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Research Article

Hydropolitical analysis of Iran-Afghanistan tensions in the Hirmand River basin with a non-binary material/discourse method

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Abstract

Water constitutes a vital source of power, and its scarcity represents a highly strategic concern with profound implications for the social and economic development of societies—thereby posing a potential threat to their political stability and authority. Among the international rivers whose allocation has generated hydropolitical tensions, the Hirmand (Helmand) River stands out as a central case, representing the most significant factor in the ongoing disputes between Iran and Afghanistan. The shortage of water in shared river basins tends to politicize water resources, transforming environmental scarcity into arenas of political contention. Within this context, hydropolitics provides a conceptual framework for understanding both cooperation and conflict among riparian states, particularly in the pursuit of optimized transboundary water governance. Accordingly, this research adopts the TWINS (Transboundary Waters Interaction Nexus) framework, which approaches cross-border water relations through a constructivist lens, focusing on how identities of friendship and enmity, as well as dynamics of cooperation and conflict, are continually redefined. The central objective of this study is to analyze the hydropolitical relationship between Iran and Afghanistan concerning the Hirmand River through an integrated material–discursive methodology. This dual approach allows us, first, to examine the natural and geographical factors influencing the hydropolitics of the Hirmand, and second, to investigate the discursive practices, narratives, and political techniques that shape perceptions and actions regarding the river. By combining these perspectives, the study seeks to offer a comprehensive and multi-dimensional understanding of the hydropolitical dynamics underlying Iran–Afghanistan relations over the Hirmand River.

Keywords: Iran, Afghanistan, Water Tension, Water Policy, Hirmand river.

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Introduction

In the coming decades, freshwater scarcity is expected to become one of the most critical global challenges (Elhance and Ascher, 2000). As a resource becomes scarcer, competition over its distribution tends to intensify, heightening the potential for conflict and violence among nations (Jankielsohn, 2018). Water, therefore, holds exceptional conflict-generating potential, particularly in transboundary contexts where multiple states depend on the same basin. In such cases, hydropolitical "language games" emerge, shaping competing narratives and contested imaginaries over access and control. Given water's variable and unpredictable behavior, countries sharing a common source often seek to maximize their usage, sometimes at the expense of other riparian states' rights. These dynamics can escalate tensions, fuel hydropolitical rhetoric, or, conversely, compel adversaries toward negotiation and cooperation (Ettehad, 2010; Ahmadi et al, 2023; Noorali et al, 2025b). The Middle East exemplifies this pattern, as water politics remain inseparable from broader political struggles. As Allan (2001) aptly notes, one cannot understand the region's water crises without understanding its politics. Within this context, Afghanistan faces persistent hydropolitical challenges with its neighbors, as it serves as the source of several transboundary rivers (Ahmadzai, 2016). Among them, the Hirmand (Helmand) River (Fig. 1) stands as the primary source of dispute between Iran and Afghanistan (Khosravi and Raispour, 2012). Although the two countries lack major territorial conflicts, their enduring disagreement over Hirmand water allocation poses a significant strain on bilateral relations. Both sides continue to suffer from drought, climate change, and poor water management, which amplify the river's hydropolitical sensitivity (Aman, 2016).

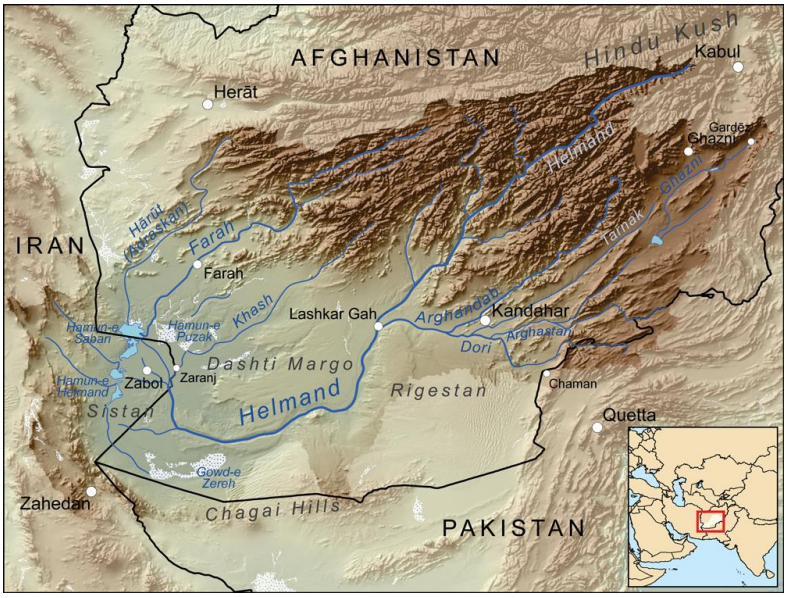

Fig. 1: Location of the Transboundary Hirmand River

The Hirmand (Helmand) River drains nearly half of southern Afghanistan (Zhong et al, 2009) and provides about 80 percent of the water sustaining the arid lands of Sistan (Whitney, 2006). As Afghanistan's longest river, stretching approximately 1,300 km (800 miles), it originates in the Hindu Kush Mountains, around 40 km west of Kabul and north of the Onai Pass. Flowing through the Upper Hirmand watershed, the river travels roughly 500 km to the Kajaki Reservoir and continues another 610 km before reaching the Sistan Delta along the Iran–Afghanistan border (Vuyovich and Jacobs, 2011). This deltaic wetland system comprises several interconnected lakes: three according to Aman (2016), or four according to other sources (Shahbazbegian et al, 2016; Dehgan et al, 2014). These include Hamun Hirmand, located entirely within Iran (Aman, 2016; Ahmadi et al, 2024); Hamun Saberi and Hamun Bringak, which straddle the border (Shahbazbegian et al, 2016); and Hamun Puzak, situated mostly in Afghanistan. All of these wetlands are fed primarily by the Hirmand River (Aman, 2016). Iran, as the downstream riparian, depends

almost entirely, nearly 100 percent, on Hirmand's waters to sustain the Sistan region (Soltani and Karbasi, 2002). Because the river's headwaters and about 95 percent of its course lie within Afghan territory, Afghanistan enjoys a geopolitical advantage in controlling its flow (Hafeznia et al, 2006). Although the international boundary between Iran and Afghanistan, marked along the river's main channel, is mutually recognized, the issues of water allocation, usage rights in the delta, and related hydropolitical arrangements remain unresolved (Soltani and Karbasi, 2002). Recurrent droughts and the reduced discharge from the Hirmand headwaters, exacerbated by the construction of canals, reservoirs, and diversion dams in Afghanistan, have significantly curtailed the river's flow into Sistan. These interventions, especially during dry periods, have led to the shrinkage of the Hamun wetlands and intensified Sistan's water scarcity, prompting large-scale outmigration from the region (Hafeznia et al, 2006). Accordingly, this research aims to analyze both the material and discursive dimensions of water-related tensions between Iran and Afghanistan within the Hirmand River Basin. In this framework, power is understood not only through its material manifestations, control, infrastructure, and unequal outcomes, but also through the discourses, perceptions, and meanings that shape and legitimize these hydropolitical realities.

TWINS Framework for Hydropolitics

The TWINS (Transboundary Waters Interaction Nexus) framework employs a constructivist perspective to analyze transboundary water relations, focusing on the dynamic identities of friendship and enmity, cooperation and conflict (Nagheeby and Warner, 2022). From this standpoint, current realities are inseparable from their historical trajectories, as the past continually shapes and informs the present. The TWINS approach views state interactions as reality-producing processes, emphasizing that such interactions are not static, but constantly evolving within and in response to broader political contexts (ibid). Accordingly, this framework places "friendship and enmity," "cooperation and conflict," and both "material and discursive processes" on the analytical agenda. Within this view, water functions simultaneously as a tangible, geographical resource that materially affects basin politics, and as a discursive construct employed to legitimize political behaviors and policies concerning rivers and water resources. Thus, speech acts and language games become key analytical tools to trace the evolution and social construction of hydropolitical relations and the hegemonic discourses shaping a river basin. Hydropolitics, in this sense, encompasses both positive interactions (cooperation) and negative interactions (conflict) over water resources. In recent decades, as water challenges have intensified globally, scholars have increasingly aligned with either the "water war" or "water cooperation" schools of thought. The water war paradigm emerged prominently during the 1980s and 1990s, an era marked by the end of the bipolar international order (Baranyai, 2020). This perspective holds that water, as a vital and limited resource essential to human, economic, and environmental needs, naturally becomes a site of competition (Uitto and Duda, 2002; Dolatyar, 2014). In 1995, Ismail Serageldin, then Vice President of the World Bank, famously warned that "if the wars of this century were fought over oil, the wars of the next century will be fought over water" (Ettehad, 2009). The sentiment was echoed in a full-page New York Times headline on December 6, 1999, declaring, "The next war will be over water," an ad sponsored by several international organizations (Dinar, 2000). Homer-Dixon (1994, 1996) similarly argued that future conflicts and civil unrest are likely to stem from resource scarcities, notably of freshwater, farmland, forests, and fisheries, and that water scarcity is closely tied to patterns of violence in key regions across the globe (O'Tuathail et al, 1998). In line with this, Swain (2001) predicts that as freshwater scarcity intensifies, future inter-state conflicts will likely center on the division of international rivers. According to Gleick (1993), there is a consistent relationship between water and violence, wherein water functions not as the cause of war but as its tool, target, or victim. Throughout history, states have instrumentalized water as part of their territorial and military strategies. For instance, in 1940, the Netherlands deliberately flooded the Gelderze Valley to halt advancing German troops, and in 1941, during Germany's offensive on the Eastern Front, the Irpin River near Kyiv was transformed into a defensive

barrier (Gleick et al, 2023; Gleick et al, 2009). The dominance of the "water wars" thesis in the 1980s and 1990s subsequently led to a shift in hydropolitical scholarship toward examining the cooperative potential of international rivers. A broad body of qualitative research shows that, globally, cooperation rather than conflict tends to characterize transboundary water relations (Baranyai, 2020). Reflecting this cooperative school, Ray et al. (2016) define hydropolitics in terms of the capacity of geopolitical institutions to manage shared water resources sustainably and peacefully, emphasizing processes that minimize tension (Rai, 2017). In contrast to conflict-oriented perspectives, Scott Moore (2018) notes that no large-scale "water war" has yet occurred and that most international water disputes have been resolved through diplomatic and institutional mechanisms, aided by global and regional organizations (Chase, 2019). The establishment of the International Centre for Water Cooperation (SIWI, 2020) exemplifies this institutional commitment, bringing together policymakers, academics, and experts to reduce conflict and foster economic growth through collaborative water governance. More recently, scholars have sought to bridge the divide between the conflict and cooperation schools. This emerging approach acknowledges that water relations are inherently complex, and that conflict and cooperation can coexist within the same hydropolitical dynamics (Baranyai, 2020; Turton, 2002). Accordingly, hydropolitics should not be narrowly defined as either rivalry or harmony; water is rarely the sole cause of disputes, but it can amplify preexisting tensions and thus must be analyzed within the broader continuum of war and peace (Wolf et al, 2005). Recent interdisciplinary scholarship, particularly within geography, has advanced the notion of critical hydropolitics to move beyond traditional analyses that treat water primarily as an arena of state-centered conflict and cooperation. Instead, this approach interrogates the political, epistemological, and ethical foundations of mainstream hydropolitical thinking (Rogers et al, 2023). The term "critical" denotes an intellectual stance that challenges dominant assumptions about water governance and foregrounds questions of social and environmental justice. According to Sneddon and Fox (2006), critical hydropolitics operates on three interlinked levels. First, it examines how discursive strategies, such as the 1995 Mekong Agreement, function as instruments of power that codify particular representations of river basins (e.g., as cooperative or transnational spaces) within international regimes. Second, it exposes sites of contestation, for instance, the Pak Mun Dam, where political-economic networks, discursive narratives, and ecohydrological processes intersect and operate beyond the rigid scales of the "transnational basin." Finally, it opens up alternative imaginaries of river systems, challenging their fixed geopolitical and institutional framings. In this framework, discursive processes related to water extend beyond language: they manifest through symbols, imagery, rituals, and physical practices that communicate meaning and power (Nagheeby and Warner, 2022). Thus, an assertive speech act may take the form of inaugurating a dam; a directive act, the obstruction of water flow; and a commissive act, the signing of treaties or joint agreements. Our critical hydropolitics integrates discourse analysis, including studies of language games, otherness, representation, and imagination, with the material realities of rivers, dams, and territorial practices. This synthesis reveals how power relations and conflicts are materialized through the interplay between discourse and physical infrastructures, underscoring that hydropolitical realities are co-constituted by both meaning and matter. Accordingly, the methodological approach adopted here seeks to bridge the binary divide between classical (state- and resource-focused) and critical (discourse- and justice-oriented) strands of hydro(geo)politics by interweaving discursive and material levels of analysis into a single, cohesive analytical framework.

Materials and Methods

Methodology

In line with Hardy and Thomas's (2014) call for more integrative approaches, recent geopolitical and hydropolitical analyses of power and conflict, such as those by Flint and Noorali (2024) and Dodds et al. (2023), transcend the traditional dichotomy between realist and idealist frameworks within classical and critical geopolitics. These works conceptualize war and peace as both a material and discursive process, offering a theoretical bridge between classical and critical schools.

This synthesis enables a geopolitical understanding of space as simultaneously objective and subjective (Fard, 2021). Accordingly, geopolitics is interpreted not merely as a material reality but also as a representational and discursive practice, one that recognizes the intertwined significance of materiality and language in shaping global political geographies (Sharp, 2020; Medby, 2021). From this perspective, the language games of political elites play a crucial role in constructing societal and global geographical imaginations (Noorali, 2024), generating a vertical layer of meaning that legitimizes physical actions upon land and water. On a material level, such discursive practices can manifest in the enforcement of territorial sovereignty, for instance, the annexation of an independent state's territory by another, and the subsequent assertion of sovereign control (Dodds et al, 2023). A persistent example of this logic is found in Henry Kissinger's realist conception of geopolitics as an arena of great-power competition, a calculated chess game aimed at advancing material interests through cool strategic rationality (O'Tuathail, 2017). Hence, classical geopolitics, rooted in realism, emphasizes the geographical foundations of global power and strategy, where natural elements such as water are treated primarily as physical resources influencing political and military outcomes (Noorali et al, 2022; Dinar et al, 2012; Mahlakeng, 2019; Homer-Dixon, 1994, 1996). Conversely, the idealist and poststructuralist approaches challenge this material determinism, advancing an ontology centered on mental worlds and an epistemology that seeks to deconstruct the hegemonic spatial imaginaries embedded within geopolitical discourse (Ó Tuathail, 1996; Ó Tuathail and Agnew, 1992). These approaches explore how power operates through language and representation. For instance, in the Russian–Ukrainian context, the geopolitical imagination shaped by leaders and their discursive "language games" employs mechanisms of Othering to construct a binary opposition between "our space" and "their space" (Dodds et al, 2023). Competing actors thus produce diverse narratives and identities that either valorize or demonize groups and justify actions, illustrated by Putin's invocation of a righteous 'Great Russia', reinforced by state-controlled media, contrasted with Joe Biden and Volodymyr Zelensky's depiction of the war as a "civilizational struggle" between liberal democracy and authoritarian despotism (Dodds et al, 2023). Together, such narratives generate the mental maps, affective investments, and redemptive stories that guide elite decision-making and shape geopolitical culture (Specter, 2023; Noorali and Mamadouh, 2025). These cultures foster distinctive spatial identities, defining how states perceive their global role and mission (O'Tuathail, 2017). Within this framework, emerging perspectives on the geopolitics of water highlight the need to engage with discursive, story-based, and place-rooted narratives surrounding rivers and water resources. Such narratives are often intertwined with a nation's historical memory and cultural imagination of space (see Bartel et al, 2018; Sneddon and Fox, 2006; Rogers et al, 2023). Therefore, rivers can be sources of geopolitical power in terms of interstate relations (Friedman and Fedirka, 2017) or sources of geopolitical imaginaries linked to collective historical memory (Suslov et al, 2020; Noorali et al, 2025a-b). Our focus point in the analysis of water conflicts between Iran and Afghanistan is from both material and discursive dimensions so that we can provide a more comprehensive hydropolitical analysis in the context of this river.

The Material Resources: Environmental Factors Affecting Hirmand Hydropolitics

- *Climate*

Climate is one of the environmental factors affecting the hydropolitics of Hirmand. The climate of the Hirmand Basin is "hyperarid", except at the edges of the basin which is "dry" (Whitney, 2006). Due to its climate, this basin suffers from successive droughts and floods (Ettehad, 2010). Hirmand Basin, especially in the lower part, shows the characteristics of continental deserts: The basin is located at a great distance from moisture sources and is surrounded by mountains that prevent the invasion of many humid air masses (Whitney, 2006). This arid climate region is the result of worldwide air circulation patterns that produce high-pressure semi-permanent cells (Hadley cells) in the general tropical region (Whitney, 2006).

2- *Rainfall*

Rainfall is another factor affecting the entire basin. The average annual rainfall in the Upper Hirmand Basin is estimated at 350 mm, while

in the lower parts of the basin, it gradually decreases (Ettehad, 2010); In most of the basin downstream of the Hirmand River, the average rainfall is about 75 mm per year (Whitney, 2006). In Sistan Basin (the lowest part of the basin) this feature is about 55 mm, which is one fifth of the average rainfall in the country (Ettehad, 2010). It is estimated that 70% of precipitation falls as snow and peak runoff occurs with snowmelt in April (Goes et al, 2015). Most rainfall occurs in the winter months (December, January, February and March) (Alami and Tayfur, 2017). Chagai, Sultan, Sindak and Kacha mountains are a barrier to monsoon rains in the Hirmand Basin (Whitney, 2006). Therefore, the very low rainfall downstream (Iranian part) causes the migration of Sistan residents to other parts of the country and changes the human geography of the destination.

- *Temperature*

Another influential environmental factor is the temperature of the basin. The maximum temperature of the Hirmand Basin in summer occurs in the lowest part of the Hirmand Basin, the Sistan Delta, where temperatures above 50° C are recorded (Ettehad, 2010). The average air temperature downstream of Hirmand Basin is generally 27 ° C (Beaumon, et al, 1976) and at the end of the basin in Sistan, the average annual temperature is about 21.8 ° C. Accordingly, Sistan is classified as a very hot and dry region (Ettehad, 2010). Whitney refers to Sir Frederick Goldsmith (1876)'s visit to the Hirmand Delta, which he described as the "most disgusting" place on earth because of the hot climate (Ettehad, 2010; Whitney, 2006).

- *Vegetation*

Vegetation is another environmental factor affecting Hirmand hydropolitics. Desert vegetation in the plains of the Hirmand Basin is limited to small depressions and areas where local runoff accumulates. The growing season of plants in Hirmand Basin, on average, is only about 270 days a year, which is generally very short and cold for tropical and subtropical vegetation. This is so that in 1970, only two small date palms were observed in the Hirmand Valley (Whitney, 2006). Vegetation can be seen in different ways in the fields, forests, and deserts of this region. Usually, the cover in the deserts is in the form of bushes that grow as scattered islands and the land in the distance between them is bare and without plants (Mehrafarin and Seyed Sajjadi, 2005). Recent droughts in the Sistan Plain, as the outlet of the Hirmand Basin, where most of the hydropolitical differences between Iran and Afghanistan are over the dryness of the region's wetlands and the resulting problems, have led to a significant reduction in vegetation (Seluki and Nouri Nohad, 2019, Ahmadi et al, 2012). Therefore, the vegetation of the pastures around the wetland is often poor and due to natural conditions, especially climate, and soil, only halophyte and xerophyte species grow in these lands (Malakootian, 2008).

- *Evaporation*

Evaporation is another factor. The Hirmand river basin, due to its arid climate, air temperature of more than 50 degrees in some parts of the basin (especially downstream areas), etc., has a very high rate of evaporation. This factor adds to the region's water scarcity for widespread politico-environmental reasons. So that some of the highest evaporation rates in the world have been recorded in the downstream basin of the Hirmand River (Evenstar et al, 2018). Evaporation on the Iranian side of the basin is about 4800 mm per year, which is twice the average annual evaporation of this country. In summer, evapotranspiration in Sistan is about 700 mm higher than the lower Arghandab area in the upper part of the Hirmand Basin in Afghanistan, which has serious effects on the water needs of crops (Ettehad, 2010).

- *Floods*

A sudden rise in temperature in a year with heavy snowfall, or a sudden warming with a large rainfall event in the upper drainage basin can cause very large floods in the Hirmand Valley and the delta (Whitney, 2006). Based on this, it can be said that a large area of Sistan region suffers a lot of damage during floods due to its very low slope (Bazrkar et al, 2013). The Sistan region, as the outlet of the Hirmand Basin, experienced many floods in 1957, 1982, 1991 and 1998. However, between 1999 and 2004, there was no inflow into the wetlands of Sistan province, which led to the loss of vegetation and the consequent virtual collapse of the ecosystem (Goes et al, 2015). In general, floods cause a lot of damage to residents and cause unemployment and migration on the one hand and bury some cities in the mud on the other hand (Bazrkar et al, 2013, Mehrafarin and Seyed Sajjadi, 2005).

- *Drought*

Another key factor influencing Hirmand's hydropolitics is drought. The Hirmand Basin has experienced extensive droughts for a variety of reasons, mostly environmental (Whitney, 2006). This has led Afghanistan upstream to refuse to grant water rights to Iran, which is located downstream of the Hirmand Basin. The country has intensified the drought in Sistan as the exit of Hirmand by constructing numerous dams and canals on the river. Occurrence of drought and reduced flow from Hirmand resources reduces Sistan inflow and water shortage in the Iranian region of Hirmand Basin (Bazrkar et al, 2013). The results of the research of Maleki and others show that despite the severe and long drought in the basin, the area upstream of the Hirmand basin remains under agricultural domination and has caused severe water stress in the downstream wetlands of Hamoun (Maleki, 2019). Accordingly, Sistan droughts, which are caused by water shortage or drought of Hirmand River, have repeatedly endangered the social and economic life of the region (Zia Tavana et al, 2010). Hirmand is faced with water shortage every two years and floods every 5 years (Khak-e-Sefidi and Nora, 2008). In Sistan region, almost every 10 years, a deadly drought (Ahmadi et al, 2012) has occurred during the years 1939-1949-1958-1970. After that, a drought in Sistan started from the 1997 crop year and since 2000, this region has been experiencing a severe drought, which is mostly of the hydraulic type (Khak-e-Sefidi and Nora, 2008). The recent drought period of 1998-2005 has created major famine conditions in the basin (Ettehad, 2010). In fact, from 1998 to early 2005, the Hirmand Basin experienced the longest drought in 175 years (Whitney, 2006). Along with war and severe political turmoil in recent decades, this five-year drought has created widespread famine that has affected 6 million people in central and southern Afghanistan (Whitney, 2006). Also, on the Iranian side of the basin as a river outlet, Hamoun Lakes have dried up almost completely during the drought period (Ettehad, 2010). Numerous droughts in the Hirmand Basin, especially in the Iranian part of the Basin in Sistan, occur in a situation where Afghanistan, as a superior country with a better geopolitical position than Iran, has always built diversion dams on Hirmand (Kaviani Rad, 2005).

- *Geomorphology*

Another environmental factor is the geomorphology of the basin. The Hirmand Basin is a structurally closed basin that began to form during the middle Tertiary as a consequence of the collision of several Gondwanaland fragments (Whitney, 2006). In fact, the formation of the Hirmand Basin shows a long tectonic history of interactions between continental plates and microplates. The Hirmand Basin is located in the micro-plate of Afghanistan, which is created by the collision of several micro-plates or microplates in the Mesozoic (Evenstar and et al, 2018). Aeromagnetic studies indicate the basin is 3–5 kilometers deep over basement rocks. Continued subsidence along basin-bounding faults in Iran and Pakistan throughout the Neogene has formed the Sistan depression in the southwest corner of the basin (Whitney, 2006). The main factors affecting the general shape of the Sistan plain as the outlet of the basin, the successive process of drought and moisture. These factors have created four terraces named Zabol, Nimroz, Ram Rud and Chaharbarjak at altitudes of 480 meters, 490 meters, 500 meters and 520 meters above sea level (Mehrafarin and Seyed Sajjadi, 2005). Also, the predominant geomorphological forms in Sistan plain, we can mention river barracks, sand dunes, natural pits (Chah-Nime), hamouns and the height of Khajeh hill (Alaei Taleghani, 2017, Badiei et al, 2011). These factors have a prominent role in intensifying the variability of the Hirmand riverbed (Badiei et al, 2011). In general, this geographical factor has a major impact on the political climate in the relations between the two countries over the Hirmand River.

- *Diversions*

Another environmental factor is the diversion of river. Arterial morphology, multi-tributary, longitudinal barriers in the middle of the riverbed, 120-day winds, thick alluvium, erodible layer and other environmental factors, have caused a sudden change in the direction of the Hirmand River (Varij Kazemi, 2021). The diversion of various routes of the Hirmand River in the past has had a tremendous economic, social and political impact on the lives of the people of Sistan and has led to the formation or destruction of many settlements in this region. At the same time, the continuation of the Hirmand River has played a vital role for

Sistan (Ebrahimzadeh et al, 2004). In general, different geological causes in changing the direction of Hirmand in the Sistan plain can be considered in the following three general categories: 1) erodability of alluvium; 2) type of sedimentation that is caused by the texture and type of soil in the area; 3) tectonic factors. Thus, the continuation of subsidence and the formation of thick alluvium in this area, in addition to preventing the formation of groundwater aquifers, has led to the change of various routes for this river (Badiei et al, 2011). The most important (geo-hydropolitical) consequences of changes in the morphology of the riverbed are: a) disputes between the two countries on the exact definition of the river boundary b) disputes between the two countries in determining the amount of water rights c) changes in the size and vast of the border (Badiei et al, 2011). Accordingly, the diversion of this transboundary river not only plays a role in political relations but also creates fundamental changes in the economic activities of this region, so the hydropolitics of the conflict between the two countries continues.

- *Winds*

Strong winds are one of the main factors affecting the climate of the basin. "120-day wind" is the most significant and frequent wind problem in the downstream basin of Hirmand (Whitney, 2006) and Sistan is one of the windiest deserts in the world (Bazrkar et al, 2013, Ettehad, 2010). A strong wind blows for 120 days each summer, scouring dry lakebeds and creating dune fields from annual flood deposits (Whitney, 2006). These winds start in June and last for 4 months until mid-September. The maximum wind speed is 120 km / h, which is reported in June and July. The harmful effects of wind are increasing evaporation from surface of reservoir and considerable soil, water losses during irrigation, soil erosion, soil particles accumulation in houses, water channels and water storage resources (for example, Chah-Nime), temperature increase, humidity decrease, lower fertilized agricultural fields (Bazrkar et al, 2013). These winds are stronger in Sistan than other areas of the basin and have significant effects on the landscape and life of local residents (Ettehad, 2010) and add to the water tensions between the two countries.

- *Erosion*

Another factor is erosion. Desert winds, which often reach storm strength (100-130 km / h), are a major cause of erosion and have created extensive cavities throughout the Lower Hirmand Basin (Evenstar et al, 2018). Wind erosion causes frequent canal changes in the Hirmand Delta (Whitney, 2006). The effect of erosion in changing the direction of Hirmand depends on the sequence of sediments in the region. In addition, water drainage inside the sand layer causes it to flow, which also facilitates erosion (Ebrahimzadeh et al, 2004). Natural factors and erosion of the river banks have also reduced the amount of water rights in Iran, which is specified in satellite images and is not considered in the treaties between the two countries. However, due to natural factors such as widespread droughts and erosion of rivers and riverbanks, and increased water abstraction inside Afghanistan, Sistan Iran has repeatedly suffered from severe water shortages and regional security and national security are at risk (Kamran, 2021). Therefore, various geological causes, including the ease of erosion and sedimentation, which depends on the texture and type of soil in the basin, and tectonic and human factors (Ebrahimzadeh et al, 2004), affect the hydropolitical fate of Hirmand between two neighboring countries.

- *Sedimentation*

Sedimentation is another influential environmental factor. By determining the route of the Hirmand watershed on the geological structure of Afghanistan, it was determined that the flow of secondary and major rivers on the geological structure consisting of andesite, basalt, limestone and dolomite, calcite, siltstone, Sandstone, schist, phyllite, granodiorite, conglomerate, andesitic tuff, shale, loess and sedimentary deposits are located (Jahan-Tigh, and Jahan-Tigh, 2019). Hirmand river downstream (Iranian parts) has a low slope and sedimentation is a dominant process in this river so with a few changes, the bed becomes unstable and the river decreases (Jahan-Tigh et al, 2019). The Hirmand River, which is the lifeblood of the Sistan region, annually carries a large volume of suspended sediments with it to the Sistan region and Hamoun Wetland, which are contaminated with some metallic and quasi-metallic elements. The environmental factor alone is not the cause of the production of elements in the suspended sediments of the Hirmand River, and human activities are also involved. Lack of development of Afghanistan and inadequacy of

their civil infrastructure in the transmission and treatment systems of industrial and human wastewater and the entry of this wastewater into the river are other factors affecting the production of these elements (Jahan-Tigh and Jahan-Tigh, 2019). Aeromagnetic studies show that there is a 3-5 km sedimentary overflow above the Precambrian crypt in the Sistan region as the outlet of the Hirmand Basin (Evenstar et al, 2018). Also, considering the high concentration of sediment load in Hirmand River and changes in the morphology of this river, it can be concluded that suspended sediments have played a major role in morphological changes in Hirmand River (Jahan-Tigh et al, 2019). The point to consider is the adverse effects of sediment pollutants on the outlet of the Hirmand Basin (Sistan Plain), which fuels the hydropolitical disputes between the two countries in the field of this river.

Results and Discussion

Discursive Resources: Political history, water rights, and geographical imagination

Geographical Imaginations within hydropolitical language games are one of the areas for increasing or decreasing tensions among countries located in transboundary river basins. For example, in the 2023 war between Russia and Ukraine, water has become a space for popular representations in Russian geopolitical culture. Here, Russia visualizes the Dnieper River in a symbolic interpretation, as a 'holy water' where the Russian people were baptized for the first time in history. Thus, the holy water imagination produced a spiritual justification for territorial expansionist goals in which it provided a divine prescription for Russia's complete control of the Dnieper (Merabishvili and Meterveli, 2021; Suslov et al, 2020; Noorali et al, 2025b). Here, we focus on the political and discourse relations between Iran and Afghanistan over the Hirmand River. In the analysis of water discourse, we analyze water agreements as discourse strategies with positive representation (Sneddon and Fox, 2006), building and inauguration of a dam as a provocative discursive act (Nagheeby and Warner, 2022), blocking the dam's water as nodes of water conflict (Sneddon and Fox, 2006), and not giving the water right to the downstream country as discursive hydro-hegemony (Zeitoun and Warner, 2006).

Relations between Iran and Afghanistan have a long history. Both countries have religious, social, economic, cultural, and geopolitical experiences with long shared borders and similar historical identities. This evokes the Persian geopolitical tradition that depicts two parts of the same historical body; So that this separation has been de-identified with a kind of artificial alienation that is rooted in the discourse of foreign powers. The oldest dispute between Iran and Afghanistan, which has a history of 130 years (Kamran, 1390), is the division of the water of the "Hirmand" river, which originates in Afghanistan and flows into Iran (Islam, 1390). Hirmand, as a part of the historical identity of Greater Iran, has a special place in Iran's geopolitical culture. So that it has the potential to mobilize a historical representation on the part of Iranian leaders over geographical resources. The separation of Herat from Iran and the consequences of the Treaty of Paris in 1857 (Iran's recognition of a country called Afghanistan) changed the nature of the Hirmand River from an internal river for Iran to an international river. This change placed Afghanistan in the geopolitical upstream position of Hirmand's water resources (Qureshi et al, 2021). The Hirmand is among the 10 largest and most important rivers in Asia and is of great geopolitical importance to Iran. The Hirmand is the lifeblood of Sistan and the life of Sistan and Baluchistan province is directly related to this river because groundwater or semi-surface and saline water in this region are not only unusable but also harmful (Akbari et al, 2020, Foroughi Nematolahi et al, 2013). In the second half of the nineteenth century, with the height of the disputes between the local rulers of Iran and Afghanistan over border issues, the two countries left the resolution of these issues to the British government (Hafeznia et al, 2006). In 1870, England handed over the issue of border arbitration and disputes over the Hirmand River to Goldsmith (Bandani, 2015). Goldsmith placed the border between the two countries on the main tributary of the Hirmand River. With the border between the two countries on a part of the Hirmand River, the river became an international river according to the Vienna Document (Qureshi et al, 2021). Therefore, this political judgment, which was rooted in the hegemonic discourses of the great powers in the 'Great Game', for the first time, established Hirmand as a watershed

for dividing mental identities and geographical boundaries. This caused the root of separation in both material and imaginary dimensions to be placed on the Hirmand River and became the source of the differences between the two countries until today. Thus, Goldsmith's geographical mapping of the river and physical boundaries created a mental mapping of the last, which became a separation of identity on both sides of the water. After Goldsmith's arbitration, with the occurrence of two natural events in Sistan, the conflict escalated again and caused the British arbitration to be requested once again (Ahmadi, 2004). This judgment was entrusted to McMahon this time (Bandani, 2015). In the initial determination of the Hirmand watershed, McMahon stipulated that Iran and Afghanistan should share Hirmand water downstream of the Kamal Khan Dam equally. However, later in the final vote, he changed the same decision and from the bottom of Kamal Khan dam, allocated one-third of Hirmand water to Iran and the other two-thirds to Afghanistan (Mojtahedzadeh, 2010). Russian newspapers published letters from the people of Sistan complaining about McMahon and the British for what they called the "conspiracy" against their water rights. The Russians, in particular, expressed their concern and displeasure to the Iranian Crown Prince about the British arbitration concerning the water rights of the people of Sistan Game (Nagheeby and Warner, 2022). Thus, what ostensibly happened on a material level with the "change of use" of the river due to natural drought (Noorali et al 2025b), mobilized the geopolitical imaginations of global actors against each other to shift the balance in the region. Such political issues between the Russians and the British surrounding the Helmand waters could be considered against the backdrop of the bigger geopolitical picture of the region known as the Great Game (Nagheeby and Warner, 2022). The unknown reasons behind the change in McMahon's decision may also be inferred from this point of view. Afghanistan served as a buffer state for the British against the Russians and control of water in Afghanistan was thus a political tool to protect the 'crown jewel' of its empire in a spatial imagination: British India (ibid). The decision following the arbitration over water allocation posed a serious threat to Iran's national security and sovereignty. While both parties accepted the decision concerning political boundaries, Iran rejected McMahon's arbitration on water allocation. Then, due to the dissatisfaction of the Iranian side, hydropolitical cooperation moved towards a hydropolitical conflict. The differences continued for years until the 1930s, when relations between Reza Shah Pahlavi and Mohammad Nader Shah improved and friendly relations prevailed. Therefore, the 1939 treaty was concluded by the government of Reza Shah Pahlavi and Mohammad Zahir Shah. Article I of this treaty recognized that "the governments of Iran and Afghanistan agree to divide in equal shares all waters of the Hirmand river which flows to Band-e Kamal Khan (30 miles inside Afghan territory) between Iran and Afghanistan," and Article II provided that in order to use more water than that is taken now between Deh-e Chahr-Borjak and Band-e Kamal Khan, the government of Afghanistan would not construct any other stream in the said district and not even repair any of the existing ones (Mojtahed-Zadeh, 1993; Islam, 2011). Due to the changing political situation during World War II when Reza Shah of Iran was exiled in 1941, Afghans refused to ratify the treaty (Islam, 2011). After that, the neutral commission in 1947 could not resolve the water dispute between the two countries and the disputes continued. Then in 1973 a new international treaty was concluded between the two countries, according to which a total of 26 cubic meters per second of Hirmand River water must be delivered to Iran in a normal (or higher than normal) water year (Hajihosseini, 2016). Thus, the Hirmand River is the only river in Afghanistan that has an international (Afghan-Iranian) water treaty (Goes et al, 2015). According to Article 2 of the agreement, the total amount of water from the Hirmand River delivered by Afghanistan to Iran in a normal (or above normal) water year is limited to an average flow of 22 cubic meters per second. This volume, in addition to the additional amount of water (4 cubic meters per second) that has been granted by Afghanistan as an expression of goodwill and brotherly relations with Iran (Hajihosseini, 2016). In fact, with the positive discourse between the two countries becoming hegemonic, Afghanistan's King Mohammad Zahir gave the extra water as a gift to Iran's King Mohammad Reza (Mojtahed-Zadeh, 2004). In total, Iran's water

right supply is 22 + 4, ie 26 cubic meters per second, equivalent to 820,000,000 cubic meters per year (Etaat and Varzesh, 2012). This treaty was approved by the parliaments of both countries (Hajihosseini, 2016: 4683). Although the treaty was ratified by the two parliaments with great difficulty, it was not implemented due to the coup d'etat in Afghanistan that year and was not fully implemented in the following years due to insecurity and instability in Afghanistan (Mojtahed-zadeh, 2004, Ahmadzai, 2016). Another hydropolitical issue that drives the Hirmand River into conflict is the Afghan facility upstream. The country is trying to conserve water in the country by building dams on the Hirmand, which in water imagination is called "Afghanistan's water rescue line". This happened despite the treaties between this country and its neighbors (Heshmat Sadat and Seyed, 2020) to form water conflict nodes in networks of spatial and historical dams. The issue of Afghanistan's facilities on the Hirmand dates back to the 1930s, when the Afghan government expressed its interest in developing an agricultural basin in the Hirmand Basin. During World War II, the Afghan government continued to build these facilities to replace the earlier positive discourse achieved through the water agreement with a provocative act (Noorali et al, 2025b; Etaat and Varzesh, 2012). Within eight years (Between 1949 and 1957), with the help of the Americans, the Bogra Dam in Girishk, the 70-kilometer-long Bogra Canal with a capacity of 2,800 cubic feet per second, and the Kajaki Reservoir Dam with a capacity of 1.5 million cubic feet were built. In addition, the Arghandab Dam is built on the Arghandab branch of the Hirmand River (Mojtahed-zadeh, 2004). The hegemonic shift of global discourse changed the interventionist power in Hirmand, and the United States advanced the nodes of the water conflict in Afghanistan to portray an alternative global power in Central Asia. Afghanistan exploited the Kajaki Dam and refused to grant Iran full water rights, especially the complete closure of the dam outlets by the Taliban government before they lost power in 2001 (Etaat and Varzesh, 2012, Bazrkar et al, 2013), the issue of wetlands drying up downstream Hirmand intensified and negative population changes intensified. This was the first consequence of changing the discourse governing Afghanistan and the effectiveness of the Taliban from 1996 to 2001 (Noorali et al, 2025b). After the fall of the Taliban in 2001, Iran's relations with the Afghan government on Hirmand improved somewhat until Ashraf Ghani came to power with the Water of Gold discourse. Ashraf Ghani's hydropolitical imagination is somehow a geopolitical otherness through water in the hydro-hegemonic control of the river discourse. In a hydropolitical rhetoric during the opening of the Kamal Khan Dam (The Kamal Khan dam is located near the Iranian border in Afghanistan's Nimroz province and has a storage capacity of 52 million cubic meters of water, which can irrigate about 174,000 arable lands) in 2021, he said: ‘After this, the key to Helmand is in Afghanistan's hands. We respect our commitments to Iran, but anything beyond the quota needs to be discussed.’ He emphasized that from now on Afghanistan ‘will not give free water to anyone’ and ‘if Iran gives oil in exchange, it can receive more water’. ‘Every drop of ‘our’ water will be more valuable than ten drops of ‘their’ oil’ (BBC NEWS, 2021; Nagheeby and Warner, 2022).

The territorial imaginations of both sides are based on the language games of "generosity". One of the elements of the argument behind Iran's pressure on Afghanistan in Hirmand is that Iran thinks it is a "generous giver" in most political and territorial areas. For example, hosting millions of Afghan refugees while facing economic challenges and providing export subsidies. Also providing Afghanistan access to open seas through Chabahar port (Noorali et al, 2025b; Nagheeby and Warner, 2022). Accordingly, it expects Afghanistan to cooperate in water and environmental issues. From Iran's perspective, the situation remains almost a zero-sum game, one in which Afghanistan receives almost all incentives and Iran receives almost nothing in terms of cooperation on water and environmental protection (Ibid). Afghanistan also thinks that for a long time, it has been a 'generous giver', that it has given water to Iran 'free', in quantities that go beyond the treaty. Afghanistan may also view the incentives it receives from Iran as relatively worthless compared to what Iran gains in terms of a strategic resource in the water-scarce region (Nagheeby and Warner, 2022). This was not the end of the political adventures of the Afghan governments regarding Hirmand’s hydropolitics. On August

14, 2021, with the Taliban occupying most of Afghanistan, Ashraf Ghani fled the country, and Iran must wait for a new round of hydropolitical developments in the east of the country (Noorali et al, 2025b). Afghanistan's wishes to fully control water for leverage came true only one year after the inauguration, though by the new rulers, the Taliban. In January 2022, the river was ultimately diverted south to block the water flow into Iran and the Hamoun Wetlands (Nagheeby and Warner, 2022). Although some non-critical views evaluated Taliban rule as positive for Hirmand's hydropolitics, the codes of Taliban hydropolitics were negative on both material and discursive levels. First, on the material level, he closed the gates of the Kamal Khan Dam to Iran and diverted the water to non-agricultural routes inside the country. Ebrahim Raisi threatened to "take my words seriously in the context of Hirmand so that you don't complain later". Dragging hydropolitics into language games resulted in the discursive action of the Taliban.

The Taliban gave a meaningful and mocking answer to the president of Iran with a motorcycle parade using "yellow barrels" in which Hirmand water was poured. The yellow barrels were similar to the barrels that the Taliban used to use for suicide and terrorist attacks. It was a kind of water threat for Iran by presenting an image of arming the Hirmand River. This water parade was aired on a television channel affiliated with the Taliban forces to portray popular hydropolitics. Therefore, it can be said that the location of most of the Hirmand River in the territory of Afghanistan has caused the Afghan government in recent decades to use Hirmand, as a political tool, to influence Iran's foreign policy and positions. This superior position of Afghanistan has led to its geopolitical superiority over Iran, which has always led to Iran's flexibility towards Afghanistan and its geopolitical dependence on the Hirmand River water resources. Inserting all of this into the TWINS framework highlights the mutual securitization of water issues that again occurred during this period.

Action outside of the realm of normal politics became necessary; cooperation meanwhile remained only ad hoc, addressing immediate issues without subscribing to a common longer-term goal.

Hydropolitical Outcomes: Political Discourses and Environmental Changes

Between 1986 and 2021, satellite analysis (based on Noorali et al, 2025b) of the Hirmand Basin reveals that changes in water resources, vegetation, and soil were deeply intertwined with the political, environmental, and hydropolitical dynamics between Iran and Afghanistan. During the late 1980s, despite the Iran–Iraq war and political instability in Afghanistan, the Hamun wetlands experienced a slight increase in water (0.26%) and a significant rise in vegetation (+23%), reflecting relatively favorable rainfall and the continued natural flow of the Helmand River. From 1990 to 1996, both water (+0.34%) and vegetation (+23%) continued to increase, indicating the absence of major droughts and a period of relatively stable water-sharing practices based on customary transboundary norms. The period from 1996 to 2003 marked a turning point: vegetation sharply declined by 80.9% and water decreased by 5.29%, while soil expanded slightly. This drastic environmental degradation resulted from severe droughts and the Taliban's restrictive water policies, which led to the drying of wetlands, ecological collapse, and widespread environmental displacement across Sistan. Between 2003 and 2008, following the fall of the Taliban and the partial restoration of political stability, both water (+0.12%) and vegetation (+18%) increased again, reflecting improved rainfall and a mild diplomatic thaw between the two countries. However, from 2008 to 2015, the trend reversed: although soil increased, vegetation declined. This period coincided with the reactivation of the Chah-Nimeh reservoirs in Sistan and Afghanistan's partial adherence to the 1973 Helmand River Treaty, which helped prevent the complete desiccation of the Hamun wetlands. From 2015 to 2019, improved bilateral relations and favorable rainfall contributed to a positive trend, with water increasing by 5.71% and vegetation rising slightly. Yet from 2019 to 2021, another sharp downturn occurred: both water and vegetation drastically decreased, while barren land expanded. This coincided with Afghanistan's political transition, the inauguration of the Kamal Khan Dam, and renewed hydropolitical tension (See Noorali et al, 2025b; Ahmadi et al, 2024). These years illustrate how policy decisions in Kabul directly shape the ecological and social stability of Iran's Sistan region,

where every cubic meter of diverted water has geopolitical and humanitarian consequences. Overall, the 35-year trend demonstrates that the Hamun wetlands have not only been victims of climatic fluctuations but also instruments of hydropolitical power and leverage between Iran and Afghanistan. Each phase of instability or unilateral water control in Afghanistan has directly corresponded with the decline of water and vegetation in Sistan, deepening one of the most acute transboundary environmental crises in the region.

Conclusion

Although the environmental factors affecting Hirmand have affected it's political and discourse dimension, the production of discourse has also been a part of Hirmand's hydropolitics. Both sides have tried to create an arbitrary hegemonic discourse space related to water. On the one hand, Afghanistan should refrain from giving water downstream by representing drought and highlighting purely environmental and non-political issues. On the other hand, Iran is trying to attribute the mismanagement of water resources in Sistan entirely to the upstream country. . Therefore, according to Agnew (2003; 2008), we show that with the change of material conditions and dominant discursive ways of understanding it, the atmosphere governing power relations changes. This approach states that both material forces and geopolitical imaginations or intellectual representations interact to influence the spatiality of the dominant power in a specific spatial and temporal atmosphere (Agnew, 2003). Therefore, showing the material effects of (water) discourse as well as the discursive effects of (water) materiality (as Hardy and Thomas have shown in Discourse in the Material World, 2014) interweaves the mental and geographical worlds in the framework of hydropolitics. Our empirical contribution is an example of the hydropolitics between Iran and Afghanistan, in this direction, it shows how the imaginations and representations of water in the semantic layer and the geographical effects of rivers/canals in the material layer have affected the relations. Above all, this non-binary combination tries to highlight water cooperation and the importance of environmental issues by clarifying water policies behind the curtain of geo-powers and reflecting the geographical effects of water and the mutual effects of material-discursive processes. The political instability in Afghanistan, whether under extremist Islamist rule (the Taliban) or during the administration of Ashraf Ghani, together with the U.S. military presence and subsequent withdrawal, has turned the Hirmand River into a focal point of contentious hydropolitics. On the Iranian side, poor water governance and the authorities' insistence on the complete dependence of Sistan on the Hirmand River, often used as a justification to avoid accountability, have further deepened the region's water crisis. These political-discursive dynamics intensify the basin's already fragile environmental conditions. Our findings indicate that Afghanistan, as the upstream hydro-power, has practiced a negative form of hydropolitics—using dam closures and discursive "language games" to impose costs on Iran, rather than engaging in cooperative or constructive interaction. Regardless of the immediate outcomes, the ongoing tensions highlight the broader diplomatic importance of natural resource governance and equitable water access. The current conflict-based hydropolitical posture could, however, evolve into one of cooperation through sustained dialogue and confidence-building measures. As Rai et al. (2017) demonstrate in another transboundary basin, adversarial riparian states can recalibrate their relations by moving beyond verbal commitments toward institutionalized collaboration, such as joint treaties or cooperative water projects. Collaborative management of the Hirmand could thus become a foundation for trust-building and even serve as an entry point for broader peace efforts between Iran and Afghanistan. Insights from the growing field of environmental peacebuilding further affirm that shared resource management can strengthen regional stability by fostering dialogue, transparency, and mutual accountability. Establishing a structured framework for cooperation within Iran–Afghanistan peace negotiations could therefore represent a viable ecological compromise. Despite the current challenges, shared waters still hold the potential to shift relations from rivalry to reciprocal engagement. The principles outlined in Article 10 of the Dakar 2022 Blue Deal reinforce this path, emphasizing the use of water as a tool for peace, solidarity, and regional integration

through dialogue and partnership, especially in the post-COVID era, which underscored the interconnectedness of nations (World Bank, 2022; Hydropolitics Association, 2022). Accordingly, this study rejects any framing of the issue as a "water war" and instead stresses the need for proactive steps toward a cooperative hydropolitical environment. Nonetheless, the Taliban's return to power in August 2021, despite informal assurances from its leadership, has yet to demonstrate any concrete commitment to such cooperation in the Hirmand Basin. The trajectory of Iran–Afghanistan hydropolitical relations will thus depend on how both governments approach water governance in the years ahead.

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References

Hydropolitics Association, 2022. 9th World Water Forum, Dakar 2022, Newsletter by Hydropolitics Association, 2020, 34 p.

Agnew, J., 2008. Disputing the nature of the international in political geography, in book: Politics: Critical Essays in Human Geography, New York and London: Routledge.

Agnew, J., 2003. Geopolitics: Re-Visioning World Politics, New York and London: Routledge.

Ahmadi, M., Ghavidel Rahimi, Y. and Darfashi, Kh., 2012. The Impact of Drought on Border Security in Sistan Region from 1998 to 2010, National Conference on Border Cities and Security, Challenges and Approaches, Sistan and Baluchestan University (In Persian)

Ahmadi, S.A., 2004. Hirmand Hydropolitical Survey, Geography Education, v. 19, p. 48-54 (In Persian).

Ahmadi, S.A., Hekmatara, H., Noorali, H. and Campana, M., 2023. The hydropolitics of Upper Karabakh, with emphasis on the border conflicts and wars between Azerbaijan and Armenia. Geo Journal, v. 88, p. 1873-1888, https://doi.org/10.1007/s10708-022-10714-4

Ahmadi, A., Noorali, H., Campana, M. and Barroudi, M., 2024. Analyzing the hydropolitical tensions of the Hirmand/Helmand River through the evaluation of land use changes using the SVM method, Human Geography Research, v. 55(4), p. 225-243 (In Persian).

Ahmadzai, S., 2016. Chapter 17 - Hydropolitics of Afghanistan and Its Future. Transboundary Water Resources in Afghanistan Climate Change and Land-Use Implications, p. 403-419.

Akbari, N., Mashhadi, A. and Kazemi Foroushani, H., 2016. Legal Dimensions of Hirmand Exploitation, Quarterly of Public Law Research, v. 22(68), p. 291-325 (In Persian).

Alaei Taleghani, M., 2017. Geomorphology of Iran, Tehran: Qomes Publishing (In Persian).

Alami, M. and Tayfur, G., 2017. Meteorological Drought Analysis for Lashkargah and Gardandiwal Stations of Hirmand River Basin, Afghanistan. Conference: IWA Regional Symposium on water, wastewater and environment, 22-24 March, 2017, Çesme-Izmir, Turkey.

Allan, J.A., 2001. The Middle East water question. Hydropolitics and the global economy. London: IB Tauris.

Aman, F., 2016. Water Dispute Escalating between Iran and Afghanistan. Atlantic Council, SOUTH ASIA CENTER.
https://www.atlanticcouncil.org/wp-content/uploads/2016/09/Water_Dispute_Escalating_between_Iran_and_Afghanistan_web_0830.pdf

Badiee Azandahi, M., Rahimi Harabadi, S. and Goodarzi Mehr, S., 2011. The Role of Morphological Changes in the Hirmand Border River in Iran-Afghanistan Political Relations, Human Geography Research, v. 78, p. 197-220 (In Persian).

Bandani, H., 2015. Assessment of Alam's dynasty role in the formation of Gold. International Journal of Scientific & Engineering Research, v. 6(5).

Baranyai, G., 2020. European Water Law and Hydropolitics: An Inquiry into the Resilience of Transboundary Water Governance in the European Union. Springer International Publishing.

Bartel, R., Noble, L., Williams, J. and Harris, S., 2018. Water Policy, Imagination and Innovation Interdisciplinary Approaches, London and New York: Routledge.

Bazrkar, M., 2013. System dynamic approach to hydro-politics in Hirmand transboundary river basin from sustainability perspective. Int. J. Hydrology Science and Technology, v. 3(4).

BBC NEWS. 2021. BBC NEWS, 24 MARCH 2021. https://www.bbc.com/persian/afghanistan-56509218

Beaumont, P., Blake, G.H. and Wagstaff, J.M., 1976. The Middle East—A geographical study: London, Wiley.

Castillo-Laborde, L., 2009. Case Law on International Watercourses. In book: (Chapter 19) The Evolution of the Law and Politics of Water, Springer Science + Business Media B.V., p. 319-395.

Chase, V., 2019. Subnational Hydropolitics: Conflict, Cooperation, and Institution-Building in Shared River Basins. Global Environmental Politics, 19(4), p. 143-145.

Dehgan, A. et al, 2014. Water security and scarcity: potential destabilization in western Afghanistan and Iranian Sistan and Bluchistan due to transboundary water conflicts. In: Weinthal, J.T., Nakayama, M. (Eds.), Water and Post-Conflict Peacebuilding. Taylor and Francis, London, p. 305-326.

Dinar, A. et al. 2007. Hydropolitics and International Relations. World Scientific Series on Environmental and Energy Economics and PolicyBridges Over Water, p. 138-158.

Dinar, S., 2000. Negotiations and International Relations: A Framework for Hydropolitics. International Negotiation, 2000 / 02, v. 5(2).

Dinar, S., 2012. The Geographical Dimensions of Hydro-politics: International Freshwater in the Middle East, North Africa, and Central Asia, Eurasian Geography and Economics, v. 53(1), p. 115-142.

Dodds, K., Taylor, Z., Akbari, A., Castán Broto, V., Detterbeck, K., Inverardi-Ferri, C., Ok Lee, K., Mamadouh, V., Ramutsindela, M. and Yuan Woon, C., 2023. The Russian invasion of Ukraine: implications for politics, territory and governance, Territory, Politics, Governance, Doi: 10.1080/21622671.2023.2256119

Dolatyar, M., 2014. Hydropolitics: Challenging the Water-war Thesis. Conflict Security and Development, v. 2(2), p. 115-124.

Ebrahimzadeh, I., Lashkaripour, Gh. and Moridi, A., 2004. The effect of geological factors in changing the course of the Hirmand River and its historical role in the movement of settlements in Sistan, Geography and Development, v. 2(4), p. 5-20 (In Persian).

Elhance, A. and Ascher, W., 2000. Hydropolitics in the Third World: Conflict and Cooperation in International River Basins; Why Governments Waste Natural Resources: Policy Failures in Developing Countries. United States Institute of Peace Press, 1999, Reviewed By Richard N. Cooper, Foreign Affairs.

Etaat, J. and Varzesh, I., 2012. Hirmand Hydropolitics: Reasons, Effects, and Consequences, Human Geography Research, v. 81, p. 193-212 (In Persian).

Ettehad, E., 2009. Hydropolitics in Hirmand/Hirmand International River Basin And Application of Integrated Water Resources Management. Master's Thesis. 30 Credits. Advanced Level EIntegrated Water Resources Management Master's Program Uppsala, Sweden.

Ettehad, E., 2010. Hydropolitics in Hirmand/Hirmand International River Basin. OAI, Université de soutenance, Online publication: http://stud.epsilon.slu.se.

Evenstar, L. et al, 2018. Quaternary landscape evolution of the Hirmand Basin, Afghanistan: Insights from staircase terraces, deltas, and paleoshorelines using high-resolution remote sensing analysis. Geomorphology, v. 311(15), p. 37-50.

Fard, R., 2021. Towards a New Concept of Constructivist Geopolitics: Bridging Classical and Critical Geopolitics, Central European Journal of International and Security Studies, v. 15(1), p. 26-57.

Flint, C. and Noorali, H., 2024. The relationality of geopolitical codes: the example of the Belt and Road Initiative, Asian Geographer, v. 41(1), p. 1-19. https://doi.org/10.1080/10225706.2023.2227618

Foroughi Nematolahi, A., Hassani Bagheri, M. and Sheikh Veisi, M., 2013. The Hydropolitical Impact of the Hirmand Border River on the National Security of the Islamic Republic of Iran, New Attitudes in Human Geography, v. 5(3), p. 33-51 (In Persian).

Gleick, P., 1993. Water and Conflict: Fresh Water Resources and International Security, International Security, v. 18(1), p. 79-112.

Gleick, P.H. and Shimabuku, M., 2023. Water-related conflicts: Definitions, data, and trends from the water conflict chronology. Environmental Research Letters, v. 18(3), 034022.

Gleick, P.H., Cooley, H., Morikawa, M., Morrison, J. and Cohen, M.J., 2009. The World's water 2008-2009: The biennial report on freshwater resources (v. 6). Island Press.

Goes, B., 2016. Integrated water resources management in an insecure river basin: a case study of Hirmand River Basin, Afghanistan. International Journal of Water Resources Development, v. 32(1), p. 3-25.

Goes, B. et al, 2015. Integrated water resources management in an insecure river basin: a case study of Hirmand River Basin, Afghanistan. International Journal of Water Resources Development, (03). doi:10.1080/07900627.2015.1012661

Hafeznia, M.R., Mojtahedzadeh, P. and Alizadeh, J., 2006. Hirmand Hydropolitics and Its Impact on Iran-Afghanistan Political Relations, Space Planning, v. 2(45) (In Persian).

Haggett, P., 1972. Geography: A Modern Syntheses. New York: Publisher: Harpercollins College Div.

Haggett, P., 1983. Geography: A Modern Syntheses. New York: Publisher: Harpercollins College Div.

Hajihosseini, H. et al, 2016. Hydrological Assessment of the 1973 Treaty on the Transboundary Hirmand River, Using the SWAT Model and a Global Climate Database. Water Resources Management, v. 30(13), p. 4681-4694, DOI:10.1007/s11269-016-1447-y

Hajihosseini, M., Morid, S., Hajihosseini, H., Delavar, M. and Booji, M., 2020. Impacts of land use changes and climate variability on transboundary Hirmand River using SWAT. Journal of Water and Climate Change, v. 11(4), p. 1695-1711. DOI:10.2166/wcc.2019.100

Hardy, C. and Thomas, R., 2014. Discourse in a Material World, Journal of Management Studies, v. 52(5), p. 1-27.

Heshmat Sadat, S. and Sayed, N., 2020. Afghanistan and Iran: From water treaty to water dispute. The Interpreter, Published 14 Oct 2020 06:00. https://www.lowyinstitute.org/the-interpreter/afghanistan-and-iran-water-treaty-water-dispute

Homer-Dixon, T., 1994. Environmental Scarcities and Violent Conflict: Evidence from Cases. International Security, v. 19(1), p. 5-40.

Homer-Dixon, T., 1996. Environmental Scarcity and Mass Violence, Current History (November 1996).

Hydro Review., 2021. President Ghani inaugurates 9-MW Kamal Khan Dam in Afghanistan. Hydro Review Content Directors -3.24.2021. Retrieved from https://www.hydroreview.com/hydro-industry-news/president-ghani-inaugurates-9-mw-kamal-khan-dam-in-afghanistan/#gref

Islam, M., 2011. Impact of Hirmand Water Dispute on the Bilateral Relations between Iran and Afghanistan; an Evaluation. International Journal of Central Asian Studies, v. 15, p. 113-141.

Jahan-Tigh, M. and Jahan-Tigh, M., 2019. Geochemical study of sediments caused by floods entering Hamoun Wetland, Wetland Ecobiology, v. 11(38), p. 81-96 (In Persian).

Jahan-Tigh, M., Tajbakhsh, M., Mirab Shabestari, Gh. and Memarian Khalilabad, H., 2019. Investigating the role of suspended sediment loading on morphological changes in Hirmand River, Case study: Sistan River, Watershed Engineering and Management, v. 11(2), p. 478-499 (In Persian).

Jankielsohn, R., 2018. Defining Hydropolitics: The Politics of Water in South Africa. Journal of Contemporary History, v. 37(1), p. 123-141.

Kaviani Rad, M., 2005. Hydropolitical Relations between Iran and Afghanistan, Strategic Studies Quarterly, v. 8 (28), p. 337-358 (In Persian).

Khak-e-Sefidi, A. and Nora, N., 2008. The effects of drought on the Hirmand River on environmental issues in Sistan and Hamoun Wetland, International Conference on Water Crisis, Zabol University, (In Persian).

Khosravi, M. and Raispour, Kh., 2012. Hirmand, the most important factor in the dispute between Iran and Afghanistan, National Conference on Border Cities and Security, Challenges and Approaches (In Persian).

Mahlakeng, M., 2019. A Theoretical Analysis of Hydropolitics, World Affairs: The Journal of International Issues, v. 23(4), p. 36-57.

Malakoutian, M., 2008. Environmental and Economic Importance of Hamoun International Wetland in Sistan Region, First International Conference on Water Crisis, 2008, Zabol University (In Persian).

Maleki, S., Saatchi, S., Pourmanafi, S. and Rahdari, V., 2019. Human and Climate Effects on the Hamoun Wetlands, Weather, Climate, and Society, v. 11(3), v. 609-622.

Medby, I.A., 2021. An articulation of geopolitics otherwise? Indigenous language-use in spaces of Arctic geopolitics, Area, v. 55(1), p. 18-25.

Mehrafarin, R. and Seyed Sajjadi, M., 2005. The Impact of Hydrology and Geographical Environment on the Ancient Settlements of Sistan Drainage Basin, Quarterly of Teacher of Humanities, v. 9(1) (In Persian).

Merabishvili, G. and Metreveli, T., 2021. Spiritual geopolitics of Georgia's territorial integrity, Political Geography, v. 87, 102374.

Mojtahed-zadeh, P., 2004. Small Players of Great Game. RoutledgeCurzon.

Mojtahed-Zadeh, Pi., 1993. Evolution of Eastern Iranian Boundaries. Ph.D. thesis. University of London.

Mojtahedzadeh, P., 2010. The Origin and Evolution of Sistan Borders in Iran's Border Policies and International Borders, Tehran: Samat Publications (In Persian).

Moore, S., 2018. Subnational Hydropolitics: Conflict, Cooperation, and Institution-Building in Shared River Basins (Oxford University Press, 2018).

Morid, S., Hajihosseini, H., Hajihosseini, M., Delavar , M. and Booij, M., 2016. Hydrological Assessment of the 1973 Treaty on the Transboundary Hirmand River, Using the SWAT Model and a Global Climate Database,. Water Resources Management, p. 4681-4694.

Nagheeby, M. and Warner, J., 2018. The geopolitical overlay of the hydropolitics of the Harirud River Basin. Int Environ Agreements, v. 18, p. 839-860. https://doi.org/10.1007/s10784-018-9418-9.

Nagheeby, M. and Warner, J., 2022. The 150-year itch: Afghanistan-Iran hydropolitics over the Helmand/Hirmand River. Water Alternatives, v. 15(3), p. 551-573.

Noorali, H., Flint, C. and Ahmadi, S.A., 2022. Port Power: Toward a New Geopolitical World Order, Journal of Transport Geography, v. 105(3), 103483 https://www.sciencedirect.com/science/article/abs/pii/S096669232200206X

Noorali, H. and Mamadouh, V., 2025. Port power 02: Chinese geoeconomic hopes and American geopolitical fears. Journal of Transport Geography, v. 125, 104207. https://doi.org/10.1016/j.jtrangeo.2025.104207

Noorali, H., 2024. Geopolinomic Codes: Territorial and Discursive Practices of Connectivity Networks of Political Economy. The Geographical Journal, v. 190(4), e12597. https://doi.org/10.1111/geoj.12597

Noorali, H., Zaki, Y., Campana, M. et al, 2025b. Hydropolitics of Russian-Ukrainian war: analyzing water governance conflicts in the Dnieper River basin through remote sensing techniques, GeoJournal, v. 90, 115. https://doi.org/10.1007/s10708-025-11338-0

Noorali, H., Ahmadi, S.A., Campana, M. and Barroudi, M., 2025b. Evaluation of environmental factors affecting hydropolitics of helmand transboundary basin. Iran and the Caucasus, v. 29(1), p. 77-89. https://brill.com/view/journals/ic/29/1/article-p77_6.xml

Ó Tuathail, G., 1996. Critical Geopolitics: The Politics of Writing Global Space, London: Routledge.

Ó Tuathail, G. and Agnew, J., 1992. Geopolitics and discourse: practical geopolitical reasoning in American foreign policy. Political Geography, v. 11, p. 190-204.

O'Tuathail, G., Dalby, S. and Routledge, P., 1998. The Geopolitics Reader. London and NewYork: Routledge.

Ó Tuathail, G., 2017. Near Abroad: Putin, the West and the Contest over Ukraine and the Caucasus, Oxford: Oxford University Press.

Prasad Rai, S., Wolf, A., Sharma, N. and Tiwari, H., 2016. Hydropolitics in Transboundary Water Conflict and Cooperation. River System Analysis and Management, p. 353-368. DOI: 10.1007/978-981-10-1472-7_19.

Qureshi, Z., Mianabadi, H. and Parvaresh-rizi, A., 2021. Correlation Matrix Analysis of Transboundary Water Interactions in Hirmand Watershed, Iranian Soil and Water Research, v. 52(1), p. 273-300 (In Persian).

Rahmani, Z., 2020. Impact of Land use and Cover Change on Soil Organic Carbon and Total Nitrogen Storage in the Hirmand River Basin. International Journal of Research in Geography (IJRG), v. 6(1), p. 10-15.

Rai, S., 2017. Hydropolitics in Transboundary Water Conflict and Cooperation. In book: River System Analysis and Management.

Rogers, S. et al, 2023. Beyond state politics in Asia's transboundary rivers: Revisiting two decades of critical hydropolitics, Geography Compass, v. 17(4), p. 1-15.

Shahbazbegian, M., Turton, A. and Mousavi Shafaee, S., 2016. Hydropolitical Self-Organization theory; system dynamics to analyse hydropolitics of Hirmand transboundary river. Water Policy, v. 18(5), p. 1088-1119.

Sharp, J., 2020. Materials, forensics, and feminist geopolitics, Progress in Human Geography, v. 45(5), p. 1-16.

Shirdeli, A., 2014. Hydropolitics and hydrology issues in Hirmand/Hirmand international river basin. Management Science Letters, v. 4(4), p. 807-812. DOI: 10.5267/j.msl.2014.2.002

Shroder, J., 2016. Chapter 14 - Hydro-Hegemony in Afghanistan and Surrounding Countries. Transboundary Water Resources in Afghanistan, Climate Change and Land-Use Implications, Elsevier, p. 339-359.

SIWI. 2020. ICWC Course: International Water Law. https://www.siwi.org/icwc-course-international-water-law/.

Sneddon, C. and Fox, R., 2006. Rethinking transboundary waters: A critical hydropolitics of the Mekong basin, Political Geography, v. 25(2), p. 181-202.

Solouki, H. and Nouri Nahad, F., 2019. The effect of soil properties and wind erosion on hydraulic structures of Sistan River, Natural hazards, v. 8(19-1), p. 229-242 (In Persian).

Soltani, J. and Karbasi, A., 2002. The Executive Role of the Hirmand River Legal Regime in Moderation of Sistan Drought, Quarterly of Agricultural Economics and Development, v. 10(38) (In Persian).

Specter, M., 2023. Realism after Ukraine: A Critique of Geopolitical Reason from Monroe to Mearsheimer, Analyse & Kritik, v. 44(22).

Suslov, M., Umland, A. and Mark, B., 2020. Geopolitical Imagination: Ideology and Utopia in Post-Soviet Russia, Ibidem Verlag.

Swain, A., 2001. Water wars: fact or fiction? Futures, v. 33, p. 769-781.

Tayie, M., 2016. The Hydropolitics of the Nile River Basin. Hdb Env Chem, v. 56, p. 599-654, DOI 10.1007/698_2016_106.

Turton, A., 2002. Hydropolitics: The concept and its limitations. in book: In The Developing World, A Southern African Perspective, 177 p.

Uitto, J. and Duda, A., 2002. Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention, the Geographical Journal, v. 168(4), p. 365-378.

Varij Kazemi, M., 2020. The role of Hirmand hydropolitics in the occurrence of ethnic crises in Sistan and Baluchestan, Geography and Human Relations, v. 3(2), p. 143-164 (In Persian).

Vuyovich, C. and Jacobs, J., 2011. Snowpack and runoff generation using AMSR-E passive microwave observations in the Upper Hirmand Watershed, Afghanistan. Remote Sensing of Environment, v. 115, p. 3313-3321.

Waterbury, J., 1979. Hydropolitics of the Nile valley. Syracuse, NY: Syracuse University Press.

Whitney, J., 2006. Geology, Water, and Wind in the Lower Hirmand Basin, Southern Afghanistan , Scientific Investigations Report 2006–5182. Prepared under the auspices of the U.S. Agency for International Development, 22 p.

Wolf, A. et al. 2005. Managing Water Conflict and Cooperation. in Book: State of The World, Redefining Global Security.

Zeitoun, M. and Warner, J., 2006. Hydro-hegemony – a framework for analysis of trans-boundary water conflicts. Water Policy, v. 8, p. 435-460.

Zhong, L. et al, 2009. Hirmand River Hydrologic Studies Using Alos Palsar In Sar and Envisat Altimetry. Marine Geodesy, v. 32, p. 320-333, DOI: 10.1080/01490410903094833.

Zia Tavana, M., Rahmani Fazli, A., Ganji, M.H. and Asghari Lofmajani, S., 2010. A Comparative Study of the Effects of Hirmand Water Reduction on Agricultural Activities in Sistan Villages, Human Geography Research, v. 71, p. 49-65 (In Persian).

World Bank, 2022. 9th World Water Forum, March 21-26, 2022, Dakar, Senegal, World Bank https://www.worldbank.org/en/events/2022/02/16/9th-world-water-forum.