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Abstract

The Persian Gulf has faced water insecurity for decades, with Iran witnessing severe water scarcity and droughts in recent years. This water shortage has forced Iranians to migrate to water-rich regions of the country, abandon their livelihoods such as fishing and agriculture in search of occupations that do not rely on water availability, and protest for their water rights. Rapid water depletion from rivers has also placed pressure on the Iranian government politically, economically, and socially, to look for alternative ways to acquire sustainable sources of water. One such major transboundary river that is facing reduced water influx is the Helmand River which originates in Afghanistan and drains into the Sistan-Baluchestan province of Iran. Employing qualitative methodology, this paper analyses the reasons behind the low water table in the Helmand River, ways it is deteriorating Iran-Afghanistan diplomatic relations, and how it is impacting the people of the Sistan-Baluchestan province. Moreover, Iran's efforts to combat the issue of countrywide water scarcity and how sanctions and diplomatic isolation bar

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the country from adopting sustainable sources of water is discussed. Lastly, recommendations on how Iran can tackle this grave issue of water scarcity are provided.

Keywords: *Water scarcity, Helmand River, Iran-Afghanistan relations, Helmand Water treaty, Climate Change.*

Introduction

Looking back at history, it is evident that empires were established and flourished alongside water sources, allowing trade, facilitation of agriculture, and steady supply of water for population use. The same holds true in the modern era. However, as of 2024, the United Nations' *World Water Development Report 2024* stated that nearly half of the world's population faces severe water scarcity for part of the year, with a quarter of the world's population facing high levels of water stress.[1] It further recognised Iran as a country facing "extreme water stress."[2] With groundwater depletion, mismanagement of water resources, construction of unwarranted dams and the surge in population, it is estimated that the Iran's renewable water resources might halve by 2041, resulting in per capita water availability to drop below 500 cubic meters or levels of absolute scarcity.[3] In this context, the Helmand River is of utmost importance to address Iran's water needs, particularly for its eastern provinces.

The Helmand River: Geographical Positioning and Importance

The Helmand River, spanning 1300 kilometres (km), originates from the Hindu Kush Mountains in Afghanistan, becoming the longest river in the country, moves southwards and then empties into lakes and wetlands in southeastern Iran. The

river covers 40 per cent of Afghanistan, irrigating the Helmand, Kandahar, Nimruz and Farah provinces.[4] After draining the entire southwestern part of Afghanistan, the river turns its course northwards at the Afghan city of Zaranj. It then bifurcates into two with one waterway making up the Iran-Afghan border for 55km and then draining into the transboundary Hamoun wetlands, particularly the Hamoun-e-Helmand (a freshwater lake in the Iranian Sistan-Baluchestan Plateau).[5] The second bifurcated waterway of the Helmand River moves southwards, falling into the Hamoun-e-Sabari Lake (also part of the transboundary Hamoun wetlands). From these two lakes which act as natural reservoirs, the water then flows further into the Sistan-Baluchestan province where it is the biggest source of drinking water, water for domestic use, agriculture, and industry. Therefore, Iran's second largest province's drinking water is significantly reliant on transboundary water that flows via the Helmand River.

Regulatory Framework for Helmand River Water Allocation

In order to fairly allocate water flowing in the Helmand River, both Afghanistan and Iran decided to formulate the Helmand Water treaty in 1973 which sets down empirical amounts of water per cubic meters to be shared between the two countries. According to the treaty, Afghanistan is to supply 22 cubic meters of water per second to Iran with an additional 4 cubic meters per second if it wishes to do so, as a sign of 'goodwill' and 'brotherly relations'.[6] The water is to be delivered to Iran at three points – at the boundary line of the Sistan river, and between boundary pillars 51 and 52 of the Helmand River.

Afghanistan needs to ensure that the water being supplied to Iran is fit for agricultural and domestic use after being treated. Moreover, in months such as February and March when there is additional flow of water due to rainfall, Iran is to make no claims on the excess water other than the amount already specified in the treaty. Furthermore, according to protocol 1 of Article 5 of the treaty, both countries are to appoint commissioners to oversee fair allocation of water, with the Iranian commissioner having access to water measurements at the Afghan city of Dehrawud during low flow years.[7] However, in recent years, contentions have exacerbated between Afghanistan and Iran regarding the Helmand River water allocation leading to souring of bilateral diplomatic relations.

Geopolitical Landscape of the Helmand River

Before delving into the tensions surrounding the Helmand River, it is important to note that despite having an influx of 75 billion cubic meters of water annually, Afghanistan is still a water scarce country due to poor water storage capacity.[8] Years of conflict in the country has resulted in less attention being paid to developing Afghanistan's water storage infrastructure, leading to unregulated flow of water from its river basins downstream to Iran, Pakistan, Uzbekistan and Turkmenistan. Since 2021, however, Afghanistan has begun construction of dams such as the Kamal Khan and Kajaki dam on the Helmand River and its tributaries to solve the country's agricultural and infrastructural challenges. Iran, on the other hand, has argued that construction of such dams will reduce the flow of water and cause

environmental damage to the transboundary Hamoun wetlands and the water flowing into the Sistan-Baluchestan province.

In 2021, at the inauguration of Kamal Khan dam, the then President Ashraf Ghani announced that "Afghanistan will not give free water to anyone" and that "in exchange for excess water Iran would have to provide oil to Afghanistan."[9] Six months later, after the Afghan Taliban takeover, the then Iranian foreign minister Hossein Amir Abdollahian warned his counterpart, Afghanistan's Amir Khan Muttaqi that continuing construction of dams and preventing Iran from its rightful access to water will "strain an already splintered relationship."[10] Moreover, the former Iranian President Ebrahim Raisi, on a visit to the drought stricken Sistan-Baluchestan province in May 2023, warned the *de facto* Taliban regime that they should take the issue of "Iran's water rights seriously", harsh words that provoked displeasure from the Taliban regime.[11] Iran also suggested that a joint technical team as stipulated under the 1973 treaty should verify the Taliban's claims of water shortage on the Helmand River to justify low flow of water downstream.

The crux of the matter is that while Iran claims that it is now only receiving 4 per cent of the water originally mandated under the 1973 treaty, independent fact-finding reports suggest that Iran has been receiving 40 per cent more water than its agreed water rights, mainly due to Afghanistan's poor water storage capacity.[12] Since the 1980s, the country has also been constructing the Chah Nimeh reservoirs to increase overall water storage capacity to twice its share under the treaty.[13] Moreover, under legal interpretations of the 1973 treaty, the treaty does not bar Afghanistan from building dams on the Helmand River to divert or restrict the remaining waters, on which Afghanistan has

unilateral rights. Therefore, after the mandated 22 cubic meters of water supplied to Iran, Afghanistan holds the right to implement hydroelectric, agricultural, and reservoir projects on the remaining waters of the Helmand River. Despite this, tensions have soared between both countries on water allocation culminating in deadly border clashes in 2023 in which at least two Iranian and one Afghan guard lost their lives.[14]

Climate Change and Water Shortages in the Helmand River: Impacts on Iran

The building of dams on the Helmand River upstream by Afghanistan coupled with soaring temperatures and high winds starting in the region from May each year, have led to the drying up of the Hamoun wetlands which have shrunk by more than 90 per cent since 1999.[15] Moreover, high temperatures cause approximately 250 to 300 million cubic meters of water per year to evaporate from the already water scarce Hamoun wetlands and Chah Nimeh reservoirs.[16] This has led to widespread droughts and desertification of the arid Sistan-Baluchestan province which is subsequently leading to prolongation of violent dust storms known as the 'wind of 120 days.'[17] These sandstorms coupled with greenhouse gas emissions have increased the instances of respiratory problems amongst the inhabitants of the Sistan-Baluchestan province, with the World Health Organisation ranking the provincial hub, Zabol, as the world's most polluted city.[18] Mismanagement of water resources and the lack of attention by the Iranian government to construct water storage infrastructure like reservoirs in the province has led to a water shortage of 6.5 million cubic meters per year and approximately 90 per cent of the region suffering from drought.[19] The lowering

of the water table has also led to ground collapse and land subsidence, endangering power lines, railroads, and pipelines. The impacts of climate change are compounded by the reduced water flow in the Helmand River, leading to water bankruptcy and forcing residents of the province to seek alternative livelihoods away from popularised agriculture. Some experts have gone so far as to term the province as suffering from a 'socio-economic drought'.[20]

As another consequence of climate change, the country has been facing extreme weather conditions. Prolonged period of droughts in the country, primarily the Sistan-Baluchestan province was alternated by periods of massive flooding this year owing to heavy rainfall. Due to the absence of storage facilities in the remote province, water flowed downstream into the Arabian Sea instead of being retained for local use. Such extreme weather conditions have caused approximately 10,000 households to migrate from Zabol in the Sistan-Baluchestan province towards northern cities such as Tehran. According to Iranian Environment Agency statistics published in May 2024, the number of climate refugees within Iran has risen by 800,000 in the last two years alone.[21] This migration, induced by climate and water shortage, is likely to increase the economic and social strain on Iranian vegetation-rich provinces such as the Gilan and Mazandaran province close to the Caspian Sea. With nearly 97 per cent of the country experiencing drought, Iran would also have to look for alternatives to agricultural practices, further economically taxing its already fledgling economy as the demand for food rises and Iran is forced to import it from allies. It is important to note that water scarcity would also mean less water available for industrial operations and manufacturing processes, reducing production

capacity and generation of economic wealth. Increased competition for scarce resources such as food and water could also lead to inter-community conflict in the country as well. Massive protests have already erupted in the past year over water scarcity throughout the country, known as the 'uprising of the thirsty',[22] with inhabitants of the Sistan-Baluchestan province demanding compensation for agricultural and livestock damage from the Iranian government. The Iranian government has also been accused of paying less attention to the development of the Sunni majority Sistan-Baluchestan province; any further aggravation of the water crisis could risk eruption of sectarian based violence in the country. Such internal violence is something that Iran cannot afford at this time as it navigates its political setup after the death of President Raisi and is engaged on multiple international fronts both directly and via proxies owing to the Israeli genocide in Gaza. Lastly, the biggest threat that could emerge from this water crisis is escalation of tensions between Iran and Afghanistan leading to a full-scale conflict. Such an outcome is not in the interest of either country, primarily due to the economic and human losses it would entail and also due to the diplomatic standings of both countries on the world stage. As a *de facto* regime, the Afghan Taliban government still stands to be recognised by states and the United Nations. Similarly, Iran has been under economic sanctions and diplomatic isolation since 1979. Hence, a conflict between the two countries may not necessitate direct intervention from major powers like the US or European powers to reduce tensions. China and Russia, as allies of Iran and Afghanistan, dealing with their own domestic issues and policy priorities (such as the Russia-Ukraine War in Russia's case), might also be limited in their ability to actively intervene.

Iran's Efforts in Combating Water Scarcity

In order to address the depleting water crisis after the Iranian Revolution of 1979, Iran under the leadership of then President Akbar Hashemi Rafsanjani went on a rigorous dam construction spree. Impressed by the Chinese Premier Deng Xiaoping's mega dam projects, Rafsanjani commissioned the Sepasad arm of the Khatam Al-Anbiya construction firm to begin building dams throughout the country.[23] Khatam Al-Anbiya itself was affiliated with Iran's Revolutionary Guard Corps (IRGC), it had formulated during the 1980-88 Iran-Iraq War as an engineering corps to build bridges, trenches, and roads for the Iranian militia and guards fighting the war. After the war, the Iranian supreme leader Ayatollah Ali Khamenei ordered the creation of an IRGC construction firm to oversee the massive development projects taking place and hence the IRGC engineering Corp was remodelled into the Khatam Al Anbiya construction company. In 1992, the Sepasad arm of Khatam Al Anbiya was founded and was solely responsible for overseeing dam construction such as the Gotvand and Karkeh dams in the southwestern province of Khuzestan.[24] These dams were created to help preserve enough water for addressing Iran's water needs. However, Al Anbiya, in collaboration with the Iran Water and Power Resources Development Company (IWPC), Iran's Energy Ministry, executives, engineers, policymakers, and IRGC members, gradually formed a 'water mafia' of sorts.[25] The main purpose of this mafia then became to take up multimillion dollar dam construction projects even in areas of Iran where dams were not required, to ensure cash influx. This water mafia is also not liable to any auditing of its projects which means that the cost of dam construction can increase two-fold owing to corruption; as an example, the cost of

constructing the Gotvand Dam increased from $1.5 billion to a whopping $3.3 billion.[26]

Another effect of the emergence of the water mafia is the construction of dams in regions that geological experts had previously advised against, as doing so could worsen water shortages, salinity, and droughts. Take the case of the Gotvand Dam on the Karun River: despite major warnings by geological experts that building the dam would mean that a multimillion-ton mass of salt outcrop on the Karun River would become part of the reservoir, construction went ahead.[27] As a consequence, salt from the outcrop dissolved into the reservoir, and the reservoir became full of brine and nearby sewage which then resulted in the government spending millions of dollars to eliminate the brine to no avail. Currently, Gotvand Dam is responsible for 25 per cent of pollution on the Karun River, and salinity in the river has resulted in destabilising the surrounding biodiversity and ecosystem. Moreover, the freshwater table has gone down, leading to major droughts in Khuzestan and protests throughout the province over water scarcity.[28]

Despite this major water mismanagement, Iran has undertaken some significant steps in a positive direction too. Iran is now implementing a policy of desalination and transferring of water from the Persian Gulf inland into central provinces such as Hormozgan, Kerman, South Khorasan, Khorasan Razavi, and Yazd.[29] This elaborate $285 billion water transfer plan set to be completed by 2025 consists of four primary lines of water supply, a large number of desalination plants, and water pumping stations.[30] However, despite these efforts it is important for the Iranian government to look towards sustainable and long-term sources of water sustenance, such as the development of water

saving technologies like smart water meters, recycling of wastewater, and an integrated water resource management system. Moreover, it is important to ensure that water is not only supplied to the more industrialised central provinces, but also to the border regions like Sistan-Baluchestan.

Sanctions: Hindrance in Iran's Water Scarcity Solutions

The United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by 198 parties, declares that "developed country Parties […] shall […] assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects."[31] However, owing to Iran's international isolation and the imposition of sanctions by the West, Iran is unable to seek financial aid and technical assistance from other nations for projects addressing climate change and water shortages. Iran is also not party to the Paris Agreement, which is a multilateral agreement involving commitments from nearly all countries to reduce greenhouse gas emissions, adapt to climate change impacts and limit global warming by keeping it below 1.5 degrees Celsius. Iran has openly said that its signing and ratification of the Paris Agreement is conditional on the lifting of economic sanctions.[32] It is however important to note that in the absence of sanctions due to the Joint Comprehensive Plan of Action (JCPOA) from 2015 to 2018, Iran did invest in renewable energy resources and climate change mitigation technologies and introduced a number of policies in this regard. Examples include the 'National Strategic Plan on Climate Change' which laid out Iran's strategy for climate change mitigation, water

management, sustainable agriculture etc., and the 'Iran National Communication (NC)' policy in collaboration with the UNFCCC which directed the construction of climate resilient infrastructure, fossil fuel divestment projects, and sustainable water sourcing methods.[33] These significant headways then reached a lull after the unilateral scrapping off of the JCPOA and the reimposition of sanctions. Currently, Iran's 2023 bill of the 'Seventh Five Year Development Plan' which serves as a guideline for policy developments and budget allocation does not include any measures to instil climate mitigation policies.[34] Solely relying on ways Iran can address its economic challenges, this plan is a testament to the fact that the need for survival and being forced to pursue autarky has resulted in the shifting of Iran's priorities from addressing the impacts of climate change and water shortage to the pressing issues of its fledgling economy.

Conclusion

It is imperative that Iran follows a two-pronged approach to address its water scarcity. Firstly, Iran and Afghanistan both need to ensure strict adherence to the 1973 Helmand River treaty. Implementation of data sharing from hydrometric stations needs to be ensured by the overseeing Afghan water commissioner at the Dehrawud Hydrometric station to the Iranian water commissioner on demand. So far this data sharing has not been implemented. Moreover, under the treaty where only Afghanistan is liable to share hydrometric data of water discharge, a mechanism needs to be ensured that Iran too is bound to share quantitative data of water influx through the Helmand River into the country. Such two-way sharing of hydrometric data would help quell the grievances of both Iran

and Afghanistan, where Iran blames Afghanistan for purposefully stalling the flow of water and Afghanistan blaming Iran for taking in a greater share of water than it was mandated under the treaty.

Secondly, on a unilateral basis, it is important that Iran invests in water infrastructure development especially in drought prone provinces such as Sistan-Baluchestan. This could include the construction of dams, water reservoirs, and pipelines. Iran should also look for other water procurement alternatives such as employing the use of desalination plants and rainwater harvesting systems to ensure year-round supply of water. Addressing the country's water crisis should be on the top agenda of the incoming Iranian President. Simultaneously, Iran and Afghanistan should respect and address each other's concerns over water sharing on the Helmand River, as it is an important water source for both countries. Active diplomatic engagement and negotiations on the Helmand River issue is essential to ensure the livelihood and survival of each country's inhabitants and to prevent souring of relations and escalation of tensions between the two.

Conclusively, lifting or easing of sanctions on Iran would also go a long way in helping the country come out of its economic conundrum and be able to collaborate with other nations to build water storage capacities and climate resilient infrastructure. Iran itself also needs to demonstrate continued political will to address its water scarcity, impose auditing and monitoring mechanisms on its water development and construction authorities, advocate for unbiased construction of water management capacities in all the provinces and opt for long term sustainable projects. Only then would Iran be able to

address its water shortage crisis and fulfil its growing population's water needs.

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