

Construction and Development of Dams on Transboundary Rivers under Precautionary Principle (A case study of the Kajaki dam)

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ABSTRACT

Kajaki dam construction and development on Hirmand/Helmand river affected the upstream and downstream of the river in a different situation. This construction project has been bringing lots of advantages for Afghanistan; on the other hand, Iran is dealing with the majority of negative effects caused by the Kajaki dam development. Moreover, the lack of an environmental approach on the Hirmand water treaty 1973 limited the environmental obligation of the upstream state. Thus, the conduction of a new bilateral treaty with a focus on environmental issues instead of the current Treaty will decrease plenty of environmental problems and codify applicable regulations regarding environmental conservation. In this respect, to achieve the mentioned purposes, parties should conduct the new Treaty with the focus on an international environmental law principle. Therefore, the precautionary principle, due to its function and extension, will be a great option to reach environmental purposes.

INTRODUCTION

Nowadays, dam construction tends to be a controversial issue from an environmental perspective. Industrial and economic purposes make governments and private sectors begin dam-building projects on rivers and other sorts of water sources. This subject became more debatable when these projects ran on transboundary rivers. However, international water resources management is an important issue for each riparian state, but this subject plays a vital role in arid and semi-arid areas such as the middle east. In this respect, Iran and Afghanistan deal with a long-term conflict about the utilization of the

Hirmand/Helmand river (hereinafter called Hirmand in this paper) as far as concluding of the Hirmand river treaty in 1973 could not solve the political and legal conflicts between riparian states. On the other hand, the construction and developments of the Kajaki dam cause plenty of environmental disasters downstream of the river. Therefore, in this paper, we are going to evaluate the environmental situation of the Hirmand river after the construction and development of the Kajaki dam under the precautionary principle.

1. Transboundary Rivers

Since many years ago, rivers have played a key role in human life. Many historians have regarded rivers as a precondition for early settlements as far back as early human civilizations, such as those in Egypt that was situated by the river. In those days, the main usage of rivers was limited to providing vital human needs such as drinking and agriculture along with non-navigational uses. People have also used rivers for navigational purposes, including exporting and importing goods and other kinds of commercial activity, which are not the subject of this paper. (Falkenmark, M., & Widstrand, C, 1992) Watercourses involve surface and groundwater resources that are either national or international. In the national type, a watercourse is completely located in the territory of a state over whose resources the government has absolute sovereignty. Therefore, there is an absolute right for each state to determine how to use their natural resources. An international watercourse, whether surface water or groundwater, crosses is located on boundaries between two or more states. According to UNITED NATION WATERCOURSE CONVENTION 1997 Article 2, 'International watercourse' means watercourse parts of which are situated in different states. This definition takes into account the fact that most freshwater is underground and that most of this groundwater is related to or interacts with surface waters. (UNITED NATIONS WATERCOURSE CONVENTION 1997)

Therefore, article 2 defines 'Watercourse' as a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole normally flowing into a common terminus. According to TFDD's latest research in **2019, there are 310 international river** basins that, in comparison to the previous report, indicate an increase in the number of transboundary rivers in the world.

(McCracken, M. and Wolf, A.T, 2019) Nowadays, given the industrial growth and the increase in population as well as technological progress, states are dealing with a wide range of uses and challenges that never existed before. Water is a crucial factor in

industrial processes. Over the past few decades, demand for water in industrial sectors has highly increased. Industrial activities immediately affect the quality and quantity of freshwater resources. Furthermore, plenty of industrial practices are putting pressure on natural resources and species. (Chowdhary, P and others, 2020) Consequently, water scarcity is rapidly growing, especially in arid and semi-arid areas. Based on a United Nations Development Program report: the majority of countries and regions have access to enough water, but mismanagement and a lack of means prevent them from making it accessible. (www.britannica.com) These issues are faced by riparian states who deal with challenges and opportunities on the utilization of international freshwater resources. On the one hand, the states' bilateral actions such as operations and industrial projects are the cause of water contamination and changes in the river flow that causes significant harm to the environment, especially downstream. On the other hand, recent technological progress has enabled the states to use plenty of data and information to promote their operational activities with a spirit of cooperation and under an environmental cause. (Petersen-Perlman and others, 2017) Not only are transboundary rivers valuable natural sources providing vital human needs, but they are also the habitat of numerous species and water birds.

The adverse effect of overexploitation and water contamination immediately impact the wildlife habitat. Hence, the importance of transboundary watercourses has been furthered, which leads to competition between riparian states in overusing freshwater resources. However, lack of an environmental approach can cause significant harm to riparian states and may raise tensions over the exploration of shared watercourses, whereas utilization of transboundary rivers can affect the rights of all riparian states in a shared watercourse. To sum it up, we are dealing with a wide range of elements on utilization and exploration of international freshwater resources, which tends to

be more complicated, particularly in dry areas where native people face water scarcity. One of the most important rivers flowing in semi-arid areas is the Hirmand River. (Parhi, P. K., & Sankhua, R. N., 2013)

1.1. Hirmand/Helmand River

The Hirmandriver is one of the most vital international watercourses in Iran that determines the country's border with Afghanistan and is highly important for residents of both sides of the border. It is the longest (1,150km) river basin in Afghanistan. The Hirmand River drains the southern one-half of Afghanistan and provides almost 80 percent of the waters that empty into the Sistan delta. (Najafi, A., & Vatanfada, J., 2011) Hirmand is the main source of freshwater supplying water for the Hamoun wetland that's divided into three separate shallow lakes: Hamoun-i-Saberi, Hamoun-i-Helmand and Hamoun-i-puzak. The river flows in the Hamoun wetlands, being of the essence for both indigenous people and animal species. (Sharifikia, M., 2013) The Hamoun wetlands are significant in many ways. More than seven million people live in the Sistan area who are completely dependent on the Hirmand River basin for irrigation, reed harvesting and fishing. (Dehgan, A and others, 2014) Also, the Hamoun wetlands are reckoned to support the majority of the species, many of which are recognized to be endangered. (Behrouzi-Rad, 2009) The wetlands are extremely important as a staging and wintering area for a wide variety of water birds, notably pelicans, herons, dabbling ducks, and shorebirds. During years of high water levels, they are also important for many breeding species. (datazone.birdlife.org) Furthermore, the Hamoun wetland deals with a natural phenomenon called the "120-day dust storms" that come from the Hindu Kish mountains in northern Afghanistan, a potential source of dryness in the Sistan area with winds of 120 days beginning in mid-May and continuing until mid-September. (Alizadeh-Choozari, and others, 2014) According to the Ramsar, moreover, the Hamoun wetland is also known as a world biosphere reserve in the UNESCO's 4th World Congress of biosphere reserves in 2016.

(www.unesco.org) Despite the importance of the wetland from a conservation perspective, it is not sufficiently well protected via legal instruments. Dam-building on the Hirmand river can be considered with the most traumatic effects on human populations and wetland conservation Convention, a large part of the Hamoun wetlands has been identified as a protected area.

1.2. Dam Construction

Dam construction history dates back to around **2950-2750 BC in the ancient Egyptian** civilization. Those days the main function of dams was limited to the retention of waters. It is notable; earlier dams were quite simplistic in construction and operation. Nowadays, dams are built for a whole range of purposes, but their fundamental function is meant for storage and safe retention of water in large quantities, which would be subsequently released to achieve various purposes such as irrigation, hydropower generation, recreation, water supply, flood prevention, etc. However, dam-building operations for any of these purposes often alter or divert the downstream river flow regime and could cause significant harm to human life and the environment. In most of dam construction projects, environmental consideration has been ignored in their design and operation. (McCartney, M., 2009). Consequently, this approach caused plenty of problems such as displacement of people, blocking watercourses, changing the river temperature, biodiversity loss, etc. Dam construction could also adversely affect the existing water rights of riparian states. (Salman, M. A., 2000) Hence, there are numerous disputes among riparian states over dam construction on transboundary rivers. For instance, one of the most controversial dam-building projects is the southeastern Anatolia Project on the Euphrates and Tigris river basin, whose overexploitation on the upstream has caused significant harm to the downstream. This is not limited to the Middle East region. It is rather considered to be a global issue. (KHRP, C., & Campaign, I. D., 2002)

1.3. Negative Effects of Dam Construction

As beforehand mentioned, dam construction cause plenty of damages to the environment. in this section, we seek to review some common environmental effects of dam-building.

1.3.1. River flow

One of the most common impacts of dams is changing of river flow. Dams change rivers' function and, in many cases, prevent the flow of plants and nutrients. This phenomenon causes a wide range of disadvantages, such as slowing water flow. In this respect, water temperatures highly increase, and it will be a potential danger to fishes and other species. Moreover, dams also trap sediments, which are vital for maintaining physical processes and habitats downstream of the dam. Changes in temperature, chemical composition, dissolved oxygen levels, and the physical properties of a reservoir are often not suitable to the aquatic plants and animals that evolved with a given river system. Indeed, reservoirs often host non-native and invasive species (e.g. snails, algae, predatory fish) that further undermine the river's natural communities of plants and animals. (archive.internationalrivers.org)

1.3.2. Human Displacement

The adverse effects of dam-building are not limited to river flow and aquatic ecosystem. Plenty of local communities live around rivers and wetlands, and their life highly depends on the situation of rivers. The latest researches indicate that over 80 million people have been displaced by dam projects worldwide. (Koirala, S and others, 2017) Displacement and resettlement of local people cause socio-economic problems. According to the World Commission On Dams reports, numerous indigenous have lost their access to clean water resources that became living downstream of rivers a suffering situation. Most of the local people are farmers, and their main source of income is farming, hence, Relocated people suffer from the loss of farmland, forestland, houses, and other properties, which may then reduce their income and their

possibilities of reemployment. It is notable mentioned impacts of dam construction directly affect people's lives. Lots of them are forced to do illegal jobs such as smuggling to earn enough money. (Huang, Y and others,2018)

1.3.3. Climate Change

Nowadays, climate change has become a global concern that adversely affects human life. In this complicated situation, natural resources play a critical role. Rivers can be an important part of the natural defence against climate change impacts. Lots of people believe that hydropower dams projects present a green and clean source of energy, while this opinion is not a realistic idea about dam construction. The negative effects of climate change on both people and natural habitats can be seen through its impacts on water. With regards to this subject, studies and researches have been illustrating that dams and reservoirs are globally significant sources of the greenhouse gases carbon dioxide and, in particular, methane. (Tayebi, S., &Mazinanian, Z. 2020)

1.4.Kajaki Dam Project

In the early 1950s, the Afghan government built the Kajaki dam in collaboration with the Export-Import Bank of the United States to increase electric power generation and transmission from the dam. This massive project is regarded as the most ambitious project ever undertaken in the history of modern Afghanistan. (Sopko, J and others,2016) According to a UNEP investigation, major dams and irrigation schemes on the Hirmand River have the capacity to hold at least 2.7 billion cubic meters. Both surface water and groundwater levels at many points along the Hirmand dropped significantly following the period of dam construction in the 1970s. In 2002, UNEP visited the Kajaki site and observed the water level at 58m out of a maximum capacity of 70m (around 900 million cubic meters). (UNEP, Post-Conflict Environmental Assessment, 2003) Despite UNEP recommendations, in 2005, the United States Agency for Development (USAID) awarded a contract for the design, manufacturing, and

installation of the third turbine (Unit 2) at the Kajaki Dam. The turbine and generator components arrived in Afghanistan in 2008 and were transported to the site in collaboration with the British Military in the course of Operation Eagle Summit, one of the largest logistical operations since World War II. Finally, in,2016 the Afghan government benefiting from the financial contribution of the United States, installed a third turbine generator (Unit 2) at the Kajaki Dam Hydropower Plant in Helmand province to expand access to electricity in Afghanistan. (www.usaid.gov) These constructions upstream of the Hirmand River caused numerous problems downstream of the river. According to local media, dryness, a lack of adequate water for farming as well as unemployment led to huge migration from Sistan province to other cities. This water crisis in the Sistan area clearly revealed the fact that dam construction in the upstream could adversely affect the watercourse and beyond, including unemployment, biodiversity loss, and even emigration.

1.4.1. Kajaki Dam Development and Hamoun Lake

As mentioned beforehand, Hamoun lake is a valuable environmental resource for the residents and species located downstream of the Hirmand river in the Sistan area. The main resource of water providing for the Hamoun lake is the Hirmand River. Therefore, the local people's life highly depended on this freshwater resource for drinking and agricultural activities. However, the sufficient water supply for the Hamoun lake that is the most important environmental resource of this area, has been ignored for a long time by the upstream state. (Sharifikia, M.,2013) In this complicated situation, the lack of water supply for the Hamoun lake has been causing a wide range of difficulties in this arid region. The failure to provide Hamoun lake water demands it situated the Sistan province in a water crisis. At first sight, it might seem that the lack of sufficient water for the Hamoun lake only can adversely affect habitats and species life. While it is cannot be a realistic assessment. (Michael JH and others, 2004) In this respect, the Kajaki dam development caused lots of significant harm to the

Hamoun lake, especially in drought years. With regards to this statement, plenty of technical researches indicate that upstream dam developments caused water reduction and salt land increasing downstream. For instance, in 2001, the salt land areas were increased five times that sharply increased unemployment and other socio-economic impacts. Moreover, the decrease in annual water income caused the majority of serious threats to species and wildlife habitats. To sum up, the Kajaki dam development has damaged the Hamoun lake ecosystem through changing river flow and unsustainable development upstream. as a result, plenty of local species life that some of are categorized as endangered species threatened, in addition, lots of migratory birds that Hamoun lake used to be a breeding place for them, have had to leave this area. (Farrokhzadeh, S and others,2020

2. International Environmental Law Principles

Dam construction on transboundary rivers is a multilateral subject that directly and indirectly affects the rights and obligations of riparian states. In addition, the majority of bilateral water treaties like the Hirmand water treaty of 1973 do not meet an effective legal framework and critical issues such as sustainable development and environmental water rights; even future needs have been fully neglected. Therefore, dam building tends to be a debatable topic among riparian states. Some states believe that they have unconditional sovereignty over their natural resources, while downstream states argue that this sovereignty is no absolute right and that upstream states should take into account no harm principles and precautionary measures to prevent causing any damage. These principles are also set out in the Stockholm Declaration 1972 and the Rio Declaration 1992, as well as in many other international instruments. Although some states have realized the importance of an effective legal framework on dam building and regulated national laws and policies, some national laws are stronger than others. For example, laws governing biodiversity in Germany are stronger than others, while the laws governing land acquisition in India are

stronger than others. It would be a valuable promotion for countries to be able to achieve a legal framework on dam building. (Hurwitz, Z.,2014) Regulating and implementing these laws at an international level seems to be complicated because riparian states often tend to prefer their own interests over international watercourses, and the rights of other states over shared watercourses are not their priority. As a result, riparian states face the majority of conflicts over the exploitation and utilization of transboundary rivers. (Poorhashemi, A, 2020) International Environmental Law principles play a key role in adjusting riparian states' actions over transboundary rivers' resources. (Rieu-Clarke, A., &Macatangay, R. E,2019) It is notable that over the past decades, to address the current and future challenges, these principles have been developed. Even if riparian states take into account International Environmental Law principles in their bilateral and multilateral treaties, they should measure them against current and future needs considering the non-stop progress and development in the International Environmental Law principles. To have a realistic perspective of dam building on transboundary rivers, we need to bear in mind the changes and development of International Environmental Law. (D'Souza, R,2006)

2.1. Precautionary Principle

One of the most important international environmental law principles for the conservation and sustainable management of rivers is the precautionary principle. At first sight, it may seem uncommon to use this principle instead of the Reasonable and Equitable Principle and also No-harm Principle because these two principles determined as the main principles concern to transboundary watercourses management in soft and hard law instruments. However, in this paper, we are going to evaluate Dam construction from the precautionary principle perspective. Initially, the origin of the precautionary principle backs to west Germany environmental law where it was known by the term *Vorsorgeprinzip*. in the 1970s–80s, international environmental law progress sharply

increased, and governments and international organizations realized the necessity of environmental law regulation to future needs. Therefore, in 1972 United Nations Conference on the Environment in Stockholm was the first world conference to make the environment a major issue. This conference became a huge step to adopt a series of principles for sound management of the environment; consequently, the Stockholm declaration presented precautionary principles for the first time in an international environmental instrument. (STEPHEN M. GARDINER, 2006)

After the Stockholm conference, this principle appeared in numerous international law instruments. In 1992 The United Nations Conference on Environment and Development (UNCED) was held in Rio. This conference that known as the earth summit consider the largest environmental conference with the participation of 117 heads of state and representatives of 178 nations in all attending. At this conference, the Rio declaration was presented. After the Rio declaration, the importance of the precautionary principle increased dramatically. Rio declaration article 15 provides (To protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.)

After the establishment of the precautionary principle as a vital legal tool regards to environmental protection, arguments and different interpretation by states and international institutions over the limitation on this principle have been raised for a long time. A wide range of states believed that the precautionary principle should not be considered as a part of customary international law. Moreover, there have been disagreements about the scope and the effectiveness of this principle. Almost every state and the international organization agreed that for the aim of this principle, they should take into account appropriate

strategies. However, in the application of this principle, there are different interpretations. In this respect, some consider it as fundamental for early international legal action that includes significant threats to the environment such as loss of biodiversity and chemical pollution. On the other hand, another group totally disapproved of this approach and limited the overregulation of this principle on human activities. Consequently, this principle does not have the same formulation in each legal instrument. Therefore, we can divide the precautionary principle into two approaches. In the traditional approach, precautionary principle presented standards that action shall only be taken where there is scientific evidence that significant environmental harm is happening. Otherwise, no action would be required. (Ambrus, M, 2012)

this approach can be seen in The 1974 Paris Convention for the prevention of marine pollution from land-based sources. In this respect, Article 4 (4) provides ((The Contracting Parties may, furthermore, jointly or individually as appropriate, implement programs or measures to forestall, reduce or eliminate pollution of the maritime area from land-based sources by a substance not then listed in Annex A to the present Convention, if scientific evidence has established that a serious hazard may be created in the maritime area by that substance and if urgent action is necessary)) in the middle of 80 century plenty of international treaties have been concluded, these legal instruments developed the concept of precautionary principles. For instance, the 1985 Vienna convention provides that the parties recognition of the 'precautionary measures' taken at the national and international levels. According to this convention, each state party should take appropriate precautionary measures not only at the international level but also at the national level. Furthermore, the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) took a huge step concern to the modern approach of the precautionary principle. (www.britannica.com)

According to the 1992 water convention ((by virtue of which action to avoid the potential transboundary impact of the release of hazardous substances shall not be postponed on the ground that scientific research has not fully proved a causal link between those substances, on the one hand, and the potential transboundary impact, on the other hand.)) as a result, in the modern approach each potential threat that may cause danger to the environment regardless of its level required appropriate measures. Therefore, if a human activity such as dam construction might adversely affect the environment, states should take into account precautionary measures to avoid adverse environmental effects at each level. All in all, although states and the international community declaring different interpretations about the scope of the precautionary principle and there is no same definition for this concept, it seems that there is an agreement among the international community to protect the environment by appropriate strategies to decrease any potential damage and adverse effect on the environment. (Sands, P. and Peel, J., 2012. Page 223)

2.2. Precautionary Principle and Judicial Decisions

The judicial decisions of courts and tribunals have promoted international environmental principles for a long time. In this respect, international tribunals and the international court of justice (ICJ) play a key role. However, the international community could not reach a comprehensive and same definition for this principle, but judicial decisions and advisory opinions of international courts developed this principle. Therefore, in this section, we are going to review the judicial decisions of international tribunals and ICJ regarding the precautionary principle.

2.2.1. International Tribunal for the Law of the Sea (ITLOS) cases

The International Tribunal for the Law of the Sea (ITLOS) has considered the precautionary principle as customary international law. Consequently, ITLOS has lowered standards of proof and potentially even

shifted the burden of proof. (Kazhdan, D.,2011) due to the ITLOS practice, the precautionary principle has been confronted in some cases of this tribunal.

2.2.2. New Zealand vs Japan and Australia vs Japan

In this case that is also known as the Southern Bluefin Tuna case, New Zealand and Australia argued that Japan had failed to follow its duties to cooperate in the protection of the southern Bluefin tuna stock by the increasing of fishing activities, then New Zealand and Australia requested ITLOS to take appropriate measure to stop Japan activities. Therefore, Australia and New Zealand litigated Japan in ITLOS explicitly invoking the precautionary principle. Due to this case, ITLOS stated that Japan from increasing its total allowable catch and from claiming that its catch was experimental and consequently did not issue the limitation of the agreement.(Poorhashemi, A., &Zarei, S,2021) however, the ITLOS did not expressly discuss the precautionary principle in its decision, but the decision-making totally relied on this principle. [In the view of the tribunal, the parties should, in the circumstances, act with prudence and caution to ensure the effective conservation measures are taken to prevent serious harm to the stock southern Bluefin tuna]. In addition, the tribunal encouraged the parties to reach a conversation agreement with each other and the other states on the fishing system. (Kerbrat, Y., &Maljean-Dubois, S,2019)

2.2.3. The Pulp Mills case

The Pulp Mills case is one of the most important cases that established the vital role of the precautionary principle in transboundary projects. Moreover, this case can be considered that ICJ expressly addressed the precautionary principle. In May 2006, Argentina submitted an application instituting proceedings against Uruguay. Argentina claimed that Uruguay, by the construction of a Pulp mill on the Uruguay River, has breached the 1975 bilateral treaty (Statue of the river Uruguay). This Treaty had signed to present a joint mechanism to rational and sustainable utilization of the river constitutes their joint boundary. (www.icj-cij.org)

notably, the parties have established the administrative commission of the river Uruguay (CARU). The commission could decide to recognize whether construction or modification is likely to present significant harm or not. In addition, the parties had to notify each other about the possible damages. Despite this mechanism, the conflicts between two states in 21s have changed the relationship between these two states. In 2003 Uruguay stated that the construction of Pulp Mills would not cause any significant damage to the environment. nevertheless, Argentina charged Uruguay for the construction of two pulp mills on the River Uruguay without complying with the obligatory prior notification and consultation procedures under the 1975 treaty. (Kazhdan, D,2011)

Argentina believed that the Pulp Mills were possible threats to the environment of the river and could cause significant damage to Argentina. Finally, in 2010 the ICJ stated that Uruguay had violated its procedural obligations to Argentina. Uruguay had notified CARU about its project. In addition, Uruguay had violated its obligation to notify Argentina on time of its plan about the Pulp Mills project. Consequently, [the Court concluded that Uruguay had not breached substantive obligations under the Statute. In addition to this finding, however, the Court emphasized that, under the 1975 Statute, "[t]he Parties have a legal obligation to continue their co-operation through CARU and to enable it to devise the necessary means to promote the equitable utilization of the river while protecting its environment](www.icj-cij.org) in addition, in this case, ICJ referred the parties to the precautionary measures. In this respect, ICJ provided [precautionary approach" "may be relevant in the interpretation and application of the provisions of the Statute" of the River Uruguay] (Argentina v. Uruguay,2010, Judgment of 20 April 2010, para. 164)) consequently, regards to the ICJ judgment the parties had agreed to interpret the 1975 statue due to the precautionary approach.

3. Kajaki Dam Under Hirmand Treaty 1973 and Precautionary Principle

3.1. Introduction

Various studies and researches have been conducted about protecting the environment of international watercourses, utilization of shared freshwater resources, as well as the role of treaties in managing shared water resources in recent years. Also, dam construction leaves various effects on the environment and the ecology of international watercourses. The considerable and distinctive point of this research is the case study and the exclusive assessment of the effects of construction and expansion of the Kajaki Dam on the Hirmand River under the precautionary principle. In this section, we are going to evaluate the situation of Kajaki dam development under the precautionary principle. As mentioned in the past sections Iran and Afghanistan conflicts concern utilization of the Hirmand river was temporarily finished by the signing of the Hirmand water treaty 1973. To present a comprehensive assessment regards to the legal situation of the Kajaki Dam and the application of the precautionary principle, we should review the 1973 Hirmand water treaty.

3.2. Hirmand Water Treaty 1973

Based on collected data and information by related organizations, 24 agreements have been concluded on transboundary rivers between Iran and its riparian states. A number of those agreements have expired over time, and some others have been terminated by subsequent agreements, thus losing their validity. Currently, there are 14 transboundary water agreements between Iran and its riparian parties in force. (Avarideh, F, and others,2016) One of the most complicated water treaties in Iran is the Hirmand Water Treaty of 1973. There is a long history of Conflict over the Hirmand water right between Iran and Afghanistan. In 1951, both governments, in collaboration with the United States, established a technical committee for the Hirmand river delta that recommended technical

solutions following both sides' needs. However, the two governments rejected the commission report at the 1956 Washington conference, thus leaving the dispute over the division of water unsettled. Finally, Iran and Afghanistan signed the Hirmand water treaty in 1973. According to the Treaty, Iran was allotted 22 cubic meters per second, with an option to purchase an additional four cubic meters per second in "normal" water years. (Dehgan, A, and others,2014) Although the Hirmand water treaty was a step forward to establish a legal joint mechanism over the Hirmand River, the Treaty only focused on downstream irrigation demands, whereas environmental demands such as the Hamoun wetland that is a key source of livelihood for Sistan province residents and also a valuable habitat for animal species were completely ignored. The 1973 treaty is the only applicable instrument that has failed to respond to the current needs of the relevant parties concerning wetland protection. Dam building on the Hirmand River is a regional case study, but its legal impacts are not limited to the concerned states. There are common agreements that impose the same legal challenges on the utilization of transboundary rivers. (Thomas, V., &Varzi, M. M,2015) Thus, this legal instrument could not reach a permanent solution to riparian parties' disputes. This failure includes different aspects, but one of the most important elements is the lack of an environmental perspective. This bilateral Treaty limited downstream water right only for irrigation purposes; consequently environmental needs were completely ignored.

3.3. Lack of Sufficient Legal Instrument

Development of the Kajaki dam, which was built in the 1950s by the American collaboration pursued seriously after the 1973 treaty. In this respect, Two 16.52 megawatt (MW) hydroelectric turbines were installed by USAID in 1975. (Etemadi, H.,2021) Furthermore, Iran Islamic revolution, then the 1980-1988 war with Iraq, and on the other hand Soviet-Afghan war 1979-1989, and also the civil war that caused the Hirmand water treaty has been forgotten for a long time. However, in recent years USAID

developed kajaki dam turbine generators to expand access to electricity in Afghanistan. (www.usaid.gov) according to the 1973 treaty, upstream states guaranteed an average of 820 MCM (26m³/s) per year to Iran for normal years and wet years. In addition, Article 4 provides that, In the dry years, the water rights of Iran would have to be reduced, depending on the water available. While Meijer's researches indicate that redaction of 3250 MCM may cause a danger to the ecology of the Sistan delta and downstream of the river. however, the environmental consideration has been forgotten in this Treaty. (Meijer, K., and others, 2006) The Treaty in Article 5 recognized the liability of Afghanistan in the case of water allocation for irrigation purposes. This Article provides((Afghanistan shall retain all rights to the balance of the water of the Helmand River and may make such use or disposition of the water as it chooses. Iran shall not claim the water of the Helmand River over the amounts specified in this Treaty, even if additional amounts of water may be available in the Helmand Lower Delta and maybe put to beneficial use by Iran.))

Regarding article 5, Afghanistan must avoid running the projects and operations that might be a threat to downstream water rights, although the limitation and the type of forbidden projects remained unanswered. Consequently, did not only environmental demands not have any place in this Treaty but also upstream state does not attend to the irrigational water rights of Iran.

3.4. Precautionary Principle Role on Kajaki Dam Project

After running of Kajaki dam project in the 1950s, in the first phase, this project was developed by 1979. In 1950-1979 international environmental law progress increased sharply. However, the international environmental principles could not be seen in the theory and practice of states (especially developing countries) in the early age of international environmental law development. The Hrimand water treaty 1973 also is not an exception for this statement. Nowadays, environmental and

ecological demands are integrated parts of an international treaty, whether bilateral or multilateral. The precautionary principle in the 21 century plays a key role in projects and any type of industrial and environmental operation, and regarding practical action in the international community, it seems that this principle can be considered as international customary law. However, in fact, the Kajaki dam project in any phases did not attend precautionary principle at all. In this respect, as mentioned before, the Hirmand treaty 1973 does not present any appropriate measure against significant dangers to the environment. to sum up, Afghanistan on Kajaki dam project not only did not limit the activities that may adversely affect the environment of the Hirmand river (modern approach) but also did not take appropriate measures against serious dangers that may harm the environment seriously in a major limitation (traditional approach). As a result, the precautionary principle does not have any role in the practical action of upstream states on the development of the Kajaki dam.

Conclusion

In fact, dam construction on transboundary rivers causes the majority of direct and indirect impacts on the environment. However, this type of operation seems unstoppable. Consequently, Dam-building on the Hirmand river can be considered with the most traumatic effects on human populations and environmental conservation. Despite the importance of the Hirmand river from a conservation perspective, it is not sufficiently well protected via legal instruments. Meanwhile, there is no efficient and updated legal framework to regulate dam-building operations on the Hirmand River in an effective manner to satisfy the demands of Iran and Afghanistan as riparian states.

Therefore, the international environmental law principles' role became highly important for the protection of the environment. Kajaki dam, likes plenty of transboundary mega-dams, causes numerous negative effects on the downstream of

the Hirmand river such as (biodiversity loss, displacement, changing river flow, etc.). However, Meanwhile, there is no efficient and updated legal framework to regulate dam-building operations on the Hirmand River in an effective manner to satisfy the demands of Iran and Afghanistan as riparian states. The 1973 Hirmand Treaty is the only applicable instrument, but it does not consider environmental issues at all. It has only sufficed to determine the water rights for Iran and Afghanistan to secure agricultural needs. As a result, it has failed to respond to the current needs of the relevant parties concerning environmental protection. Consequently, in the absence of any effective, coherent legal regime, the development of upstream dam-building projects has caused environmental damage to the river. This issue caused a wide range of problems in this watercourse, especially in Iran as the downstream state. As a result, nowadays Sistan delta deals with serious environmental (water shortage, access to freshwater) and also economic crises (unemployment). In this critical situation, the importance of the conduction of a new bilateral agreement with the centrality of the Precautionary principle will be a wise decision. Although still lots of countries and international institutions have different interpretations from the scope of the Precautionary principle, this principle became acceptable in the international community and can be categorized as international customary law. It is notable, however, reasonable and equitable utilization and no-harm principle are recognized as main principles concern transboundary watercourses, but besides these two principles, we should consider the potential of other international Environmental law principles such as the precautionary principle, which can tend the Hirmand river environmental situation to a sustainable condition. Whether we apply a traditional or modern approach to the precautionary principle, the application of this principle will bring many standards and appropriate measures (for example, Environmental Impact Assessment) to human activities, especially the development of the kajaki dam. To increase the efficiency of the new

agreement besides a new technical committee establishment of a legal committee that assesses the legal aspects of the Treaty and maintains the rights and obligations of parties will be suggested. All in all, however, it seems complicated for Iran and Afghanistan to conclude a new treaty on the Hirmand river, but this decision can solve numerous environmental and political conflicts over the utilization of the Hirmand river between parties. To achieve a new useful and comprehensive treaty with a focus on the Precautionary principle at the first step, the international community should reach an acceptable and united definition because different definitions and interpretations might be caused hardness in the global application of this approach. Moreover, the United Nations should present this principle as international customary law because some states, such as the United States, did not consider this principle as international customary law, and it might decrease the effectiveness of this principle in the international community. All in the application of the precautionary approach, especially in the arid and semi-arid areas, can avoid the potential damages in transboundary projects.

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