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Research Article

Comparison and Contrast of Islamic Water Management Principles with International Water Law Principles: A Case Study of Helmand River Basin

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Abstract: Considering the negative impacts of climate changes along with the rapid increase in population in Islamic dominated states, e.g., the Middle East, water tension among upstream and downstream states is increasing. Despite the importance of water management in Islamic culture, the role of religion has been under-valued and under-emphasized by the scholars. The paper has sought to compare and contrast Islamic water management principles (IWMP) with international water law principles (IWLP).

The findings from this analysis show not only that IWMP are in conformity with IWLP, but that in many cases, IWMP can be more effective. For instance, where international water accords between riparian states of a shared river basin are poorly developed and lack enforcement mechanisms under IWLP, those upstream states can abuse their geographical locations depriving those downstream-ers. In contrast, IWMPs stress the equitable and reasonable use of water resources among upstream and downstream users of a shared watercourse. Moreover, although IWLPs emphasize the conservation and preservation of ecosystems and the environment at the basin level, the inter-basin states especially those upstream can pose significant harm to the ecosystems. On the other side, Islam as the religion of peace, has placed much emphasis on the preservation of nature. For example, the verse, ".... And waste not by excess, for Allah loves not the wasters" [Quran, 7:31], illustrates the importance of the sustainable use of water and the environment.

It is argued that if Islamic Water Management Principles are incorporated into the management instrument of Islamic States, the issue of equitable and sustainable use of water among Muslim-dominated riparian states (e.g., Iran, Afghanistan, etc.) will be solved.

Keywords: Islamic Water Management Principles (IWMP); International Water Law Principles (IWLP); Helmand River Basin; Upstream State; Downstream State

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1. Introduction

Water access is a global concern in the 21st century [29]. Given the adverse effects of climate changes along with the increase in population, water conflict is increasing between upstream and downstream users of some shared river basins due to unfair allocation of water resources among users [97, 18, 96, 4, 90, 43, 77, 38]. Despite the existence of international water treaties among some riparian states, water conflict is still sparking in many regions [66, 97, 45, 30, 77, 58, 74] due to the result of asymmetrical power [100, 101] and competing interest among users [74], especially in the Middle East [51, 30, 98, 100, 77].

Despite fierce water tension among upstream and downstream users in the Middle East, some scholars such as Wolf [96] and Amery [11] contend that the role of culture and religion in managing and utilizing natural resources has been under-emphasized by scholars. Wolf [96] believes that for water conflict resolution mechanisms, one field of study that has not been further explored is the role of religion and culture [1]. Amery [11] argues that in Muslim-dominated countries, the inclusion of a culturally and religiously based approach into the "management instrument" of Muslim-dominated states could lead to broader sustainable and equitable use of water resources [p. 488]. The incorporation of religious doctrine in water management could help protect and conserve the nature and ecosystems.

Islam, as the predominant religion in the Middle East, has guided its followers to consider equality, justice, and sustainability in utilizing natural resources. For instance, Lambton [54] asserts that water has a pivotal role in Islamic culture. considering the importance of water in Islam, Naff [67] and Shroder [86] argue that water is mentioned more than 63 times in the Koran. Additionally, Naff [67] and Gaathier [32] assert that the term river (Nahr) and 'drinking water' (Shariba) have been mentioned 54 and 39 times respectively in Quran. Similarly, Amery [11] notes that the various forms of precipitation [*rainfall, dew, snow]* are cited more than 100 times, including the verse: "*And we created from water every living thing*" [Quran, 21:30].

In Islam, water is managed by Islamic law- Sharia. In fact, the Arabic term "Sharia" or "Shari'ah" means "irrigation source" or a path to irrigation [24]. There are two basic Sharia concepts that refer to water rights in Islam: "*shafa"* the right of thirst, which establishes the most fundamental right of human beings to quench their thirst and the thirst of their animals; and the "*shirb"* which is the right to irrigate lands [45, 30, 21, 23]. According to Islamic water law principles, priorities are given to human and domestic use, then to animals, agriculture, industrial and recreational activities, respectively [1]. These two basic regulations of Sharia are interpreted differently by various Islamic schools and implemented in various ways, taking the geographical, social, ethical, and cultural aspects of Muslim communities into consideration.

Regardless of the differences in implementation of *shafa* and *shirb* in different Muslim-dominated countries, Ansari [13] contends that Islam teaches its followers how to live in peace and harmony with each other and with their natural environment. Islamic water management principles assert that the natural environment belongs to *Allah* (God), who entrusted it to human beings, and that the earth dwellers are responsible to not cause significant harm to the nature. This Islamic doctrine is fully in line with the perspective of sustainable and equitable use of natural resources, including water [1, 11].

This study will compare and contrast IWMP with IWLP using the three criteria- equity, responsibility and sustainability- through a case study of Helmand River Basin shared by Islamic Republic of Afghanistan and the Islamic Republic of Iran. The paper will specifically address the following two questions:

I. What are the strengths and weaknesses of Islamic water management principles (IWMP) in addressing equity and sustainability in a shared river among upstream and downstream riparians?
II. What are the similarities or/ and differences of Islamic Water Management Principles (IWMP) and International Water Law Principles (IWLP)?

The authors will first present the theoretical framework. Next, the three criteria will be presented; followed by a background information about Helmand River Basin shared by Afghanistan and Iran. The second part of the paper will compare and contrast the two sets of principles- IWMP and IWLP- using graphs and tables, followed by a conclusion.

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2. Theoretical Framework

2.1. Islamic Environmental Theory

Natural resources have been severely affected by human activities in the last century. It is argued that environmental crisis happens when mankind forgets his understanding of himself/ [herself] as trustee or vicegerent of Allah (GOD) and stopped understanding that nature is the precious sign of Allah [33]. Shomali [85] believes that the best way to stop the destruction of the nature is to return to teachings and practices of religion and redesign our policies related to the over-exploitation of natural resources. Gada [33] contends that the main root of environmental crises is the separation of worldly living and the religion.

In the western world, philosophers and environmental ethicists have developed four schools of environmental ethics related to the role and responsibility of human with the nature. These schools are: anthropocentrism, biocentrism, liberation/rights theory and ecocentrism. However, each of the school disagrees with others on the role and duty of human beings with nature [3].

While anthropocentrism or human-centered ethics is the belief that humans alone possess intrinsic values [37], the liberation or rights theory argues that animals also have the same right to be treated equally [95]. The third school is biocentrism. According to Gada [33], biocentrism is the school where every living thing has an intrinsic value regardless of their instrumental value for human beings. The last school of environmental ethics is ecocentrism. Ecocentrism or ecosystem-centered is the belief that natural resources including non-living resources have intrinsic value [53].

On the other hand, Islamic perspective of nature is neither anthropocentrism nor ecocentrism. Rather it is theocentric (God-centered). According to theocentric perspective, God (Allah) has created everything in the universe [3, 65, 33]. Quran repeatedly states that nature is created by one [Allah]. For instance, "*there is no God but He, the Creator of all things*" [Quran, 6:106]. In fact, the creation of nature is one of the signs of Almighty God. Allah in holy Quran says, "*There are certainly signs in the earth for people with certainty; and in yourselves. Do you not then see?"* [Qur'an 51:20-21]. Özdemir [73] quotes that Seyyed Hossain Nasr, an Iranian Islamic Scholar, argues that nature is "*the theatre wherein are manifested His signs"* [p.15]. Gada [33] states that the relationship between God and nature is the relationship of creator and creature respectively. It is further noticed that humans are not the only creatures that need to be protected, but also any living and non-living nature, e.g., forests, lakes, shared watercourse [12, 57]. Allah, for example, says, *"There is not an animal (that lives) on Earth. Nor a being that flies on its wings, but (forms a part) of a community like you"* [Quran, 6:38].

Now, we will briefly discuss the three principles of Islamic Environmental ethics.

A. Principle of Unity (Tawhid)

The principle of Tawhid points to the oneness or unity of Almighty Allah. Gada [33] notices that the term Tawhid indicates that Allah is the only source of all value. Lubis [57] claims that Tawhid is the core of "the oneness of the Creator from which everything else follows". Allah in the holy Quran says, "*To Him belongs whatever is in the heavens and the earth all obey His will and it is He who originates creation…*" (Qur'an 30:25). Khalid [50] contends that the principle of Tawhid shows the interconnectedness of human beings and the nature (e.g., environment).

B. Principle of Trusteeship (Khilafah)

This principle emphasizes on the vicegerency of human on the earth [31]. According to Islamic perspective, Allah created mankind and granted him the position of being a steward or trustee of God on earth. In chapter two verse thirty, Allah says, "*And lo! Your Sustainer said to the angels: Behold, I am about to establish upon earth a Khalifa"* [Quran, 2:30*]*. Lubis [57] notes that the term Khalifa (Arabic term for the word trustee) along with the term *fi al-ardh (Arabic word, means earth)* has been cited seven times in Quran. Each time it

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is used, it refers to people (mankind) to whom God entrusted some part of his power on earth. In fact, Mohamed [65] believes that Allah examines mankind's fairness and justices over things under their stewardship including the natural environment, e.g., rivers, lakes, wetlands, etc.

C. Principle of Responsibility

The third principle of Islamic Environmental ethics is *Amana* (trust). According to Islamic view, Allah offered trust to man, *the trustee [31, 33, 82].* Mankind took the risk of accepting the '*responsibility.* Allah in the holy Quran says, "*Verily, we did offer the amana to the heavens and the earth and the mountains; but they refused to bear it Yet man took it - for, verily, he has always been prone to tyranny and foolishness"* [Qur'an 33:72]. *As trustee or vicegerent of God, man has to fulfil the responsibility by acting justly according to the wills of Allah, or he disobeys God's commands by committing injustices against God's creation [33], e.g., the over-exploitation and over-abstraction of natural resource and the nature.*

Sarkawi et al. [82] posit that failing to utilize the resources wisely will have negative consequences on us (*mankind*). It is argued that the two main sources of Islam, *Quran* and *hadith* (*Al-Sunnah*) teach us that the universe is created in perfect and accurate measure, and if the environment is managed reasonably, the earth provides sufficient resources for mankind's consumption, inasmuch as the world exists. Sarkawi et al. [82] further add that human beings are viewed as part of nature; however, they are considered superior to other creations due to their mental capabilities and talents [15].

It is argued that if mankind makes mischief and does evil on earth, e.g., over-exploitation of natural resources, Allah will torture mankind. For example, "*The Taste of some of their Deeds"* from the Quranic verse, "*mischief has appeared on land and sea because of what the hands of men have done, that Allah may give them a taste of some of their deeds, in order that they may turn back*" [*Quran*, 30:41] points to environmental disasters and crises [82]. Ammar [12] argues that a man has two responsibilities with regards to the nature. First, man is the manager of the nature (natural environment). Second, man is the user of the nature, e.g., using freshwater for irrigation, domestic, and industrial uses, etc. The Quran notes, "*Do you not see that Allah has subjected to your (use) all things in the heavens and on Earth and has made his bounties flow to you in exceeding measure, both seen and unseen" [Qur'an 31:20].* Figure 1 illustrates the relationship between God (Allah), the trustee (mankind) and nature (environment).

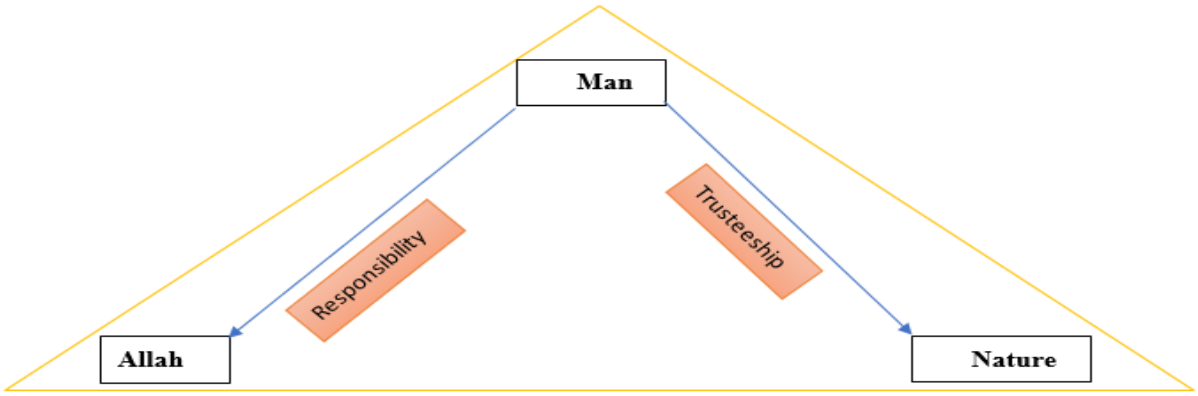

Figure 1: Relationship between Allah, Nature and Human beings. Source (Authors' drawing)

2.2. Theory of Islamic Water Management

Islam has emphasized equity and social justice among mankind. Ansari [13] contends that Islamic way of living includes "living in peace and harmony" at individual, social and ecological levels. Islamic teachings emphasize that natural environment e.g., water

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resources, belongs to GOD, who entrusted it to humankinds to utilize it in a sustainable and reasonable manner and are expected to pass it on to the future generations [9, 11, 82].

The theory of Islamic water management is based on two important notions, *Tawhid and Fitra*. The notion *Tawhid*, according to Amery [11], testifies the unity of God who created the universe and Muslims have to submit their will and actions to him (God) [31, 45]. Based on this notion, human beings (regardless of their faith) have to treat each other equally, including equality in opportunities and co-operation. The notion of "*Tawhid*" points to the interaction of human with its natural resources environment. As the trustee of God, human beings have to utilize the natural environment (e.g., water) in more reasonable and equal manner [89]. The second notion of the theory of IWM, *Fitra*, points to the interaction of people with each other. *Fitra* is "the measure of truth in our actions and being, and at some time the quality of harmony between ourselves and the cosmos" [11].

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2.3 International Water Law Principles

The increase in population along with reliance on rivers and lakes have led to the emergence of rules and regulations on non-navigational uses of rivers [81]. Various theories and doctrines were emerged stating the practices of riparian states on the use of internationally shared rivers and lakes [77, 81]. we will briefly explain some of these theories and doctrines.

A. Theory of Absolute Territorial Sovereignty

According to the Theory of Absolute Territorial Sovereignty, every nation has the absolute right to utilize the water of an international river flowing its territory, regardless of its adverse effects on other nations (e.g., the downstream states). The upstream state/s may control the shared river without considering the hydrological needs of the downstream states [77]. Salman [81] also note that this theory is also called Harmon Doctrine after the US Attorney General, Mr. Judson Harmon, who declared the absolute right of the US to divert the Rio-Grande in 1895. However, this doctrine is no longer used by water experts.

B. Theory of Absolute Territorial Integrity

According to this theory, the lower riparian (downstream states) has the right to full flow of water that crosses the downstream riparian. This theory also asserts that if the upstream state needs the consent of the downstream state if it interferes or controls water in the upstream [77]. Salman [81] believes that the theory of Absolute Territorial Integrity is actually the opposite of the theory of Absolute Territorial Sovereignty. In fact, this theory is in favor of the downstream countries of an international watercourse. Birnie and Boyle [19] add that this theory was criticized and is no longer used in international watercourse discussion.

C. Theory of Limited Territorial Sovereignty

According to this theory, every riparian state has the right to use the shared water resources for free without prejudicing or discriminating the right of any co-riparian state. This theory gives a reciprocal right to each riparian to utilize natural resources in an equitable manner [81]. The advantage of this theory compared to the two theories that have just been discussed is that this theory recognizes the right of every upstream and downstream riparian to reasonably and equitably use the shared international watercourse. Schroeder-Wildberg [84] contends that the two principles, "equitable and reasonable utilization and obligation not to cause significant harm" are part of this theory (p.14).

On May 21st, 1997, the UN General Assembly adopted the Non-Navigational Uses of International Watercourse, which is also known as UN Watercourses Convention. This convention codified the principles of international watercourses which were built based on the 1966 Helsinki Rules. As per the request of Turkey, the UN General Assembly called for voting for adoption of UN watercourse convention. 103 out of 133 countries voted in favor including Iran, 3 against and 27 abstained including Afghanistan [4].

we will briefly discuss the four principles of International Water Law.

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a. *Principle of equitable and reasonable utilization [49]*

This principle is a subset of the theory of limited territorial sovereignty. According to this principle, each riparian state has the right to share an international watercourse in a reasonable and equitable manner within its own territory [77, 93]. This principle is based on the shared sovereignty. Equality in rights of utilization of a shared river basin does not mean equal share of waters. To determine equitable and reasonable share of each basin state, a number of factors should be taken into considerations:

i. "*Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;*
ii. *The social and economic needs of the watercourse States concerned;*
iii. *The population dependent on the watercourse in each watercourse State;*
iv. *The effects of the use or uses of the watercourses in one watercourse State on other watercourse states;*
v. *Existing and potential uses of the watercourse;*
vi. *Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect;*
vii. *The availability of alternatives, of comparable value, to a particular planned or existing use*" [93].

b. *Principle of Obligation not to cause significant harm*

This principle is also part of the theory of limited territorial sovereignty [27, p. 82]. This principles stresses that no riparian state in an international basin is allowed to utilize the shared watercourse in its territory in a way that trigger "significant harm" to other basin states or to the environment including harm to human being's health or safety and the health of living species in the basin [93]. This principle is widely recognized by international watercourse and environmental law. However, the main question of "significant harm" or how to define harm as 'significant' remains unanswered [49].

c. *Principle of general obligation to cooperate*

It is the responsibility of all the riparian states to cooperate with each regarding the state of the watercourse and present and future planning use of the shared watercourse [77]. The cooperation will help the shared water basin to be protected [93].

d. *Principle of Protection and preservation of ecosystems*

The Riparian states shall individually, and jointly protect and preserve the ecosystems of an international shared basin [77].

3. Definition of the Three Criteria

3.1 Equity

Although equity and equality are used interchangeably in daily conversation, Gutoskey [40] argues that "*equality is about dividing resources in matching amounts, and equity focuses more on dividing resources proportionally to achieve a fair outcome for those involved*."

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Brownlie [20] sees equity as "*considerations of fairness, reasonableness, and policy often necessary for the sensible application of the more settled rules of law*" (p. 26).

In Islam, the main purpose of sending the Prophet (PBUH) is to teach justice and equity to the followers and servants of Allah [47]. About the importance of Justice and Equity, Allah says, "O you who have faith, stand firm in equity (qist) as witnesses for Allah, even if it were against yourselves, or your parents, or your relatives. Whether rich or poor, Allah is more worthy of both. Follow not your desires, so that you may be just." Elias [28] elaborates on the above mentioned verse of the *Quran*. He argues that this verse is the base concept of justice and equity in Islam. Elias [28] further notes that we have to consider justice and equity for everyone regardless of their religion, ethnicity, language, gender, and race. Mankind should avoid bias and discrimination in utilizing natural resources, e.g., the equitable use of water among upstream and downstream users of a shared river basin.

Similarly, in International Water Law, McIntyre [60] argues that the concept of equity plays a significant role in managing, using and protection of an international watercourse among riparian states. In the principle of 'equitable and reasonable utilization' of international water law [93], the term equity, as the "key normative value", entitles each riparian state (upstream and downstream) to an equitable and reasonable use of an international shared basin flowing their territory [60]. McIntyre [62] critically explores the precise meaning of equity in the area of international water law. McIntyre [62] argues that, "*one reason for confusion about the precise meaning of equity in the area of international water law is that it has historically been invoked in relation to a number of different roles" (p. 116)* e.g., equity as justice and fairness, procedural equity and Equity" – "ex aequo et bono.

3.2 Responsibility

In terms of international water law principles, some scholars believe that one of the responsibilities of riparian states is to not pose significant harm to each other and to the watercourse [30, 45, 63].

The over-exploitation of natural resources, e.g., adverse effects of human-induced climate changes, which led to the environmental degradation, have raised the question of whether future generation will experience a livable environment or not. In a world with fast growing economy, the fair allocation and utilization of natural resources without compromising the needs of future generation, becomes a less critical issue. Kolstad and Krautkraemer [52] contend that the two criteria, Present-value Criterion and Conservation Criterion are the two basic intergenerational equity criteria. While the present-value criterion centers on the utilization of natural resources at its maximum level, the conservation criterion emphasizes on an economy that is more sustainable. According to conservation criterion, the current generation is responsible to utilize natural resources, e.g., water in a way that does not endanger the needs of future generation. According to the "conservation criterion" future generation has the right to enjoy a natural environment the same as the current generation does. Thus, the discourse of intergenerational equity becomes an important concern in recent decades [52].

From an Islamic lens, responsibility is the most important aspect of Islam. Sahih Al-Bukhari & Muslim narrate that everyone is responsible for his/her doing [16, 71]. Obaidullah further states that Allah created the world for a purpose [71]. For instance, the verse "When your Lord told the angels, 'I will place a steward on earth', they said, 'Will you put someone there who will corrupt it and shed blood, while we glorify, praise, and sanctify You?' He said, 'I know things you do not know.'" [*Quran*, 2:30; 48]. According to this verse, Allah had decided about our responsibility before our creation. Hence, we have to fulfil our responsibility in this life. This responsibility is divided into two parts:

a) Responsibility to the creator of the universe (GOD or Allah)

b) Responsibility to the creation, e.g., mankind. In this context it could be the responsibility of upstream and downstream users to sustainably use and preserve a shared river basin [71].

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3.3 Sustainability

Despite the wide acceptability of the term "sustainability" as the most important and desirable characteristic of human activities, its meaning and framework, according to Hermanowicz [44] is poorly formulated [26]. The notion of sustainability was first presented more than three decades ago by the World Commission on Environment and Development (WCED). Sustainability is to "meet the needs of the present generation without compromising the ability of the future generation to meet their own needs." Hermanowicz [44] believes that despite the fact that the term, "*sustainability*" is morally and ethically convincing, the term is technically impractical in planning and decision-making processes. Dovers and Handmer [26] assert that although human and the environment are deeply connected, from sustainability perspective, no such thing exists as purely human or purely environmental system.

Hermanowicz [44] posits that the practicality of sustainability could be achieved if the term is explored from three angles:

i. The domain of sustainability
ii. The time interval
iii. The measurement metrics

Gasparatos et al. [34] explore sustainability assessment. They believe that sustainability assessment should:

a. incorporate economic, environmental, social and institutional issues and their inter-linkages;
b. consider the effects of present actions well into the future;
c. recognize vagueness and uncertainty related to the outcome of our present action
d. include public involvement;
e. consider equity (intra-generational and intergenerational) [42].

Islam emphasizes that Allah (the creator of the universe) has created natural resources (i.e., water resources and nature) with a purpose [82]. The purpose is to provide livelihoods for human beings during their life on earth. Sarkawi et al. [82] also believe that the other purpose of creating natural resources is to test the trusteeship of mankind on the earth. Islam [46] notes that as a result of over-exploitation and inappropriate management of natural resources, along with the negative effects of climate changes, the biosphere is struggling with the significant decline of natural resources, ozone depletion, loss of ecosystems, air pollution, land degradation, river flooding and drought, and sea level rise.

Sarkawi et al. [82] further notes that Almighty GOD prohibits mankind from doing mischief or evil on the earth, because if they commit evil, then they are responsible for the consequences. In chapter thirty, verse forty-one, the creator of the universe says, "*mischief has appeared on land and sea because of what the hands of men have done, that Allah may give them a taste of some of their deeds, in order that they may turn back" [Quran, 30:41]. This verse implicitly points to the mismanagement of natural resources and its consequences or impacts on human beings. Using the interpretation of the abovementioned verse, one can argue that as the result of exploitation and human-induced climate changes on natural resources, e.g., the desiccation of wetlands in Iran and at the political border of Afghan-Iran [69, 70, 92], the livelihood of millions of farmers and irrigators on both sides of the border have been devastated [10].*

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4. Case Study: The Helmand River Basin

4.1 Historical Context

The Helmand River Basin, which encompasses approximately 45% of the surface area of Afghanistan, is the largest basin in the country. Approximately 97% of agriculture lands in southeastern part of Afghanistan and 80% of irrigated lands in Seistan-Baluchistan of Iran are irrigated by the Helmand River Basin [41]. The basin is of particular strategic importance to both countries.

The prolific lands of the Helmand River Delta surrounded by the deserts of eastern Iran and southwestern Afghanistan have been irrigated for many centuries through the abundance of water of the Helmand River [25]. The use and allocation of water along both sides of the Helmand River Delta has always been very contentious [91]. Since the Afghan-Iranian political border was drawn in 1872, the Helmand River Delta has been recognized as internationally shared river basin in the region. The Helmand River Basin is an international watercourse that is shared by the Islamic Republic of Afghanistan [81.4%], Islamic Republic of Iran [15%], and Islamic Republic of Pakistan [3.6%] [36, 92, 91, 87]. The role of Pakistan in the Helmand River Basin has been largely overlooked and underemphasized due to the existence of the tiny portion of the basin in Pakistan.

After the establishment of Afghan-Iranian political border, conflicts over water allocation between Iran and Afghanistan were on the rise [10, 92, 87]. According to Dominguez et al. [25], both of the neighboring countries made efforts to settle water tension through negotiation and agreement. But the initiation of development in the upstream of Helmand River Basin (Afghanistan) along with the severe drought in the summer 1947 intensified water conflict among the two riparian states, however, despite the various efforts of both states in solving the water distribution problem of Helmand River Delta. To settle the water allocation dispute among the upstream and downstream users of the Helmand River Delta, the US Department of State played the role of a mediator between the two riparian states [25, 36, 87, 56].

4.1.1 Helmand River Delta Commission (HRDC): Establishment and Function

In February 1948, the US Department of State proposed a neutral tri-lateral technical commission elected by the government of Iran and the government of Afghanistan to settle the water allocation dispute between the upstream Afghanistan and the downstream Iran. With the full engagement of upstream and downstream riparian states- Islamic Republic of Afghanistan and Islamic Republic of Iran, the Helmand River Delta Commission (HRDC) was finally established in March 1950. It consisted of three experts and engineers from different neutral countries- Francisco J. Dominguez, a professor at the Universidad de Chile and the Universidad Catolica de Chile; Robert L. Lowry, a consulting engineer from El Paso, TX USA; and Christopher E. Webb, District Engineer for the Water Resources Division of the Department of Resources Development in Vancouver, BC Canada [25].

The aim of the commission was to search and present an engineering-oriented mechanism for water allocation between the two neighboring countries at or below Bandi Kamal Khan (Persian to English translation: Kamal Khan Dam) for water use in Sistan, Iran and Chakhansur, Afghanistan [25].

4.1.2 Findings of the Helmand Commission

The Helmand River Delta Commission presented their findings in February 1951. According to Dominguez et al. [25], Iranians' water share or entitlement from Helmand River Delta amounted to 22 cubic meters per second [10, 91]. However, the outcome of the report of the commission was unaccepted by the Iranian side. Iranian authorities were stressing the need for more water shares from the Helmand River Delta [87, 36]. On the other side, Afghanistan, as the upstream riparian, suggested allocating an extra four cubic meters of water per second to Iran, provided that Iran allowed Afghanistan access to Bandar Abbas port on the Persian Gulf. Eventually the transboundary water accord was signed in 1973 by the Prime Minister of Afghanistan, Mohammad Musa Shafiq and the Prime Minister of Iran, Mir Abbas Hoveida [36, 87, 91].

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4.2 Current Context

In the presence of a poorly developed international water treaty, Wolf [96] argues that the issue of water allocation among upstream and downstream users is the most pressing topic. There is currently strong disagreement between the two Islamic states over the water allocation of the Helmand Basin. In recent years, the dispute over water appropriation coupled with drastic climate change, severe droughts, and lack of proper water management have escalated between the two riparian states [10, 91].

According to the 1973 water-sharing treaty, Iran's water right amounted to 22 cubic meters per second. Additionally, Iran was allowed to buy as much water as possible. In return, Afghanistan was allowed to use the Bandar Abbas and Chabahar ports without any restrictions [10, 91, 88]. However, since then, Afghanistan has faced conflict and civil unrest [5] for almost four decades. The devastating condition of the upstream riparian, Afghanistan (1990s and 2000s) has, sometimes, provided Iran with the opportunity "to enter Afghanistan to divert waters to its advantages" [88, p. 36] which is a violation of sovereignty of state. Now, as water is shrinking in the downstream due to climate changes, Iran claims that the hamouns (wetlands) are drying up.

As a late hydraulic mission developer [70], the newly established government of Afghanistan- after the fall of Taliban regime- has stressed controlling water within its territory [69, 70, 91]. Thomas and Warner [92] argue that as a result of poorly working transboundary water sharing treaty between the basin riparian, along with the presence of US-led NATO forces in Afghanistan, as well as constraints on foreign policy of Iran, and drastic climate change [70], the Afghan government has adopted a monolithic resource-capturing policy in the Helmand River Basin [69, 92]. On the other side, utilizing the covert and overt tactics, Iran has always disrupted the dam construction projects in Afghanistan through equipping anti-government groups, e.g., Taliban [10, 78, 79, 7, 72].

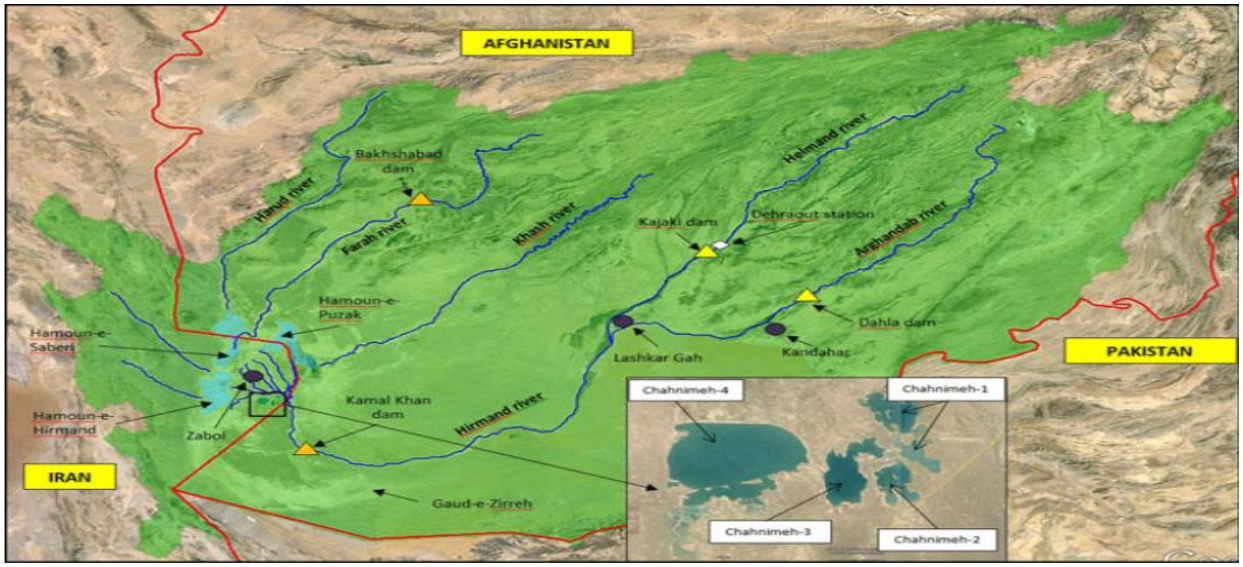

Figure 2: The location of the hamouns at both sides of the political border of Iran and Afghanistan [91].

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5. Analysis and Discussion

5.1 Commonalities and Differences of IWMP and IWLP

Here, Islamic water management principles will be compared and contrasted with international water law principles. The norms of international water law include:

(1) *The use of shared water resources in equitable and reasonable manners by the riparians* [68]

McIntyre [60] believes that the concept of equity plays an important and central role in utilization, management and protection of shared watercourse among co-riparian states. While the principle of equitable and reasonable use of water resources is now being universally understood [60], it is claimed that the concept of equity, as a "normative value" entitles every riparian state to use and benefit from the shared river basin. McIntyre [60] further notes that the "use and share" of international watercourse basin is based on the needs of co-riparians through consideration of various factors. Some of these factors are:

A. Geographic, hydrologic, climatic and ecological factors

B. Socioeconomic factors related to the co-riparian basin

C. The impact of the use of a watercourse by one riparian state on the utilization/ use of another riparian state

D. Factors related to the conservation and protection of the watercourse

E. Religious, cultural and local factors that impact the flow of the international watercourse between the riparian states [60, 93].

While the aim of equitable and reasonable use of shared watercourse is to allow upstream and downstream users to utilize and benefit the shared river basin in an equal manner, McIntyre argues that, "equality of right does not entitle each State to an equal share in the waters of a shared basin," taking the socio-economic, geographic, climatic, geographic and ecological factors into consideration [60].

In line with the argument of McIntyre [60], some scholars, for example, Moore [66], Wolf [96] Naff & Dellapenna [68] argue that due to lack of enforcement mechanism, the international water law fails to settle water tension among upstream and downstream riparians. In fact, Moore [66] notes that every state perceives equity based on their socio-economic, hydro-meteorological, climatic [61], legal and institutional aspects [68, 103].

However, from an Islamic Water Management perspective, if an accord is signed among two communities, i.e., Helmand River Basin, the two communities must abide by and be fully committed to the implementation of the agreement [8].

Al-Jayyousi [8] further documents that Islam puts much emphasis on equity and justice. This equity and justice could also be interpreted in terms of environmental flow and equal utilization of a shared river basin. For instance, the prophet states, "*none of you will have faith till he wishes for his (Muslim) brother what he likes for himself*" [Al-Bukhari 1:12]. This *hadith* implies that Islam motivates its followers to consider justice and equity in the use of clean and freshwater resources [30].

This discussion is further strengthened by the opinion piece of De Chatel [21] who contends that Muslims who forbid or prevent others from accessing to water are committing sin. Abu-Dawoud also narrated that once prophet Mohammad said, "*the man who, having water in excess of his needs, refuses it to a traveler*" will be overlooked by Allah on the day of judgement [21, 23, 31]. Islam orders the followers to observe or abide by fairness and justice in utilizing water resources. However, lack of enforcement power is the main hurdle to the implementation of Islamic Water Management.

(2) *The commitment of upstream and downstream riparian states for cooperation* [31, 64]

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In the presence of a poorly-developed water treaty, Wolf [96] believes that the upstream states occasionally abuse from their geographic position. In contrast, Islam considers a community *[upstream and downstream communities]* as a body of people who co-operate, help and protect each other and the environment [9, 31, 45]. Al-Jayyousi [9] reasons that this principle has been cited in *Quran* in various forms, such as forbidding evil, commanding good, institutionalizing equity and justice. *Quran* commands the importance of cooperation among the people [*upstream and downstream users of a shared river basin*] in the following verse: "The believers, men and women, are friends and protectors of one another; They all enjoin good and forbid evil, establish prayers, pay zakah (charity), and obey God and His Messenger- these are the ones upon whom God is going to have His mercy. Verily, God is Almighty, Wise!" [*Quran*, 9:71]. This verse of *Quran* could be further interpreted in a way that Islam stresses the need for cooperation.

This principle was abided by the prophet and other successors. It should be also observed and followed by all communities who share an international watercourse (e.g., Islamic Republic of Afghanistan and Islamic Republic of Iran). Additionally, IWMP allows each riparian to enjoy equal distribution of shared water [2, 11, 31, 45, 55, 96]. For example, in the traditional way of water allocation in Afghanistan, upstream and downstream users of a shared canal enjoy equal right to water allocation [2, 55]. Additionally, Amery [11] believes that *Fitra*, points to the interaction of people with each other. It vividly highlights how cooperation at all levels of life, e.g., cooperation among co-riparian states of a same river basin [96, 11, 87, 14, 64] is of most importance. This cooperation could take place at individual and community levels [*national and inter-basin level]* [9].

(3) *Posing no significant harm* [64, 83, 102]

Despite having an international water treaty on the Helmand River Basin [36], Thomas and Varzi [91] assert that Afghanistan maintained control over the use of water in the upstream Helmand River through construction of dams, posing significant harm to the downstream Iran and triggering the loss of one million jobs in the downstream Iran [10]. In return, Iran has equipped Taliban and other anti-governmental groups to blow up dams in the upstream of Helmand River Basin [10, 72, 79,7]. While the upstream co-riparian poses significant harm to the flow of water to the downstream, McIntyre [63] argues that downstream riparian can also exert significant harm to the "future upstream utilization" (p. 1-2) of the same watercourse, e.g., the disruption of Kajaki and Kamal Khan Dam construction processes in the upstream of Afghanistan [17, 35]. In fact, such destructive measures by either upstream user or downstream user (or both of them) will challenge the responsibility of each co-riparian in addressing the third principle of International Water Law- *posing no significant harm*.

Since IWLP are very general, McIntyre [63] notes that the responsibility and the liability of the riparian in posing no significant harm through proper utilization of natural resources, e.g., the river and the protection of ecosystems is unclear and vague [61, 64]. This vagueness and uncertainty has forced the co-riparian states to seek alternative legal means for their water sharing dispute, e.g., negotiation of ad hoc interstate dispute settlement arrangements, see also [63, 64]. That is why Iran, as the downstream state, has taken different measures and steps to tackle the water crisis in Sistan, Iran [10, 72, 87, 69] and Afghanistan maintained control over the upstream of Helmand River Basin through construction of Kamal Khan [7, 17, 80].

On the other hand, Islamic principles of water management commanded the followers to observe and abide by justice between each other. This means that if there is any agreement between two communities [*upstream Afghanistan and the downstream Iran signed the Helmand River Water Treaty in 1973*], both of the communities should remain committed to it [9, 45].

The prophet Mohammad says, "*Muslims must abide by their agreements, unless there is an agreement that makes halal (permitted) what is haram (prohibited) or makes haram what is halal*" [9]. Additionally, Al Baghdadi [6] claims that the prophet Mohammad (pbuh) asserts, "*Don't commit any harm or injury to yourself, and do not cause harm or injury to others*." Hussein & Al-Jayyousi [45] reason that *"harm practices"* should be rooted out. Islam enjoins Muslim to prevent harm as much as possible [31]. This verse of holy *Quran* and the two *hadiths* warn people to not exert harm to each other, e.g., the upstream and downstream users [9].

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(4) *Maintaining and preserving the sustainability of the natural resources* [64]

Islam has put much emphasis on the preservation of the environment. The verse, "…. ***And waste not by excess, for Allah loves not the wasters*" [*Quran*, 7:31] and the *hadith*, "***A Muslim does not plant a sapling but a man or an animal or a bird eats of it, it is a charity for him till the Day of Resurrection*" shed lights on the conservation of the environment. As trustees of God,** Ansari [13] argues that natural resources, e.g., water belongs to God, who entrusted it to us to use it in sustainable and equitable manner and to pass it to the next generation without posing significant harm to that [the ecosystems].

Due to the presence of a poorly adapted water treaty between Afghanistan and Iran in the Helmand River Basin, and the adverse impact of climate changes [69, 80], the wetland ecosystems have already dried up [10, 91, 92].

According to Asyraf et al. [14], there are more than 500 verses discussing the importance of the natural environment for the livelihood of human beings and other species and the equal and sustainable use of natural resources among riparian states. In a changing environment [80], maintaining the ecosystems of the Helmand River is the toughest task. It is argued that a community-driven natural resources adaptation mechanism would reduce the effects of climate changes and anthropocentric effects [59].

Using the three criteria- *Equity, Responsibility and Sustainability*- Islamic Water Management Principles and International Water Law Principles will be compared and contrasted through drawing of tables and figures.

Table 1: Assessing three Criteria for the Comparison and Contrast of International Water Law Principles and Islamic Water Management Principles

Number	**The Principles**	**Criteria**		
		Equity	**Sustainability**	**Responsibility**
1	**International Water Law Principles (IWLP)**	1.The reasonable and equitable use of natural resources, e.g., water 2.Avoiding significant harm	3.Posing no significant harm to the environment and the ecosystems	4. Commitment for cooperation among upstream and downstream users (responsibility at the transboundary level)
2	**Islamic Water Management Principles (IWMP)**	The notions of (I). Shafa and (II). Shirb point to equal use of water resources by mankind, animals, and other livings (e.g., environmental flow, fish, etc.)	(III). The notion of Tawhid, points to the preservation of the ecosystems	(IV). The notion of Fitra, points to the cooperation between human beings (e.g., upstream and downstream users)

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Table 2: Assessment of the Criteria: Equity, Responsibility and Sustainability

Assessment of Equity for International Water Law Principles	
Upstream State	Downstream State
√	×
Assessment of Equity for Islamic Water Management Principles	
Upstream State	Downstream State
√	√
In Afghanistan [76, 94] and in some other Islamic states, e.g., Palestine and Morocco [96], water is distributed based on time. In the time-based water allocation not only downstream right is granted or protected, but it also allows more water to flow downstream (*i.e., This way sufficient water will flow as environmental flow).* In contrast, at the international level where water is shared based on volume, justice and equity is not met [96]. While the upstream state enjoys water redundancy, the downstream feels dis-privileged or disfranchised.	

Assessment of Responsibility for International Water Law Principles			
Individual Level	Local Level	National Level	Transboundary Level
×	×	×	√
Assessment of Responsibility for Islamic Water Management Principles			
Individual Level	Local Level	National Level	Transboundary Level
√	√	√	×
Al-Jayyousi [9] notices that mankind, as the trustee of Allah has responsibility toward protecting the natural environment (ecosystems) and different living (species in the river).			

Assessment of Sustainability for International Water Law Principles		
Downstream User	Environmental Flow	Upstream User
×	×	√
Assessment of Sustainability for Islamic Water Management Principles		
Downstream State	Environmental Flow	Upstream State
√	√	√

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NOTE: √ means agreement or Yes, while × means disagreement or No.

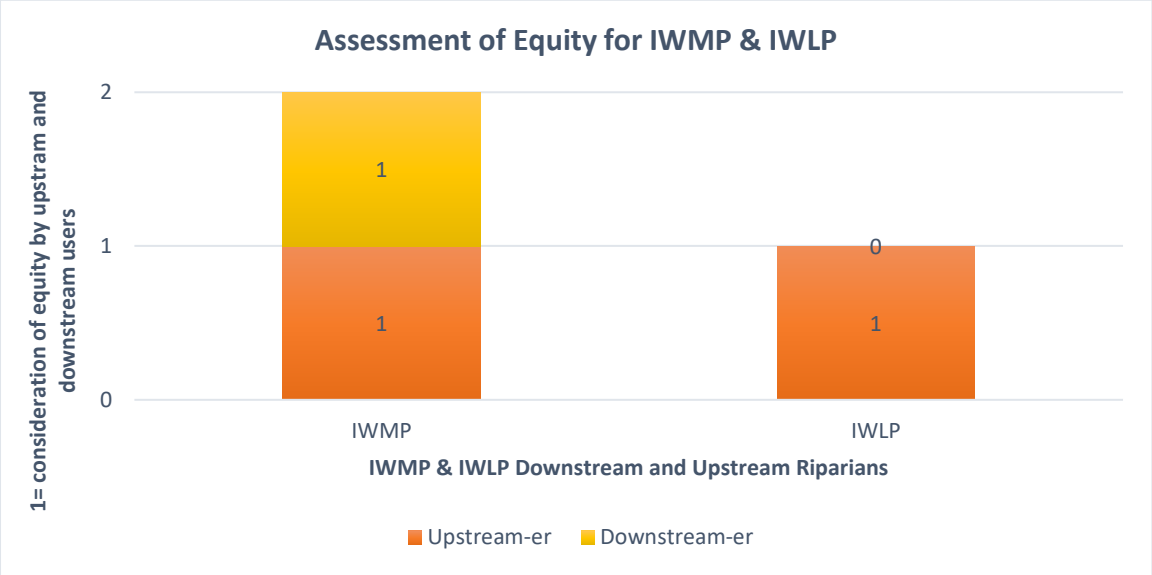

Figure 3: Assessment of equity for Islamic Water Management Principles and International Water Law Principles

Note 1: While one (1) stands for consideration of equity by both the upstream and downstream states, zero stands for inconsideration of equity by upstream and downstream states.

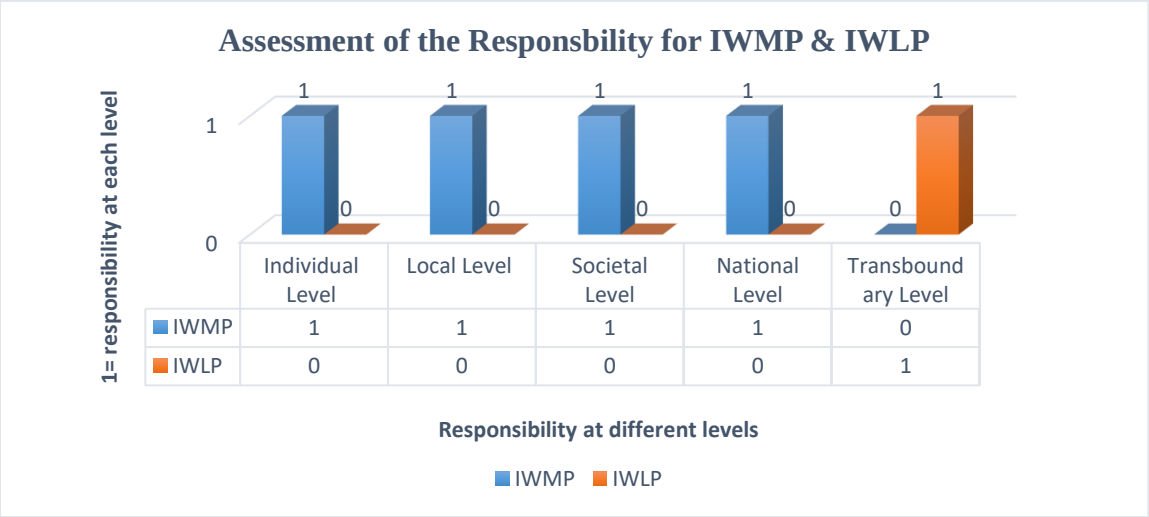

Figure 4: Assessment of Responsibility for IWMP and IWLP

Note 2: At the international level, IWMP principles need to be further explored to ensure equity between upstream and downstream riparian states of a shared basin in Islamic-dominated states.

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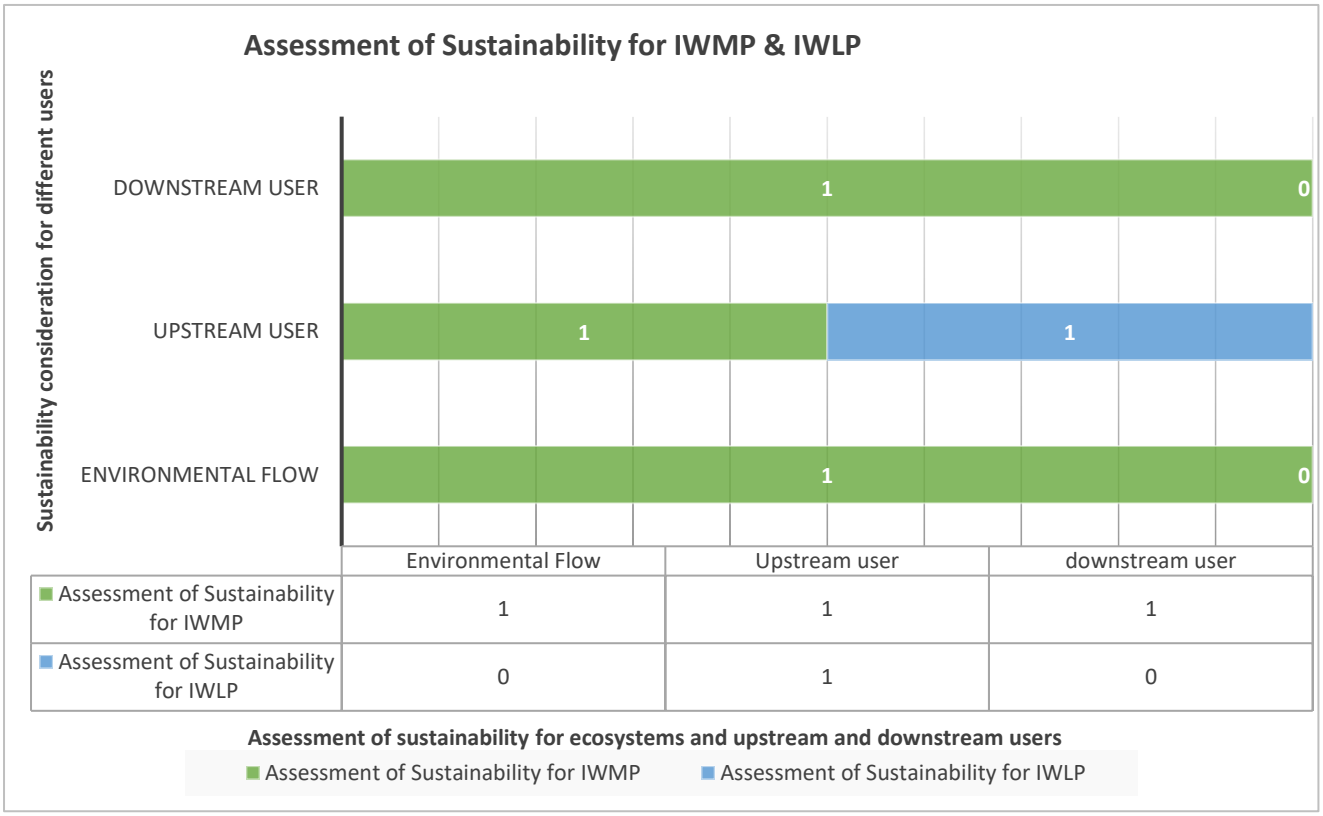

Figure 5: Assessment of Sustainability for IWMP and IWLP

Note 3: While 1 stands for the consideration of sustainability by upstream or downstream users or environmental flow by IWMP & IWLP, zero (0) stands for the lack of consideration of sustainability by IWMP and IWLP.

6. **Conclusions**

Given the adverse effects of climate changes, along with rapid urbanization and over population in Islamic-dominated states, especially the Middle East, e.g., Iran and Afghanistan, water allocation among riparian is significantly convulsive [22, 92, 36, 87, 91, 10]. Conflict between co-riparian states of a shared river basin rises as the result of lack of cooperation or the adoption of unilateral resource capturing policy by one riparian, or due to the presence of a poorly developed water treaty among upstream and downstream states [92, 96, 99].

Despite the high tension among Muslim-dominated co-riparian states, the role of culture and religion in water allocation and water conflict resolution has been under-emphasized and less recognized by scholars. The aim of the paper was to compare and contrast religiously-inspired principles- IWRMP- with western-oriented principles- IWLP.

This study found out that not only are IWMP consistent with IWLP, but that IWMP can be more effective than Western-oriented water management norms for many cases in Muslim-dominated States. For example, where co-riparian states have poorly developed international water agreements based on IWLP norms, the upstream state may abuse its geographic location to the extent that the downstream state is dis-privileged and excluded from its water rights (see Wolf, 2000; 2003). In contrast, IWMP emphasizes equity and justice in utilization of water resources among the upstream and the downstream riparian states.

Furthermore, as the result of uncertainty and vagueness in the “no significant harm” principle of International Water Law Principles [39, 64], the riparian states, especially the upstream state, can significantly harm both the downstream state and the environment.

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Contrary to the International Water Law principles, Islam, as the religion of peace and harmony, stresses the preservation of nature and species. Allah Almighty, for example, said, *"…. And waste not by excess, for Allah loves not the wasters"* [*Quran*, 7:31]. This verse of *Quran* points to the importance of sustainability in the use of natural resources.

Finally, Amery [11] argues that if Islamic Water Management Principles are incorporated into the National agenda of Muslim-dominated States- most of Muslim states adopted western-inspired water management principles, the issues of equity, justice and sustainability in utilization of natural resources among upstream and downstream co-riparian of Muslim-dominated nations, e.g., Islamic Republic of Afghanistan and Islamic Republic of Iran, will be addressed.

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Notes

Quran ***(Chapter: Verse)***

1. 7:31
2. 21:30
3. 30:41
4. 2:30
5. 6:38
6. 9:71
7. 6:106
8. 51:20-21
9. 30:25
10. 33:72
11. 31:20

hadith

1. Al-Bukhari [1:12]

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