajikistan, and Iran—but Afghanistan has continued to demur, claiming that it lacks expertise, data, and capacity to participate in transboundary water negotiation (Xinhuanet 2010; EastWest Institute 2009). Although this is true, Afghanistan may be using the argument as a stalling tactic. Any negotiations with Iran could potentially result in a decrease in water retained by Afghanistan. Concessions by Afghanistan would also limit economic growth in its unstable region, which is largely driven by agricultural development. Therefore, Afghanistan possesses little incentive to seriously engage in talks based on the water issue alone.

Brokering such treaties may prove difficult for Afghanistan at the moment anyway. Being in the midst of a conflict and rebuilding, it is uncertain how much water Afghanistan needs or even how much it has (Peter 2010). Moreover, it is not clear—given the decentralized nature of power in Afghanistan and the split in reconstruction efforts between U.S. Agency for International Development, the U.S. military's Commander's Emergency Response Program, and other donors—whether a centralized Afghan development strategy on water would be carried out consistently and systematically.

U.S. activities and the threat to security posed by the reduction of water supplies have caused Iran to create perverse alliances counter to its normal interests. Although Iran nearly went to war with Taliban-controlled Afghanistan and the Taliban (who, as conservative Sunnis, see the Shia as apostates), Iran reportedly has been providing various factions of the Taliban with support in western Afghanistan. In March 2009, Afghan security forces found a cache of Iranian-made explosives and ammunition around the Bakhashabad Dam in Farah Province, and Iran continues to attempt to disrupt the dam project (Tabish 2011). Simultaneously Iran has allocated US$3.2 million for reconstruction of Afghanistan's water sector (MOE 2010). This competing strategy suggests that it may be possible to use concerns over water to build bridges for engagement and peacebuilding.

LESSONS LEARNED AND RECOMMENDATIONS

Any water-based development project in Afghanistan must take into account the water needs of Afghanistan's neighbors and the rights and obligations imposed on Afghanistan by international law, bilateral treaties, and state practice on the use of water from shared basins (EastWest Institute 2009). At the same time, Afghanistan's immediate future economic growth will occur through agriculture, which requires using more water, improving irrigation and distribution systems, and increasing water efficiency. Water is necessary for Afghanistan's development, security, and stability (USG 2010).

Afghanistan cannot proceed to build new dams, restore old dams, and take an increasingly greater fraction of shared groundwater and surface water resources from the Helmand River and Hari Rud in Afghanistan without serious consequences if it does not equitably address the transboundary water issues with Iran. Because Afghanistan claims that it lacks the capacity and data to enter into negotiations, the United States should be focused on increasing Afghanistan's capacity on the technical level, creating monitoring systems that are transparent and shared, and building mechanisms for technical cooperation to the benefit of both countries. Finally, any agreement needs to take into account seasonal, year-to-year, and future climate-based changes in the quantity of water in the Helmand River. In any future agreement, the benefits of gains in water flow and the costs of shortages need to be shared.

This chapter outlines a five-part strategy for addressing the transboundary water issues between Afghanistan and Iran.[11] Transparent and shared monitoring systems and databases should be developed for Afghanistan's transboundary river basins to improve the scientific basis for any agreement. To create a better understanding of changes in water availability in Afghanistan's river systems, historical hydrometeorological baseline data need to be identified. Capacity building in water management and irrigation efficiency is required. An international support network must be created for negotiations on water. Finally, a transboundary commission between Afghanistan and Iran should be created to manage transboundary water resources.

Monitoring systems and databases

Though circumstances in western Afghanistan and southeastern Iran may make it difficult to perform measurements related to water, water cannot be managed if it cannot be measured. There must also be an understanding of the water budget. The major technological and knowledge deficit in the water sector restricts prospects for efficient management and use of water resources and hinders the policy development process (Arasteh and Tajrishy 2006; Homayoonnezhad, Amirian, and Piri 2008; Meybeck and Vörösmarty 2004; Rahimzadeh, Asgari, and Fattahi 2008; van Beek et al. 2008). Decision makers need to know the quantity and quality of water in transboundary river basins before moving forward with upstream projects that will affect both instream flow and groundwater levels.

The international community—possibly under the direction of the World Bank, the UNDP, the United Nations Environment Programme (UNEP), or

[11] U.S. counterinsurgency operations in Afghanistan would also benefit from the recommendations outlined in this section. For more information on these counterinsurgency operations, see Laura Jean Palmer-Moloney, in this book.

the United Nations Educational, Scientific and Cultural Organization—should continue to help Afghanistan to put in stream gauges, map glacier melt, record changes in precipitation and snowfall, develop satellite monitoring tools, and monitor water-table depth and inflows and outflows to underground aquifers associated with transboundary river basins (USAGC 2009). On the basis of these data, dynamic models of water flow should be developed for each transboundary basin to predict the potential impacts of agricultural projects, population growth, climate change, and infrastructure projects on downstream water flow and quantity. Development of this knowledge base would allow the parties to negotiate water-sharing agreements that are more sensitive to seasonal, interannual, and long-term changes in water flow in Afghanistan and throughout the region. These data should be available online in close to real time and shared with surrounding countries. The monitoring stations and infrastructure should be opened to inspections by participating countries, as well as observer states and organizations.

The international community should look beyond aid delivery at just the national level and incorporate regional water strategies into policy development and aid programming, and it should work with the United Nations Assistance Mission in Afghanistan (UNAMA) to improve coordination of water-related donor aid. After the Taliban were removed and the Bonn Agreement was signed, Iran helped Afghanistan by establishing a water research institute in Kabul. This institute was equipped with tools and technology to train water experts, thereby increasing Afghanistan's capacity with regard to its water resources (van Beek and Meijer 2006). The existence of the institute could open doors for Iran to build or financially support the building of much-needed monitoring systems.

Historic hydrometeorological baseline data

Afghanistan's years of civil war and unrest have interrupted data collection on the amount of water moving through its river basins, data that had been collected since the agreements negotiated in the 1950s through the 1970s.[12] Discussions with scientists at the National Center for Atmospheric Research suggest that Afghanistan's river systems probably have less water in the last fifty years due to global warming, similar to patterns found in other transboundary river systems in the region, and may see further decreases in the future.

There are ways to develop proxies for past changes in water distribution and flow, including looking at past records of well depth; time series remote sensing imaging of glaciers, snow cover, and rivers; and preexisting river gauges. The United States should assist Afghanistan in establishing historical baseline information on water flow—for example, by obtaining the Fairchild Aerial Survey dataset and sharing commercial remotely sensed images of its critical watersheds.

12 Helmand Commission Report, unpublished, and John G. Laylin, unpublished working papers of the arbitration.

It can also help with creating new baselines. Establishing the extent of previous water flow is important for adequate prediction of future changes, better understanding of the variability of water flow and the plasticity of its pathways, and adjustment of previous water-sharing agreements in light of current realities. In addition, Iran has data collections and expertise that could be shared and could prove useful to both countries.

Capacity building

The United States, partner states, and the United Nations and other international organizations should build capacity in Iran and Afghanistan to better understand international law and potential models governing shared water resources, as well as capacity for negotiations (Chavoshian, Takeuchi, and Funada 2005; McMurray and Tarlock 2005). Technical officials from these states should study the successes and failures of other regional water-sharing commissions, such as the Mekong River Commission, the Colorado River Commission, and the Nile River Basin Commission.

Because irrigation drives much of the demand for water, the United States, through its land-grant universities, should work with both Iran and Afghanistan on improving irrigation efficiency throughout the system, working closely with the Academy of Sciences of Iran, with which the United States has had active exchanges for more than ten years. The United States should also leverage its scientific assets in academia and in federal science agencies—such as the U.S. Geological Survey, the Department of Interior, the Army Corps of Engineers, the Environmental Protection Agency, and the National Oceanic and Atmospheric Administration—to build the capacity of Afghan scientists for gathering water-flow and volume information through remote sensing that would be shared among all basin partners.

International support network for negotiations

The United States is no longer a disinterested country in the water dispute between Iran and Afghanistan, nor is it necessarily a trusted partner for either party. Accordingly, the United States should continue efforts to build an international support network for resolution of the transboundary water dispute. It should push for expansion of the existing Water Sector Group, which includes the UNAMA, the Canadian International Development Agency, the U.S. Army Corps of Engineers, the U.S. Agency for International Development, the European Commission, the German development association Deutsche Gesellschaft für Internationale Zusammenarbeit (also known as GIZ), and the Dutch Embassy. Additional donors and implementing agencies may include UNDP, UNEP, the Organization for Security and Co-operation in Europe, the World Bank, and the Asian Development Bank, as well as key nongovernmental organizations, such as the Wildlife Conservation Society, that work in both countries on ecosystem management. Wider engagement of a larger donor community is needed to ensure the consistency and success of the water strategy. Engaging international agencies where Iran is a party, as opposed to working solely through the International Security Assistance Force and its member states, would help build Iranian trust.

Transboundary commission

A transboundary commission between Afghanistan and Iran should serve as a formal body that would negotiate water-sharing agreements, collect and share data, and build confidence and capacity on both sides. At the end of 2010, the government of Iran called for the creation of such a commission. It should have as its initial mandate the creation of a technical working group of three representatives from disinterested countries, agreed on by Iran and Afghanistan, to review the entire course of the Helmand and to assess existing and planned infrastructure, agriculture production, and population density and growth. The technical working group would oversee data collection, monitoring, and modeling of the Helmand River Basin, including the Farah Rud. It would assess future changes and make recommendations.

CONCLUSION

Afghanistan's plans for upgrading and developing its water infrastructure on each of its major river basins are aimed at exploiting the irrigation and energy potential of its rivers and at mitigating floods. Although these projects are crucial to the social and economic development of Afghanistan, they will also affect transboundary water flow and, as a result, Afghanistan's relations with its neighbors. Failure to address water concerns in the middle and lower Helmand River and the Hari Rud Basin has the potential to increase tensions between Iran and Afghanistan explosively, slowing or preventing stability gains in western Afghanistan and interfering with the success of important development projects in agriculture and energy generation. Moreover, Iran increasingly sees threats to its water supply as threats to its security, and it could seek to destabilize the region, possibly through support for its adversaries, such as the Taliban. On the other hand, adroit handling of water concerns could encourage closer cooperation with Iran on stability and development in Afghanistan and potentially even create a framework for U.S. cooperation with Iran.

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