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Citation: Nagheeby, Mohsen and Warner, Jeroen (2022) The 150-Year Itch: Afghanistan-Iran Hydropolitics Over the Helmand/ Hirmand River. *Water Alternatives*, 15 (3). pp. 551-573. ISSN 1965-0175

Published by: Water Alternatives Association

URL: <https://www.water-alternatives.org/index.php/alldo...> <<https://www.water-alternatives.org/index.php/alldoc/articles/vol15/v15issue3/672-a15-3-1>>

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## The 150-Year Itch: Afghanistan-Iran Hydropolitics Over the Helmand/Hirmand River

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**ABSTRACT:** Reports predict frighteningly serious escalations of the controversy between Afghanistan and its neighbours over transboundary waters. However, a postulated future is not empirical evidence. This paper focuses on Afghanistan's relations with Iran. It aims to examine the evolution of the hydropolitical relations between Afghanistan and Iran over the Helmand River Basin and to identify where and how changes in the relationship occurred over the past century. The Transboundary Waters Interaction NexuS (TWINS) model is used to map the evolution of hydropolitical relations between the two riparian states. The paper also explores the dynamics of the political relations between the states in order to understand the potential for greater cooperation. While there is a complete disconnect between the two sides in terms of water management, the paper's historical analysis shows that the frightening claims are not backed by facts on the ground and that they misrepresent the hydropolitical relations as they exist within the broader geopolitical context. The paper concludes that for both Afghanistan and Iran over the period of Western intervention and civil war, the water controversy has constantly been overshadowed by other priority concerns such as security, economy, and the quest for the stabilisation of Afghanistan. Enhanced water cooperation therefore depends on a change in the nature of geopolitical relations between the two countries and on the creation of a collective identity by Afghanistan and Iran over the Helmand River Basin.

**KEYWORDS:** Helmand/Hirmand River Basin, transboundary waters, cooperation, frozen conflict, Western interventions, geopolitics, Iran, Afghanistan

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### INTRODUCTION

The Helmand/Hirmand<sup>1</sup> River is an endorheic river that rises in Afghanistan and runs for many kilometres before crossing into Iran. The populations in the river delta in both Nimrooz Province in the southwest of Afghanistan and the Sistan region in the southeast of Iran depend heavily on the river for domestic water supply and agricultural irrigation. The Helmand River is also a critical resource for sustaining the transboundary Hamoun Wetlands and the Goad-e-Zereh depression which, from an environmental perspective, are the most important parts of the river delta.

Under the intense geopolitical rivalry of the Great Game and throughout the Western interventions, Afghanistan and Iran experienced long-standing political and legal controversy over the allocation and utilisation of the Helmand River and over the protection of the shared Hamoun Wetlands. Such conflicts over transboundary water issues have sometimes featured high-level transboundary political and security discourses, reflecting the importance of water as a high politics issue for both Afghanistan and

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<sup>1</sup> In Iran this river is called the Hirmand River.

Iran. In 1973, after all these ups and downs, Afghanistan and Iran agreed on a treaty to share the waters of the Helmand River; however, this legal arrangement itself became a source of controversy, with each country blaming the other for not respecting the treaty and its specified water rights.

The water controversy between Afghanistan and Iran over the Helmand River offers a classic example of the challenges of fostering transboundary water cooperation. Tensions arise in the delta between, on the one hand, historical use and environmental considerations and, on the other, nationalism and development. Iran, as a downstream, is obviously eager for cooperation in order to guarantee its domestic, agricultural and environmental water demand, while, Afghanistan, as an upstream, is reluctant to negotiate openly on its transboundary waters if it means losing some control of its river and not being able to guarantee its use for the country's development or for supplying a growing demand that mirrors that of Iran. To establish a basic platform for mutual water cooperation and to find possible solutions for common water and environmental problems, Iran suggested a joint study (with possibly one agreed-upon international actor); however, this initiative did not receive a positive response from Afghanistan. By 2021, the water controversy around the Helmand River Basin (HRB) had reached a point where Afghanistan's then President Mr. Ghani said (at the inauguration of the Kamal Khan Dam near the Iranian border) that, "after this, the key to the Helmand is in Afghan's hands; we will honour our commitments with Iran, but anything beyond the stipulated quota would require discussions". He insisted that from now on, Afghanistan "will not give free water to anyone", and that, "Iran can get more water if it gives oil in return" (*ToloNews*, 2021; *Pajhwok*, 2021). He left the country soon after, and the dam came under the control of the Taliban. 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 (Alcis, 2022). With a history of controversy that can be traced back to the 1870s, the sustainability of the entire river basin – and in particular the Hamoun Wetlands – has fallen victim to increased competition, deep mistrust, unilateral water utilisation, and cooperation with a reluctant upstreamer. There is no sign of significant progress in resolving the dispute.

Reports in the international media and in some international think tanks have tended to label Afghanistan – Iran water relations, especially over the Helmand River, as a serious "deterioration" and a sign of "emerging conflict". Overstated headlines have appeared that refer to the "threatening [of] regional stability" or "fights over water". This alarming language has arisen out of conditions of water scarcity in the region, development ambitions in the context of ongoing political instability in upstream Afghanistan, high water dependency in downstream Iran, and lack of mutual water cooperation (see, for example, Dehgan et al., 2014; AtlanticCouncil, 2016; *LATimes*, 2020; WPS, 2020). Among many other reports, one published by the US Senate Committee on Foreign Relations in February 2011 warned of the growing number of disputes and insecurities throughout the region that were due to Afghan dam development plans (USGovernment, 2011).

The news leading up to the Taliban takeover of Kabul was positive with regard to possible improvements in the cooperative management of the HRB. A lack of critical analysis of the history of Afghanistan – Iran hydro-political relations, however, hampers understanding of the history of that cooperation and of the effects of the internal and broader external geopolitical factors. There has been limited in-depth analysis of the key characteristics of the hydro-political relations between Afghanistan and Iran, particularly with regard to the Helmand River (see, for example, Abidi, 1977; Sinaee, 2012; Thomas and Warner, 2015; Malyar, 2016; Thomas et al., 2016; Nagheeby and Warner, 2018; Nagheeby and Rieu-Clarke, 2020). Curiously, however, the fundamental questions have remained unanswered. The first question is, what is the dominant hydro-political pattern between Afghanistan and Iran, particularly with regard to the Helmand River; the second is, should we expect an escalation of relations into full-blown conflict over the Helmand River, as forecasts so alarmingly claim, or is it just an illusion. To answer these questions, we will explore the 'shadow of the past' on the Helmand River. We will identify the

forces that have driven past dynamics and that – assuming a degree of path dependency – may show possible future paths.

We also set out to understand the potential of Afghanistan – Iran relations for greater cooperation towards beneficial socio-economic and ecological ends for all the basin's stakeholders. In this paper, we use the conceptual framework of the Transboundary Waters Interaction NexuS (TWINS). It was introduced by Naho Mirumachi (Mirumachi and Allan, 2007) to show the state of relations over time; its hope was to contextualise current worries within broader socio-economic and political contexts. A postulated future is not empirical evidence. Thus to shed possible light on future hydro-political relations, this paper pioneers a case study analysis of over 150 years (1872 to 2022) of coexisting conflict and cooperation between Afghanistan and Iran. The study is based on historical analysis of given speech acts and on particular transboundary water interactions in the HRB.

In the process of mapping out the trajectory of coexisting competitive conflictive-cooperative relations over the Helmand River, the alarming threat to the relations between the two countries was not substantiated, nor was there a suggestion of an emerging fight or war between them. In the context of their complex historical relationship, socio-economic interdependency, and the region's broader geopolitical complexity, such alleged threats have often been overshadowed by other geopolitical issues; these have particularly included the quest for stabilisation in Afghanistan and Iran's economic interests. Our study shows that perhaps the so-called threat to the relationship stemming from water disputes may never have been as serious as claimed. There are indications that, even after the Taliban again seized Kabul in 2021, there was a continuation of mutual cooperation over Afghan refugees, trade and development (such as railroad construction and the port of Chabahar), and security issues; this was the case, albeit at a somewhat slower pace, despite all the typical challenges and disagreements.

This paper comprises five sections. The next section explains the TWINS framework and the methodology of the study. The paper then sketches the hydrological and socio-economic context of the HRB and its main characteristics. Following that, it describes the historical events related to the Helmand River since the 1870s and examines HRB hydro-political interactions between Afghanistan and Iran by adopting the TWINS matrix. It concludes with a summary of findings and with suggestions for further research.

## **THEORETICAL FRAMEWORK AND METHODOLOGY**

The Helmand River arises in Afghanistan and, after many kilometres, crosses the border into Iran. This paper aims to elucidate the dynamics of coexisting conflict and cooperation centred around the river. In doing so, and given the state-centric nature of decision-making in the HRB, we use the TWINS matrix to map the evolution of hydro-political relations from an historical perspective. The TWINS framework takes a constructivist (Onuf, 1998) approach to transboundary water relations with regard to the changing identities of friendship and enmity, cooperation and conflict.

From a constructivist point of view, present-day realities reflect within them, and carry forward, the shadow of their past (Reus-Smit, 2013). We use the TWINS framework in the sense that, "interaction between states is worthy of detailed analysis for its reality-creating effects" (Mirumachi, 2010: 49). Interactions, in this view, "are not static but rather in constant flux, influenced by, and influencing, the broader political context in which they occur" (Mirumachi, 2015: 41; see also the most recent application of TWINS in Vitale and Meijerink, 2021). It is expressed in a matrix of different combinations of conflict intensity, from 'non-politicisation' to 'violation' on one axis, and cooperation intensity from 'confrontation of the issue' to 'collective identity formation' on another; together this creates the trajectory of the development of hydro-political relationships in a transboundary river basin (see Figure 4).

While *le politique* (the political) will be with us forever, water can be 'made political'; that is, it can be an object of *la politique* but also depoliticised (Warner and Wegerich, 2010). Non-politicisation exists where water issues are not the concern of riparian states and where related issues are not part of the public debate. According to Buzan et al. (1998), an issue can be "made political" (politicised), and "promoted to a security issue" ('securitised'), legitimising extraordinary measures in the name of survival; but these declarations can also be "undone" (desecuritisation, depoliticisation) for entirely pragmatic reasons. Once a concern "is presented as an existential threat, requiring emergency measures and justifying actions outside the normal bounds of political procedure", it is securitised (Buzan et al., 1998: 23). There may be another form of act at this level (that is, opportunitisation) when there is an extraordinary opportunity to improve a situation and when that justifies actions outside the normal bounds of political procedure. Both forms declare an act of emergency, overriding all other considerations. This is also relevant in that, while water conflicts are often not really about water, water can be extremely visible in the highlighting of other conflicts (Warner and Wegerich, 2010). Violation scarcely ever occurs when interaction goes beyond securitisation to the extent that violent action is seen as the necessary response (Neumann, 1998).

On the other axis of TWINS – that of cooperation intensity – confrontation of the issue occurs when "the issue is acknowledged but there is no specific joint action or identification and sharing of goals" (Mirumachi, 2015: 60); that is, ad hoc joint action may result in joint action but not in shared goals. In common goal formation there may be a shared goal, but states hold widely divergent opinions on how to approach that goal. At the level of collective identity formation, "states do not differentiate between their domestic interests and their collective international interest" (Mirumachi, 2015: 50).

The TWINS framework utilises the constructivist notion of speech acts to delve into the evolution and social construction of hydropolitical relations. We used discourse analysis to explain the changing nature of transboundary water interactions and power struggles among the riparian states. We analysed speech acts in order to better understand the political perspectives, interests, policies and strategies of the key parties concerned with the basin. We looked for the literal or inferred speech acts that created or established the social reality of the actors involved. This study employs three categories of speech act: a) assertive, through which something is stated unequivocally, as in, "our country is experiencing a difficult situation"; b) directive, by which something is demanded, as in, "we need more water"; and 3) commissive, by which something is promised, as in, "I will pay my debts" (Mirumachi, 2015: 66).

Speech acts are pragmatic – performative, sociolinguistic – acts. They can create a new social reality by declaring, promising and committing, and by directing from a position of authority and in a validating setting. They are different from normal acts in that, in order to 'work', they require acceptance by an audience. The speech act may not only redefine the issue or situation; it may also reconstruct the identity of the speaker in relation to an Other. It can reaffirm identities of animosity and friendship between Self and Other. An example is Turkey and Syria, who declared in 2008 – as the relations between the states were thawing – that they had "always been brothers" (Warner, 2012). Such statements can be understood in the context of the politics of what separates 'us' from 'them'.

Speech acts are not necessarily expressed in words; the job may be done by symbols and images (Williams, 2003), practices (Balzacq, 2011), or by a physical action that transmits a particular message, meaning, or feeling. In this respect, assertive speech act could be the inauguration of a dam. A directive speech act could be a blockage of water. A commissive speech act manifests itself in signing a treaty or a joint action.

This study mainly uses extensive analysis of available documents to grasp the variety of perceptions and ambitions represented in the case. We target international and national reports, policies, and strategies, including governmental (such as the Helmand River Basin Master Plan and the Afghanistan National Development Strategy) and non-governmental. Secondary documents are used to examine the political and legal history of relations over transboundary waters. These include a large number of

scientific articles and books in either English or Farsi, with a focus on the Helmand River and with a technical, political and legal basis. Main official documents should not be the only ones used, however; classified documents, if available, may also give an altogether richer picture of the case. Over the course of this case study, the available declassified secret documents – including US government letters concerning the HRB – were also used to unpack the hidden agenda.

Analysis of the related discourses was carried out with the help of several media sources; these included TV programmes, online news websites, newspapers, reports and headlines in press releases from international, Afghan (only in Dari-Farsi and English), and Iranian (in Farsi and English) sources, all from the last decade. The political affiliation of these sources was closely examined in order to critically evaluate their discourses and narratives. This was achieved by analysing the patterns of argumentation, searching for the dominant agenda, and studying words and phrases in political linguistic terms in order to find the paradigm that shapes the basin actors' and key policymakers' positions, interests and identities. To complement the puzzle of the complex conflict, a discourse analysis of press releases concerning the case was conducted along with document analysis. The study also benefited from earlier fieldwork-based studies and their available interviews (see, for example, Malyar, 2016; Thomas et al., 2016).

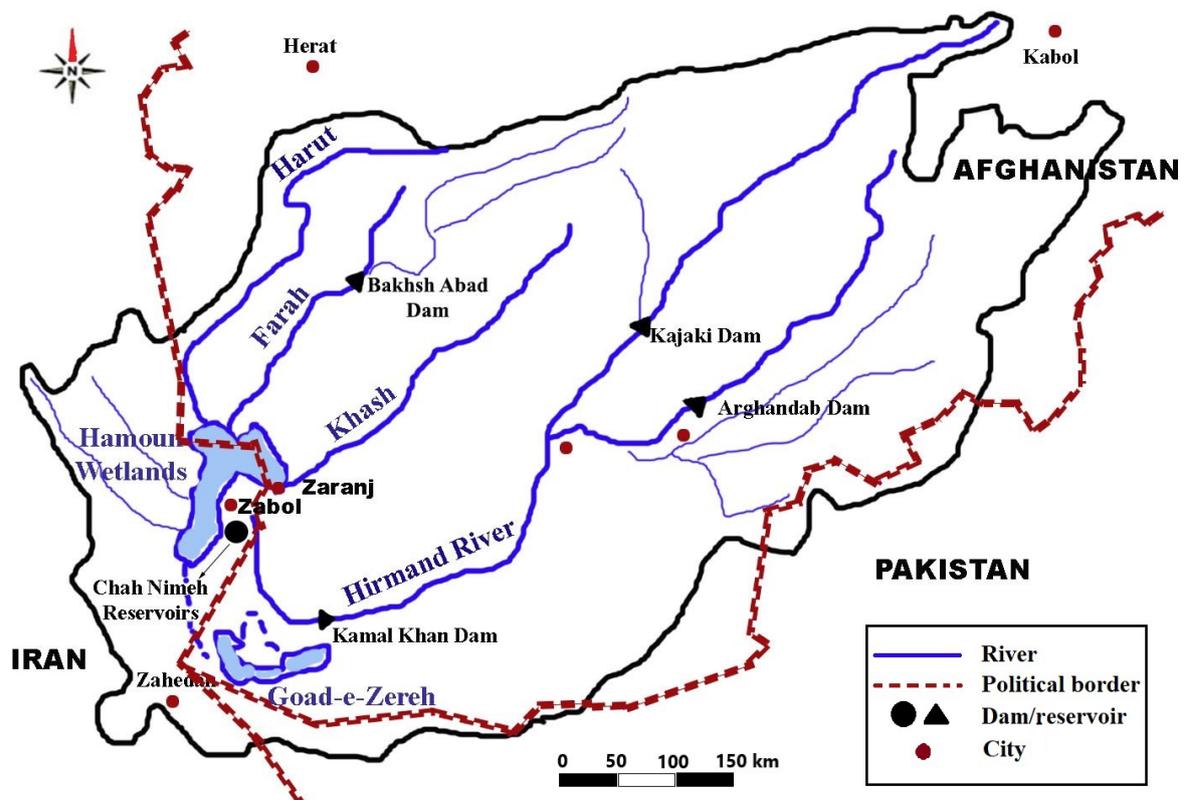
Each methodology, even so, has some limitations. In the context of transboundary waters, whose nature is politicised and often sensitive, the data collection and analysis of the discourses and observations may be subject to misunderstanding and misrepresentation. As shown below, the controversy over the water resources of the Helmand River is overall very complicated, multilayered, and overshadowed by the broader geopolitical rivalry. The sudden recent political changes (for example, the US – Taliban 'Peace Deal') and subsequent tragic incidents in Afghanistan demonstrate the inability of almost all political analysts and regional and local experts to fully understand such complexity or to capture the underlying causes. The Helmand River suffers from such broader geopolitical setting in the region in which water (and ecosystem) is only one 'thing' among many other 'things'. Misunderstandings and exaggerations thus abound and misrepresentation of facts and wars of words are intensified because of the history of accusations and counter-accusations between the two sides. We have also witnessed extreme public sensitivity and intensive emotions on both sides in relation to the Helmand River. This highly contradictory, layered and complex context makes it very difficult for any researcher to capture or tell the whole story or to convey all the competing discourses and narratives. This paper is no exception, however we took all necessary steps – including critical reading and validation methods – to help ensure that such limited and possibly incomplete narration would not negatively affect our analysis or our final concluding remarks.

## GENERAL BACKGROUND

The 1300-km Helmand River originates in the Hindu Kush mountains of Afghanistan, west of Kabul. Crossing southwest and then north, it forms 55 km of the Afghan – Iranian border and ultimately ends in the Sistan Delta. Here, it forms a large complex of three main interconnected wetlands, the Hamoun-e-Puzak, the Hamoun-e-Saberi, and the Hamoun-e-Hirmand. In exceptionally wet years, it overflows further to the south into the Goad-e-Zereh depression (Figure 1).

The Helmand River has an average surface water availability of 9552 million cubic metres per year ( $\text{Mm}^3/\text{year}$ ) (Thomas and Varzi, 2015). It is considered to be the lifeblood of one of the poorest regions of both Afghanistan and Iran. In 2010, these regions were home to, respectively, 5,800,000 and 1,050,000 people (King and Sturtewagen, 2010). The water resources of the HRB are used extensively for irrigation and are crucial for Afghan and Iranian farmers alike. Both states – though particularly Afghanistan with its larger population and lack of infrastructure – are struggling to provide drinking water for the region's people.

Figure 1. The Helmand River Basin and its main infrastructure.



Source: Authors.

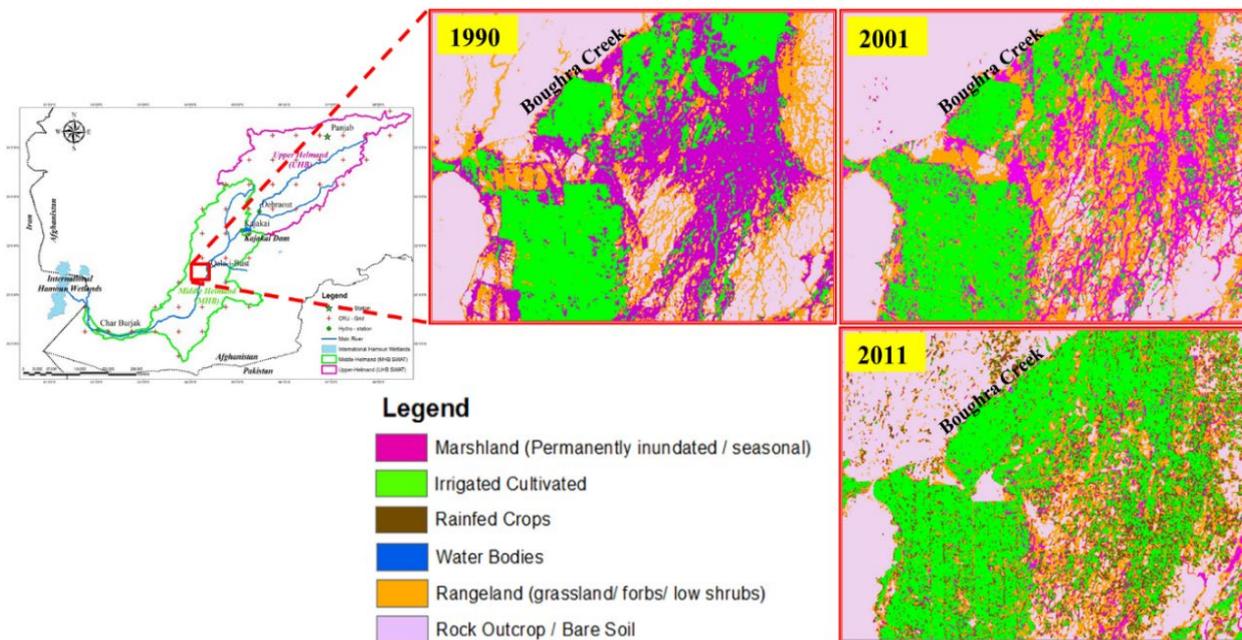
The Helmand River is also a critical resource for sustaining the transboundary Hamoun Wetlands. From an environmental perspective, these wetlands are the most important parts of the river delta. In 2016, the Iranian side of the wetlands was listed under the Ramsar Convention and was recognised as a UNESCO Biosphere Reserve. There have been some efforts to invite Afghanistan to also join the international campaign to revive the Hamoun Wetlands; so far, however, their participation has not been forthcoming.

Local people who live in the delta on either side of the Helmand River, in the area adjoining the Hamoun Wetlands, are mainly engaged in farming. Occasionally, however, when the wetlands are inundated, they may engage in fishing, reed harvesting, and/or bird hunting. Some illegal smuggling of opium from Afghanistan and fuel from Iran also occurs across the river at the political border.

Afghanistan's history has been shaped by the international and regional geopolitical competitions in which it has been caught and which thus have shaped its development and its own history of conflict. During both colonial and postcolonial periods, it has been a buffer state for superpowers with security interests in the region. Such intense geopolitical competition arguably overshadows everything in Afghanistan, including the management of water resources (Nagheeb and Warner, 2018). Landlocked and attempting to catch up on development, Afghanistan focuses on unilateral water development as a strategic policy to overcome political failures and to satisfy the growing socio-economic demand in several provinces, including Helmand and Nimrooz. Severe concern is arising in Iran due to Afghanistan's already-constructed dams on the upper HRB (the Kajaki Dam on the Helmand River and the Dahla Dam on the Arghandab tributary), as well as from its current projects to build the Kamal Khan Dam on the Helmand River and the Bakhshabad Dam on the Farah River, and to expand the area under irrigation (see

Figure 2). Iran itself has developed several projects to manage water resources, such as the Chahnimeh Reservoirs; these are aimed at meeting its drinking water demand (including from its main cities of Zabol and, the outside of the basin, Zahedan) and irrigation water demand in Sistan; however, Iran’s vulnerability to water flow variability and its complete dependence on upstream water resources from the Helmand River have required it to maintain or even reduce the irrigated lands in its Sistan area from 1951 levels. All in all, unsustainable and disconnected water – land management of the HRB in and between the two sides have substantially contributed to the desiccation of the Hamoun Wetlands. This has seriously affected all segments of the dependent population and has caused deterioration of socio-ecological conditions.

Figure 2. Change in land use and the massive irrigation expansion in upstream Afghanistan (the Nawa Barakzai region) between 1990 and 2011.



Source: Hajihosseini et al. (2020); reprinted from Journal of Water and Climate Change 11(4): 1695-1711, with permission from the copyright holders, IWA Publishing; see also Mianabadi et al. (2020) and Mianabadi et al. (2021).

**HISTORICAL TRAJECTORY OF HYDROPOLITICAL RELATIONS: COEXISTING CONFLICT AND COOPERATION UNDER WESTERN INTERVENTIONS**

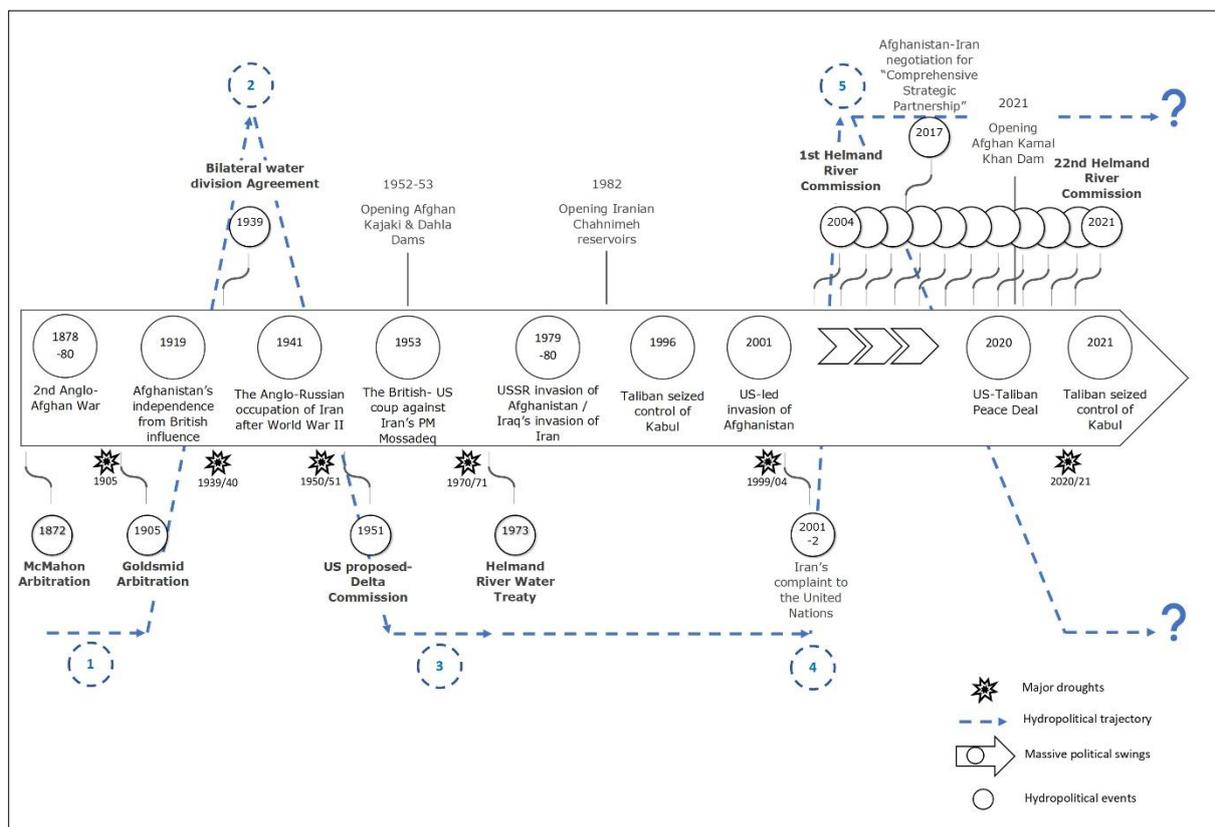
This section describes the 150-year history of conflictive and cooperative events concerning the HRB (see Figure 3); it then puts them into the TWINS matrix (Figure 4) in order to examine how and when changes in relations occurred. Table 1 delineates the respective speech acts observed during this time. The historical trajectory of hydropolitical relations between Afghanistan and Iran over the HRB has witnessed almost no progress and is full of dead ends and unexpected twists that are overshadowed by massive political swings (see Figure 3 for more detailed information).

Significantly, disputes over the Helmand waters have been heightened in periods of drought and flood. Figure 3 highlights how droughts in the river delta – caused by either nature or human activities – have also played a crucial role in the Helmand River’s history of conflict and cooperation. Such extreme events have driven legal and political interactions between the countries and have influenced them to undertake certain cooperative behaviours and to make a number of coordinated decisions. Our findings

show that conflicts have arisen during periods of drought, but that these conflicts have often been kept under control by both sides in favour of a limited 'cooperative' approach; however, both countries – but particularly Iran – appear to be dissatisfied with the level and outcome of cooperation. We know that not all cooperation is necessarily good for everyone involved (see, for example, Zeitoun et al., 2020), and that disputes may indeed lead to more equitable arrangements. Cooperation over the Helmand River, in fact, resulted in the invalidation of a legal treaty, which required that an underlying disagreement be revisited.

Arguably, Afghanistan’s non-cooperative behaviour and the resulting conflict may, at least in part, be more rooted in the 'damaged identity' that it sustained in the course of a lengthy war and Western invasions. As we will see here, in 150 years there has been almost no change in Afghanistan’s interests as upstreamer or in its strategies for controlling Helmand waters; nor has there been a change in Iran’s desire, as downstreamer, to guarantee its water demand with regard to the HRB. The behaviour and progress of conflict-cooperation over shared waters has also been seriously overshadowed by Afghanistan’s broader political context. The history of hydropolitical relations over the HRB could therefore be divided into four main political periods: a) colonial imperialism, b) postcolonial nationalism, c) civil war, and d) post (and within) civil war.

Figure 3. Legal evolutions, major droughts, and infrastructure development in the Helmand River Basin in the context of massive political events.



Source: Authors; see also Nagheebay and Rieu-Clarke (2020).

### Imperialism and the seeds of conflict: Securitising water

Many of the fundamental crises and conflicts in most parts of the world are rooted in the colonial past and are "still in the empire's shadow" (Hardy, 2016). Afghanistan, as the buffer state for the British Empire when it ruled much of South Asia, is one such example. The first arrangements between Afghanistan and Iran with regard to water were rooted in late-19th-century imperialist rivalry over sovereignty and territorial boundaries. By the end of the Anglo – Persian War (1856/1857) and under the rivalry of the Great Game between England and Russia, the 1857 Treaty of Peace (the Paris Treaty) between Persia and Great Britain was signed (Ebrahimi and Kamaruzaman, 2019). Accordingly, Persia was obliged to relinquish all claims over Herat by acknowledging the independence of Afghanistan under British suzerainty, and Britain agreed to serve as arbiter to resolve disputes between Persia and Afghanistan "in a manner just and honourable to Persia" (quoted in Mojtahed-Zadeh, 2007: 180). In 1872,<sup>2</sup> the British officer General Sir Frederic Goldsmid, on behalf of Britain, became responsible for arbitrating the dispute between Iran and Afghanistan over the delimitation of the boundary in Sistan. In the process, the main branch of the Helmand River in the delta region was defined as the border, with the principle irrigation areas and the major population at the time remaining on what is now the Iranian side; meanwhile, the supply canals necessary for those Persian/Iranian-side irrigations were assigned to the other side of the border/river, in what is now Afghanistan (Mojtahed-Zadeh, 2007). Goldsmid's boundary award was problematic in its failure to decide or recommend a mechanism for water division between the two newly divided sides. In fact, he contented himself with only offering general advice, suggesting that, "It is, moreover, to be well understood that no works are to be carried out on either side calculated to interfere with the requisite supply of water for irrigation on the banks of the Helmand" (ibid). He clearly did not consider the natural impacts of changes in river morphology or, accordingly, their influences on the political border.

While the question of water allocation remained unanswered, for 30 years disputes over the Helmand waters in the delta were apparently settled locally without intervention from central authority; that is, local residents – Afghans and Iranians – cooperated in sharing the same water. In 1896, however, further disputes occurred between the two countries. These arose mainly because the river had changed its course in the border area as a result of flooding, which led to a severe drought (ibid). In 1903, once again, British arbitration assigned an officer to demarcate new boundaries and determine the water rights; this time it was Colonel Sir Henry McMahon.<sup>3</sup> With regard to water allocation between the two sides, it is said that in 1903/1904 McMahon ruled that the Helmand water should be divided equally between the two parties in the border area (ibid), but that, in 1905, he decided instead to allocate two-thirds of the Helmand water in the delta to Afghanistan and one-third to Iran (ibid). The Hamouns' water demand was also neglected in his arbitration, perhaps because environment was not an issue at the time.

While the reasons for this change in his decision are not clear from the literature, the arbitration could potentially be questioned since the Iranian side at that time was apparently wider, more fertile, and more populous than the Afghan side (the district of Nimrooz), even without taking into consideration the needs of the Hamoun Wetlands themselves. The arbitration could be seen as a purposeful British tactic to keep the buffer state under their control. While the Afghans were satisfied with the water award, the public opinion from the other side regarding the arbitration was that it was unfair. In the summer of 1905, when the Helmand waters had fallen to extremely low levels, the opposition Iranian newspapers abroad, as

<sup>2</sup> The first and second Anglo–Afghan wars between the British Empire and the Emirate of Afghanistan were from 1839 to 1842 and from 1878 to 1880.

<sup>3</sup> In this regard, Mojtahed-Zadeh (2007: 247) points out that "[t]he original problem was that rulers of the British protectorate of Afghanistan at the turn of the twentieth century considered river Hirmand as an internal river of that country, reserving for Afghanistan the right to utilise its water in whatever way it wished. McMahon's Memorandum of 25 September 1904 asserts: 'The Afghan Government does not admit that there is any water question in dispute, as their geographical position makes them sole owner of the whole Helmand above the Band-i-Sistan'".

well as 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.<sup>4</sup> 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 (ibid).

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, 2018). 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: British India. The decision following from 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 (ibid).

Looking through the lens of TWINS, interactions over the Helmand water in these periods may be considered as efforts to arrive at an ad hoc joint action, in the sense that the parties involved gathered only to address the specific problem and the immediate need; they did not hold shared goals with regard to the wider issues concerning the utilisation of the HRB, which were bound to be problematic. Disagreements over water, moreover, lay at the heart of disputes about land and territory, and any form of appeasement concerning water issues reflected concerns about the loss of sovereign control and threats to national security. Such imperial interventions in these disputes over water in the context of the Great Game made the Helmand basin a hydropolitical security complex<sup>5</sup> in which the matter was presented as a threat to the national security of Afghanistan (and Britain) and Iran, requiring urgent action outside the normal political domain, that is, arbitration (TWINS Sequence 1 in Figure 4).

Officially, the question of water division remained unsettled; for almost 30 more years, however, there again appeared to be sufficient cooperation at the local level and lack of serious disagreement at the state level over utilisation of Helmand water. From 1905 to 1930, an annual joint commission made up primarily of academics appointed by the two countries cooperated in jointly measuring and allocating the Helmand water at Band-e Kamal Khan (CIA, 1964).

### **Postcolonialism, nationalism, and the politicisation of water**

During the postcolonial era and into the 21st century, international water basins across the world have seen the effects of strands of (hydro)nationalism. This nationalism may be a symptom of postcolonial state-building (Allouche, 2020); it may also be a repudiation of globalising capital seeking outlets in the Global South, as exemplified in the water riot in Cochabamba, Bolivia in 2000 (Schneider, 2018). Independent states' willingness to politicise/securitise waters – protecting their own sovereignty – dramatically reduces the range of possible win-sets (Rigi and Warner, 2020), as any compromise will raise their concerns about independence. The complex struggle to build a nation state is readily apparent in the HRB. The Helmand River was divided by political borders in the colonial era, left with asymmetric and interdependent socio-economic relations between Afghanistan and Iran, and affected by anarchic nature and geopolitical tensions between out-of-basin actors in the postcolonial era.

Shifting from the colonial to the postcolonial era, development and modernisation became the heart of global powers' policies with regard to newly independent states. This often manifested in dam projects, land reform, and planned cities (Cullather, 2002). These policies persuaded the then leaders of

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<sup>4</sup> Local people in Sistan area also physically attacked the British arbitration headquarters; this was followed by a request from the Iranian government for fresh arbitration (ibid).

<sup>5</sup> Schulz (1995) introduced this notion as, "a set of states that are geographically part owners and technical users of a water body, and that consider that water body to be a major national security issue".

Afghanistan and Iran to use such development programmes to modernise their countries and to create and promote a national identity (Nagheeb and Warner, 2018).

In the 1930s, the relationship between the newly centralised government of Reza Shah Pahlavi in Iran and the government of Mohammad Nader Shah and then Mohammad Zahir Shah in Afghanistan became friendly, being united by the same development drive. This friendship was apparent in the commissive speech act of Mohammad Nader Shah regarding a land dispute, wherein he stated that, "I would leave the decision up to the opinion of His Highness Reza Shah" (Arfa, 1964: 284). Such a speech act may be understood as an attempt by both sides to normalise relations, a normalisation that resulted on several occasions in bilateral cooperation in trade and consular relations. Amid this promotion of good relations, upstream development caused a shortage of water downstream, and thus local protests. This resulted in the prioritising of water issues in bilateral political discussions (Mojtahed-Zadeh, 2007). Speech acts from both sides, such as those quoted above, triggered attempts to achieve mutual consensus over the settlement of the Helmand water disputes; they accordingly resulted in the conclusion of the 1939 treaty (*ibid*). Article I of this treaty recognised that, "the governments of Iran and Afghanistan agree to divide in equal shares all waters of the Helmand River which reaches to Band-e Kamal Khan (30 miles [48 km] from the border inside Afghan territory) between Iran and Afghanistan" (*ibid*: 236). The treaty again did not address the achievement of shared goals, instead it was limited merely to a rigid dividing of water between the two parties. The water issues, therefore, took on a politicised nature that was associated with a commissive speech act followed by ad hoc joint action (TWINS Sequence 2 in Figure 4).

The 1939 bilateral treaty, despite several rounds of bilateral negotiation amid the newly established relations between the two states, also failed to put an end to the disputes. This was mainly because not all Afghan delegates would consent, though from the Iranian point of view there was significant improvement on McMahon's water award. The treaty, however, could not create a shared goal or shared vision between Afghanistan and Iran concerning the utilisation of the Helmand waters; this left management of the basin unilateral and fragmented. The signing of the 1939 treaty was also overshadowed by the political swings in Iran during World War II; these resulted in Reza Shah being exiled in 1941 by the British and the Russians. The disputes, accordingly, were revived again, particularly after the inauguration of the US-funded Helmand-Arghandab Valley Authority (HAVA). The US pursued a geopolitical goal similar to that of the British within the 'new Great Game'; their goal was to maintain Afghanistan as a buffer state, though with a different strategy – that of making it a development model for the whole world (Nagheeb and Warner, 2018). Contracts signed between the US and Afghanistan in 1945 with regard to projects in the Helmand River included the construction of diversion dams and canals (Farouq, 1999).<sup>6</sup>

The installation of two major dams by HAVA to control water flows was enough to cause great uproar in downstream Iran. These included the Dahla Dam, with a storage capacity of 478.6 Mm<sup>3</sup>, and the Kajaki Dam, with a storage capacity of 1.7 billion cubic metres (Bm<sup>3</sup>); these were finally inaugurated in 1952 and 1953, respectively (Whitney, 2006). The project was supposed to provide Afghanistan with hydroelectric power and increase agricultural productivity; however, Iran opposed the HAVA project, fearing its negative impact, including a decline in the natural flow of the river downstream (Mojtahed-Zadeh, 2007). Despite the development projects being still in their initial stage, the low water flow in 1946 and the subsequent long drought in Sistan in the summer of 1947 were believed by the local population to have been caused by the construction in Afghanistan of these American dams and canals. The British Consul General of Mashhad reported that,

From Zabol a report has been received that no water from the Helmand has reached the town for a month and that outlying villages have been without it for some three months. The drought-stricken population will

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<sup>6</sup> Many issues and doubts concerning these projects are pointed out in some research however, in terms of not only technical and economic perspectives but also environmental effects such as waterlogging and salinisation (Whitney, 2006).

not believe that failure of last winter's snow is the reason and they have expressed their intent of crossing into Afghanistan and forcibly release the water on which they depend and which they are convinced the Afghans are illegally stealing or diverting by their new American engineered irrigation scheme in the neighbourhood of Girishk (Mojtahed-Zadeh, 2007: 249).

Following these events, Iran, whose national security was considered to be under threat, decided to call on the United Nations Security Council (UNSC) to step into the water disputes with Afghanistan. In the end, however, encouraged by the US, Iran renounced its decision (Fakhari, 1993). At this point, the US offered to mediate the Afghanistan – Iran water dispute over the newly re-securitized Helmand River. American mediation, however, could have been tainted by conflict of interest, since an American company, Morrison-Knudson (CIA, 1964), had an interest in intervention as they were building dams and canals for the Afghan government as part of the HAVA project.

The American proposal was based on the creation of a neutral commission of international experts from disinterested countries to study technical aspects of the problem concerning water allocation, with the aim of establishing an engineering basis for mutual agreement (ibid). Iran and Afghanistan created the Helmand River Delta Commission in 1948 based on an American proposal. In 1951, having focused primarily on joint fact-finding, it presented its recommendation for water allocation between the two countries. The Commission took the same position as McMahon, arguing that the core problem in the delta was actually due to "poorly constructed irrigation canals and unscientific diversion of available water" (ibid: 7). Following the same approach, the Commission's representatives estimated water demands at the time merely for irrigation, livestock and human domestic use, without addressing the environmental requirements of the Hamoun Wetlands. While Afghanistan expressed its satisfaction almost immediately after the Commission published its report, Iran rejected the results. The Iranian rejection was based mainly on the disagreement and on different views on the estimation of the irrigation lands and their water allocation in Sistan; their argument was similar to that made against McMahon's award.

Thirty years after the failed 1939 bilateral treaty, negotiations between Afghanistan and Iran were still ongoing, despite ups and downs due to international political competition between the West and the East (Figure 3). It is not clear from the literature whether the local people cooperated with each other during all the years that the water allocation problem between Afghanistan and Iran remained officially unresolved. In fact, most of that time the problem of water division did not cause serious conflict – except perhaps in extreme events of drought or flood – as both states exhibited a willingness to cooperate and improve their relations.<sup>7</sup> In 1973, once again following a period of severe drought in the downstream part of the river in 1970/1971, the two countries signed the Helmand River Water Treaty. The signing occurred after several rounds of negotiations and despite Iran's initial rejection of the Commission's report.<sup>8</sup> The agreement centred on previous recommendations that had initially been rejected by Iran; these included a commitment in normal or above-normal water years to supply Iran with an average of 22 cubic metres per second (m<sup>3</sup>/sec), with an additional 4 m<sup>3</sup>/sec for "goodwill and brotherly relations". This is about 820 Mm<sup>3</sup> per year, which constitutes 8.5% of the average surface water availability of 9552 Mm<sup>3</sup> in the whole basin or 14% of the 5661.71 Mm<sup>3</sup> measured at the nearby Kajaki Dam; it is less than 14% of the overall water demand and requirement in Sistan (Thomas and Varzi, 2015).

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<sup>7</sup> It is also said that there had been some negotiation to draw up a 'package deal' between Afghanistan and Iran for sharing the benefits related to water, energy and the Iranian port of Chabahar (CIA, 1964: 11). See also the 1969 diaries of Asadollah Alam, the Shah's Minister of Court, in which he notes that Afghanistan was offered better access to the Iranian ports at Chabahar and Bandar Abbas along with development assistance in exchange for providing more water to Iran (Alam, 1992).

<sup>8</sup> The 1973 Treaty contained 12 articles along with two protocols related to Articles VIII and IX. Article I(c) identifies a "normal water year" as a year during which the total volume of water from 1 October to the end of the following September (as measured and calculated at the hydrometric station of Dehrawud, upstream of Kajaki Dam) is 5661.71 Mm<sup>3</sup>.

This highly asymmetric water allocation has been one of the major sources of contention up to now. Iran complains that this amount of water cannot meet the domestic and agricultural needs of one of its poorest areas or the ecological demand of the wetlands. Afghanistan, on the other hand, itself struggles with poverty and poor living conditions has repeatedly stated that it needs the same water resources for its socio-economic development, particularly for economic recovery after the civil war. The signing of the treaty in 1973 was widely promoted by the officials of both countries, once again through commissive speech acts. The Afghan Prime Minister, Mohammad Musa Shafiq, for instance, stated that the treaty "will solve the Helmand problem" and will ensure that "another 100 years of the two nations are [not] wasted on finding a solution for this difficulty" (Abidi, 1977: 372). Similarly, the Iranian Prime Minister, Amir-Abbas Hoveyda, pointed out that "there is no longer any question mark in relations between the two countries" (ibid). Enthusiasm on the part of the riparian states for the treaty, however, quickly faltered; an exchange of assertive and directive speech acts occurred and the treaty did not enter into force until June 1977, when the instruments of ratification were finally exchanged (ibid). It was, and still is, strongly claimed by some Afghans that the Helmand River is a 'national' and 'internal' river, invoking the (Harmon) doctrine of absolute territorial sovereignty (Nagheeby et al., 2019).<sup>9</sup> The delay in ratification could thus be explained by the discontent of the Afghan government and parliament, which perceived Afghanistan to be acting as a "water dealer" (Mahmoudi, 2017); it "resented 'giving away' what they regarded as precious Afghan water" (CIA, 1981: 1). Disdain for the treaty was also felt by some Iranians, who accused its signatory of being a "traitor" (Alam, 1992).<sup>10</sup> Iranian views (which still persist) were shaped by the idea that the 1973 treaty emerged from "hidden" talks and that it was a "gift" from the Shah and the Americans to the Afghan people in exchange for standing up against the (Russian) communists (Alam, 1992).

Coming from this atmosphere of securitised water issues and overshadowed by the 'new Great Game' in the 1950s to 1970s, the 1973 treaty was unable to establish common norms with regard to a joint water – land – ecosystem regulation or to cooperatively arrive at a benefit-sharing arrangement for the whole basin; at best, it was able to regain control of the conflict through ad hoc joint actions (TWINS Sequence 3 in Figure 4). Arguably, this status quo of sustained chaos may be a manifestation of the geopolitical complexity of the basin, a condition which serves the interests of outsiders. The treaty remained in abeyance and for some 20 years neither official cooperation nor serious conflict between the countries on water-related issues took place. This can be attributed to: 1) the great political upheaval in Afghanistan that followed the Soviet invasion of 1979, the subsequent civil war, and the US-led invasion of 2001; and 2) the Iranian revolution of 1978/1979 and the war that Iraq then waged against Iran from 1980 to 1988, which was initiated by the Western-backed President Saddam Hussein. During these years, the water issues between Afghanistan and Iran were abandoned by both sides.

### **Civil war and political instability in Afghanistan, and moving back to water securitisation**

The Taliban seized control of Kabul in 1996. It retained control for the next five years, during which several factors raised the water issues around the Helmand River to their highest and most serious level of tension. The first factor was the relationship between Iran and the Taliban. This became hostile after the Taliban attacked the Hazara Shi'as in Afghanistan; it deteriorated further in 1998, after they killed many Hazaras in the northern Afghan city of Mazar-i-Sharif and murdered Iranian diplomats and a journalist in the captured Consulate General of Iran (Milani, 2006). The second factor contributing to tensions was the long period of extreme drought suffered by the entire region between 1999 and 2001 (Wegerich,

<sup>9</sup> See footnote 3. See also the BBC Persian interview with Najib Agha Fahim, a former Afghan diplomat, who sees the Helmand River as an 'internal' and 'national' river rather than an international river (*BBC Persian*, 2019b).

<sup>10</sup> Asadollah Alam, the former Iranian Prime Minister and the Minister of the Royal Court at the time, shouted at signatories for being "cowards" and "betrayers".

2002). During this period, there was a 98% reduction in water flow to Iran and the whole Hamoun Wetlands completely dried up, resulting in a massive displacement from Sistan (UNCT, 2001).

Within the growing political tensions, the Taliban was accused of closing the gates of the Kajaki and Dahla Dams in order to put Iran under pressure. Iran, in response, tried to solve the issue using international and regional political channels. Surprisingly, under conditions of such apparently insoluble conflict, Iranian efforts resulted in the creation of a joint inspection committee of experts from both sides which visited the Kajaki Dam in July 2000. The joint inspection team observed the dam to have "a considerable amount of water in its reservoir" (at that time, 1 Bm<sup>3</sup> of stored water), and found that "the main cause of the water blockage was the closure of the gates at the Kajaki dam" (UNSC, 2001: 2).<sup>11</sup> Iran sent an official complaint to the United Nations in March 2001, which referred to Afghanistan's "blockage of water flow in the Hirmand River, causing irreparable damage to the agriculture and animal husbandry in the Sistan region and the Ham[o]jun wetlands in the Islamic Republic of Iran" (UNSC, 2002: 58). Meanwhile, in late 2001, the US invaded Afghanistan in response to the September 11 attacks. The Transitional Islamic State of Afghanistan, with considerable support from Iran, then established a new government (Milani, 2006). The water shortage continued, however, and the second round of joint inspections took place in early September 2002, after the official visit to Afghanistan by Iran's President Muhammad Khatami. The second joint inspection led to the same conclusion as the first; it was followed by Iran's second letter to the United Nations in December 2002, which asked Afghanistan to comply with the 1973 treaty on the Helmand River (*IRNA*, 2002).

Inserting all of this into the TWINS framework highlights the mutual securitisation 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 (TWINS Sequence 4 in Figure 4).

### **Stuck in an endless loop: Living between hope and despair**

In August 2004, following the period of drought and civil war in Afghanistan and after the collapse of the Taliban, the countries held the first meeting of the Helmand River Commission (HRC) in Tehran. The new Afghan government had received strong Iranian support in its battle with the Taliban, which gave rise to a newly progressive atmosphere of friendly relations between the two countries. This, combined with Iran's growing political influence, motivated both states to agree to begin implementation of the Helmand treaty. This restart of negotiations occurred despite opposition from prominent dissidents on both sides who, as mentioned above, strongly believed that the 1973 treaty was an unfair and imposed law and that the signatories to the treaty were 'traitors'. In such a sensitive environment, these efforts may be seen as a willingness on the part of the two states to scale back hydropolitical relations from their securitised level; this new openness resulted in the beginning of formal cooperation in the form of ad hoc actions that were based on the inherited 1973 treaty (TWINS Sequence 5 in Figure 4).

Despite encountering impasses and even though the possibility of dissolving the HRC was on the table several times, HRC meetings continued to take place about twice yearly, in the course of which there were calls to expand mutual water cooperation to better implement the treaty. The most recent progressive steps were taken on November 17 and 18, 2019, in Tehran, where both parties agreed to carry out a joint study to determine the places for delivering Iran's water rights (*IRNA*, 2019). This was followed by an agreement on 5 February 2020 (and another in 2021) to conduct a joint geological survey of the Helmand River in the border area (*IRNA*, 2020).

A number of international organisations, particularly UNESCO, the Ramsar Convention, UNDP, UNEP and the Global Environment Facility (GEF), have also sought to create an integrative regional/basin-wide

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<sup>11</sup> It also notes that "the flow of water at the hydrometric station at Dehrawud was 46.8 cubic metres per second and that the Kajaki dam had 1 billion cubic metres of water in reserve".

plan for cooperation and management of the Helmand River and for protection of the Hamoun Wetlands (see, among others, UNEP, 2003; UNDP, 2005; UNDP, 2006; DoE and UNDP, 2014). The UNEP, for instance, facilitated several programmes of environmental diplomacy between the two sides by organising technical meetings in 2005. It was recommended there that both parties share information on water quantity, establish national advisory committees, and develop joint restoration projects with financial support from the GEF. This effort, however, "has unfortunately been stalled by increasing insecurity in the region" (UNEP, 2009: 27). Similar efforts have also been welcomed by Germany and the Netherlands; in 2016, they showed their interest in supporting and facilitating the establishment of a cooperation framework for the whole basin (*TehranTimes*, 2020).

Notably, while there has been very little progress in water relations, cooperation on other issues has seen significant growth, especially in the areas of trade and other economic activities. In 2013, during the time of Afghan President Hamid Karzai, a memorandum of understanding (MoU) was signed. Following this signing, the two states have engaged in a series of negotiations to conclude a major bilateral strategic cooperation agreement to expand their "cooperation on issues of counter-terrorism, drugs, refugees, economic links and transit trade" (Panda, 2015). This trend continued in January 2016, when another MoU was signed between the two countries. It emphasised the boosting of cooperation in several areas, including water and environmental conservation, which was very important for Iran. Although, in the end, the no-harm principle was removed from the MoU by Afghanistan, the Iranians saw this as very important progress because they were finally able to persuade Afghanistan to sign a piece of paper that mentioned water and environmental cooperation, even if it was a non-binding MoU. In this MoU, both parties agreed to guiding principles based on international law, which set out equitable and reasonable water utilisation. Notably, however, these applied only to the Harirud River – another transboundary river between Afghanistan and Iran – not to the Helmand. Both states also agreed to conduct a joint technical study that would consider concerns about the condition of the HRB ecosystem, and both also agreed to implement the Helmand River Water Treaty.

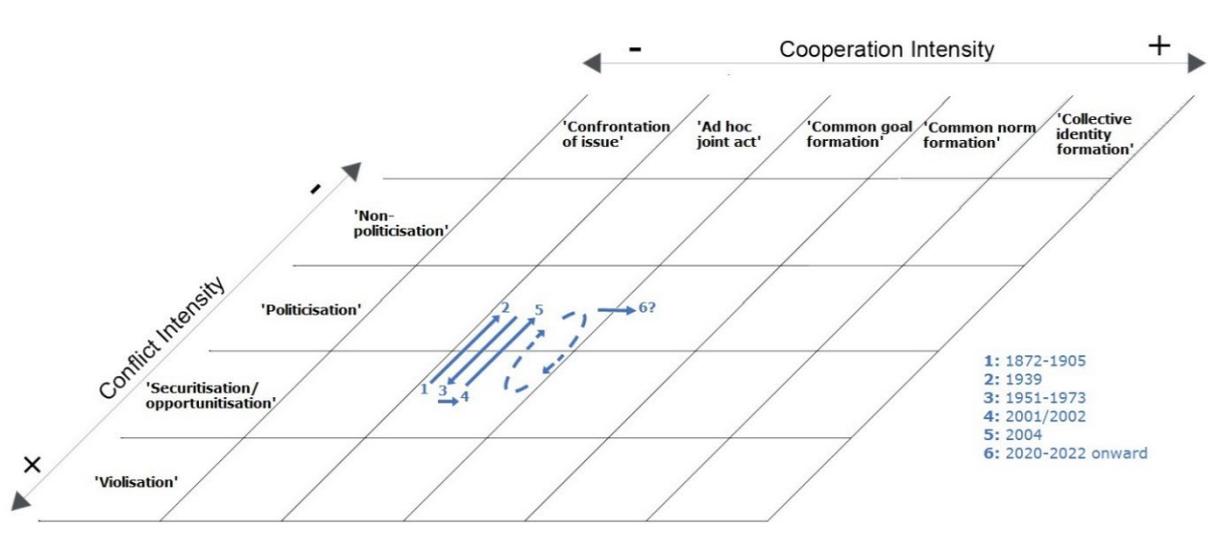
Further progress in the non-water relationship was followed by the signing of a trade corridor deal between Iran, India and Afghanistan in 2016 that includes a plan to turn the Iranian port of Chabahar into a transit hub; this would be strategically significant for all three states, particularly Afghanistan as a landlocked country (*AlJazeera*, 2016). Finally, in 2017, parallel to a meeting of the HRC, higher-level negotiations between Iran and Afghanistan sought to establish a "Comprehensive Strategic Partnership" on several issues; this included security and water, again with an emphasis on boosting economic cooperation between the countries (*IranPress*, 2019). The respective negotiations continued during a visit by Iran's Deputy Foreign Minister, Abbas Araghchi, to Afghanistan in July 2020. Araghchi emphasised the need to sign a comprehensive document to find common ground for cooperation, noting Iran's proposal for conducting a joint study that would be either bilateral or would be in collaboration with an independent international organisation (Langari, 2020; *TehranTimes*, 2020). It is not yet clear, however, whether Afghanistan will accept this.

By providing such an incentive package, Iran, through a pragmatic policy, hoped to improve cooperation over the Helmand River; it wanted particularly to guarantee the Hamoun's water demand beyond the Helmand River Water Treaty. It seems that Iran, as downstream state, thinks that the creation of a 'give and take' relationship and the bringing to the table of all common issues (including economy, trade, education, refugees, and security) in one package of benefit-sharing will convince Afghanistan to cooperate in water and environmental issues. One element of the reasoning behind this idea is that Iran thinks that in most of these areas it is a 'generous giver' (for instance, hosting millions of refugees while being under economic challenges and providing export subsidies); accordingly, it expects Afghanistan to cooperate on water and environmental issues. In Iran's view, the situation has remained almost a zero-sum game, one in which Afghanistan has been the recipient of almost all the incentives and Iran has received almost nothing when it comes to cooperation on water and environmental protection.

Afghanistan, however, does not agree. It *also* thinks that for a long time it has been a 'generous giver', that it has giving 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 (see, for example, Malyar, 2016). Afghanistan thus has a fear of being a 'loser' by putting all the issues in one 'benefit-sharing' basket. Afghanistan's view has also been shaped by its belief that Iran – struggling with economic sanctions and seeking not to lose its influence – has no other option but to invest and develop its economic relations with Afghanistan. Afghanistan's involvement in a long war, its lost chance for development, and its struggle with severe poverty and political instability means that, like Iran, it is engaged in a zero-sum game where the only thing left to leverage its relations is its water resources. This may be very evident in what President Ashraf Ghani shouted at the inauguration of the Kamal Khan Dam over the Helmand River near the Iranian border in March 2021; he asserted that: "each drop of Afghanistan's water will be more valuable than our neighbours' oil" (*BBCPersian*, 2019a). This could be recognised as assertive speech act. With such reasoning behind it, it seems there are some voices calling for "sanctioning cooperation with Iran on transboundary waters". In this respect, Malyar (2016: 105) points out two differing interviewees' interpretations concerning such a policy: "Some believed that it was a matter of Hamid Karzai and his administration's view on the topic, but others blame the international community, particularly the U.S.; for manipulating the situation and not allowing Afghanistan to resolve its water issue with neighbouring states". Some Afghans also take very pessimistic views of Afghanistan's water cooperation with its neighbours before the completion of dams and development project (Thomas et al., 2016).

In this context, a record of more than 20 HRC meetings have taken place (see Figure 3). Triggered by specific incidents, however, such as shortage of water or unilateral upstream water development plans, the HRB has experienced continual fluctuations in the degree to which negotiations are politicised and securitised; till now, it appears to be stuck in an endless loop (see the loop in TWINS matrix in Figure 4). The almost-frozen nature of the negotiations continued – albeit with steady progress by Afghanistan in the control of water – until, in August 2021, a radical change occurred: after the 'Peace Deal' with the Americans, the Taliban again seized Kabul. That development has put a big question mark against the future of relations (Figure 3 and TWINS Sequence 6 in Figure 4).

Figure 4. 150 years of hydropolitical relations of the Helmand River Basin in the Transboundary Waters Interaction NexuS (TWINS).



Source: Authors.

Table 1. Respective speech acts observed in the course of hydropolitical relations in the Helmand River Basin.

No. of event	Date	Speech act category	Evidence (non-verbal)	Selected examples of verbal speech acts	Hydropolitical effects	Outcome
1	1872, 1905	Assertive	. Asking for third party arbitration . Water dispute was displayed as a threat to national security	N/A	Securitisation and ad hoc joint act	Rejecting the arbitration decision by Iran (Persia)
2	1939	Commissive	. Mutual attempts to achieve consensus	Mohammad Nader Shah: "I would leave the decision up to the opinion of His Highness Reza Shah".	Politicisation and ad hoc joint act	Signing the 1939 treaty to share water
3	1951-1973	Commissive followed by assertive and directive	. Both parties agreed to creating a joint committee and ultimately a treaty, but this was challenged by critics	. Amir-Abbas Hoveyda: "[T]here is no longer any question mark in relations between the two countries". . Some Afghan officials: the Helmand River is a 'national' and 'internal' river. . Both sides accused their signatory of being a 'traitor'.	Securitisation and ad hoc joint act	Signing the 1973 treaty (while being heavily criticised on both sides)
4	2001/2002	Assertive (by Iran) and directive (by Afghanistan)	. Iran makes official complaint to the UNSC . Closure of dam's gates by Afghanistan	N/A	Securitisation and ad hoc joint act	Creating a joint inspection committee of experts from both sides
5	2004	Commissive	. Mutual attempts to implement the treaty	Muhammad Khatami, former President of Iran: "The stability and security of Afghanistan is the same as our own security and stability" (Nagheeby and Warner, 2018).	Politicisation and ad hoc joint act	First meeting of the Helmand River Commission
6	2020-2022 onward	Assertive and directive by Afghanistan	. Unilateral act by building dams (for example, Kamal Khan Dam) . The diversion of water from its natural course	Ashraf Ghani: "[E]ach drop of Afghanistan's water will be more valuable than our neighbours' oil".	Not yet clear	Not yet clear

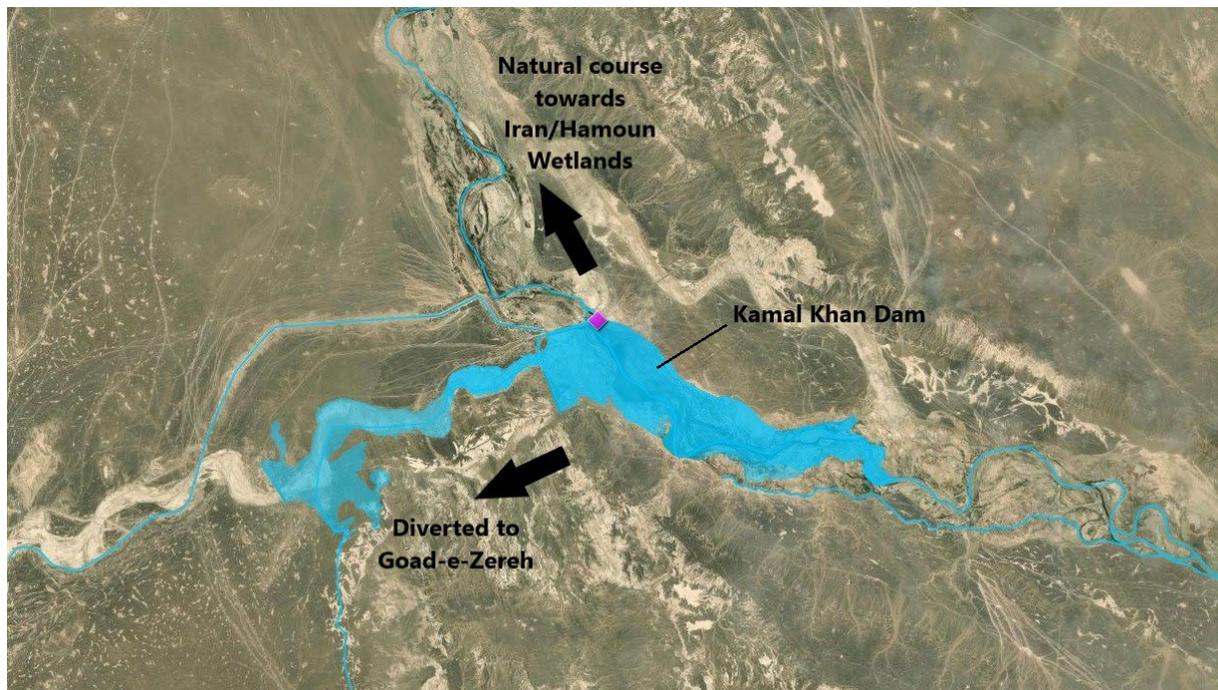
Source: Authors.

After 150 years of fluctuation under Western interventions, the political landscape across the whole region has been changing dramatically. There is a simplistic point of view that argues that Iran's political relations with the Taliban and their common goal to withdraw US troops will ease the water controversy over the Helmand River; however, the recent questionable and adverse reaction of the Taliban to Iran's request to open the gates of Kamal Khan Dam after a long period of drought (*TehranTimes*, 2022; *Al-Monitor*, 2022) has contradicted such a reductionist view. There is unconfirmed news that the Taliban has asked Iran to pay for any water they want, including for the water received under the 1973 treaty. At the time of writing this paper, satellite images show that Afghanistan – seemingly following a plan designed during previous regimes of the Taliban's opponents – is diverting water directly to the Goad-e-Zereh from its natural course, interrupting water flows towards Iran and the Hamoun Wetlands (see Figure 5). This diversion completely bypasses the water supply to Iran, without showing clear economic and agricultural benefits for the people downstream from the Kamal Khan Dam on both sides of the border (Alcis, 2022). History appears, with this, to be repeating itself in that the diversion constitutes a clear revisiting of the 2001/2002 tensions over the closure of the gates; this time, however, Iran is taking a relatively conservative position with regard to Afghanistan's illegal act.

Arguably, Afghanistan has reached the goal set for it in the 1870s for the British interests, that of full control of the Helmand River water. Control of the water (mainly by the Kamal Khan Dam) is now, however, in the hands of the Taliban. They are able to use it for their own goals, against Iran but, even more so, against their Afghan opponents who built the dam. The Taliban are likely to use their control of tap water to put pressure on Iran for other issues; these include conferring legitimacy on the Taliban and blocking Iran's support for their opponents (Iran has as yet declined to give the Taliban political legitimacy; they are making it conditional upon the setting up of a government in Afghanistan that includes the country's different political parties). Iran, on the other hand, will likely have to be patient about its water controversy; it will need to deal with the broader geopolitical circumstances and to stick with its priority interests, particularly security issues and the rise of the Daesh in Afghanistan (and within Iran's own borders). Iran's pragmatic policy for carefully dealing with water disputes and with the related public concerns is manifested in its conservative reaction to the latest provocative remarks by Mr. Ghani at the inauguration of the Kamal Khan Dam. On that occasion, Iran sought to ignore the provocation by only highlighting water rights and by showing its willingness to turn the issue into a subject of cooperation (*TehranTimes*, 2021). This has been followed by the continuation of Iran's social and economic support of Afghanistan under the Taliban's current ruling (see, for example, *IRNA*, 2022).

It is too early to assess the impact of the unfinalised negotiations between Iran and the former rulers of Afghanistan and too soon to analyse how they might overcome the impediments that emanate from the new waves of chaos in Afghanistan such as the re-empowering of the Taliban and the rise of the Daesh (ISIS). In practice the disputes have continued, with both sides continuing to accuse each other of violating their treaty obligations while their wishes remain a 'paper tiger'. No shared goal, shared vision, or common norm has been created to address the interests and identities of Iran and Afghanistan with regard to the HRB. History demonstrates that while disputes over water between Afghanistan and Iran have been continuously reined in and kept more or less under control, some questions remain unanswered: Will Afghanistan insist on selling water? Will Iran accept this or will it propose an alternative such as desalination and transferring water from the sea to ease the pressure? How can Afghanistan and Iran complement each other and collectively address their shared concerns and problems?

Figure 5. Kamal Khan Dam and Afghanistan's diversion of water from its natural course (Iran/Hamoun Wetlands) to the Goad-e-Zereh.



Source: Alcis (2022); reproduced with permission from the copyright holders, Alcis.

## CONCLUSION

Water, we argue, cannot be simply disconnected from the broader geopolitical overlay. While (neo-)Malthusian literature (for example, Gleick, 1994) predicts that scarcity will lead states to engage in violent resource conflict, game theory predicts that lengthening the 'shadow of the future' will bring them to cooperation (Bearce et al., 2009). There is no overwhelming evidence for either of these schools; rather, we may characterise the situation in the Helmand River as a 'frozen conflict' or a 'frozen peace' that could go either way (Smetana and Ludvík, 2019). There is neither war, nor peace, nor stasis; rather there is a status quo that oscillates among them.

This paper proposes avenues for further examination of the multi-layered political nature of the Helmand River and of the public narratives and discourses that are critical to regional peace-building mechanisms and mutual water cooperation in the basin. The TWINS matrix is used in this research to map the evolution of the coexistence of conflict and cooperation in hydropolitical relations surrounding the Helmand River. The paper shows how little movement there actually has been in the course of a century of political ups and downs that have been seriously influenced by outside interventions.

Notably, the deterioration in relations between Afghanistan and Iran – let alone the predicted 'water wars' scenario – is simply not borne out by the facts on the ground and by the states' historical relations. It is true that relations around water resources have not significantly improved and that they loom as high politics for both Afghanistan and Iran. Both states, however, have ultimately preferred to adopt a form of 'cooperation' in the management of their water controversies; this is due to the primacy of other interests such as security, economy and, in Afghanistan, stability. Iran, in this case, has to compromise and largely put aside its water dispute with Afghanistan in order to deal with the greater and seemingly continual threat of insecurity in Afghanistan. Afghanistan, in contrast, while struggling with insecurity,

may benefit to some extent from Iran's position in order to maintain its own status quo and accelerate its development. Within the highly contested nature of the geopolitical setting under Western interventions, both states – but particularly Iran – appear to have little choice but to swallow the bitter pill and control their controversies over water issues with very limited cooperation. Accordingly, based on historical evidence, it is most unlikely that the water-related controversies between Afghanistan and Iran will take an uncontrolled path. This type of frozen atmosphere, however, is by its nature highly contested; this makes for widespread misunderstandings, accusations, and counter-accusations between two sides that both claim to be victims of circumstance. Continuing the same zero-sum destructive blame game will result in severe and irreparable damage to the whole ecosystem. After 150 years of controversy over the Helmand River Basin, is this still a potential remedy?

## REFERENCES

- Abidi, A. 1977. Irano-Afghan dispute over the Helmand waters. *International Studies* 16(3): 357-378.
- Al-Monitor. 2022. Iran's water woes worsen despite warmer Taliban ties. <https://www.al-monitor.com/originals/2022/02/irans-water-woes-worsen-despite-warmer-taliban-ties#ixzz7KOz3B1H1> (accessed 14 Feb 2022)
- Alam, A. 1992. *Yad' dashtha-ye Alam: Virayesh va Muqaddamah az Alinaqi Alikhani* Bethesda: ML: Ibex Publishers.
- Alcis. 2022. Holding Water to Ransom: Kamal Khan Dam in Southwest Afghanistan. <https://storymaps.arcgis.com/stories/62cca686665041a09f32df6b15cbe371> (accessed May 2022)
- AlJazeera. 2016. Indian, Iran and Afghanistan sign trade corridor deal. <https://www.aljazeera.com/economy/2016/5/24/indian-iran-and-afghanistan-sign-trade-corridor-deal> (accessed 14 Feb 2022)
- Allouche, J. 2020. Nationalism, legitimacy and hegemony in transboundary water interactions. *Water Alternatives* 13(2): 286-301.
- Arfa, H. 1964. *Under five Shahs*. London: John Murray.
- AtlanticCouncil. 2016. Water dispute escalating between Iran and Afghanistan. Atlantic Council.
- Balzacq, T. 2011. *Securitization theory : How security problems emerge and dissolve*. Oxon: Routledge.
- BBCPersian. 2019a. Ashraf Ghani: Our water is more valuable than our neighbours' oil. <https://www.bbc.com/persian/afghanistan-47342918> (accessed 8 Feb 2021)
- BBCPersian. 2019b. Why did a treaty that ended a hundred years of conflict become controversial again. <https://www.facebook.com/notes/pargar-bbc-persian-tv/2471442749550394> (accessed 22 January 2021)
- Bearce, D.H.; Floros, K.M. and McKibben, H.E. 2009. The shadow of the future and international bargaining: The occurrence of bargaining in a three-phase cooperation framework. *The Journal of Politics* 71(2): 719-732.
- Buzan, B.; Wæver, O. and De Wilde, J. 1998. *Security: A new framework for analysis*. Lynne Rienner Publishers.
- CIA. 1964. The Helmand waters dispute between Iran and Afghanistan. CIA Library.[CIA-RDP08C01297R000100130005-4]. <https://www.cia.gov/library/readingroom/docs/CIA-RDP08C01297R000100130005-4.pdf>
- CIA. 1981. Iran-Afghanistan: Helmand river dispute still sensitive. CIA Library.[CIA-RDP08C01297R000100130002-7]. <https://www.cia.gov/library/readingroom/docs/CIA-RDP08C01297R000100130002-7.pdf>
- Cullather, N. 2002. Damming Afghanistan: Modernization in a buffer state. *The Journal of American History* 89(2): 512-537.
- Dehgan, A.; Palmer-Moloney, L.J. and Mirzaee, M. 2014. Water security and scarcity: Potential destabilization in western Afghanistan and Iranian Sistan and Baluchestan due to transboundary water conflicts. In Weinthal, E.; Troell, J.J. and Nakayama, M. (Eds), *Water and post-conflict peacebuilding*, pp. 323-344. Routledge.
- DoE and UNDP. 2014. Towards a solution for Iran's drying wetlands: International Technical Round Table on Drying Wetlands. Tehran: IRI Department of Environment; UNDP Iran. [https://www.ir.undp.org/content/iran/en/home/library/environment\\_sustainable\\_development/Towards-a-solution-for-iran-drying-wetlands-Conclusions-and-Recommendations.html](https://www.ir.undp.org/content/iran/en/home/library/environment_sustainable_development/Towards-a-solution-for-iran-drying-wetlands-Conclusions-and-Recommendations.html)

- Ebrahimi, M. and Kamaruzaman, Y. 2019. On Iran's eastern borders: Origins and consecutive treaties with the British during the nineteenth century. In Ebrahimi, M.; Goudarzi, M.R. and Kamaruzaman, Y. (Eds), *The Dynamics of Iranian borders*, pp. 17-26. Springer.
- Fakhari, G. 1993. *Dispute between Iran and Afghanistan on the issue of Hirmand river*. Kabul.
- Farouq, G. 1999. *The effects of local, regional and global politics on the development of the Helmand-Arghandab Valley of Afghanistan*. School of Oriental and African Studies (University of London).
- Gleick, P.H. 1994. Water, war & peace in the Middle East. *Environment: Science and Policy for Sustainable Development* 36(3): 6-42.
- Hajihosseini, M.; Hajihosseini, H.; Morid, S.; Delavar, M. and Booij, M.J. 2020. Impacts of land use changes and climate variability on transboundary Hirmand River using SWAT. *Journal of Water and Climate Change* 11(4): 1695-1711.
- Hardy, R. 2016. *The poisoned well: Empire and its legacy in the Middle East*. Oxford University Press.
- IranPress. 2019. Iran, Afghanistan to finalize a comprehensive cooperation document. <http://iranpress.com/iran-i131310> (accessed 21 January 2021).
- IRNA. 2002. The re-cutting of the Helmand River is a breach of obligations. <https://www.irna.ir/news/6825671> (accessed 3 Feb 2022)
- IRNA. 2019. Tehran-Kabul Agreement on the delivery of Iran's water right. <https://www.irna.ir/news/83562735> (accessed 21 January 2021)
- IRNA. 2020. Joint geological survey from the Helmand river begins after a bout half a century. [www.irna.ir/news/83661941/](http://www.irna.ir/news/83661941/) (accessed 21 January 2021)
- IRNA. 2022. Iran ready to invest in Afghanistan's electricity sector. <https://en.irna.ir/news/84642176/Iran-ready-to-invest-in-Afghanistan-s-electricity-sector> (accessed 14 Feb 2022)
- King, M. and Sturtewagen, B. 2010. *Making the most of Afghanistan's river basins: Opportunities for regional cooperation*. New York: The EastWest Institute.
- Langari, S.Z. 2020. Stability of Iran, Afghanistan 'Interconnected': Araghchi. <https://tolonews.com/afghanistan/stability-iran-afghanistan-interconnected-araghchi> (accessed 21 January 2021)
- LATimes. 2020. God, gas and heroin. Now, the fight's over water. <https://www.latimes.com/world-nation/story/2020-02-06/afghanistan-and-iran-battle-over-water-with-spies-bribes-and-threats> (accessed 22 January 2021)
- Mahmoudi, S.M. 2017. Historical events after the signing of the Helmand River water treaty. <https://8am.af/x8am/1396/02/26/historical-events-after-the-signing-of-the-treaty-helmand-river/> (accessed 20 January 2020)
- Malyar, I. 2016. Transboundary water institutions in developing countries: A case study in Afghanistan. MSc thesis. Oregon State University, Oregon, US.
- Mianabadi, A.; Davary, K.; Mianabadi, H. and Karimi, P. 2020. International environmental conflict management in transboundary river basins. *Water Resources Management* 34(11): 3445-3464.
- Mianabadi, H.; Alioghli, S. and Morid, S. 2021. Quantitative evaluation of 'No-harm' rule in international transboundary water law in the Helmand River basin. *Journal of Hydrology* 599: 126368.
- Milani, M.M. 2006. Iran's policy towards Afghanistan. *The Middle East Journal* 60(2): 235-279.
- Mirumachi, N. 2010. Study of conflict and cooperation in international transboundary river basins: The TWINS framework. King's College London (University of London).
- Mirumachi, N. 2015. *Transboundary water politics in the developing world*. Routledge.
- Mirumachi, N. and Allan, J.A. 2007. Revisiting transboundary water governance: Power, conflict cooperation and the political economy. Paper read at Proceedings from CAIWA international conference on adaptive and integrated water management: Coping with scarcity. Basel, Switzerland.
- Mojtahed-Zadeh, P. 2007. *Boundary politics and international boundaries of Iran: A study of the origin, evolution, and implications of the boundaries of modern Iran with its 1*. Universal-Publishers.

- Nagheeb, M.; Piri, M. and Faure, M. 2019. The legitimacy of dam development in international watercourses: A case study of the harirud river basin. *Transnational Environmental Law* 8(2): 247-278.
- Nagheeb, M. and Rieu-Clarke, A. 2020. Water diplomacy in the Helmand River Basin: Exploring the obstacles to cooperation within the shadow of anarchy. In Kittikhoun, A. and Schmeier, S. (Eds), *River basin organizations in water diplomacy*, pp. 201-221. Routledge.
- Nagheeb, m. and Warner, J. 2018. The geopolitical overlay of the hydropolitics of the Harirud River Basin. *International Environmental Agreements: Politics, Law and Economics* 18(6): 839-860.
- Neumann, I. 1998. Identity and the outbreak of war: Or why the Copenhagen School of Security Studies should include the idea of "violatisation" in its framework of analysis. *The International Journal of Peace Studies* 3(1): 7-22.
- Onuf, N. 1998. Constructivism: A user's manual. In Kubalkova, V. (Ed), *International relations in a constructed world*, pp. 58-78. Routledge.
- Pajhwok. 2021. Afghanistan no longer relinquishes free water: Ghani. <https://pajhwok.com/2021/03/24/afghanistan-no-longer-relinquish-free-water-ghani/> (accessed 14 Feb 2022)
- Panda, A. 2015. Iran, Afghanistan approach strategic cooperation pact. <https://thediplomat.com/2015/01/iran-afghanistan-approach-strategic-cooperation-pact/> (accessed 14 Feb 2022)
- Reus-Smit, C. 2013. Constructivism. In Burchill, S. and Linklater, A. (Eds), *Theories of International Relations*, pp. 217-240. Hampshire, NY, US: Palgrave Macmillan.
- Rigi, H. and Warner, J.F. 2020. Two-level games on the trans-boundary river Indus: Obstacles to cooperation. *Water Policy* 22(6): 972-990.
- Schneider, M. 2018. *Hydro-nationalism: Effects of world-systemic processes and nationalism on water resource sovereignty*. UC Irvine.
- Schulz, M. 1995. Turkey, Syria and Iraq: A hydropolitical security complex. In Ohlsson, L. (Ed.), *Hydropolitics. Conflicts over water as a development constraint*, pp. 91-122. London: Zed Books.
- Sinaee, V. 2012. Hydropolitics and human security: Water cooperation in relations between Iran, Afghanistan and Turkmenistan. *Iranian Review of Foreign Affairs* 2: 111-133.
- Smetana, M. and Ludvík, J. 2019. Between war and peace: A dynamic reconceptualization of "frozen conflicts". Springer.
- TehranTimes. 2020. Iran-Afghanistan's comprehensive document to be finalized in three months. <https://www.tehrantimes.com/news/450125/Iran-Afghanistan-s-comprehensive-document-to-be-finalized-in> (accessed 21 January 2021)
- TehranTimes. 2021. Iran welcomes Afghan president's remarks on Helmand water right. <https://www.tehrantimes.com/news/459266/Iran-welcomes-Afghan-president-s-remarks-on-Helmand-water-right> (accessed 14 Feb 2022)
- TehranTimes. 2022. Foreign Ministry: Iran's water rights from Helmand not fulfilled. <https://www.tehrantimes.com/news/469686/Foreign-Ministry-Iran-s-water-rights-from-Helmand-not-fulfilled> (accessed 3 Feb 2022)
- Thomas, V.; Azizi, M.A. and Behzad, K. 2016. *Developing transboundary water resources: What perspectives for cooperation between Afghanistan, Iran and Pakistan?* Afghanistan Research and Evaluation Unit Kabul, Afghanistan.
- Thomas, V. and Varzi, M.M. 2015. A legal licence for an ecological disaster: The inadequacies of the 1973 Helmand/Hirmand water treaty for sustainable transboundary water resources development. *International Journal of Water Resources Development* 31(4): 499-518.
- Thomas, V. and Warner, J. 2015. Hydropolitics in the Harirud/Tejen river basin: Afghanistan as hydro-hegemon? *Water International* 40(4): 593-613.
- ToloNews. 2021. President Ghani Inaugurates Kamal Khan Dam. <https://www.youtube.com/watch?v=JQ1pUgeXtv8> (accessed 5 June 2021)
- UNCT. 2001. United Nations Inter-agency Assessment Report on the Extreme Drought in the Islamic Republic of Iran. Tehran. July 2001.

<https://reliefweb.int/sites/reliefweb.int/files/resources/08951820C13C2BC5C1256A85005081E0-ocha-irn-10jul.pdf>

- UNDP. 2005. Restoration and sustainable use of the Shared Sistan Basin: A Baseline Situation Analysis. Tehran.
- UNDP. 2006. Hamoun wetlands Current Situation and the way Forward. Tehran: UNDP Iran.
- UNEP. 2003. *Post-conflict environmental assessment-Afghanistan*. UNEP.
- UNEP. 2009. *From conflict to peacebuilding: the role of natural resources and the environment*. UNEP/Earthprint.
- UNSC. 2001. The situation in Afghanistan and its implications for international peace and security Environment and sustainable development: water supply and sanitation. UNSC.  
<https://digitallibrary.un.org/record/436057?ln=en>
- UNSC. 2002. Environment and sustainable development. UNSC. <https://digitallibrary.un.org/record/481606?ln=ru>
- USGovernment. 2011. Avoiding water wars: Water scarcity and central Asia's growing importance for stability in Afghanistan and Pakistan. Washington, DC: Majority Staff Report. [www.fdsys.gpo.gov](http://www.fdsys.gpo.gov)
- Vitale, C. and Meijerink, S. 2021. Understanding inter-municipal conflict and cooperation on flood risk policies for the metropolitan city of Milan. *Water Alternatives* 14(2): 117-138.
- Warner, J. 2012. The struggle over Turkey's Ilisu Dam: domestic and international security linkages. *International Environmental Agreements: Politics, Law and Economics* 12(3): 231-250.
- Warner, J. and Wegerich, K. 2010. Is water politics? Towards international water relations. In Warner, J. and Wegerich, K. (Eds). *The politics of water: A survey*, pp. 3-17. London: Routledge.
- Wegerich, K. 2002. Natural drought or human made water scarcity in Uzbekistan. *Central Asia and the Caucasus* 2(14): 154-162.
- Whitney, J.W. 2006. *Geology, water, and wind in the lower Helmand Basin, southern Afghanistan*. US Geological Survey.
- Williams, M.C. 2003. Words, images, enemies: Securitization and international politics. *International Studies Quarterly* 47(4): 511-531.
- WPS. 2020. WPS Global Early Warning Tool September 2020 Quarterly Update.  
<https://waterpeacesecurity.org/info/global-tool-update-September-2020> (accessed 20 Jan 2021)
- Zeitoun, M.; Mirumachi, N. and Warner, J. 2020. *Water conflicts: Analysis for transformation*. Oxford University Press.

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