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The Role of Data Sharing in Transboundary Waterways: The Case of the Helmand River Basin

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Chapter 10
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Abstract While data and information exchanges theoretically play an effective role in the decision-making process of a shared watercourse, in practice, there are several challenges that prevent riparians from sharing data in an effective and cooperative manner. This chapter seeks to assess why the riparian nations of the Helmand River have failed to adopt an effective data exchange mechanism although both nations signed an internationally recognized bilateral water treaty in 1973. Applying a mixed study approach, the study draws on the theory of planned behavior (TPB) to interpret the main obstacles of data sharing between Afghanistan, the upstream state, and Iran, the downstream state, of the Helmand River Basin. Using both secondary literature data and stakeholder interviews, this research found a number of specific factors that impede the ability of the riparian nations of the Helmand River to share data and information, such as national security, political instability, lack of capacity, negative emotions, pride, and historical factors. Our research suggests that these underlying elements have been under-estimated in the TPB models of data sharing at the transboundary level. Thus, borrowing from Wehn's model (2003b), we have developed a modified version of TPB to unpack the challenges of data sharing between the riparian states of the Helmand River Basin.

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10.1 Introduction

Managing an international watercourse is a complicated process, where various actors with different interests can influence the flow of water within the basin (Botterweg and Rodda 1999; Toset et al. 2000; Wolf et al. 2003). In fact, the management of a transboundary river basin can be challenging, as states can adopt unilateral resource-capturing strategies for exploiting the shared water, both in quantity and in quality. Such unilateral resource-capturing policies can lead to water conflicts between the riparian states (Sadoff and Grey 2002; Furlong et al. 2006; Gleditsch et al. 2006). However, proper data and information exchange may prevent water conflicts between the upstream and downstream nations of a shared river basin (Barua et al. 2018).

Using a case study exploring the Helmand River Basin, shared between Afghanistan and Iran, this chapter borrows from the Theory of Planned Behavior (TPB), according to which planned behavior is someone's intended assessment (either positive or negative) of the self-performance of a peculiar behavior (Kerr et al. 2005). Scholars such as Pooreh and Nodeh (2015) posit that planned behavior is "an individual's perception about the particular behavior, which is influenced by the judgment of significant others (p. 840)," such as the policy makers of a shared river basin. TPB was developed by Ajzen in 1985, and it is widely applied to data sharing, for example of hydrological data, at transboundary level, including the Mekong River Basin, which is shared between China, Thailand, Vietnam, Laos, Myanmar, and Cambodia.

However, to further unpack the challenges of data sharing in the basin, we have modified the TPB model developed by Wehn (2003a, 2003b). We felt that Wehn's TPB model under-estimated some important factors that highly influence the data sharing mechanism of riparians on a shared watercourse. Applying a mixed approach, we relied on both secondary data and semi-structured interviews conducted with officials, scholars, and authorities from both Afghanistan and Iran, as well as two international scholars who were previously engaged in the basin. In accordance with good research ethics practice, the study uses pseudonyms for all interviewees.

The chapter first presents the theoretical framework of the study, followed by the introduction of the historical background to the case study. The results of the analysis are then explored, followed by a discussion of their implications. The study concludes that despite the benefits of data sharing in an international shared watercourse, there are some underlying factors that have prevented both Helmand River riparians from cooperating over data and information. These factors, which were under-represented by scholars such as Wehn (2000, 2001, 2003a, 2003b), Thu and Wehn (2016), Gharesifard (2015), and Gharesifard and Wehn (2016), are emotions, history of a shared river basin, pride, national identity, and securitization.

10.2 Theoretical Framework—The Role of Data Sharing in Transboundary Water Relations

10.2.1 The Importance of Data Sharing from a Theoretical and Empirical Perspective

The importance of data sharing in transboundary water management can be verified by both theoretical and empirical analysis. From a theoretical point of view, it can be argued that sharing scientific information is the foundation for the successful negotiation of agreements between riparian states (Gerlak and Grant 2009). Thu and Wehn (2016) believe that sharing information on a transboundary watershed among riparian states can help mitigate the negative impacts of droughts and flooding. Moreover, data sharing provides the basis for assessing the impacts of socio-economic activities on water resources (Timmerman and Langaas 2004, 2005), enhancing the functionality of ecosystems, and increasing adaptive measures in response to climate change (Wilby and Dessai 2010; Singh 2017; Singh et al. 2014).

Neoliberalism, a school of International Relations, is not only an economic ideology, it is also widely used in political ecology. It describes the relationship between power and knowledge sharing that can encompass data sharing at the international basin level (Ong 2006). The neoliberalism school of thought centers on the discourse of data openness and free data availability. For example, through the availability of public data at the inter-basin level, riparian nations, especially the local communities in a shared river basin, will witness economic growth and stability in the basin (Holmwood 2017). Additionally, data sharing at the international basin level leads to transparency, accountability, and fairness in the utilization of natural resources, which in our context refers to the water flow of a shared waterway (Slavnic 2017).

Thus, we first apply the neo-liberal theory to assess why the riparian nations of the Helmand River Basin lack cooperation and how this challenges the sustainable utilization of the river. While some riparian countries of a transboundary watercourse prefer cooperation over non-cooperation, other riparian countries tend to utilize the resources in an unfair and unequitable manner, triggering water conflict between the neighboring countries (Keohane and Nye 1973). We then update the neo-liberal model with components of constructivist theory, through which we argue that for the enhancement of water cooperation between the riparian nations of the Helmand River Basin, both upstream and downstream states must commit to data sharing. This is because the southern part of Afghanistan and the Sistan-Baluchistan region of Iran rely on the sustainable utilization of the Helmand River, which could be achieved through a reliable and thorough data sharing mechanism between the two countries (Thies 2004).

Additionally, data sharing is considered a means for building trust between riparian states, which eventually leads to strong water cooperation among the riparian states (Kliot and Shmueli 2001; Kliot et al. 2001; Eckstein 2005). Although many riparian

states sign international water agreements on specific international basins that enable them to share data and information, the mechanisms for accessing reliable data on a shared transboundary basin are challenging (Gerlak et al. 2011), especially when climatic changes and over-utilization in both upstream and downstream nations negatively impact river flows in terms of both quantity and quality (Armitage et al. 2015).

Data sharing is crucial for the sustainable and transparent management of a transboundary watercourse. The thirteen interviewees who were interviewed for this research project, for example, overwhelmingly supported the value of data sharing. Eight out of the thirteen stakeholders interviewed for the project emphasized the need for regular data sharing. Out of eight, specifically, five interviewees advocated annual data sharing while the rest emphasized semi-annual data sharing. Moreover, many of them highlighted the importance of event-triggered data sharing, especially during flood and drought periods. In addition, the interviewees highlighted the value of data sharing in many different fields, including seven main topics they consider especially important for transboundary basin data sharing. These priorities include information on water quality, water pollutants, groundwater abstraction, and future planned measures in the basin, as well as metadata on methodologies and approaches, meteorological data, and hydrological data.

Data sharing can take place in different forms and through different mechanisms. Beside the traditional intergovernmental level, many authors (Chenoweth and Feitelson 2001; Schmeier et al. 2016; Porta and Wolf 2021) recognize joint research centers and river basin organizations as optimal tools in transboundary river management, as well as their contribution to water data and information exchange between riparian states. Moreover, they also have the potential to improve mutual trust between the riparian states of a shared watercourse (Burton and Molden 2005; Susskind and Islam 2012; Sarfaraz et al. 2022). These theoretical expectations were echoed by the interviewees, who also highlighted the importance of establishing an independent joint research center where scholars, policy makers, and government staff (as well as independent researchers) could jointly engage in researching the shared river basin.

10.2.2 Explaining the Shortcomings in Data Sharing—The Theory of Planned Behavior (TPB) Model

While both researchers and practitioners agree that data and information exchange may lead to mutual benefits, in practice, many obstacles can arise. One of the main challenges is the cost of developing the data and information resources. A lack of mutually credible data and information can undermine any effort of data sharing. As this case study will show, facing political or economic fragility, riparian states might not be able to either develop reliable data or participate in joint data development. Moreover, as Beniston et al. (2012) argue, in some cases data politization and manipulation, the high cost of data collection, license issuance for data collection,

and national regulations might also add to the problem of having reliable information, and eventually, data sharing.

Researchers also identify several other reasons why data sharing is not achieved. Chenoweth and Feitelson (2001) suggest that the main obstacles for data and information exchange are differences in legal systems, mistrust, language, culture, technical capacity, economic growth and development, and an increasing demand for water use among the riparian states of a shared river basin. Past history of conflict in a shared river basin can also adversely affect the transboundary dialogue between the riparians of that basin. In fact, the conflict background of a basin may trigger riparian states to favor tensions over shared interests (Brady 2017).

In addition, the scarcity of water in a transboundary basin can inevitably push riparians to consider water as a national security interest, which can also create challenges for data exchange (Dormido 2019; Prasai 2013; Faizee 2022). Shroder (2016) argues that considering water a component of national security will impede the equitable and reasonable utilization of water among riparian states (p. 342). Thus, tying water to national security can also hinder data exchange procedures in water-stressed countries (Plengsaeng et al. 2014).

While the above-mentioned factors can serve as impediments to data sharing between riparian states, we argue that there are other interrelated and relevant factors that can influence data exchange mechanisms at a transboundary level. These include emotions, history and pride, national identity, and securitization (Hutchison 2016; Sultana 2011; Seide 2010, 2016, 2018).

To address the challenges of data sharing in the Helmand River Basin in a comprehensive manner, and to incorporate these additional factors into the analysis, we began with the Theory of Planned Behavior first developed by Ajzen (1985), who contended that TPB helps understand how people at the decision-making level (e.g. officials) behave. TPB has been widely applied in data sharing at the transboundary level. For instance, Gharesifard (2015) and Gharesifard and Wehn (2016) apply it in Italy, the UK, and the Netherlands, while Thu and Wehn (2016) and Plengsaeng et al. (2014) apply it to the Mekong River Basin. We in turn applied this theory to assess the behavior of Iran and Afghanistan in the context of data sharing over the Helmand River Basin. The model assumes that behavior is planned, and so it is easy to anticipate the intentional behavior of riparian states in sharing or not sharing water data in a transboundary basin (Wehn 2000, 2001, 2003a, 2003b).

The components of TPB as stated by Ajzen (1985) are as follows:

1. **Attitude** shows the friendly (pleasing) and unfriendly evaluation of the behavior of interest (Cherry 2022).
2. **Subjective Norms** highlight how people approve or disapprove of each other's behavior (Gawronski 2007), in our case, whether the riparian states of Helmand River approve or disapprove of each other's contentious or cooperative manner.
3. **Perceived behavior control** shows people's varying perception of how challenging or easy the performance of the behavior of interest is (Pooreh and Nodeh 2015).

4. **Behavior intention** highlights the factors that shape or co-shape a behavior. It is also argued that the more powerful the intention, the more certainly the behavior will be performed (Sheeran and Webb 2016).
5. **Behavior** is "an attempt on the part of an individual to bring about some state of affairs – either to effect a change from one state of affairs to another, or to maintain a currently existing one" (Bergner 2011, p. 148).

However, one limitation of TPB, according to Wayne LaMorte (2022), is that the theory under-values the role of interrelated factors, especially the role of emotion and how emotion influences the decision-making processes of the policy makers of the riparian states in an internationally shared river basin. Thus, we argue that to further assess the challenges of water cooperation in the context of the Helmand River Basin, the TPB model should be revised by including factors such as emotion, history, pride, and national identity in Wehn's TPB model (2003a, 2003b) because these factors shape the decision-making processes of the riparian countries related to data sharing on the transboundary Helmand River Basin (see Fig. 10.1).

We argue that the model explains the motivations behind data sharing in specific cases, or the lack of it. To engage in the practice of data sharing, states have to be committed to do so. This commitment comprises three components:

a. **Attitude**: Attitude demonstrates the viewpoint or position of each authority (i.e. both the upstream and the downstream riparian countries) about the positive and negative impacts of data sharing.
b. **National Interest(s)**: This notion is deeply influenced by culture, tradition, social values, ideology, pride, national identity, and security (Liu 2013). In the context of the Helmand River Basin, water is considered to be a national security priority for both Iran and Afghanistan, which is embedded in emotions, history, and pride (Voice of America Persian [VOA] 2022; Shroder 2016). Iceland and Otto (2017) contend that when thinking about national security issues, rivers, lakes,

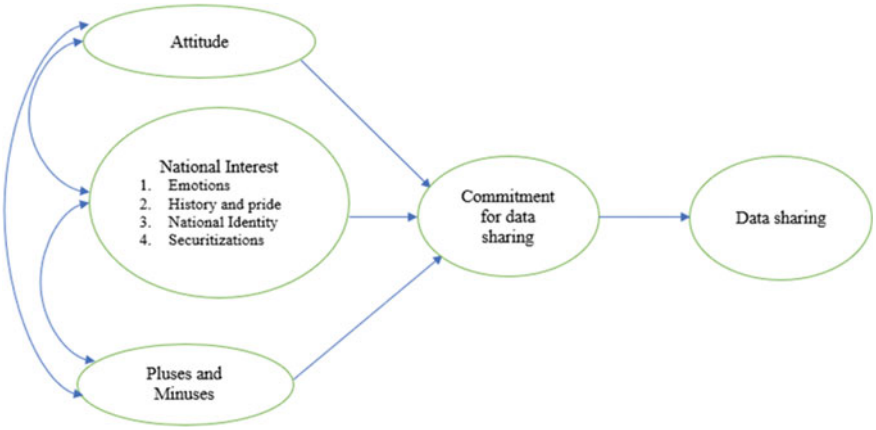

Fig. 10.1 Proposed conceptual model for data sharing. Created by the authors

and glaciers are the common issues that leap into our mind. Water is typically considered a critical national security concern in water-stressed countries that suffer from climate change and drought (Tadros 1996).

b.1. **Emotion**: Emotion is a mix of socio-biological reactions that influence the activities of human beings. As a biological reaction, emotion prepares the body to act in any situation (Coelho et al. 2016). Myers and Smith (2012) describe emotions as subjective feelings that trigger someone to feel in a specific manner, e.g. feeling anger or joy. As a social phenomenon, emotion is established by postures, gestures, and facial expressions that involve feelings, body movement, and non-verbal communications (expressions) to prepare human beings to react to their surroundings (Coelho et al. 2016). In international relations, emotion is an under-represented field of study. Emotion has various definitions, depending on whom we ask (Gendron 2010). As a biological state, emotion occurs due to our feelings, behaviors, and thoughts attached to something. While Davis (n.d.) categorizes emotion into pleasure and displeasure (satisfaction and dissatisfaction) subsets, Hutchings et al. (2022) describe emotion as positive and negative. For instance, positive emotion leads to hope and cheerfulness, which benefits health and the socio-economic condition of a community; in contrast, a negative emotion such as sadness, anger, or anxiety has a negative impact on health and the well-being of communities (see Frederickson and Joiner 2002). In international relations discourses, political emotion has received less attention, although during a crisis of natural resources (famine, drought, or flooding), emotion plays a significant role in the formation of politics in the community (Hutchison 2016).

In water-stressed countries such as Iran (Foltz 2002) and Afghanistan (Dormido 2019), access to shared water is contested. For example, in the Helmand River Basin, one of the most arid basins in the region with less than 100 mm annual precipitation, access to shared water is highly challenging. The right to access this limited quantity of water is embedded within emotions of anger, grief, and sometimes even threats from both upstream and downstream states. Since the two countries became independent states, the number of water conflicts between the riparians has increased significantly. This became especially evident when the Afghan government decided to resume the construction of Kamal Khan Dam in Chahar-Burjak District, Nimrouz Province, in the lower Helmand River Basin in Afghanistan (Kakar and Sayedi 2022; Saif 2021; Mehdi 2021; Ramachandran 2022; Askari and Bashardost 2021). Once construction started, Iranian officials expressed their deep concerns over the flow of the Helmand River below the dam. For instance, former President of Iran Hasan Rouhani stated that "we cannot remain indifferent to the [water dams] issue which is apparently damaging our environment." He further said that "Construction of several dams in Afghanistan, such as Kajaki, Kamal Khan, Salma and others in the north and south of Afghanistan, affect our Khorasan

and Sistan-Baluchistan provinces" (Zahid 2017). It can be argued that this statement is embedded within the emotions of anger and grief, and even threat.

b.2. **History and pride**: Historians and philosophers assess pride both positively and negatively. For example, while Hume defines pride as an "agreeable impression, which arises in the mind, when the view either of our virtue, beauty, riches or power makes us satisfied with ourselves" (Hume 1896, pp. 277, 297), Aristotle argues that pride (satisfaction that someone gains from something or somewhere, such as a country or region, e.g. the Sistan region) can be achieved through doing or achieving great things (Smith 1998). He also asserts that "the man is thought to be proud who thinks himself worthy of great things, being worthy of them." However, Aristotle believes that to be proud of something, the man must be good in the highest degree (Smith 1998, p. 73). Historically speaking, the region encompassing the cities of Ghazni, Zabul, Kandahar, Bust, Zaranj, and Farah (all in Afghanistan), alongside Zabol in Iran, were collectively called Sistan. In terms of water management, Sistan was one of the most prominent basins in ancient and medieval times. Using community water management approaches, people in the region used to utilize the natural flow of water in a sustainable and reasonable way (Spandyar 2020; Bidabadi and Afshari 2020). In more recent times, the increase in population, coupled with excessive use of water for agricultural development, has largely contributed to a water conflict between the two riparian countries, especially since the political border between the two countries was drawn along the river in the 1870s. While Afghanistan did construct the Kamal Khan Dam in Nimrouz Province in 2021, the Afghan government has never initiated or operationalized any other large-scale dams due to its poor economic circumstances (Shroder 2016; Zahid 2017). Nevertheless, Iran has consistently expressed its extreme concern over the flow of the Helmand River. Like Egypt, as the downstream state on the Nile River (Seide 2010, 2018), Iran has repeatedly claimed historic rights over the flow of the Helmand River for agricultural, instream flow, and domestic uses (Nagheeby and Rieu-Clarke 2020).

The Sistan and Baluchistan sub-basin of the Helmand River continues to remind Iran of its ancestral great Persian (Achaemenid) Empire, and it is a source of great pride for Iranians. This region, which has been inhabited for more than 5,000 years, has been drained by the continuous flow of the Helmand River for centuries (Bidabadi and Afshari 2020). One of the prominent archeological sites in Sistan-Baluchistan in Iran is Shahr-i Sokhta, known as the Burnt City, which was established along the Helmand River in 3100 B.C. This city was home to people who used to make a living through community-led agriculture, most probably fruit cultivation (UNEP 2006). Iranians remember their great civilization in the basin and constantly assert historical and ancestral rights over water use in the basin. That is why the history of Sistan-Baluchistan is interwoven with Iran's national pride and interests. Policymakers in Iran argue that Goldsmid's

arbitration on the demarcation of the political border of Afghanistan and Iran in the 1870s was a big mistake because it was detrimental to Iran and its historical claims to the region (Dabiri 2011). Despite the excessive use of water, climate change, and recurring droughts in both states (Mianabadi et al. 2020; Bhattacharyya et al. 2004; Lane 2020), Iran still demands its historic rights and believes it is entitled to the flow of the Helmand River as it flowed for centuries without any restriction. Similar to the Egyptian view on the Nile River (Sandstrom et al. 2018), ignoring the historic rights of Iran is a direct threat to the country's national interests. In contrast, the Afghan government, both the current Taliban-led regime and the previous government under President Ashraf Ghani, is committed to the implementation of the 1973 Afghan-Iranian Helmand River Water Treaty (Gul 2021; Mehdi 2021). Thus, the phenomenon of the pride and history that is embedded in the national interests of riparian countries is a challenge for water cooperation among co-riparian countries (Price et al. 2014).

b.3. **National Identity**: Smith defines national identity as a means for influencing individuals (e.g. the citizens of a region or the upstream or downstream users of a shared watercourse) and how individuals attach and express their feelings and emotions related to a country or region (Smith 1991). Calhoun (1997) argues that national identity assumes special priority over other collective identities in the construction of personal identity (p. 125). The notion of national identity is common in contemporary political geography. The incorporation of social theories into political geography has motivated geographers to explore various aspects of everyday life and how these aspects are influenced by political processes. These political processes affect people's lives in a way that awakens their sense of identity in a society (Storey 2009). Strictly speaking, national identity can be viewed based on a belief in common ethnicity, race, language, etc. (Tolia-Kelly 2009), while loosely taken, other factors such as homes, villages, cities, natural resources, e.g. a river, can be considered a part of the national identity of a nation (Edensor 2009; Boelens 2015). For instance, the flow of the Nile River, which is shared between upstream Ethiopia and downstream Egypt (as well as other riparian states), is interwoven within the culture, language, religion, and identity of each country (Seide 2010). For thousands of years, people along the river, especially Egyptians, have utilized the waters of the Nile for irrigation, as well as cultural and spiritual affairs (Ahmed et al. 2020). Like with historic and present Egyptian civilizations, water has been used for spiritual and agricultural purposes in greater Persia (today's Iran, Afghanistan, Tajikistan, and Uzbekistan), where water is part of the national identity (Foltz 2002). In fact, Iranians perceive that the Sistan region, where the Helmand River flows (currently Nimruz province in Afghanistan and Sistan-Baluchistan in Iran), is an inseparable part of greater Persia (Dabiri 2011). Considering water as part of their national identity, they argue that at least two-thirds of the Helmand River flow should

have been allocated to the residents of the Sistan-Baluchistan Region, as two-thirds of the Sistan region is situated in Iran (Dabiri 2011). In contrast, Shroder and Ahmadzai (2016) accuse Goldsmid of unfairly arbitrating the Sistan region between Afghanistan and Iran. Considering the Sistan region as their national identity, they argue that Goldsmid, the British General who was responsible for dividing up the Sistan Region between the two neighboring countries, arbitrated the Sistan region in favor of Iran as the British fought and lost the war with Afghans in the nineteenth century (p. 350).

c. **Pluses and Minuses**: Pluses and minuses refer to the ease and difficulty of data sharing at the transboundary level. Factors that contribute to or create challenges for data sharing include technical expertise, financial resources, type of data, method of sharing, data security, and opportunities (see Wehn 2003b). Once these barriers and challenges are overcome, riparian states are more likely to commit to data sharing.

10.3 Historical Background of the Tensions Regarding the Helmand/Hirmand River

The Helmand River Basin (known as the Hirmand in Iran) is the largest closed arid river basin in southern Afghanistan. This basin is drained by the Helmand River, which has supported various civilizations in the Sistan Valley, located in the lower part of the basin in southwestern Afghanistan, for more than 6,000 years (Dominguez et al. 1951; Spandyar 2020). The total area of the Helmand River Basin is approximately 400,000 square kilometers, covering almost 40% of the total area of Afghanistan. While 89% of the basin is located in Afghanistan, 9% of the basin is found in Iran, and 2% is located in Pakistan[1] (Mianabadi et al. 2020). The Helmand River originates in the Koh-I Baba Mountains in Central Afghanistan. The river begins its 1,300-km journey west of Kabul and flows southwest toward Iran (Najafi and Vatanfada 2013).

Before reaching the border, the river divides at a point known as the Helmand Fork. The northern part of the fork is called Chila-e Charkh River (known as the Parian in Iran) and flows northward, forming the political border between Afghanistan and Iran. The southern part of the fork flows into Iran, forming the Sistan River, which finally reaches Hamoun Helmand (Hamoun Hirmand in Iran), a lake and wetland area at the terminus of the Sistan River (Hearns 2015). According to some scholars, in a normal water year, the Helmand River used to flow into the hamouns (inland desert lakes and wetlands) that cover the border region in a counterclockwise direction (Shroder and Ahmadzai 2016). The river first flowed into Hamoun Puzak in Afghanistan, then to Hamoun Saberi (a transboundary hamoun located at the border of Afghanistan and Iran), and then into Hamoun Helmand (Whitney 2006; Shroder 2014). Moreover, when Hamoun Helmand overflowed, its waters ran into a small

[1] As only a small portion of the basin is situated in Pakistan, which is not part of the 1973 Helmand River Treaty, Pakistan is excluded from this analysis.

hamoun called Gowd-i-Zerah, located inside Afghanistan (McMahon 1906, pp. 218, 223) (see Fig. 10.2). However, all four of these hamouns have dried up ever since Iran built four Chahnimehs (artificial lakes) in 1981, just beyond the Helmand Fork in Iran (Goes et al. 2015, p. 18) to supply water to the Iranian cities of Zahedan and Zabol (Sharifikia 2013, p. 207). Today, a canal diverts the water from Helmand Fork to the four Chahnimehs, which has led to the desiccation of the hamouns in both Afghanistan and Iran (Van Beek et al. 2008).

Although there is no territorial dispute between the two riparian countries, Afghanistan and Iran disagree over the distribution of the waters of the Helmand River. Water tensions in the region date back to the 1870s, when British officer Sir Frederic Goldsmid drew the political border of the two countries along the Helmand River (Dominguez et al. 1951; Whitney 2006). The water conflict further escalated when the Afghan government decided to build the Kajaki Dam in the 1950s. To mitigate these tensions, in the 1950s and 1960s, the Afghan government proposed, as a

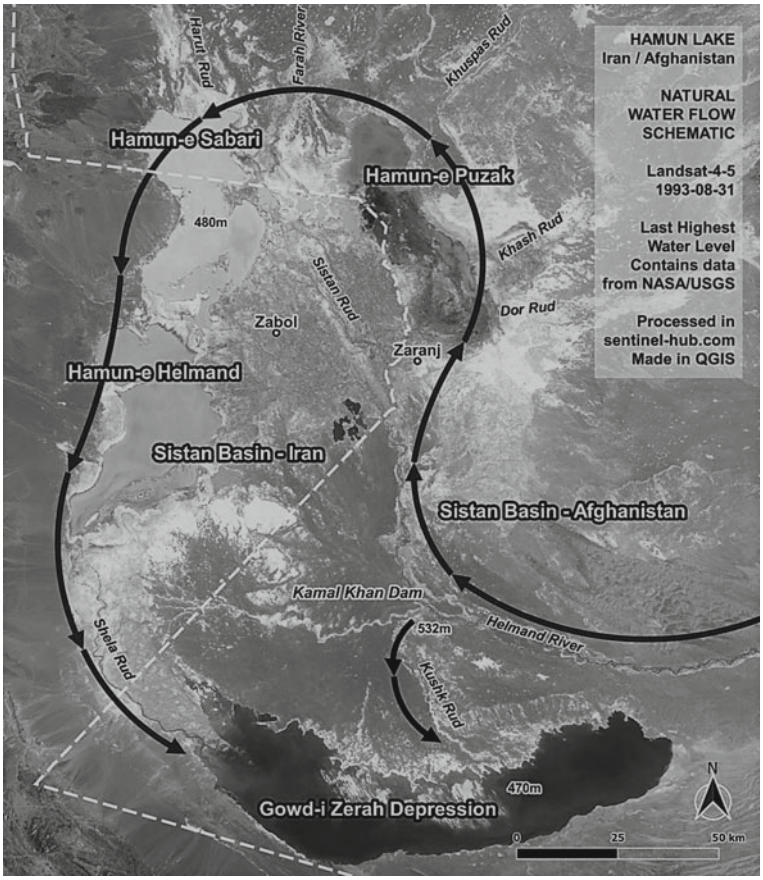

Fig. 10.2 Location of four hamouns in the lower Helmand River basin (Soar Earth 2022)

gesture of goodwill, that Afghanistan would deliver to Iran a supplementary 4 m^3/s of water in addition to the average of 22 m^3/s that the Helmand River Delta Commission recommended in 1951 (Faizee 2022; Loodin and Wolf 2022). This gesture, however, was conditioned on Iran allowing Afghanistan to expand its trade activities, both import and export, with other neighboring countries through the Chabahar and Bandar Abbas Ports in Iran (Abidi 1977).

On 21 March, 1973, the Prime Minister of Iran, Amir Abbas Hoveida, and the Prime Minister of Afghanistan, Musa Shafiq, signed the Afghan-Iranian Helmand River Water Treaty, in which Afghanistan accepted to allocate an average of 26 m^3/s of water from the Helmand River to Iran in a normal water year (Mianabadi et al. 2020).[2] In total, Iran's annual water share of the Helmand River is approximately 820.5 million cubic meters per year in a normal water year (Dabiri 2011; Thomas et al. 2016). The agreement also created a comprehensive system for managing transboundary water issues. According to Article III (A) of the treaty, water should be delivered to Iran in the Helmand River at three points:

1. At the place where the boundary line crosses Rude Sistan (Rude means river in Persian)
2. At pillar (marker) 51
3. At pillar 52 (see Hearns 2015; Dabiri 2011).

The treaty also stated that the commissioners of both riparian countries should jointly establish pillars 51 and 52. However, the above-mentioned domestic political transformation in the two states, as well as a lack of political will by authorities from both countries, has impeded the creation of the two pillars, leading to the intensification of disputes over the Helmand River (Ramachandran 2022; Climate Diplomacy 2016; Shroder and Ahmadzai 2016).

While the agreement was ratified both by Iran (1973) and Afghanistan (1977) (Abidi 1977), several circumstances have hindered its implementation. Soon after signing the treaty, Afghanistan began experiencing political instability, which has continued into the present, while Iran also underwent serious political transformation with the Islamic Revolution taking place in 1979–1980 (Milani 2018). Notably, the instability in Iran was coupled with its hydraulic mission to capture as much water as possible through the construction of dams, canals, and channels, an approach taken by some riparian nations (Wester et al. 2009). These factors have undermined the potential for cooperation between the two states.

Another tangible consequence of the domestic turmoil in the region occurred in Afghanistan from the mid-1970s, in that the country's water infrastructure, including the water management systems and structures on the Helmand River, drastically deteriorated. The hydrometric stations and other structures that were installed during the late 1950s and 1960s were destroyed during the internal war between the Mujahideen and the Soviet Union, and later between the Mujahideen and the Taliban (Sidky 2007;

[2] A normal water year, as defined in article 1 (c) of the Helmand River Treaty, is a year-long time period during which the flow of water at Dehrawud Station, located at Kajaki Dam, is at least 5,661 million cubic meters from 1 October to 30 September (Helmand River Treaty 1973).

Land Links 2018; World Bank 2018). Goes et al. (2015) argue that the lack of data between 1980–2004 is due to conflict and insecurity, which has especially challenged water resources assessment and management in the upper Helmand River Basin (also Shroder 2014, p.147).

The lack of discharge data from gauging stations is now responsible for an ongoing rift between Afghanistan and Iran over water rights and allocations under the 1973 treaty. Iran has consistently blamed the Afghan government for alleged shortfalls in the flow of the Helmand River and accused Afghanistan of not delivering Iran's rightful share of the water as provided for in the 1973 treaty (Amiri et al. 2013; Amini et al. 2021). In response, the Afghan government has claimed that Iran received more water than it was entitled to under the treaty over many years (Shroder 2016; Shirdeli 2014).

Using remote sensing data, Iranian scholars such as Mianabadi et al. (2020, 2021) argue that precipitation did not decline significantly in the basin between 1983 and 2016, contradicting Afghanistan's claims of low flows due to climate change and extreme drought especially between 1993–2001 (see Alami and Tayfur 2022; Mayar 2022) and during 2018, and 2021–2022 (Mayar 2022). As a result, Mianabadi et al. (2020) contend that Afghanistan has failed to deliver the amount of water that was agreed upon in the 1973 treaty. However, the authors acknowledge that their analysis lacks data on infiltration and evaporation, especially during the summer, when evaporation increases, as well as snowmelt data. Moreover, their analysis lacks reliable information, as they relied only on satellite data rather than actual flow measurements in the Helmand River (Mianabadi et al. 2020, p. 3459).

In contrast, the Water Resources Department of the Ministry of Energy and Water of Afghanistan (WRD-MEW 2022), the country's main agency for hydrological data collection and analysis, claims that on average, between 1973–1979 and from 2010–2020, Iran received more than double its water rights under the treaty based on measured discharge rate data from Khwabgah Station on the Helmand River (see Figs. 10.3 and 10.4).[3] Similarly, Sadat and Sayed (2020) estimate that "Iran has received 40% more water than its total agreed rights of 26 cubic meters per second per normal year since the signing of the treaty." Moreover, Shroder (2016) argues that Afghanistan has delivered more water to Iran, even in drought years, despite the country suffering from a lack of water infrastructure and because it simply does not use much of the water that it is entitled to (p. 469). Even with the construction of Kamal Khan Dam, farmers are still unable to irrigate their lands, as the necessary water infrastructures, such as diversion channels, have not been built yet (Kakar 2021).

Beside the domestic political and technical issues, climate change and severe drought have also significantly impacted the flow of the entire basin in both countries (Iqbal et al. 2018; Loodin and Warner 2022; Mayar 2022). Analyzing climatic conditions in the basin between 1970–2006, Roodari et al. (2021) argue that the Helmand River Basin suffered from drier weather due to a changing climate between

[3] Afghanistan also collected data between 2004–2010 at the Khwabgah and Chila-e Charkh Stations, however, according to the World Bank, that data is not reliable (World Bank 2018).

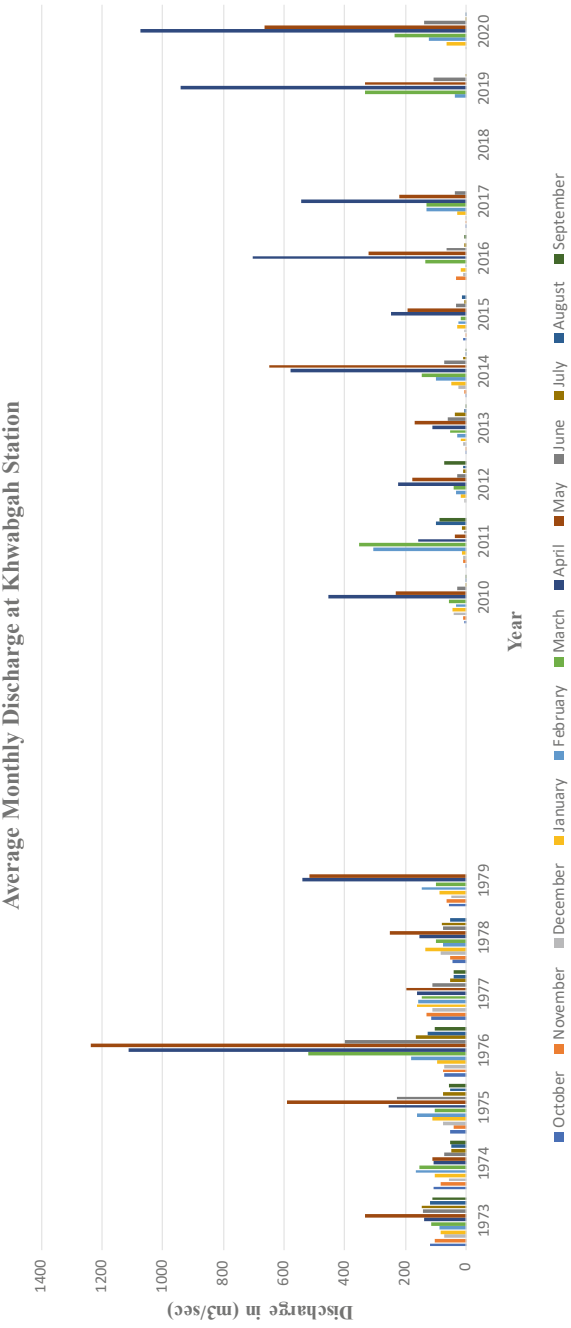

Fig. 10.3 Average monthly discharge at Khwabgah Station (WRD-MEW 2022)

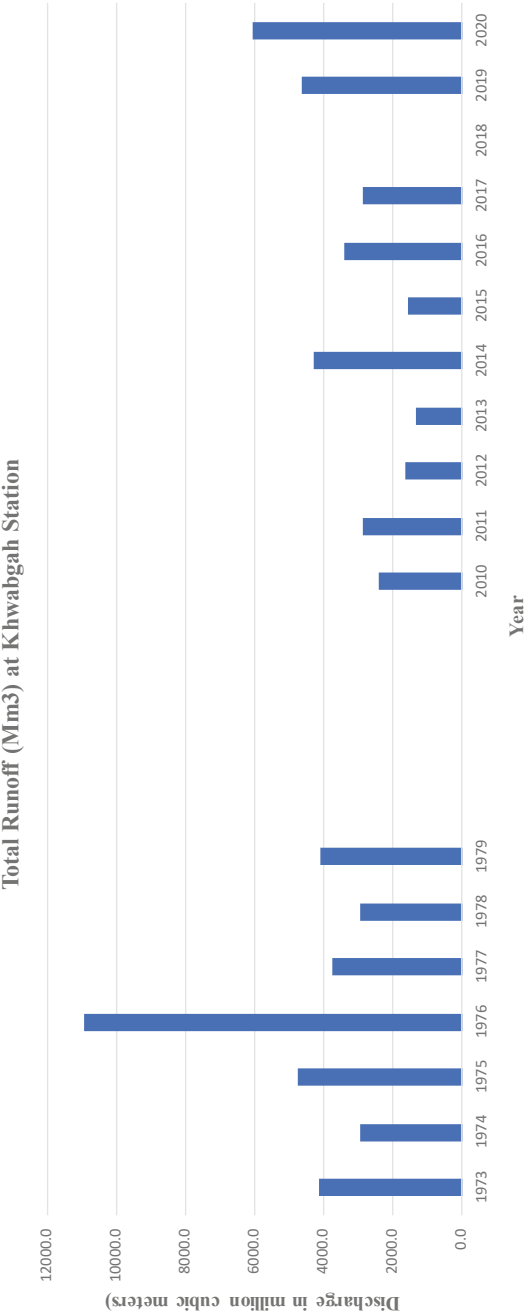

Fig. 10.4 Total runoff (Mm3) at Khwabgah Station (WRD-MEW 2022)

1970–1979 and again from 2000–2006 (p. 1962). They also contend that the Sistan-Baluchistan region in Iran suffered from significant drought, leading to sharp declines in the surface water levels of the Chahnimehs from 1999–2004. However, their research outcome suffers from a lack of reliable measured data, as they relied on satellite-based data, which excludes infiltration, evaporation, and snowmelt data (Roodari et al. 2021, p. 1962). Additionally, using a mix of satellite-based data and field data from the Sistan region of Iran, Sharifikia (2013), asserts that the lower section of the Helmand basin is becoming more susceptible to drought. He states, for example, that the Sistan region of Iran received 16,000 million cubic meters (MCM) of water from the Helmand River between 1990–1991, whereas the flow dramatically declined to 40–50 MCM of water from 2000–2001 due to climatic changes and severe drought (p. 2010). Similarly, Afghan researchers such as Alami and Tayfur (2022) conclude that the Helmand River Basin suffered from extreme drought from 1993–2001 and from severe drought from 2001–2004 (p. 9). More recently, Jain (2018) argued that Iran received more than 3 billion cubic meters of water in 2017 despite the drought that hit the basin during 2017–2018, a claim that has been rejected by Iranian authorities (Iran Front Page 2022). As the level of mistrust between the two riparian states has continued to grow, the water conflict between these two riparian states has also increased (Mianabadi et al. 2020).

Authors such as Akhtar and Shah (2019), Sharifikia (2013), and Loodin and Warner (2022) argue that Iran took advantage of the chaos in Afghanistan that began in the mid-1970s by constructing and expanding water infrastructure within its own territory in the downstream segment of the Helmand River Basin without alerting Afghanistan of its plans. According to Bazzi et al. (2021), Iran built several large and medium-size dams on the lower part of the basin (see also Sistan-Baluchistan Province Portal 2011). Additionally, Iran constructed four Chahnimehs (reservoirs) through which a significant portion of the Helmand River flow is now diverted. The total storage capacity of these four Chahnimehs is 2,900 million cubic meters (Dahmardeh Ghaleno et al. 2017). According to Afghan authorities interviewed for this study, these infrastructural changes in Iran are partially responsible for Iran receiving more than its fair share of Helmand River water as compared to its allotment under the 1973 treaty (Ehsan, March 17, 2022, 18:49; Mahmood, Mar 12, 2022, 01:25). However, by installing the Chahnimehs, diverting the Helmand River into these reservoirs, and then transferring the water to Zahedan city, which is located 200 km away from Helmand Fork and lies outside the Helmand basin, Hussaini and Azimi (2021a) contend that Iran has actually triggered water shortages and the desiccation of the hamouns in both Iran and Afghanistan. Mayar (2020) believes that Iran currently transfers 26 million cubic meters of water annually to Zahedan city (see also Ali 2020). As a result, the hamouns of Gowd-i-Zerah (McMahon 1906) and Puzak in Nimroz Province have dried up, which has led to a massive migration of Afghans to other parts of the country (Rasmussen 2017).

Shroder and Ahmadzai (2016), on the other hand, indicate that Iran has exacerbated the situation of water scarcity by over-pumping the lower basin's transboundary aquifers, causing cross-border groundwater depletion (p. 413). Shroder (2016) indicates that these withdrawals have lowered the water table across the border in Nimroz

Province in southwestern Afghanistan (p. 350), where the 630,000 residents of the province currently suffer from a lack of water for drinking and irrigation (Salehi 2021; Bhattacharyya et al. 2004; Kakar 2021). Nimroz residents now have no choice but to buy water from tanker owners who import water from Iran (Zurutuza 2014). Moreover, the combined decline in both surface and groundwater flows has further prompted Nimroz residents to migrate away (Kakar 2021).

10.4 Interpreting the State of Data Sharing Between Iran and Afghanistan from the Perspective of the TPB Model

10.4.1 Data and Information Sharing Regarding the Helmand River Basin

In the context of the Helmand River, except for data on measured discharge rates Afghan commissioners shared in hard copy between 2004 and 2021 with their Iranian counterparts from Khwabgah Station (Goes et al. 2015; Hearns 2015; Mohammad, February 23, 2022; 10:15), no other formal or informal channel of data sharing has been reported. Between 1980–2004, no discharge data was shared largely because Afghanistan's hydrometric stations were destroyed during the social unrest that afflicted the country. Clearly, the lack of sharing reliable data on shared waterways hampers water negotiation and cooperation among riparian states (Gerlak et al. 2011, 2014). This is one of the chief reasons why Afghanistan and Iran have not been able to develop any coordinated drought and flood mitigation strategies or water use efficiencies in the Helmand River Basin (Suryavanshi et al. 2021).

The reason data sharing has been limited is that neither Afghanistan nor Iran has implemented regular data exchange procedures. While Article 5 of Protocol # 1 to the 1973 Helmand River Treaty states that "the Afghan commissioner shall put at his disposal [referring to the Iranian commissioner] the related data registered at that station [Dehrawud Station]" and that "should the Iranian commissioner so desire, the Afghan commissioner shall put at his disposal the monthly flow records registered at that station" (Art. 5, Protocol #1), neither of these provisions has ever been implemented.

In fact, the Helmand River Treaty lacks a true mechanism for data sharing. First, it only created a one-way process (Mohammad, February 23, 2022, 10:23), as only Afghanistan is responsible for sharing data with Iran upon its request (Helmand River Treaty 1973). Iranian commissioners, on the other hand, have no obligation to share data under the treaty and have not done so voluntarily due to the lack of shared water infrastructures near the political border of Afghanistan and Iran. Secondly, under the treaty, the two riparian states are responsible for jointly building "technical structures" through which they can sustainably utilize the water resources of the river. However, as revealed by the analysis, the two and half decades of internal war in

Afghanistan, along with a lack of political will by both Iran and Afghanistan, have made it considerably difficult to construct the necessary joint structures (see Shroder and Ahmadzai 2016; Ramachandran 2022). Moreover, Dehrawud Station, the most important hydrometric station for data sharing according to the treaty, was destroyed during the social unrest in Afghanistan and was inaccessible between 2001–2020, when the Taliban controlled the lower Helmand basin region. The Afghan government was only able to re-activate the station in 2020, once the region was liberated from the Taliban.

Additionally, under the treaty, the Afghan government was responsible for constructing the Dehrawud hydrometric station. The purpose of this station is solely to assess when "a normal water year" occurs (Helmand River Treaty 1973, article 1[d]). This station, however, was not constructed until 2021 due to the ongoing conflicts between the Afghan government and the Taliban in southern and south-eastern Afghanistan, especially in Helmand Province (2001–2021) (Mohammad, February 23, 2022, 09:30).

Some of the Afghan and international experts interviewed for this study accused Iran of supporting the Taliban to disrupt security in the region so that Iran can utilize the Helmand River without interference or objection (Mahmood, Mar 12, 2022, 01:25; Kabir, Mar 30, 2022, 17:00). They contend that if the Afghan government had been able to construct Dehrawud Station earlier in the century, Iran would not have been able to use more water than its rightful share from the Helmand River (Sharif, March 13, 2022, 13:03). This claim is frequently rejected by Iranian authorities and scholars (Tahir, March 13, 2022, 21:45).

While Dehrawud Station did not exist until 2021, the Afghan Water Resources Department measured discharge rates at Khwabgah Station (Mohammad, February 23, 2022, 09:50). Those measurements were delivered to the Iranian authorities during the official meetings of the two countries' commissioners since 2004.

According to interviewee Mohammad, from 2004 until the Taliban took over Afghanistan in August 2021, commissioners from both riparian nations held 24 official meetings in both countries, but neither country has ever made any official records of these meetings publicly available (Faizee 2022). At these meetings, Afghan commissioners shared the hard copy of their annual discharge rate measurement at Khwabgah Station with their Iranian counterparts. According to interviewee Mohammad, no other type of data (e.g. hydrological, meteorological, groundwater, or hydro-morphological data) was shared by the Afghan commissioners with Iran. Although exchange through email and other online platforms (e.g. uploading data through a website, or via open data sources) is the most common means for data exchange among riparian states (Mukuyu et al. 2020), Afghanistan has only ever shared hard copies of discharge rate data with Iran.

10.4.2 Identifying the Causes of the Lack of Data Sharing

As established by the TPB model, the commitment to data sharing is shaped by attitude, national interest, and other "pluses and minuses." In the case of Afghanistan and Iran, the primary cause for the limited data sharing has been the historical lack of trust between the two countries (Mianabadi et al. 2020), which affects their attitude and their perceptions of national interest. According to Mianabadi et al., despite the Afghan government having shared its data with their Iranian counterparts for more than sixteen years (2004–2021), Iran still does not trust the data collected by Afghanistan (see Mianabadi et al. 2020, p. 3459; Shroder 2016, p. 356). As discussed above, government officials and scholars from the two countries offer very different opinions on the flow rates reaching Iran, as well as on the amount of water that both countries are entitled to. As a result, the two riparians have consistently disagreed over water rights and allocations for decades, including the application of the 1973 treaty.

Some of the Afghan authorities and international experts who were interviewed for this project believe that Iran has never been honest in data sharing. They argue that Iranian officials know how much water they have received during the two and half decades during which Afghanistan was mired in conflict (Goes et al. 2015), as well as over the last two decades, when the basin experienced significant tension between the government and the Taliban (Akhtar and Shah 2019). Throughout this time, Hussaini and Azimi asserted that Iran has strategically argued that its water rights have been violated by Afghanistan's upstream uses of the Helmand River (Mahmood, Mar 12, 2022, 01:30; Hussaini and Azimi 2021a, 2021b).

One reason why Iran may not be committed to regular data sharing in the basin is that it has realized that its current water rights under the treaty (820 million cubic meters of water in a normal water year) are not sufficient to meet its water needs (Mahmood, Mar 12, 2022, 01:43). Consequently, it is not in its national interest to respect the agreement. In fact, Iran's water needs have increased due to a dramatic increase in population, coupled with climatic changes and unsustainable irrigation practices in Iran (see Madani et al. 2016; Madani 2014, 2021). Iran's present water needs from the Helmand River amount to three times its treaty-based water rights (Shahab, February 27, 2022, 13:15). Thus, according to interviewee Mohammad, Iranian authorities believe that sharing data with Afghanistan, including historical data from 1975–2001, will directly threaten Iran's national security (Mohammad, Feb 23, 2022, 10:25). Thus, we argue that the scholarship of International Relations (IR) should be further explored, as a number of important factors, such as fear, threat, pride, national identity, or emotion (i.e. challenges of data sharing), are still un-explored from the discourse of transboundary water governance.

Iran and Afghanistan have also failed to cooperate on filling the data gap that developed between 1980 and 2004 due to domestic turmoil. Mustafa, an interviewee from Iran, believes that Iranian officials may now be ready to jointly work with Afghan officials on filling these gaps and mitigating the water conflict between the two nations (Mustafa, March 18, 2022, 20:00). However, Afghan authorities have

repeatedly requested their Iranian counterparts to help Afghanistan fill in the missing data, and Mohamad, an interviewee from Afghanistan, reported that Iran has always rejected these requests (Mohammad, February 23, 2022, 10:16). This may be because sharing data on the Helmand River Basin is very sensitive and serves as a national security priority for both states, especially for Iran (VOA Persian 2022).

10.5 The 2013 Comprehensive Strategic Cooperation Document

To address its water needs, in 2013 Iran proposed that the two governments jointly develop and sign the "Comprehensive Strategic Cooperation Document" (CSCD). While the aim of the document initially was to strengthen bilateral cooperation through transportation and trade (Panda 2015), the former Minister of Energy and Water of Afghanistan claimed that the aim of the document was to revise the Helmand River Treaty to meet Iran's water needs in return for financial support (Osmani 2021). If the CSCD had been signed by the two countries, more water would have been allocated to Iran than what is provided for in 1973 treaty (Mayar 2020; Hussaini and Azimi 2021a), which would have decreased the current flow of the Helmand River for agriculture and domestic purposes in Afghanistan's Nimroz province. Furthermore, Hussaini and Azimi (2021b) emphasize that the new agreement would have further worsened the socio-economic situation of the residents of Nimroz and Helmand provinces, who rely on the flow of the Helmand River.

Although the CSCD was finalized by both governments and was about to be formally signed, Afghan water professionals and scholars highlighted the adverse consequences of the agreement in summits held both inside and outside Afghanistan and on Afghan television networks. As a result, they were able to convince the former president of Afghanistan not to sign the document (Osmani 2021). Given the ongoing climatic changes and drought in the basin, Mayar (2020) believes that if the Helmand River Treaty were revised in a way that meets Iran's current water need, which is three times higher than what is enabled by the current treaty (Thomas and Varzi 2015), the residents of Helmand and Nimroz provinces in Afghanistan would suffer from even worse water shortages and drought then they are experiencing now. In fact, drought has already affected the livelihoods of local Afghan farmers in the lower Helmand River Basin, resulting in massive migration from villages and farms to nearby cities in Afghanistan (Jain 2018; Kakar 2021; Ali 2021).

After the collapse of the Afghan government in August 2021, Iran established close relations with the Taliban administration, a government that has been deemed illegitimate by the majority of the world's nations (Faiez 2022). Faizee (2022) notes that since the Taliban took over, Iran has held two official meetings with the Afghan commissioners, but no agreement has been reached. Given the dramatic decline in the flow of the Helmand River due to climatic changes, coupled with an increase in population, Iran's water needs have grown significantly. To address this need, Iran

has requested a meeting of the "committee of ministers" under the treaty, which includes representatives from both the Iranian and the Taliban governments. It is worth noting that the call for a meeting of the committee can happen only in an emergency situation or when the commissioners of both riparian nations are unable to reach an agreement (see article 10(c), Helmand River Treaty 1973). However, the current government of Afghanistan under Taliban administration lacks the legitimacy and technical expertise to facilitate and participate in these committee meetings. Faizee (2022) contends that even if such meetings take place, the committee will not privilege Iran with more water than its rightful share of water from the Helmand River as provided for in the 1973 treaty.

The Iranian actions are rather unique from the perspective of the theoretical literature on transboundary water management. Contrary to the expectation that upstream riparian countries tend to limit downstream riparian nations from accessing water use and water abstraction data from their section of the basin (Affeltranger et al. 2009), in the case of the Helmand River Basin, the roles are interchanged. It is the downstream riparian state, namely Iran, which has restricted Afghanistan's access to its data, a situation that was made possible by the chronic instability in Kabul. According to various authors, the Iranian government has tried to capitalize on the developments taking place in Afghanistan in many ways. Ramachandran (2017, 2022), an Indian journalist, argues that Iran supported the Taliban's efforts to disrupt the construction of Kamal Khan Dam to prevent Afghanistan from using more Helmand River water. Moreover, Aman (2016), an Iranian-born journalist, argues that when the Afghan government initiated the third phase of the dam, Iran tried to use the three million Afghan refugees in Iran as leverage to coerce the Afghan government (p. 4) to stop the construction of the dam. Shroder (2016) explains that Iranian authorities have also used undocumented Afghan immigrants and refugees in Iran as a bargaining chip in other negotiations related to the Helmand River. Similarly, Osmani (2021), former Minister of Energy and Water of Afghanistan, argues that in 2020, Iran used the refugee issue against Afghanistan, threatening to deport the three million illegal Afghans in Iran to try to force the Afghan government to revisit the Helmand River Treaty by having the Afghan government sign the CSCD.

10.6 Conclusion

Despite the importance of the exchange of reliable data and information in transboundary river basins, the Helmand River case study shows that in practice, there are factors that hamper the process of sharing between riparian nations on a transboundary watercourse. Employing a mixed study approach, this research borrowed from the TPB model to illustrate the challenges of data sharing for the transboundary Helmand River Basin shared between Afghanistan and Iran. While the TPB model is well-developed and is widely applied in various international river basins, we felt that the model has under-represented some factors that challenge the reliable

data exchange mechanism between riparian nations. Thus, we developed a modified version of the model, which unravels some of the underlying challenges of data sharing between Afghanistan and Iran, the riparian nations of the Helmand River Basin. Relying on stakeholder interviews and secondary literature data, this chapter found that emotions, history and pride, national identity, and securitization are critical factors of national interests that have impeded the Helmand River Basin riparian states from cooperating on data sharing.

For example, given the drastic climate changes on the flow of the Helmand River, especially in the downstream, the demand for water use has tripled in the Sistan region due to the rapid increase in population. On the other hand, as both riparian nations have failed to specify the three points of water delivery, the water conflict has intensified between the two nations. While Afghanistan accuses Iran of the desiccation of the Hamoun wetlands, including Gowd-i-Zerah, the downstream state of Iran blames Afghanistan for blocking the flow of the Helmand River through the inauguration of Kamal Khan Dam. As water serves the national interest of both countries, we argued that TPB should be modified to uncover the current challenges of data sharing in the Helmand River Basin. It was also contended that the discourse of transboundary water governance, especially from the perspective of data sharing, should be revisited and further explored, as a number of important factors, e.g. emotions, national identity, pride, threat, or fear are under-estimated or under-explored by theories of International Relations. Therefore, our findings serve as a basis for future research on the discourse of neo-liberalism and how neo-liberal theory highlights the challenges of data sharing in a water-stressed basin, e.g. the Helmand River, and finally how the incorporation of constructivist elements into a model of neo-liberalism may lead to the sustainable utilization of a shared river through a reliable data sharing mechanism.

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