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## Afghanistan's international rivers and the importance of their region

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### Abstract

Aside from the issues peace and stability, one of Afghanistan's most vital needs is safe and reliable supplies of water. But Afghanistan faces certain economic, political, institutional problems to develop water resources potential. These problems will increase as the years go by. Afghanistan is one of the world's poorest countries, with an economy largely based on subsistence agriculture. Afghan farmers depend on reliable, year-round sources of surface water and groundwater. Seasonal flows of streams and rivers fed by melting snowpack high in Afghanistan's mountains recharge alluvial aquifers located in populated valleys and provide city dwellers with drinking water. The current population of Afghanistan is about 31 million and it is projected to increase by nearly 80 percent by the year 2050 to approximately 56 million. This will raise demand on the country's already economic stressed water resources. Almost all of the river basins are transboundary in the country. The Country due to the political unrest has not participated in many of the agreements regulating water resources in Central Asia. its current "non-player" and "outsider" status of the Central Asian Hydropolitic has to be changed when starting water resources development. This could create an international dispute in future regional water sharing discussions. In addition, recent research suggests that global climate change could alter precipitation patterns in Afghanistan. In particular, both the amount and the timing of snowfall received at higher elevations could change, affecting the major source of water for many areas in Afghanistan. Development of Afghanistan's most transboundary water resources is a vital need for its own national interest, but it is also directly related with a transboundary water management dispute issue in the region. In other words, Afghanistan should find the best way to develop its transboundary water resources for national development as well as peace and stability of the region. But this development won't be so easy if current amount of water use of riparian states will be samewhen Afghanistan plans to release smaller amount of water.

**Keywords:** Afghanistan's international Rivers, Regional their region, Hydro Politics of Afghanistan, transboundary water resources, transboundary management

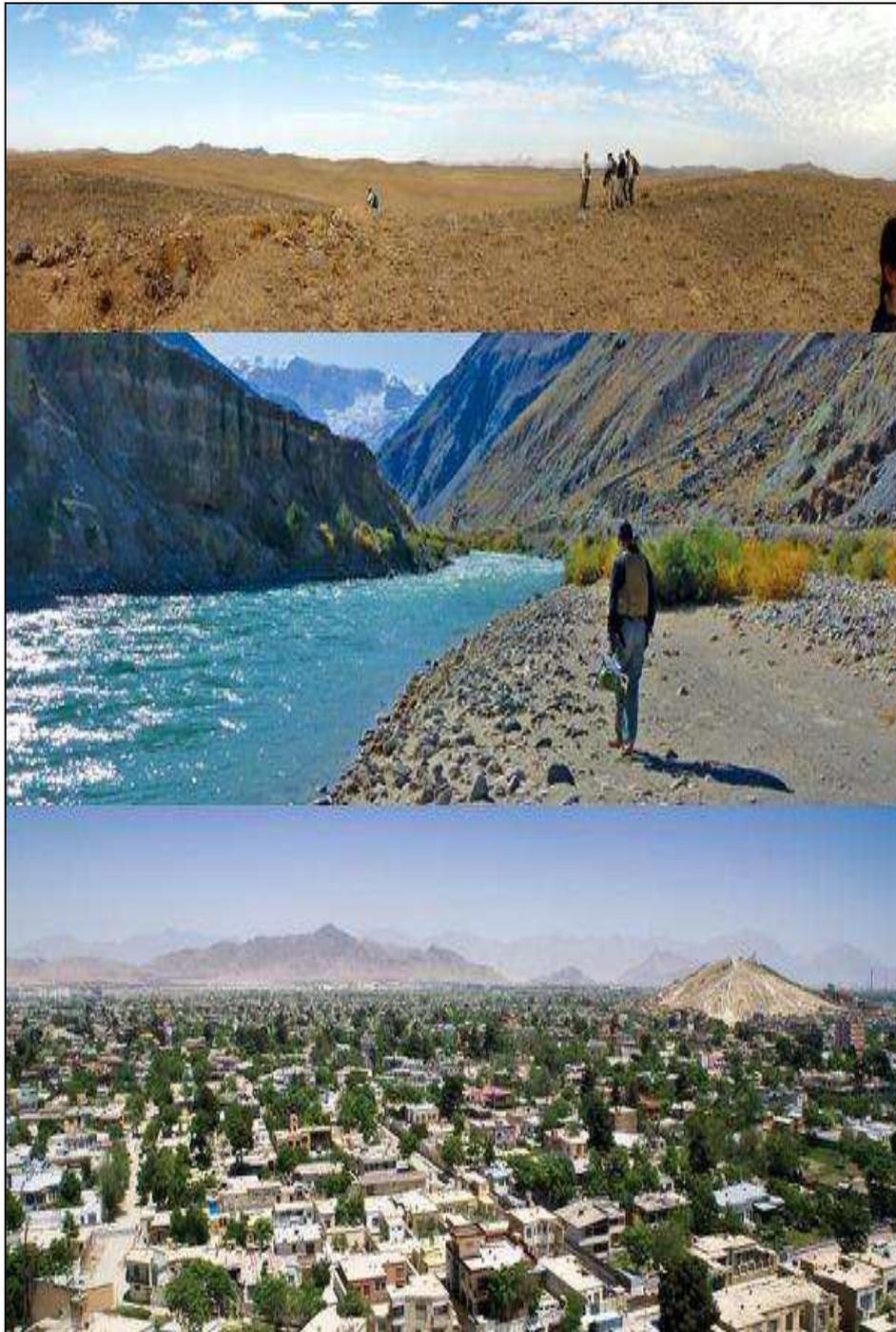
### Introduction

Because of Afghanistan's innate land locked setting virtually all of Afghanistan's major rivers drain off into riparian neighboring states. Trans-boundary concerns are intensifying along all of Afghanistan borders (Ziaie, 2015). Afghanistan has many water resources and its geography provides significant opportunities for their exploitation (Matthwe; Benjamin, 2010). Afghanistan possesses many rivers, river basins, lakes and desert areas. The four major river systems are the Amu Darya, the Oxus of antiquity, (boundary with Central Asia, 1,100 kilometers in Afghanistan); the Helmand (1,300 kilometers); the Harirud (650 kilometers in Afghanistan); and the Kabul (460 kilometers). Only the Kabul River, joining the Indus system in Pakistan, leads to the sea. Many rivers and streams simply empty into arid portions of the country, spending themselves through evaporation without replenishing the four major systems; others flow only seasonally. Afghanistan is an unlucky country that lacks the ability to develop its water resources. The existing water infrastructure has been destroyed during thirty years of war. This deficit in water management capacity exacts a heavy toll, exacerbating unemployment, food insecurity, water disputes, and the production of crops that can compete with illicit drugs. Without the means to store and divert water, existing infrastructure is vulnerable to devastating seasonal floods and droughts. Afghanistan also needs electricity, which only reaches 6 percent of its rural communities and 15 percent of its urban population. Afghanistan is highly susceptible to drought. When the country suffered a drought from 1999 to 2005, whole villages with limited water resources were forced to abandon their land and flee to larger cities and towns.

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Improving the national and transboundary management of water resources of Afghanistan is a necessity to improve the lives of millions of people. Enhanced regional cooperation to avoid tension over the use and management of shared

water resources will be crucial to the success of the Afghan government's and the international community's efforts to provide a secure and stable future for the country and its neighbors.



**Photo 1:** A tale of three Afghanistan's: Deserts, mountain streams and growing cities. Credit: top and middle: Thomas J. Mack, USGS; bottom: ©iStockphoto.com/MieAhmt (Matthwe; Benjamin, 2010).

## 2. Hydrology of the river basins

Afghanistan divides hydrographically into four major river basins, the Amu Darya, Harirud-Murgab, Helmand and the Kabul River Basin, all of which cross international boundaries (Schroeder, 2015) <sup>[3]</sup>.

Additionally, Afghanistan's water resources are unequally distributed. The Amu Darya Basin, including the Harirud

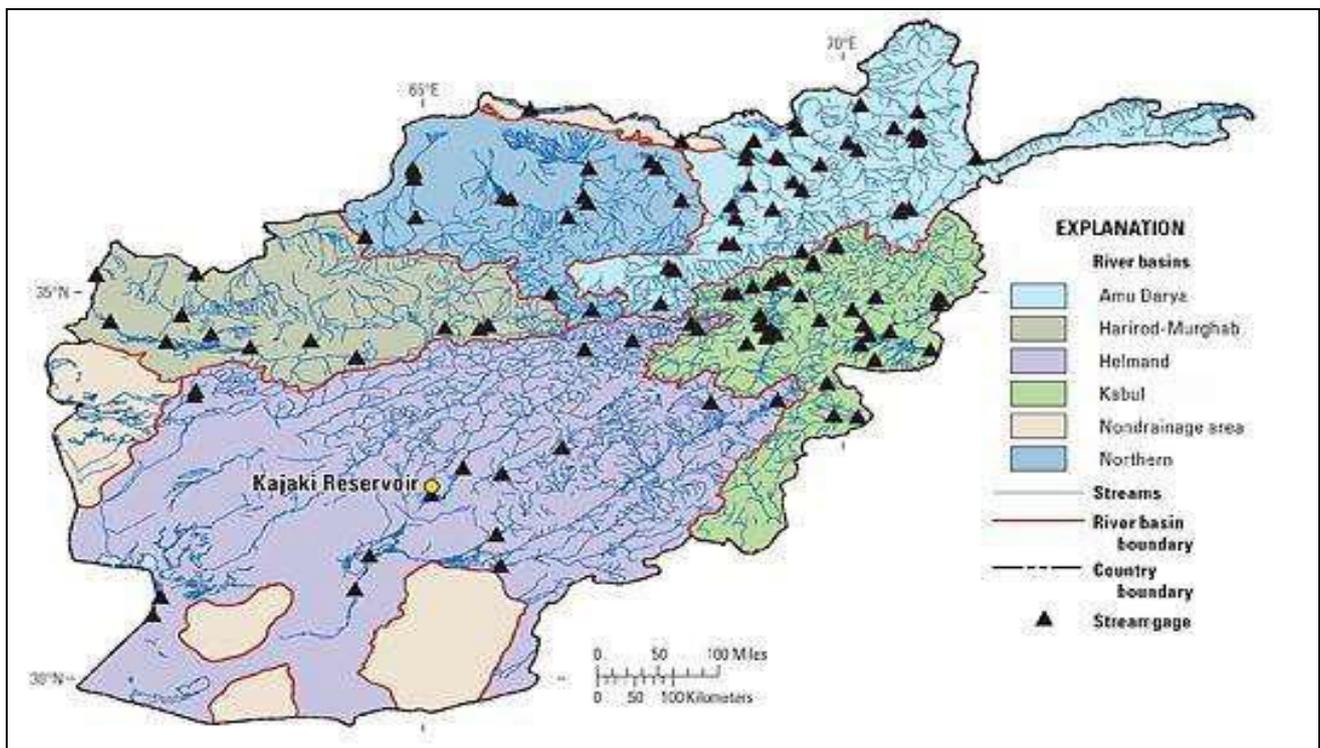
and Murgab Basin and non-drainage areas, covers about 37 percent of Afghanistan's territory but contains about 60% of the water flow. The Helmand Basin covers about 49% of the territory and holds only 11 percent of water flow. The Kabul- Eastern River Basin, with area coverage of about 12 percent holds around 26 percent of the water flow.



**Fig 1:** Afghanistan map and Transboundary Rivers.

The Amu Darya is one of the longest rivers in Central Asia. It flows into the Aral Sea and forms part of Afghanistan's borders with Tajikistan, Uzbekistan and Turkmenistan. Water resources from the Amu Darya are shared between Afghanistan and all of the Central Asian states through which it runs,

The Harirud-Murgab represents about 12% of Afghanistan's water resources. It is centered in Herat, an intensely irrigated region of Afghanistan. The river flows through Iran, ending in Turkmenistan, and acts as a border between Afghanistan and Iran and further between Iran and Turkmenistan.



**Fig 2:** Locations of Afghanistan's major drainage basins, reinstalled stream gage stations and the Kayak Reservoir, a major source for hydropower and irrigation in the Helmand River Basin. Credit: Thomas J. Mack, USGS (Matthwe; Benjamin, 2010).

**The Helmand river basin contains** the longest Afghan river, which forms the Afghan-Iranian border for 55 kilometers. Water from the Helmand basin is used primarily for irrigation.

**The Kabul River flows through** Afghanistan and Pakistan and represents approximately 26% of the available water resources in Afghanistan. There is presently no agreement between Afghanistan and Pakistan concerning the distribution of the water resources available in the Kabul River (Schroeder, 2015)<sup>[3]</sup>.

### 3. Water Resources Development Difficulties

Drinking water supply and water for irrigation is the priority for the Afghanistan. But as the country develops further, additional water supplies will be required for anticipated mining and mineral processing activities, as well as for associated businesses and communities that will be vitally important to Afghanistan's future stability. But there are some difficulties as indicated below; Following decades of invasion and civil war, Afghanistan lacked the technical capacity, the communications infrastructure, and the modern equipment necessary for effective hydro geologic investigations of its water resources.

The difficulty of obtaining safe and reliable supplies of water in Afghanistan is heightened by the fact that water-resources data collection was suspended around 1980 due to civil strife and the Soviet invasion. Subsequently, much of the institutional knowledge relating to water resources was lost, most of the country's water monitoring equipment was destroyed, and the abilities of Afghan water scientists stagnated (Matthwe; Benjamin:2010).

#### 3.1. Recent Developments

Recent developments have begun re-establishing civil hydrologic expertise, and have led to the creation of local and national groundwater monitoring networks and a national climatic network as well as functioning streamflow and reservoir water level gaging network.

Although further improvements are needed, these advances should assist Afghanistan's planners and managers to assess and monitor current and future water resources.

In 2004, U.S. Geological Survey (USGS) researchers arrived at the Afghanistan Geological Survey (AGS) headquarters in Kabul to begin a decade-plus long collaboration with AGS scientists. Since 2004, USGS efforts have focused principally on basic skill building. For example, USGS scientists have provided training to Afghan scientists and technicians in using modern computerized techniques required for hydrologic monitoring and for maintaining large databases (Matthwe; Benjamin:2010).

One of the first projects USGS and AGS engineers undertook was to investigate water resources in the Kabul Basin. By 2010, AGS engineers applying the lessons learned in Kabul had established similar groundwater monitoring networks in the major population centers. Meanwhile, collaborative work with the Danish Committee for Aid to Afghan Refugees, an international NGO, led to the development of a national network of more than 150 wells to monitor groundwater levels. Administered by Afghan engineers, this first national groundwater network will be vital to detecting and assessing regional trends in future groundwater levels and quality.

By the late 1970s, Afghanistan had a functioning stream

flow and reservoir water level gaging network that consisted of 169 stream gages distributed across the country. This network operated until 1980 when most stream gages were destroyed or fell into disrepair. From 1980 to the early 2000s, Afghanistan's original streamflow records were misplaced or destroyed and the data were lost.

From 2006 to 2010, USGS and MEW researchers worked to recover daily streamflow data from whatever historical documents hadn't been destroyed and could be located.

Nationwide, approximately 127 historical stream gages were re-established and supplied with modern equipment from 2008 to 2011 as part of a USGS and World Bank program. In March of 2014, the United States Agency for International Development ("USAID") contracted with Laura A. Schroeder to conduct a three-week consultation mission in an active war zone in Kabul, Afghanistan. The goal of this mission was to provide international water law expertise in developing a decentralized and sustainable water use system by analyzing the current methods of the Country's governance within its various river basins (Schroeder, 2015)<sup>[3]</sup>.

The mission focused on teaching Public Administration and Governance Training for the basin and local agencies, as well as members of the Technical Secretariat Council on Water. Through this training and teaching, the goal was to provide solid practical instruction to Afghanistan senior and technical staff to facilitate understanding of the deficiencies and challenges within the water sector, and to assist in implementing Afghan water code.

#### 3.2. Climate: The Context for Water Resources

Effect of climate change is a critical unknown factor in Afghanistan's water resources development. "May Kabul be without gold, but not without snow," implores an Afghan proverb. Afghanistan relies on winter snowfall in the mountains to replenish the snowfields and glaciers that supply water to its perennial and ephemeral rivers and streams. Reductions of the mountain snowpack and glaciers due to climate change could have a profound effect on Afghanistan's water resources (Matthwe; Benjamin:2010).

In 2010, the USGS and AGS assessment of Kabul Basin's water resources found that about half of the shallow groundwater supply wells could become dry or unusable due to declining stream flows and recharge under projected climate change by 2050.

#### 4. Water Management and Transboundary Agreements

Afghanistan is the second-largest contributor of water resources to the Amu Darya after Tajikistan, so there is an obvious need for cooperation between Afghanistan and the Central Asian states. Yet Central Asian states have had limited engagement with Afghanistan, in part because of differences among Central Asian states themselves. (Disagreements between Uzbekistan and Tajikistan are the reason why a memorandum of understanding between Afghanistan and Tajikistan on trans-boundary water use has been pending for years).

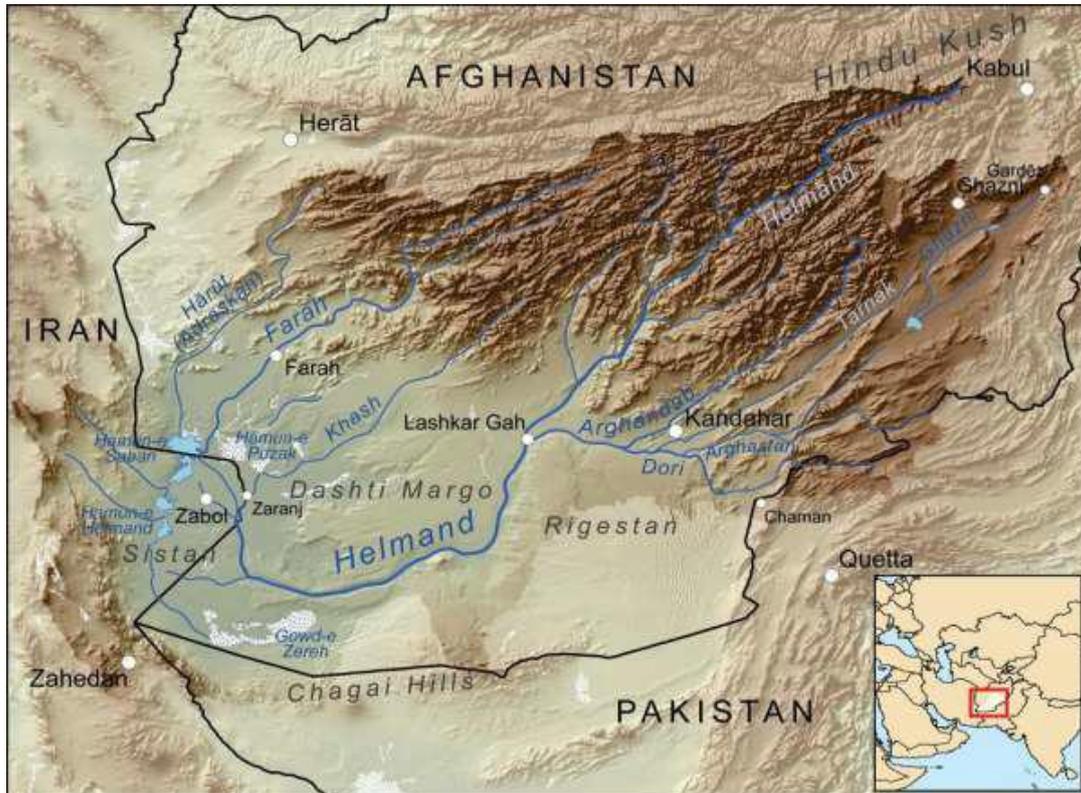
No bilateral or multilateral treaties have been signed on the Harirud and Murgab (Matthwe; Benjamin:2010). Historically, cooperation and trust between Iran and Afghanistan on the issue of water has been limited. With the exception of an unbinding 1973 water accord that defined an acceptable rate of discharge from the Helmand, there are no formal water - sharing agreements. Trust was further eroded

when the accord was breached by Afghanistan during a drought from 1998 and 2002. The development of more water infrastructure in Afghanistan, unbounded by agreements, will increase Iran's vulnerability

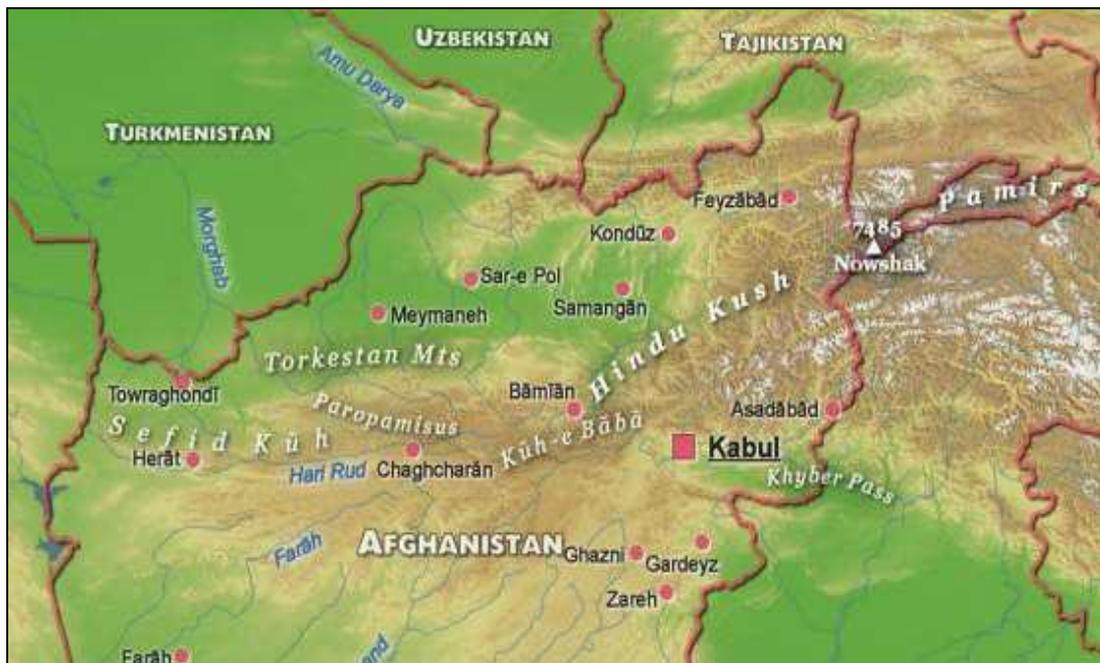
**4.1. Hydropolitic of Afghanistan**

Afghanistan is the only non-player country in the region

although it is all rivers are transboundary. Afghanistan's reluctance in Hydropolitic is partly due to having a weak bargaining position compared to its neighbors. It is clear that after three decades of conflict, Afghanistan has a severe lack of technical knowledge, institutional capacity relative to its neighbors and very poor hydro-meteorological data.



**Fig 3:** Helmand River Basin.



**Fig 4:** Murgab-Hari Rod, Kabul, Amu Darya River Basins.

At the same time, it is also important to recognize that Afghanistan's neighbors have not undertaken any serious efforts to incorporate Afghanistan either. Existing frameworks for regional cooperation on some of the shared

water resources continue to exclude Afghanistan<sup>10</sup>. But when Afghanistan is able to start develop water resources; the regional stability balance will be threatened. Because no bilateral legal frameworks on shared water resources exist

except for the 1973 bilateral treaty between Afghanistan and Iran on the Helmand River,

#### 4.2. The Amu Darya Basin Agreements

Development of agriculture (in all riparian states) and hydroelectric power (in Tajikistan and Afghanistan particularly) depend heavily on the water resources of the Amu Darya. It is also crucial water to the livelihoods of 44 million people in the Aral Sea Basin. Since 1873, Afghanistan and its northern neighbors - Russia, the Soviet Union, and the Central Asian states - have concluded agreements relating to the Amu Darya. But no water resource sharing schemes were ever stipulated.

The most significant agreements:

- The Frontier Agreement between Afghanistan and Russia (1873); ,,
- The Frontier Agreement between Afghanistan and the Union of Soviet Socialist Republics (1946); and,
- The treaty between the government of the U.S.S.R. and the Royal Government of Afghanistan concerning the regime of the Soviet-Afghan state frontier (1958).

In 1977, Afghanistan sent a delegation to Tashkent and Uzbekistan to negotiate a water sharing agreement. The Soviet Union could only offer 6,000 cubic meters a year, which was 3,000 cubic meters short of the Afghan demand. An agreement failed to materialize (Rycroft; Wegerich: 2009).

#### 4.3. The Harirud-Murgab River Basin Agreements

The Harirud-Murgab River Basin represents about 12 percent of Afghanistan's water resources and is centered on the intensely irrigated area of Herat. It rises in the central Hazarajat and flows west through northeast Iran before exhausting itself in Turkmenistan. No bilateral or multilateral treaties have been signed on the Harirud and Murgab. A number of regional frameworks established Amu Darya Basin do not cover the Harirud-Murgab River Basin directly. Iran has indicated readiness to cooperate bilaterally and trilaterally with Afghanistan and Turkmenistan. However, bilateral and/or trilateral frameworks of cooperation are yet to be developed. Furthermore, Iran and Turkmenistan did not consult Afghanistan when jointly building the Doosti Dam on the Harirud, which has increased concerns in Kabul (Matthwe; Benjamin: 2010). In 2005, Iran and Turkmenistan constructed the Doosti Dam, with each country agreeing to equal rights to the river; however neither country consulted Afghanistan prior to constructing the dam. The current \$200 million dam project in the works to divert water from Iran to Afghanistan will severely restrict water flow to Iran. Because Afghanistan was not consulted prior to the construction of the Doosti Dam, Afghan officials state they have no plans to negotiate water rights with Iran prior to building the new dam. This project may potentially cause a great set back in the great strides towards peace which has taken place between these two countries.

#### 4.4. The Helmand River Basin Agreements

The Helmand River is a special river in terms of Afghanistan's Hydropolitics. It is the longest of Afghanistan's rivers, shared between Afghanistan and Iran and the only river basin on which Afghanistan has entered

into a formal agreement with a neighbor. The Helmand River is at approximately 1,300 kilometers (800 miles). It rises in the Hindu Kush mountain crossing southwest, it forms the Afghan-Iranian border for 55 kilometers. The water resources of the Helmand River Basin are used extensively for irrigation. Its water is crucial for Afghan and Iranian farmers in Sistan and Baluchistan alike. Therefore, implementation and expansion of various water infrastructure projects is raising the tension in the basin. On September 7, 1950, the Afghan and Iranian governments signed an agreement establishing the Helmand River Delta Commission to elaborate technical methods to share the Helmand River's water between Iran and Afghanistan. The commission was to provide an engineering basis for mutual accord regarding the apportionment of the waters of the Helmand. Iran and Afghanistan did not agree with the commission's 1951 report. However, the bilateral treaty on the allocation of the Helmand River's water resources. The agreement allocates 26 cubic meters per second to downstream Iran. However, the treaty was never fully implemented and disputes arose over the terms of the allocation. Due to the 1973 Afghan coup, the 1978-1979 revolution in Iran, the 1979 Soviet invasion of Afghanistan, and the rise and fall of the Taliban, the treaty was never fully implemented and disputes over the terms of agreement remained<sup>14</sup>. Improved Kabul-Tehran relations following the ouster of the Taliban have not yet yielded a solution. However the Afghan and Iranian Helmand River commissioners currently meet on a quarterly basis to promote bilateral cooperation and the formation of subcommittees on dredging and food control in the Helmand.

Additionally, Iran and Afghanistan have made constructive efforts Hamun Lake. They have worked in close cooperation since 2003 with the United Nations Environment Programme (UNEP), the United Nations Development Programme, and the Global Environment Facility (GEF) through a process of trilateral sessions between Afghanistan, Iran, and UNEP. As a downstream user of the water resources of the Helmand River, Iran has an obvious interest in cooperating with Afghanistan. Current Iranian technical assistance to the construction of a research institute in the Afghan Ministry of Energy and Water can serve as an example for the enhancement of regional data and information sharing (Ziaie, 2008).

#### 4.5. The Kabul-Eastern Basin Agreements

The Kabul River flows in eastern Afghanistan and northwestern Pakistan. It is approximately 700 kilometers long, of which 560 kilometers flow through Afghanistan and pass into Pakistan. It joins the Indus River. The water resources of the Kabul River are essentially shared between Afghanistan and Pakistan. Despite repeated attempts on both sides to reach an agreement on the Kabul River, such an agreement has not materialized. The technical committee established in 2003 maintained that its efforts failed because it did not receive sufficient river flow data from Afghan authorities. No institutionalized framework of cooperation on the Kabul River Basin currently exists. At the sidelines of the March 2009 meeting of the Economic Cooperation Organization, and Tajik leaders agreed to speed up implementation of projects on the water-energy nexus. Joint commitments of a similar nature were not made between Afghanistan and Pakistan.

## 5. Security of the region and water

Clearly, security and development became the key elements of contemporary international relations, with water being an essential basis for security and driving force behind development. The Central Asian states established a series of regional institutions and agreements with the expressed intention of allocating the Aral Sea Basin's waters and protecting the Aral Sea. They began with the 1992 Almaty Agreement. In the following years a number of institutions were established. However, Afghanistan has not been a member of any of the water management related regional organisations however. On the other hand there is no evidence that the Central Asian states or the water bodies established have ever considered including Afghanistan. There is no textual exclusion to the fact that Afghanistan is an Aral Sea Basin state or contributor to the Amu Darya's waters.

Similarly in a report recording IFAS's first ten years, Afghanistan was only mentioned as a potential problem. The report stated that Afghanistan's future water demands are a "big uncertainty" for the other riparians (Aslov, 2003)<sup>[1]</sup>. In neither instance did IFAS or member states suggest that Afghanistan's membership was a way of addressing these "uncertainties." No bilateral agreements have been reached between Afghanistan and the Central Asian riparians either. In fact the only transboundary water agreement that the Karzai government has with any of its neighbours is with Iran over the Helmand (Hirmand) river (Government of the Islamic Republic of Afghanistan, 2007). The only Central Asian riparian that seems interested in serious dialogue with Afghanistan is Tajikistan (Horsman, 2008)<sup>[5]</sup>. Therefore regional security is very much depend on transboundary water use and management of the Afghanistan. In other words Afghanistan's water development project and Hydro policy will play very important role on the regional security.

## 6. Current conditions and future of the region

Considering the last section before this part, it is not difficult to see that there are no regional mechanisms for cooperation on water in Southwest Asia that involve Afghanistan. With the exception of the 1973 bilateral treaty between Afghanistan and Iran on the Helmand River, no bilateral legal frame works on shared water resources exist, let alone regional frameworks. The Iran-Afghanistan dialogue on the Helmand River is the most developed. Additionally, recent agreements in the framework of ECO, RECCA, and other forums could start to serve as a fertile ground for bilateral and regional water diplomacy.

Regional cooperation requires political will, which, to date, has not been forthcoming. Several existing processes have shown the potential for bilateral - if not regional - cooperation on water. Afghanistan is not a water dependent country from abroad but currently highly dependent on foreign aid to reach its national development goals. Since 2001, Afghanistan has received more than \$15 billion in official development assistance, not including an estimated \$50 billion in off-budget security expenditures.

Water resources development to stabilization and development in Afghanistan is therefore immense. Because of that many donors are giving considerable attention to the development of Afghanistan's water sector. But starting this development will be directly related with the Hydropolitic of Afghanistan for improvement of the cooperation.

## 7. Conclusions

Water is more important to Afghanistan than any mineral or other natural resources. Population growth, urban expansion, more intensive agriculture and prospective mining operations will all require more water that is under the effects of climate change.

A comprehensive understanding of Afghanistan's most transboundary water resources by its scientists, engineers, political leaders and citizenry is vital for the future of this struggling nation. Afghanistan's reluctance to engage I regional dialogues on water has to be attributed, among other concerns, to the country's limited hydro meteorological capacity, the lack of adequately skilled human resources (with solid knowledge of international law and the ability to negotiate in international forums), and a knowledge gap of about thirty years of hydrological data due to war. Therefore, they are currently away from regional cooperation agreements on water fearing that they might lose in bilateral forums. Data acquisition and exchange could be a first vital step for the improvement of the cooperation with riparian states. But it seems that there is a long way for water cooperation between riparian states in the region. Building up cooperation on the nonpolitical, technical aspects of water is the most promising starting point for any eventual bilateral or regional framework of cooperation. Information sharing and building technical capacities would contribute to regional trust building and lay a foundation for regional cooperation on other policy issues as well.

There is unprecedented interest from the international community for Afghanistan's development, including considerable aid packages for the water sector. The international community efforts in a regional context, rather than a merely national context would be more important for Afghanistan's water development.

The international community should look beyond merely national realities and incorporate regional water strategies into political and development agendas. The country needs for urgent investment in capacity development and data collection which an area where the international community has much to contribute. Programs such as those provided by USAID developing water resource administration and governance provide education and support to those who might be able to negotiate international water agreements that will make a difference in stabilizing the region.

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