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Water Security: Afghanistan Transboundary Water Resources in Regional Context

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This document outlines the global trends in water security and the threats to regional stability posed by the transboundary water resources. Moreover, the document presents salient details in the particular case of Afghanistan's transboundary water resources, reviews disputes over the four main international basins Afghanistan shares with its neighbouring countries, and introduces a framework to properly manage water resources. Further information on these issues is available at www.cimicweb.org. ***Hyperlinks to source material are highlighted in blue and underlined in the text.***

Within the next twenty years, the global demand for water will exceed expected supply by forty per cent, according to a report by McKinsey & Company. Since "water security is the gossamer that links together the web of food, energy, climate, economic growth, and human security challenges," a shortage of water will escalate food prices, disrupt energy availability, limit trade, increase refugee flows and undermine authority, says the World Economic Forum (WEF). If the worsening water security structural problem is unheeded, it will inevitably tear into various parts the global economic system. Illustratively, water was at the heart of the agricultural challenges that caused the unprecedented volatility in food prices between 2007 and 2010. As economies grow and societies develop more water is needed to match the accelerating demand for food and obtain energy to supply the rapidly increasing urban and industrial systems. At the same time rainfall and weather patterns shift and rivers and groundwater sources are becoming more polluted.

This report is divided into four sections: (i) global trends in water security issues and how these can affect global stability in the future; (ii) drivers of transboundary water management conflicts in Central and South Asia; (iii) overview of the four critical international basins that Afghanistan shares with neighbouring countries; and (iv) recommendations by experts for improving water management and avoiding conflict over transboundary water resources.

Global Trends in Water Security

In the upcoming decades, pressures on water resources are set to increase exponentially, pushing the highly interlinked water-food-energy-climate nexus to the limits. According to McKinsey, agriculture water withdrawal

will increase from 3,100 billion cubic meters (bcm) to 4,500 bcm in 2030. Similarly, the global demand on industrial water withdrawal will increase from 16 per cent to 22 per cent in 2030; China alone will account for 40 per cent of the additional demand. The world's population will approach the eight billion mark by 2030. The estimated economic annual growth rate of six per cent in emerging countries, in addition to the rapid urbanisation processes in developing and emerging countries, will drastically increase the demand for food, energy and water. Given that it takes one litre of water to grow one calorie, water use will skyrocket to achieve an increase in production by 70-100 per cent necessary to match the demand and changing diets of the world's population. Furthermore, the International Energy Agency (IEA) forecasts that by 2030, the world economy will require forty per cent more energy compared to today, which will be dependent on sufficient water availability. McKinsey adds that 77 per cent of the infrastructure to obtain such energy has yet to be built[1]. The 75 per cent of the additional demand in energy will be met by fossil fuels, resulting in an increased rate of global warming that, amongst others, will exacerbate water scarcity and food insecurity, warns the IEA. Also, many countries in Asia are constructing hydropower plants as a source of renewable energy, which will be responsible of the evaporation of large quantities of water from their reservoirs. Experts warn that climate change could threaten mountain glaciers, one of the main sources of freshwater, which provide water to two billion people in Asia alone. The WEF further estimates that the demand for water as a source to generate energy will rise sharply in the next two decades[2]. Moreover, as long as societies progress in terms of social and economic development, the use of freshwater increases. Between 1990 and 2000 for example, while the world population grew by a factor of four, the withdrawal of freshwater grew by a factor of nine. Many countries are extracting groundwater faster that it can be replenished. By 2030, if the current trend continues, nearly two-thirds of the world's population will live in areas of extraordinary water stress.

United Nations Secretary General Ban Ki-moon emphasised during the WEF Annual Meeting the need to create new water management frameworks: "As our global economy grows, so will its thirst…Water Security is not an issue of rich or poor, North or South… And yet there is still enough water for all of us if we keep it clean, use it more wisely, and share it fairly." Undoubtedly, water security is a global challenge. While in some regions geographical characteristics are explicitly water scarce, in others, waste and overuse or water policies such as under-pricing have depleted stocks at the expenses of economic growth. Some top food exporting countries are water-scarce, and several water "bubbles"[3] are bursting in many parts of China, the Middle East, Gulf States, southern Africa, the Mediterranean and the South-western United States. According to experts, these trends will define new geopolitical dynamics based on new water availability-scarcity relations, emphasises the WEF. For example, in order to secure food supplies during the last decade, fast growing economies have signed land-lease agreements with poorer nations that have fertile and well-watered land. Japan now owns three times more land abroad than at home; Saudi Arabia, Kuwait, South Korea and China have signed agreements with several African and Asian countries. The WEF clearly states that these agreements are not about land or food, but access to water, inasmuch the majority of the purchasing countries have plenty of land but lack access to water to make it productive. Such deals will likely cause regional disputes while impacting local ecosystems and jeopardising secure, sustainable and equitable water access for local populations.

[1] China will expand its capacity to more than 1,300 GW, equal to 1.5 times the current level of the United States, and India by 400 GW, which is the current combined capacity of Japan, South Korea and Australia.

[2] According to estimations, the increase will be 56 per cent in Latin America, 63 per cent in West Asia, 65 per cent in Africa and 78 per cent in Asia.

[3] Water bubbles are related to the food bubbles, that is to say when food production is inflated through the unsustainable use of water and land. Experts say that the concerning bubble is the water "bubble" as many countries are using to "sustain" its economic growth more water than their water stocks get replenished. For instance, the World Bank says fifteen per cent of the Indians are fed by grain produced by over pumping from aquifers that have falling water tables. In fact, half of world's population lives in countries with falling water tables.

Defining and Measuring Water Security

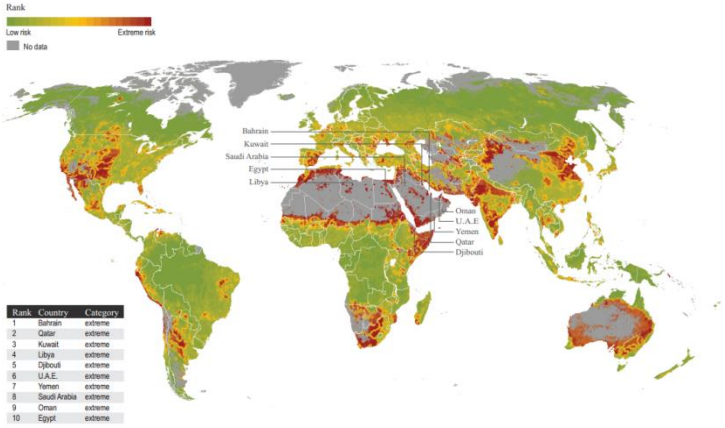
There have been many attempts to define and measure water security. Different definitions of water security can produce different answers to the question of which regions have the highest level of water stress. One of the most widely accepted definitions for water security is produced by UN-Water, the United Nations agency to coordinate and tackle all water-related issues. According to UN-Water, water security is: "The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability." Likewise, different organisations and academia have developed a series of indicators and indices aiming to quantify water security, scarcity and vulnerability from different approaches (e.g. economic, conflict, social). Two of these effective and accepted indices are the Water Security Index (Figure 1a) and the Water Stress Index (Figure 1b), both produced by the global risk analysis firm Maplecroft. On one hand, the Water Security Risk Index measures "countries' water stress; population rates; reliance on external water supplies; sustainability of water use; intensity of water use in the economy; government effectiveness; and virtual water use, which is a unique assessment of the water intensity of imported goods, such as food and oil." On the other hand, the Water Stress Index "pinpoints areas of water stress down to 10km² worldwide by calculating the ratio of domestic, industrial and agricultural water consumption, against renewable supplies of water from precipitation, rivers and groundwater." While the Water Security Index provides a quantitative measure at the country level, the Water Stress Index depicts the information on the level of water stress down to areas of 10 square kilometres. Interestingly, eight out of twelve of the Organisation of Petroleum Exporting Countries, which are directly dependent on water to obtain oil, fall in the categories of either 'Extreme risk' or 'High risk'. Maplecroft also found a correlation between 'Extreme risk' or 'High risk' levels of water security and stress with local and regional conflicts. Examining the countries focus of this document, it is apparent that Afghanistan, Iran, and Pakistan fall in the category of "High Risk", while Turkmenistan falls in the category of "Extreme Risk". The Water Stress Index map provides further details of geographical distribution of the risks in each country.

Figure 1. Water Security Risk Index (a) and Water Stress Index (b)

Legend	
Extreme risk	
High risk	
Medium risk	
Low risk	
No Data	

Rank	Country	Rating
1	Mauritania	Extreme
2	Kuwait	Extreme
3	Jordan	Extreme
4	Egypt	Extreme
5	Israel	Extreme

Rank	Country	Rating
6	Niger	Extreme
7	Iraq	Extreme
8	Oman	Extreme
9	U.A.E.	Extreme
10	Syria	Extreme

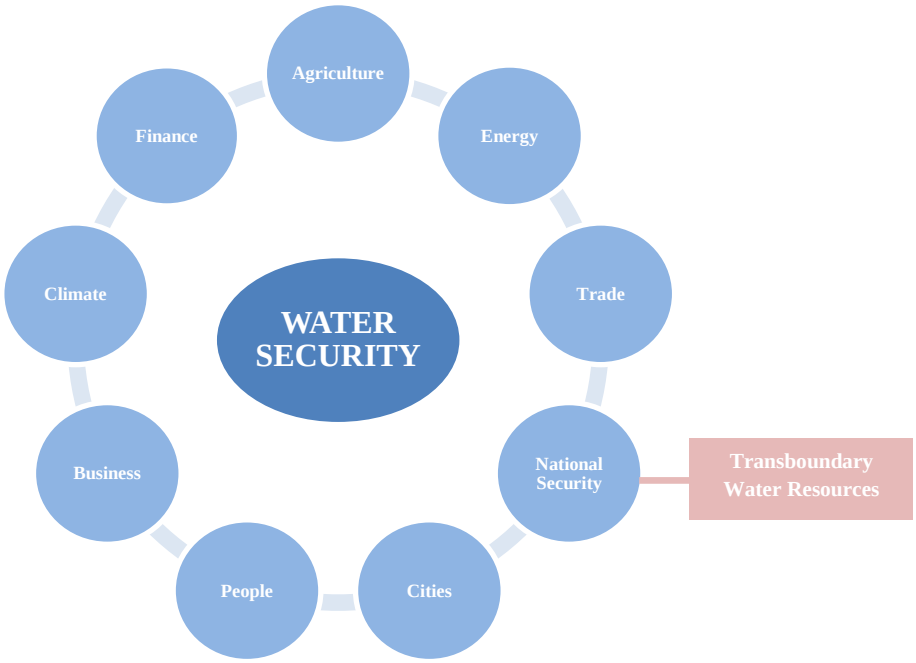


Rank	Country	Category
1	Bahrain	extreme
2	Qatar	extreme
3	Kuwait	extreme
4	Libya	extreme
5	Djibouti	extreme
6	U.A.E.	extreme
7	Yemen	extreme
8	Saudi Arabia	extreme
9	Oman	extreme
10	Egypt	extreme

Sources: Water Security Index and Water Stress Index, Maplecroft.

Water security is a broad topic that can be approached from many different perspectives. As a result of the social, economic and political nature of water security challenges, water insecurity can be either a cause or a consequence of developments in several domains (Figure 2), according to the WEF. For the purpose of this paper, water security will be addressed from one of these subdomains, referred to as the transboundary water resources, which is part of the national security domain. In March 2001, Kofi Annan, then the United Nations Secretary-General, stated, "fierce competition for fresh water may well become a source of conflict and wars in the future". Statements such as this proved contentious. While some argued that water-related conflicts were near at hand as a result of climate change, population growth and weak water resource management, others note that, during the last fifty years, international cooperation concerning water had increased significantly. There are more than 261 rivers that cross at least one border on the earth. In these cases, the two or more riparian states sharing a river must confront a geopolitical dilemma: either fight over the management or find collaborative ways to share the transboundary water resources. Although cases of countries disputing transboundary water resources ending in armed conflicts are rare, context-specific case studies show that non-collaborative management approaches are very inefficient for the countries involved. As the paper titled "Management of Transboundary Water Resources" illustrates, international water basins are regulated and managed by different authorities and are often subject to numerous international agreements, including bilateral and multinational treaties, which are open to various interpretations. Notably, in other cases, transboundary water systems simply may not be regulated.

Figure 2. Domains of Water Security



Sources: Adapted from Water Security: The Water-Food-Energy-Climate Nexus, World Economic Forum.

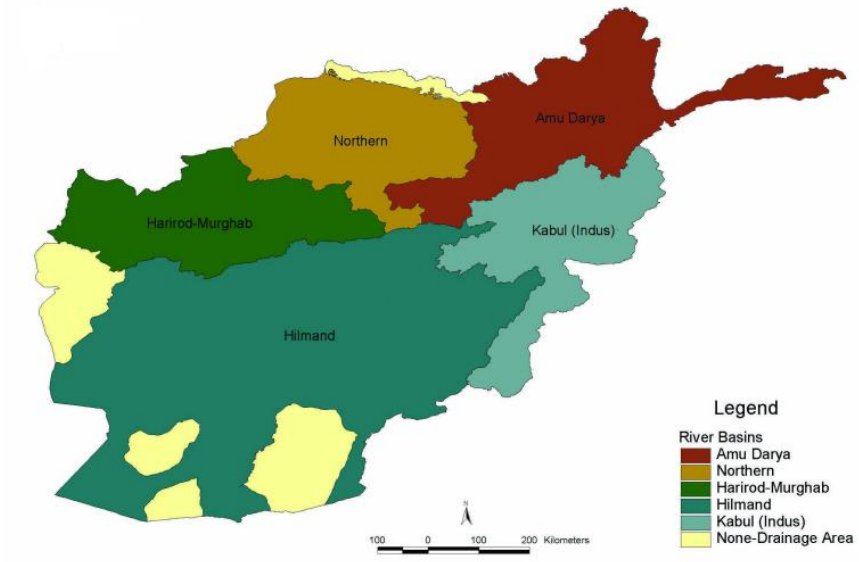
Transboundary Water Disputes in Afghanistan

Given the abovementioned forecasted trends in global water security, water scarcity is set to worsen in many regions in the world. Therefore, the risk of eventually ending up in regional conflicts as a result of an overuse of transboundary water resources will indeed increase, according to a World Water Council (WWC) report entitled "A New Water Politics". The condition of the transboundary water resources in the Central Asia and South Asia

regions, with a particular focus on Afghanistan, provides an excellent case study as it combines high levels of water stress with complex and volatile geopolitical relations between the different countries in the region.

Of the 261 international basins featured worldwide by the the Transboundary Freshwater Dispute Database, four are shared between Afghanistan and its neighbours: the Kabul River Basin (part of the greater Indus River Basin), the Helmand River Basin, the Amu Darya Basin and the Harirud-Murghab River Basin (Figure 3). Despite the fact that the country shares the aforementioned four transnational river basins with five countries – Turkmenistan, Iran, Pakistan, Uzbekistan and Tajikistan – Afghanistan has only one existing bilateral treaty, a sixty-year-old agreement with Iran concerning the Helmand River. During the last twelve years, Afghanistan has progressed to significant levels of social and economic development which require increasing use of water resources. The four transboundary rivers shared by Afghanistan originate in Afghan territory; however, the new hydropower plants and irrigation schemes built across the country are having a significant impact on the amount of water flowing towards its neighbouring countries. Prior to 2001, largely due to instability and weak governance, Afghan rivers were barely altered, nonetheless the new *status quo* is causing serious concerns in Iran and Pakistan.

Figure 3. International Basins Shared by Afghanistan and Neighbouring Countries[4]



Source: *Afghanistan Watershed Atlas.*

The last estimation of water usage in Afghanistan dates from 2000. The existing figures indicate that Afghanistan is far from being a water-scarce country. The total amount of renewable water resources was estimated at 65 bcm per year in 2011. In the year 2000 the total water withdrawal was estimated at 20 bcm per year, 98 per cent used for agricultural purposes[5]. Although consumption of water must have increased as a result of the economic development and stabilisation in the country, the difference between water availability and water withdrawal is significant. However, the availability of water resources is not geographically homogeneous, with a significant disparity between the Central Highlands and the Northern Plains in comparison to the Southern Plateau, where water is scarce. Afghanistan's main problem, with regards to water security, is the lack of infrastructure to properly distribute and supply water for human consumption, agriculture and other activities to foster economic

[4] The Northern basin is not a transboundary basin and is located entirely within Afghanistan, thus it is not object of this report.

[5] It is important to highlight the lack of up-to-date data on this front. The water availability and water withdrawal figures were estimated with ten years difference. Although this data is barely comparable it brings about an idea of the disparity in the amount of water that Afghanistan's geography generates and the amount of water the socioeconomic systems in Afghanistan consume.

development. Water is, and has the potential to remain, one of the main drivers of economic development in Afghanistan on several fronts. Further, access to improved water and sanitation must be seen not only as an economic development booster but also as a basic human right "for leading a life in human dignity", as recognised by the United Nations. It has been estimated that USD 1 invested in water and sanitation produces between USD 3 and USD 34 in the agricultural and industrial sectors, contributing to increased productivity and production, as well as improved health and poverty eradication. Furthermore, countries with a higher control over water resources (e.g. an increased water storage capacity) are more resilient to rainfall variability. This is extremely important for Afghanistan, as agriculture, which largely depends on water availability, generates an important part of its GDP and provides subsistence economy for many of its households.

Disputes over Water Resources in Afghanistan

Water-related disputes in Central Asia are increasingly recognised by policymakers and members of the international community. In February 2011, the United States Senate Foreign Relations Committee released a report entitled "Avoiding Water Wars: Water Scarcity and Central Asia's Growing Importance for Stability in Afghanistan and Pakistan". The report recommended guidelines for preventing disputes over shared water resources. Similarly, the Norwegian Institute of International Affairs (NUPI) warned in 2008 that water scarcity and the management of transboundary water resources were challenges to stability in Afghanistan and the region. The NUPI report notes that skirmishes between Afghan and Iranian forces have occurred in western Afghanistan over water-related development projects in Afghanistan. Indeed, Pakistani and Iranian officials have both raised concerns that infrastructure developments in Afghanistan would negatively affect their countries' water security; such concerns were focused upon the Kabul River Basin, the Helmand River Basin and the Harirud-Murghab River basins. The most relevant incidents are illustrated in the Figure 4.

Drivers of Transboundary Water Resources Disputes in Afghanistan

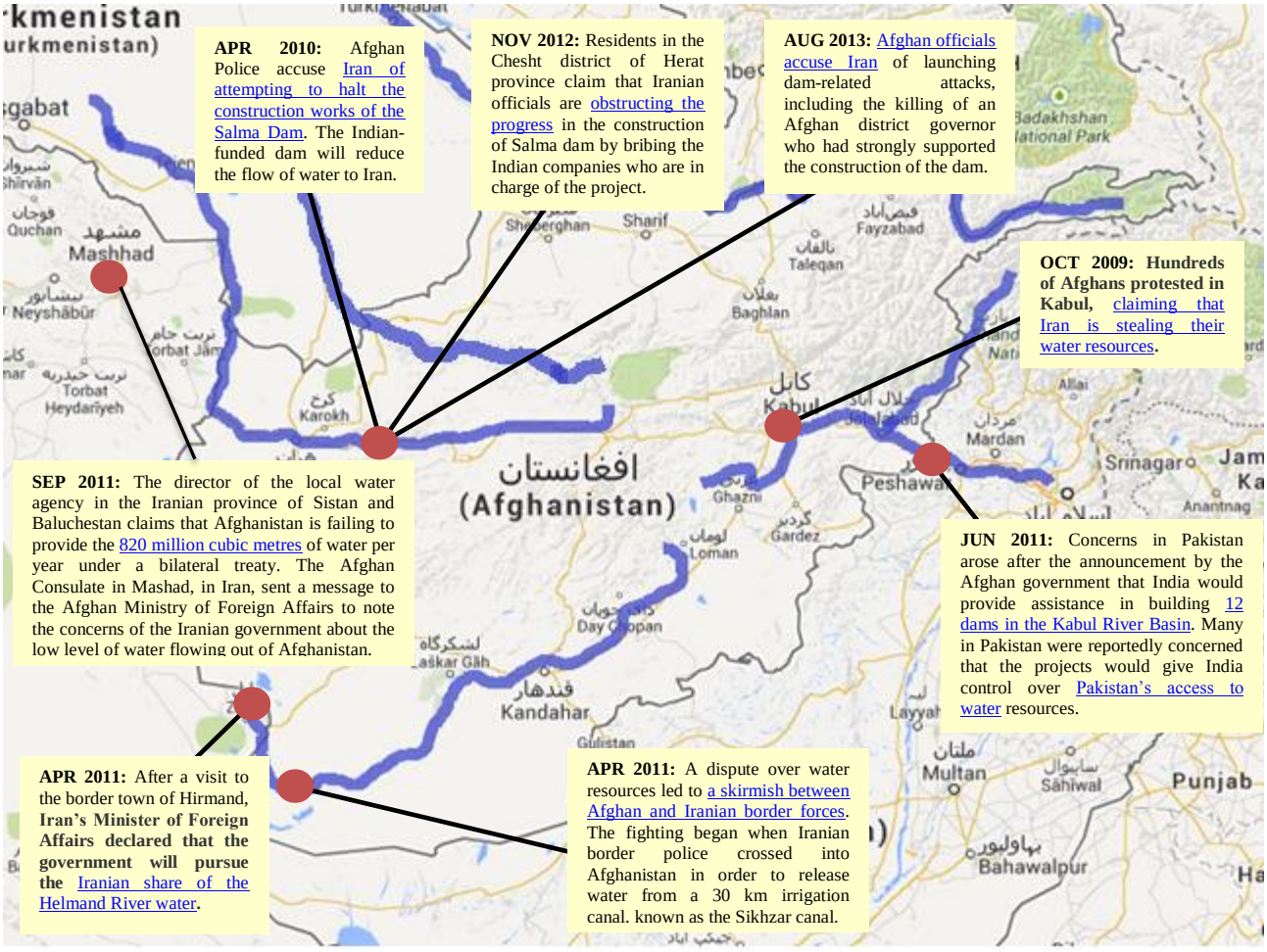
The aforementioned report by the US Senate Foreign Relations Committee identifies three main causes that can act as drivers of tensions in the Central Asia and South Asia region: (i) demand on water for agricultural uses; (ii) flood control and water demand for energy generation; and (iii) climate change. Each of these is addressed below.

Water Demand for Agricultural Uses. Irrigation accounts for seventy per cent of freshwater use worldwide. According to experts, agricultural water use is likely to increase as farmers seek to increase per hectare crop yields in order to maximise profits and feed growing populations. Special crop varieties that require high levels of irrigation water are increasingly being introduced in order to maximise yields, and farmers are increasingly relying upon fertilisers to improve yields. Hence, as the United Nations remarks in the "World Water Development Report", the result has been greater water usage and increased water contamination from chemical fertilisers. International organisations suggest that such dynamics will increasingly affect Afghanistan as the country's agricultural sector further develops. According to the World Bank, agriculture accounts for fifty of Afghanistan's licit GDP, with only forty per cent of agricultural land currently being irrigated. Increased irrigation and per hectare crop yields are a major priority for the Afghan government and the international community, a fact which will likely require increased water demands and usage in the future.

Since 2001, the international community has funded several irrigation projects across Afghanistan. Many of these interventions are framed under the 2007 Water Sector Strategy which aims at improving, rehabilitating and re-establishing previously irrigated areas. However, the ecological, economic and political impacts downstream have reportedly not been fully considered despite the transboundary nature of the country's freshwater systems, reports NUPI. For instance, Afghanistan is rehabilitating and developing several new irrigation schemes along the Harirud River through the Asian Development Bank's "Western Basins Water Resource Management and Irrigated

Agriculture Development Project". Although the project document recognises that water is a limiting factor for the success of the project, it does not analyse the downstream effects of these new developments once the river enters Iranian territory. On a related point, Afghanistan's Ministry of Energy and Water (MEW) notes that it is vital for new irrigation initiatives to focus on capacity building amongst farmers, who often lack the technical expertise and knowledge to use water efficiently. As the aforementioned report from the US Senate Foreign Relations Committee highlights, this is particularly a concern in the Amu Darya River Basin, where Soviet-era collective farms were divided into small plots of land. Under the Soviet system, farmers could rely on centralised and technically proficient irrigation water management, a fact which changed when the collective farms were broken apart (to some degree). The result was not only a decline in yields but also the degradation of irrigation infrastructure and the decreasingly efficient use of water resources.[6]

Figure 4. Relevant Incidents in the International Basins Shared by Afghanistan



Sources: Created by the CFC.

[6] Nothing in this paragraph should be construed as suggesting that land reform processes in Central Asia were primarily negative or unnecessary. While they did result in a loss of efficiency, research suggests that land reform often had economic and legal benefits for farmers in the region. See, for instance, the International Crisis Group (ICG) report, "The Curse of Cotton", and "Land Reform and Farm Restructuring in Central Asia" by Ramesh Deshpande.

Flood Control and Water Demand for Energy Generation. Abdul Razique Samadi, chief executive officer of the state-owned power utility, Da Afghanistan Breshna Sherkat (DABS), said that only one in three Afghans has access to electricity, a figure that increases to seventy per cent in the capital Kabul. During the last five years, the electricity demand in Kabul has tripled. Samadi foresees that in 2020, the country will have an estimated demand of 3,000 megawatts (MW) or five times greater than the current supply of 600 MW. Despite the fact that Afghanistan's power stations have a capacity of 500 MW, they generate less power due to water shortages and inadequate maintenance. Samadi recognises that Afghanistan imports half of its supply from neighbouring countries, resulting in widely fluctuating energy costs. For instance, Afghanistan pays Uzbekistan for electricity increases of 300 per cent during the winter months. According to a *Power Engineering* magazine article describing the potential for and challenges facing the hydropower industry in Afghanistan, the country's water resources could generate enough hydropower for Afghanistan and its neighbouring countries. Specifically, the Academy of Sciences of Afghanistan (ASA) estimates that Afghanistan has the potential to generate up to 23,000 MW of electricity per year, which is much greater than the country's current energy production. In order to deal with this future energy crisis and take advantages of the hydropower potential in the country to match the energy demand, Afghanistan is developing several hydropower schemes. Flood control efforts and hydroelectric power generation require the construction of infrastructure (e.g. large dams) along the rivers that result in diminution of water flows and alteration of the river morphology.

Large dams can affect an entire water basin. The most common upstream effects may be the flooding of inhabited areas, siltation, deforestation and salinisation. Downstream effects may be severe changes to the floodplain, river flow, water quality, timing and temperature as well as alterations to the fish population and reductions of the silt carried, which is necessary for keeping the river balance.[7] As the aforementioned NUPI report highlights, Central Asia has particularly been embroiled in debates over how much water should be dedicated to agriculture, and how much should go towards energy generation. Such debates often ensue given the need for water at differing times during the year. Energy needs in the region are high in the winter; however, releasing water resources at this time of the year would deprive them from farmers in the summer, when water needs for irrigation are greater.

Climate Change and Environmental Pollution Effects. Climate change has exacerbated concerns over the utilisation and sharing of transboundary water resources. The main concerns in Central and South Asia are the rates at which glaciers melt. As several sources, including the report "Regional Water Intelligence Report Central Asia", highlight, glaciers in Afghanistan decreased by fifty to seventy per cent during the twentieth century. While shrinking glaciers increase water supply in the short term, the depletion of freshwater from glaciers reduces the water supply in the long term. Furthermore, environmental pollution reduces the quality of water resources, rendering them becoming unsuitable for agriculture or water supply. According to the UNDP, Central Asia water quality has drastically deteriorated since the 1960s. This is particularly alarming for the Aral Sea Basin (Amu Darya River is part of it) where fifty per cent of the river flow is extremely polluted water coming from industrial and urban areas. Mineralisation in the lower part of the river has doubled, and currently water is not suitable for drinking.

The Four International Basins Shared by Afghanistan

The aforementioned US Senate Foreign Relations Committee report notes that as long as water demands increases and water availability decreases, water will more commonly be viewed as an issue of national security for countries around the world. Such a perception has the potential to complicate relations between water-dependent countries, as is the case in Afghanistan. As research by NUPI illustrates, relations between Afghanistan and its

[7] If the reader is interested in further insights regarding upstream and downstream impacts of dams, see "Ecosystems Impacts of Large Dams".

neighbours have been historically complex. Accordingly, it is important to understand the main sources of friction within the four international basins shared by Afghanistan and its neighbours. These are addressed below.

KABUL / KUNAR RIVER BASIN (PART OF THE INDUS RIVER BASIN)

Riparian states: Afghanistan and Pakistan

Total area of the basin: 76,908 km^2

Population living in the basin[8]: 7,184,974 people

Population density: 93 persons/km^2

Treaties

The only applicable treaty was signed between Afghanistan and the British in 1921. The treaty references the entire Indus basin and focuses solely on water quantity issues. Neither Afghanistan nor Pakistan recognises the current validity of this treaty.

Potential challenges:

- With the assistance of India, the Afghan government is planning to build twelve dams along the Kabul River, which are crucial for agriculture, water supply, energy generation and sanitation purposes in Afghanistan and Pakistan. The planned dams will be constructed in the Panjshir sub-basin (along the Kunar River) and the Upper and Lower Kabul basins (along the Kabul River) at a cost of USD 6.8 billion and are poised to negatively impact (hinder) water flow to Pakistan have an impact on the water flow reaching Pakistan.
- The absence of waste and wastewater-treatment procedures in populated areas, primarily the city of Kabul, is another potential challenge. As a result of the lack of treatment facilities, the river is carrying large amounts of diluted and floating pollutants. The water quality is well below international drinking standards.
- The lack of essential hydrological data and technological capacity in Afghanistan makes it difficult to monitor water use and to hence implement or enforce any water-distribution agreements which are reached.
- The Kunar River originates in the Pakistani Hindu Kush in Chitral District and crosses the border into Afghanistan to become a tributary of the Kabul River, which subsequently enters Pakistan as part of the Indus River Basin. In order to avoid greater losses of water through the Kabul River, Pakistan has already derived the flow of the Kunar River before it crosses the Afghan border.

Current status:

Afghanistan and Pakistan have been unable to reach a water management/sharing agreement after several attempts. The World Bank is currently leading an initiative to establish an agreement that will focus on the Kabul River Basin by creating the Kabul River Basin Management Commission modelled after the 1960 Pakistan-India

[8] The source of Population Living in the Basin, Population Density and Area of the Basin, for the Kabul River Basin, the Helmand River Basin, the Harirud-Murghab Rivers Basin and the Amu Darya Basin is "Making the Most of Afghanistan Rivers".

Permanent Indus Commission, which is considered by many to have been successful in avoiding water-based disputes. Afghan, Pakistani and international experts who met in in a conference on "Regional Water Governance: Facing Scarcity, Enhancing Cooperation" in October 2012 pushed Afghanistan and Pakistan to sign a new water treaty to avoid future water disputes. The experts emphasised that the dialogue should show greater trust between the two countries and offer science-based, feasible solutions. Experts called for the creation of think tanks and technical committees focused on water management and conflict resolution. In addition, experts suggested public information campaigns which emphasise the importance of water conservation and sustainable water use. The World Bank is also aiming to enhance institutional capacity on the Afghan side in order to improve the sharing of hydro-meteorological data and the use of hydrologic, hydraulic and economic models. The overall cost of the project is estimated at USD 8 million, and the participation of other organisations such as South Asia Water Initiative (SAWI), the Afghanistan Reconstruction Trust Fund (ARTF), and the Climate Change Adaptation Fund (CCAD) is expected.

HELMAND RIVER BASIN

Riparian states: Afghanistan, Iran and Pakistan

Total area of the basin: 353,400 km^2

Population living in the basin: 7,800,000 people

Population density: 22 persons/km^2

Treaties

In 1950 Afghanistan and Iran created the Helmand River Delta Commission in order to establish technical criteria for sharing the Helmand River's water. One year later, both countries rejected the recommendations put forward by the commission, thus blunting its effectiveness and influence. However, in 1973 Afghanistan and Iran signed a bilateral treaty that guaranteed an allocation of 26 cubic meters per second to downstream Iran.

Potential challenges:

- As a result of significant political and regime changes in Afghanistan and Iran in the 1970s and subsequent wars in both countries, the bilateral treaty has barely been applied, and disputes over the terms of agreement persist.
- Iran did not compensate Afghanistan for the overuse of water resources as stipulated in the treaty. Additionally, Afghanistan has accused Iran of violating its national sovereignty by excavating channels which divert water from the Helmand River.
- Until the fall of the Taliban regime, Afghanistan did not have the capacity and technology to exploit the water resources of the Helmand River. During the past decade, the Afghan side of the Helmand River Basin has been flooded by new irrigation infrastructure funded by the international community. These will have significant impacts on the downstream water flow to Iran.
- The lack of historical monitoring stations to measure and establish surface and groundwater flows on both

sides of the border also poses challenges with regards to water management and sharing.

- Lake Hamun, which is located on the Iranian side of the border, is the only water source for drinking and a major driver of economic activity for more than one million Iranians in Sistan and Baluchestan province. The lake's water level has declined, and the area has experienced seasonal droughts, thus harming the ecosystem and undermining livelihoods for Iranians in the area.
- Due to the sub-optimal management of water resources and the resulting decline in water supply on the Afghan side, an increasing number of farmers choose to cultivate opium poppies rather than more water-intensive, licit crops.

Current status:

Soon after the fall of the Taliban regime, both Iran and Afghanistan expressed their willingness to address the disputes over water resources in the Helmand River Basin in several bilateral meetings and conversations. Afghanistan committed itself to releasing more water downstream to Iran despite the fact that Iran had been using 75 per cent of Helmand River water for the last decades, according to the *Afghanistan Times*. According to Stimson Centre think tank, Iran's official policy is to pursue an agreement under a comprehensive, cooperative framework which addresses flood and drought control, political stability and regional economic development. In fact, relevant ministers from Iran and Afghanistan, as well as Tajikistan, are working together in order to establish a supreme regional water council. Furthermore, Afghanistan and Iran have cooperated together with the United Nations Environment Program (UNEP), UNDP and the Global Environment Facility (GEF). However, as the Stimson Centre report highlights, discussions over water-sharing face major political obstacles. Afghanistan has accused Iran of working with the Taliban in order to attack water-related infrastructure projects in western Afghanistan which would impinge upon Iran's access to water. The situation along the Helmand River, the main source of freshwater for the southern provinces, is becoming serious: in August 2013 the river dried up in its way through Nimroz province.

HARIRUD-MURGHAB RIVER BASIN

Riparian states: Afghanistan, Turkmenistan (Murghab and Harirud) and Iran (only Harirud)

Total area of the basin: 61,000 km^2 (Murghab) and 92,600 km^2 (Harirud)

Population living in the basin: 1,060,000 (Murghab) and 5,020,000 (Harirud)

Population density: 17 persons/km^2 (Murghab) and 54 persons/km^2 (Harirud)

Treaties

Afghanistan has not established direct agreements concerning the Harirud-Murghab River Basin either with Turkmenistan or with Iran. However, the Harirud-Murghab Basin forms part of the wider Amu Darya Basin,

which is the subject of several regional frameworks (see below).

Potential challenges:

- As with the Helmand River Basin, irrigation and infrastructure is being constructed in the Afghan side of the Harirud River. These developments will impact downstream water flow. One of the most conflictive is the construction of Salma Dam, which Afghanistan has accused Iran of attempting to sabotage. Nearly 80 per cent of construction works in Salma dam are complete, which will provide 42MW of electricity and irrigation for 75,000 hectares of land. The Salma dam project, implemented by M/S WAPCOS Ltd, is one of two large projects funded by India. The construction of the project started in 2006 but in 2010 it was halted as a result of the frequent gun battles in the area. The Afghan Directorate for Security (NDS) in coordination with the Afghan National Security Forces recently prevented a plot targeting the Salma dam. Afghan officials have accused Iran of launching dam-related attacks, including the killing of an Afghan district governor who had strongly supported the construction of the dam. Estimations say that on the Iranian side, water flow will shrink by 73 per cent in a region where the population depending on the water flowing along the Harirud River is three times larger than on the Afghan side.
- The Afghan Government is implementing several irrigation projects funded by the ADB's Western Basins Water Resources Management Project. These new irrigation schemes will add up to the reduction of the water flow produced by Salma Dam and other infrastructure projects along the Harirud and Murghab Rivers.
- The Harirud Basin feeds the reservoir at Doosti Dam, which is the main water source for the city of Mashhad in northern Iran. Upstream water demand in Herat and other urban areas in western Afghanistan is also expected to increase in the coming years.

Current status:

The three countries have expressed their readiness to cooperate trilaterally. However, consensus has not yet been reached, and neither Turkmenistan nor Iran consulted Afghanistan before starting construction of the Dostluk Dam. While several international analysts advocate for developing agreements on water issues with Iran, Afghan officials insist they do not have plans to start up negotiations. The main problem seems to be the Harirud River, in particular the construction of the Salma Dam and how it will affect the water flow. "We have many projects in Afghanistan, and every project has its enemy. But unfortunately Salma Dam has three enemies," says Fazl Ahmad Zakeri, Ministry of Energy and Water's acting director for the Harirud and Murghab River Basin. The third enemy Zakeri refers to, besides Iran and Turkmenistan, is Pakistan, which, according to him, is allegedly "trying to stop the work" because the dam is being constructed by its strategic rival India. The Afghan intelligence services accused Pakistan of leading the Taliban plot to blow up the dam with 2,860 pounds of explosives in April. A few months later, six security guards were killed near the dam by a roadside bomb. Without naming Iran, the provincial security chief said that the killings had: "A political motivation. This is the work of those countries [which] don't want Afghanistan to develop." However, Iranian officials say they support the development of Afghanistan and deny accusations of trying to destabilise the neighbouring country. Zakeri confirmed that Iran has repeatedly asked for negotiations.

AMU DARYA RIVER BASIN (PART OF THE ARAL SEA BASIN)

Riparian states: Afghanistan, Tajikistan, Pakistan, Uzbekistan and Turkmenistan

Total area of the basin: 309,000 km^2

Population living in the basin: 15,564,000 people

Population density: 50 persons/km^2

Treaties

The existing agreements signed by Afghanistan with the Soviet Union focus solely on the river as an international boundary; these date from 1873, 1946, 1958 and 1978. Afghanistan has not signed any treaty establishing water quantity and quality parameters, thought it has agreed to a protocol that includes provisions concerning join management of the river and its tributaries. Central Asian countries and the international community have set up several cooperation frameworks, including the following: the Interstate Coordination Water Commission of Central Asia (ICWC), the Amu Darya and Syr Darya Basin Management Authorities, the Interstate Council on the Problems of Aral Sea Basin and the International Fund for Saving the Aral Sea (IFAS).

Potential challenges:

- Approximately 92 per cent of the water demand in the Amu Darya basin is used for irrigation. Any upstream alteration, such as the construction of more irrigation infrastructure or dams, will critically impact agriculture in downstream areas.
- The need for water for different purposes at different times of year (e.g., for energy in the winter and irrigation in the summer) also poses major challenges.
- Northern Afghanistan is seen as having a potential for agriculture and irrigation development. However, development of irrigation infrastructure in this area will have subsequent impacts on water flows in downstream areas.
- Turkmenistan and Uzbekistan do not have diversified sources of water, being highly reliant on the Amu Darya and the Syr Darya (for Uzbekistan). Hence, they have a vital stake in water management agreements and development in northern Afghanistan.
- Pollution from industry and urban areas along the whole length of the Amu Darya is exacerbated by a lack of waste and wastewater facilities.

Current status:

Afghanistan is the second largest source of water for the Amu Darya River. However, despite international concerns about the shrinking Aral Sea, no successful steps have been undertaken to integrate Afghanistan into the existing or new regional frameworks. The main problems along the Amu Darya Basin are not due to disputes over water usage by each country, but instead over the irreversible environmental problems the overuse of water is causing on the river's ecosystems and the Aral Sea. In this regard, on January 2013, the Organization for Security

and Co-operation in Europe (OSCE) Office in Tajikistan organised a one day workshop to discuss common water management and environmental challenges in Afghanistan and Tajikistan. The aim of the event was to raise awareness and identify solutions to many of the water management and environmental challenges faced by the two countries. The workshop, which was attended by more than seventy people, focused on water management, hydrological and ecological monitoring, disaster risk management, environmental degradation and climate change, with special attention given to the upper Amu-Darya river basin.

Conclusions and Recommendations

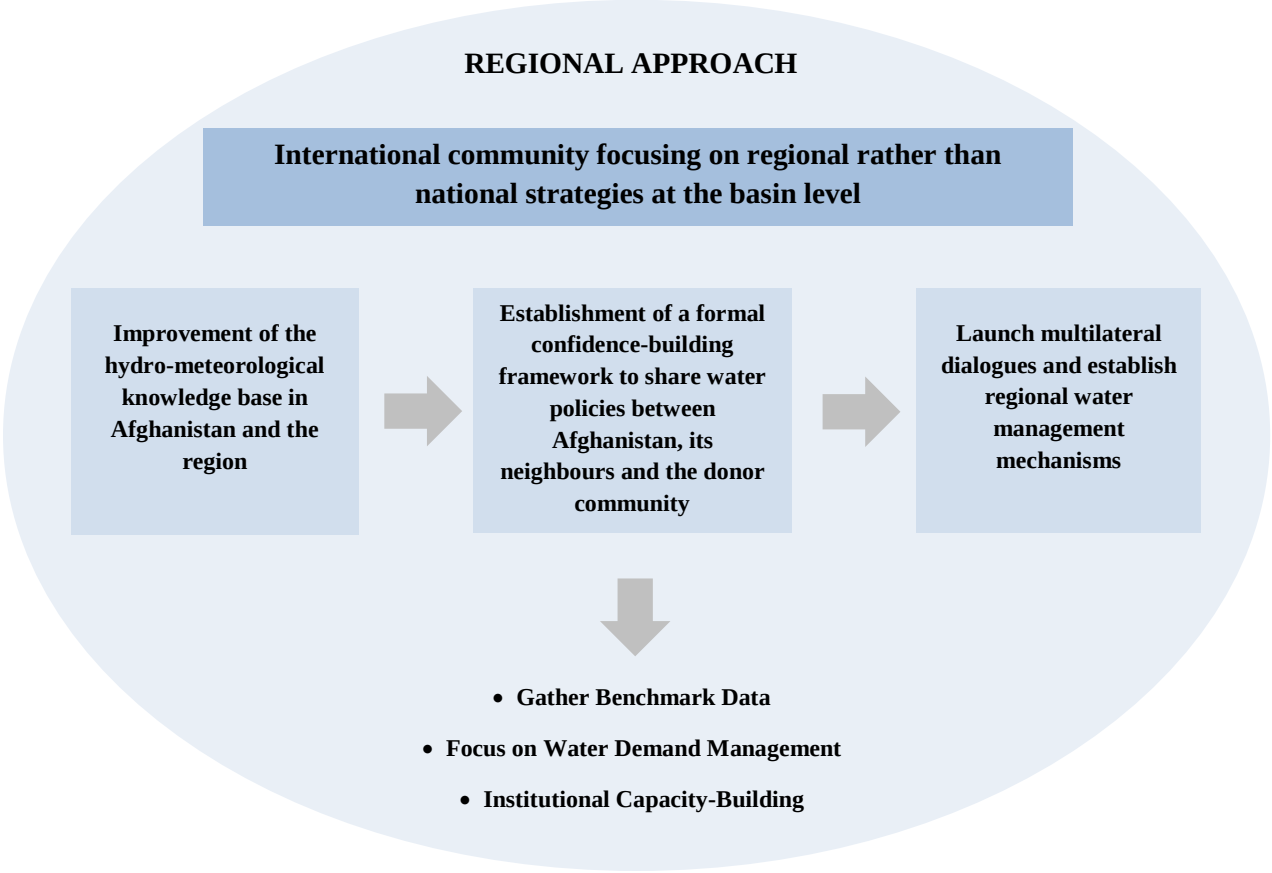
A research study by the Kings College London examined how control over water resources is determined by riparian states. The report attributes different water security-related outcomes to the "power" of each country. Predictions of wars over shared water resources have failed not due to an increased cooperation among countries but because stronger countries have managed water for their own benefit at the expense of weaker countries. The authors use the concept of "hydro-hegemony", described as "somewhere between positive regional leadership that emphasises cooperation, and regional dominance," to analyse how countries "exploit power inequalities to stake their claims to water resources." Countries capitalise on their hydro-hegemony through: (i) Resource Capture - by acquiring or annexing land or construction large-scale water control infrastructure; (ii) Containment - where stronger countries dominate competitors by threating economic sanctions or political isolation; and, (iii) Integration - where stronger countries encourage more shared control of transboundary water resources. Although relative to Iran or Pakistan, Afghanistan cannot be considered as a dominant country, it will most likely implement a "Resource Capture" strategy by making use of its upper riparian state condition. As the Kabul, the Helmand, the Harirud and the Murghab rivers all originate in Afghanistan, the country is using water control upstream to wield more power against its neighbours. On the contrary, to counterbalance the overuse of water by Afghanistan, Iran and Pakistan may use another forms of power such us political, economic or military.

Afghanistan is withdrawing less water from transboundary rivers than it would have legally been allocated by international agreements. Even though Afghanistan is not making full use of transboundary water resources, the ecosystems of the lower riparian states are already experiencing significant pressures. As economic development and the construction of new infrastructure in Afghanistan progresses, such pressures will likely increase. Accordingly, experts have highlighted the importance of fostering development in a manner which is sensitive to regional tensions over shared water resources (Figure 5). Thus far, the international community and states in the region have primarily, though not exclusively, focused on countries as individual units rather than implementing region-wide strategies in the water resources management sector. The EastWest Institute advocates for a shift in order to focus on a regional approach at the basin level. Such engagement, experts have noted, should be based on the following: (i) a better understanding of the hydro-meteorological dynamics; (ii) the establishment of transparent confidence-building frameworks between the different involved stakeholders; and (iii) the creation of supreme regional water management mechanisms. According to the previously discussed report from the US Senate Foreign Relations Committee, there is a need to provide national and regional authorities with better resources and capacity, particularly regarding data collection and analysis.

Iran, Afghanistan and Pakistan have mutual interests that go beyond transboundary water resources. However, equitable bilateral water-sharing agreements must be concluded, not only as a prerequisite for geopolitical stability but also to ensure sustainable environmental and human development in the region. An illustrative example of damages that occur from unilateral actions is provided in 1998 when the Taliban government caused a humanitarian and environmental crisis in the Iranian Sistan and Baluchestan province by closing the sluices of Kajaki Dam. This movement induced drought in the region that had severe impacts on the ecosystem and led to a massive human migration. In order to avoid these situations, some regional experts advocate for using the case of the 1960 Indus Waters Treaty signed between Pakistan and India as an example for future transboundary water

management policies. In order to reach a bilateral treaty, governments must have the disposition and vision to address water problems, detach from historical grievances (e.g. Durand Line) and overcome power asymmetries.

Figure 5. Framework Towards Effective Transboundary Water Resources Management



Sources: *Adapted from findings and recommendations in the following publications: Avoiding Water Wars: Water Scarcity and Central Asia's Growing Importance for Stability in Afghanistan and Pakistan; Making the Most of Afghanistan's River Basins: Opportunities for Regional Cooperation: Enhancing Security in Afghanistan and Central Asia through Regional Cooperation on Water; and Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention.*