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Water Security and Cross-Border Water Management in the Kabul River Basin

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Abstract: This paper investigates the collaborative and benefit-sharing approaches to conflict management in the management of cross-border water resources for the sustainable development of the Kabul River Basin riparian states of Afghanistan and Pakistan. The study offers an understanding of water management strategies concerning peace, progress and development, and sustainability. Using an interpretative social science approach, this paper investigates the impacts of water scarcity and stress, hydro-politics, water diplomacy, and water issues among co-riparian countries. It also investigates how cross-border river management impacts river water sustainability and sustainable cross-border water management strategies. The paper finds that the most significant factor in resolving and managing cross-border water disputes is to employ a collective and combined method of water management based on cooperation and benefit-sharing. This is in addition to providing an immediate cost-effective benefit of improving water supply, hydroelectric generation, and agricultural production, as well as future communal and monetary benefits for the public who reside and work the river basin. The paper proposes establishing a combined cross-border basin authority for both Afghanistan and Pakistan in order to effectively realize the benefits of the Kabul River Basin.

Keywords: water resources management; Kabul River Basin; sustainability; water diplomacy; Pakistan

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1. Introduction

Water is an important component of sustainable development, socio-economic progress, and dynamic ecosystems, and for the survival of humanity; it is also vital for reducing the global load of disease and improving the health, welfare, and productivity of people. Thus, water security is an essential element of sustainable development, meaning that a country possesses a sufficient quality and quantity of water to propel different productive activities. Water security places a state in a position to alleviate poverty and raise livelihoods. The Kabul River Basin (KRB) is a cross-border water structure between Afghanistan and Pakistan that serves as an important part of regional water security for both nation-states. The basin is extremely delicate to the ramifications of climate change through fluctuations in precipitation and temperature due to the ice-capped nature of its origin. The Kabul River flows eastward from the Sanglakh Range northwest of Kabul City, passing through Kabul and Jalalabad before crossing the Durand Boundary Line (DBL) near Laalpur, Nangarhar Province, Afghanistan (Figure 1). It then flows for approximately 140 km before emptying into the Indus River at Attock, Pakistan [1,2].

This paper investigates collaborative and benefit-sharing approaches to conflict resolution in the management of cross-border water resources for the long-term development of Afghanistan and Pakistan's Kabul River Basin riparian states. This study offers an advanced review of cross-border water and sustainability issues in terms of water management of the KRB. The paper prudentially scans the challenges and opportunities in sustainable water management between neighboring countries, and a way forward is offered. This article provides a literature review focusing on a collective benefit-sharing approach rather than a

legal settlement on the part of both neighbors. The paper primarily refers to the following key readings; Atef et al. [4], Mianabad et al. [5] Ranjan and Chatterjee [6], Sahoo et al. [7] and Zareie et al. [8]. This article is divided into three sections. The first section discusses KRB dynamics, focusing on water as a resource and the pressures placed on it. It also focuses on water politics and water diplomacy in relation to the KRB, with a primary focus on water issues between Afghanistan and Pakistan. The second section focuses on long-term cross-border water management strategies that emphasize a combined benefit-sharing approach. Thirdly, the conclusion section includes recommendations for long-term water management strategies.

Figure 1. Kabul River Basin [3].

Issues with Kabul River Management in Afghanistan and Pakistan

The Kabul River Basin (KRB) flows into Pakistan and contributes to nearly 21 billion cubic meters of water per year. It is a vital water source in both Afghanistan and Pakistan for municipal, agricultural, and hydropower purposes [9]. Water is one of the most important engines for developing Afghanistan and Pakistan's economies. As such, its free flow must be managed through a proper water management system. The Kabul River originates in the Hindu Kush mountains and receives significant flows from several rivers. It is 700 km long and flows 460 km within Afghanistan and 240 km in Pakistan [10].

Afghanistan has a plentiful supply of water, with some 80% of the water coming from surface water from snowfields and glaciers in the Hindu Kush and Himalayan plateaus. As an agrarian economy, Afghanistan has the potential to achieve self-sufficiency in food security, especially by managing and utilizing free water resources. Amidst abundant water resources, Afghanistan has been classified as a high-risk country in the Water Stress Index, indicating that the country is unable to consume its annual water supplies generated by precipitation, rivers, and groundwater. Dam construction along rivers has been cited as a more sustainable approach to tap the vast water resources available in Afghanistan. However, protracted internal conflicts have squandered the opportunity to design a water management system in Afghanistan that could harness nearly 12 billion cubic meters of the Kabul River water which flows freely into Pakistan each year. It is estimated that Afghanistan's water, worth approximately $12 billion, irrigates Pakistan's agricultural land annually without receiving anything in return. Farming and horticulture support four-fifths of Afghanistan's population of 38 million people. Sporadic drought and the effects of climate change have severely harmed this sector, reducing cultivated areas from 10.8 million acres in 1978 to 4.6 million acres in 2002, with further reductions expected in the coming decade. In addition, approximately six million Kabul and Jalalabad residents rely on the Kabul River for all their water needs. Hence, this water resource can be developed comprehensively to not only meet the population's water needs but also to

generate hydropower energy. Afghanistan has a severe electricity shortage and imports 80% of its electricity from its neighbors [10].

On the other hand, Pakistan gains more from the water flow than Afghanistan. Pakistan has already built a number of barrages, irrigation canals, and other infrastructure on its section of the Kabul River. Warsak Dam, located 20 km northwest of Peshawar, is a good example. However, a significant decrease in surface water, including the Kabul River's flows, may pose a serious threat to Pakistan's agriculture, which accounts for more than a fifth of the country's GDP. Afghanistan has built barrages on the Kabul River which are used to store water when precipitation is at its heaviest, to prevent flooding, to water agriculture, and to generate affordable, clean energy [10]. These water diversion activities are what Pakistan fears the most—Afghanistan may pursue the 'national interests' leverage to pressure Pakistan for greater compensation and/or more mutual benefit sharing. It should be noted that the riparian countries have yet to fully exploit the Kabul River's potential, and there is currently no cross-border cooperation system with the river flowing into Pakistan on the Kabul River. A trust deficit between the head-region in Afghanistan and the tail region in Pakistan has slowed down significant discourse for mutual work. Although both states have greater interests in cooperation while considering that water resources are largely cross-border, thus Afghanistan and Pakistan have great reliance on freshwater. As such, cross-border cooperation between riverine states is vital to the state to manage its rising requirement for water and energy. Furthermore, its food security as a one-sided resource capture could possibly stimulate clashes with tail-stream riparians [10]. Even though a legal foundation is essential for avoiding or resolving disputes between competing water parties and their stakes, using a legal strategy can be difficult when the problem is of a transnational nature. Therefore, a collaborative and sustainable management strategy may be a key tool for the sustainable development of water resources given the transboundary nature of those resources [11].

Afghanistan is not the only state with cross-border water resources. Worldwide, there are approximately 286 trans-border tributary and stream basins comprising a surplus of 50% of the total terrestrial surface of the earth, contributing to nearly 60% of the biosphere's river flow [9,12]. Most of these basins are governed through agreements regarding numerous features of managing the river. Some of the earlier transnational agreements dealt largely with the navigational purpose [13,14]. Later arrangements comprised of guidelines on the administration of water resources for water supply, deluge control or business production, pollution [15], and some dealing with sharing water [16]. Indeed, with the growing population and need for economic development, the exploitation of cross-border basins has been continually increasing, and fair and just distribution of cross-border water resources between and among riverine countries is essential for freshwater sustainability.

Climate change is among the most fundamental challenges that humanity has ever faced. This is the most basic problem that threatens the long-term prosperity of the world and the survival of the human race [17–19]. Some studies have addressed climate change and its effects on natural resources pertaining to Afghanistan [2,20]; however, these studies are often narrowed and inadequately cover the issues relevant to climate change and its impacts [21]. Similarly, Pakistan is facing water issues because of climate change [3,22,23] and water has become scarce in recent years as a result of increasing population, expansion of drainage regions, increasing urbanization, and industrialization, all of which put a strain on available water supplies. Furthermore, the return of refugees, particularly from neighboring Pakistan and Iran, has also put stress on Afghanistan. Analysts are of the view that a restful Afghanistan would voice more claims on upstream water resources at the cost of downstream consumers [24]. Recent studies point to growing tension between Afghanistan's upstream riparian countries and Pakistan's downstream riparian countries due to environmental, social, and political powers being aggravated by fluctuating weather patterns [6,25]. Contemporary research has established that, in spite of the pull on water resources of the KRB across borders, there is no operative established structure of collaboration or covenant between Afghanistan and Pakistan over the KRB [6]. As no such treaty

or covenant exists, pulls between Afghanistan and Pakistan are often apparent and may soon intensify despite the expanding populace, climate alteration, and augment industrial and municipal demand. Therefore, research and policy dialogues have underscored the requisite to improve cooperation for sustainable use of water resources by both users.

Historical solutions to cross-border water conflicts have been perplexing; even following the formation of contemporary nation states, such issues often end in a geo-political pull between riverine nations. Yet, there appear some notable examples of cross-border collaboration concerning states culminating in prosperous cross-border arrangements. Such accommodating arrangements are regarded as a win-win scenario, as parties agree that no gain arises from conflict. The Mekong Treaty was signed by Cambodia, Lao PDR, Thailand, and Vietnam in 1995. It is regarded as an example of effective transboundary cooperation in the Lower Mekong River Basin aimed at sustainable development of the co-riparian countries [9]. With regard to data on the KRB on the Afghan side, there is a dearth of literature on sustainability, water resource management, water politics, technical engineering, and hydrology due to continued war, tensions, and instability, which has triggered a disturbance in data gathering preservation on water resources. Therefore, this work primarily depends on secondary data on the themes of the importance of water as a resource in terms of the KRB and cross-border water management for sustainable development. Some studies have been conducted on cross-border water cooperation in the KRB which are used during the analysis. A wide body of literature on the subject of the KRB exists which offers a broader perspective of cooperation.

2. Materials and Methods

The article adopts an interpretative social science approach by reviewing extensive literature to examine the impacts of water scarcity and stress, hydro-politics, water diplomacy, and water issues between co-riparian countries, and to determine how cross-border river management impacts river water sustainability and sustainable cross-border water management strategies. The interpretive social science methodology focuses on describing and comprehending "the actual human interactions, meanings, and processes that constitute real-life organizational settings" [26–28]. The meaning-making practices of human actors are central to interpretive methodologies, which place them at the center of scientific explanation. They are carried out from an experience-near perspective, which means that the researcher does not start with predetermined concepts, but rather seeks to allow these to emerge from encounters in "the field" [29–32].

3. Results and Discussion

3.1. Kabul River Basin Dynamics

Afghanistan, being a land-locked country, possesses ample water resources and produces 80 billion cubic meters of water per year. Almost all the major rivers of Afghanistan drain into neighboring countries, such as Tajikistan, Turkmenistan, Uzbekistan, Iran, and Pakistan [33]. Interestingly, the two neighbors share a minimum of nine freshwater riveters; however, there is no legal or contracting device available on the mutual administration of the shared rivers. Kabul River is the major water body shared by the two countries. The KRB is a cross-border basin and is situated in the northeast of Afghanistan and the northwest part of Pakistan. The basin has a drainage area of 76,908 square kilometers and is distributed into 12 sub-basins spread through 10 provinces in Afghanistan, including Kabul. The upper catchment area of the KRB consists of sharp highland vales in the Hindukush Mountain range, at an elevation of 7,500 m above sea level which mostly rests as ice caps. The lower watershed area comprises farming land and inhabited space with an altitude of 300 m above sea level [34]. The KRB, as a transboundary basin, pours into Pakistan benefiting nearly 21 billion cubic meters yearly. Additionally, the river basin is an essential source of freshwater for the community, cultivation, and power generation in both riparian nations [9,35]. Furthermore, approximately 70% of the "principal river (named Chitral River in Pakistan and Kunar River in Afghanistan) originates in the Chi-

tral area of Khyber Pakhtunkhwa (KPK) province in Pakistan which then courses into Afghanistan (Kunar Province) and returns to KPK's Peshawar Valley via the Kabul River, an important tributary of the basin thus, both Pakistan and Afghanistan become upper and lower riparian states," making the KRB's yearly highest streams up to 4,500 million cubic meters [13]. Therefore, the KRB plays an important role in regional water security for the two bordering nation states, and the basin is extremely delicate to climate change through fluctuations in rainfall and temperature due to the ice-capped nature of its origin. Nevertheless, Afghanistan has not exploited the complete value of the river appropriately hitherto, and there is no cross-border cooperation system with Pakistan on the Kabul River. Random endeavors were taken in the past but failed, largely due to Afghanistan not taking the move seriously. In cross-border water basins, the construction of new reservoirs and deviation points can affect tail-region riparian's, which frequently results in tensioned relations [36]. This relates to expansion initiatives by Afghanistan on the KRB, as the basin is encrusted with an intricate structure of natural, societal, and political systems. Furthermore, the frontier between Afghanistan and Pakistan is permeable; ethnic clusters, stretched families, and dissatisfied groups reside in both states.

3.2. Pressure on Water Resources and Water Needs

With the advent of the new millennium, the earth's water supply came under extra stress. Indeed, freshwater is considered a valuable natural source: an instrument for generating energy, an element of agrarian production, a tool for industrial development, a geo-hazard, a vital component of the environs, a beverage, and it is now encircled by a larger number of glitches than in the past [37]. Any modern-day argument about freshwater resources must commence with the essential issue of the shortage of freshwater. This is the case in many parts of Pakistan and Afghanistan, where the pressure on inhabitants is significant. This shortage of freshwater resources is compelled by the demand for natural resources, which is increasing at a rate that has not been seen previously. According to the United Nations Food and Agriculture Organization, the pressure on national water is measured by calculating the total water extraction as a percentage of total renewable water resources (TRWR) [38]. The stresses are regarded to be high if the TRWR value is higher than 25%. Out of the three neighboring states, India measures at 34% pressure, Afghanistan measures at 31% pressure, and Pakistan has an extremely high pressure of 74% [39,40]. The gravity of the freshwater predicament in Pakistan is to be determined by the certitude that Pakistan will be converted into a water-deficient state by 2025 [33]. Water inadequacy means, "a lack in the accessibility of renewable freshwater compared to demand" [41]. With the surge in the populace of Afghanistan and Pakistan, the demand and supply bracket are widening, consequently giving rise to water conflicts between Pakistan's provinces and between the two neighboring states [42]. According to an International Monetary Fund (IMF) report, Pakistan ranks third among the world's most freshwater scarce countries [43]. For that reason, the water resource concerns of Pakistan require immediate consideration. Similarly, under the United Nations banner, the freshwater requirement in Pakistan is snowballing at an annual rate of 10% [44]. On the contrary, as a result of population growth and a larger freshwater requirement in Afghanistan, including a substantial number of repatriates and refugees from bordering Iran and Pakistan, have also amplified pressure on previously strained freshwater resource supplies [45]. Political analysts are of the view that a more restful Afghanistan being a head-riparian would demand more claims on freshwater resources at the cost of tail-riparians, such as Pakistan and Iran [24]. Further, Kabul is among the rapidly developing cities and is anticipated to mass a populace of approximately nine million by 2050 [46]. This would further put pressure on freshwater demand in the region and make room for bilateral negotiations in the region.

3.3. Hydro-Politics and Water Diplomacy

The rise in the global population and continuous water requirements has compelled riverine states to consider water diplomacy and hydro politics. Formerly riparian na-

tions preferred freshwater convenience to freshwater availability [17,18,47,48]. Prevailing cross-border water conflicts will likely be aggravated by climate change; this may result in intensifying global water pressures and could even lead to armed clashes [49]. Cross-border water challenges are very important in maintaining international relations among nation-states, as can be envisaged from the United Nations, "Agenda 2030- on the name of Sustainable Development Goals". Therefore, combined and collaborative management of freshwater resources, all-encompassing and crystal clear among co-riparian nations, can serve as a better model based on the joint identification of opportunities and benefits. This may help to negotiate adjustable freshwater management devices, which ultimately would result in regional economic amalgamation rather than divided entitlements for water [50]. However, the authors of [3,17,18,47,51] argue that "to be sustainable and effective, transboundary cooperation needs to be based on solid science and a factual analysis of the prevailing challenges, potential solutions, and shared benefits emanating from alternative solutions." On the contrary, among water management strategies, water diplomacy is a new method to address difficult water issues. According to Harold Nicholson, water diplomacy is "the art of conducting dialogue between and among states" [8] and is a strategic instrument employed for viable water resource administration and for improving cooperation through negotiation between riparian countries. In the view of the author [50], it is an action beyond theory; however, authors of [52] call it the "water diplomacy framework (WDF) and value-focused approach to managing water allocation issues such as optimization, cost-benefit analyses, and scenario analysis towards decision making regarding multipart water problems." Similarly, the authors of [53] determined that "water diplomacy aims for resolving conflicts related to water availability, allocation, and shared use between and within riverine states." However, the element of sustainable solutions is missing in the aforementioned literature on water diplomacy.

Indeed, the cross-border KRB, shared between Afghanistan and Pakistan, offers prospective hope for cross-border collaboration. Socioeconomic development in the KRB has been slowed down by local conflict in the recent past; however, very recently, there appears to be increasing attention from Afghanistan on the manipulation of its freshwater resources to deal with contemporary challenges comprising power deficits, scarce freshwater quantity, and susceptibility to deluging [4,13]. Thus, the KRB is regarded as a vital tool for Afghanistan in order to achieve its objective of complete municipal electrification by 2032. Similarly, energy security is of paramount standing in Pakistan, and Pakistan recognizes growth in hydro-electricity production as an important element of its energy set [3]. It is pertinent to mention that energy security is linked to water security for both neighboring nations and is also important for socio-economic development in the cross-border areas between the two countries. Cooperative hydro-electricity development projects on the KRB can also afford a chance to strengthen two-pronged cooperation, as emphasized in some of the recent conferences held on the issue of water security and sustainability [54]. However, for this purpose, identification, and realization of ideal settings and operational arrangements, besides consideration of the qualified impacts of freshwater management strategies and climate change concerns, are indispensable. Nevertheless, the study [3] discussed the "hydropower production potential and transboundary flow impacts of projected climate change, planned water infrastructure development on the Kunar River, and potential unilateral water management policies by Afghanistan and Pakistan." Yet, the work delivers an addition to the extant body of literature by giving a comparison connected to mutual and one-sided freshwater administration in the KRB. It also reveals the comparative degree of extrinsic factors such as climate change, and intrinsic factors such as water resource management strategy elements that influence water and energy patterns in the KRB. The distinctive hydrology of the KRB, with both co-riparian being concurrently upstream and downstream, increases the chances of suspicion and water clashes between the two neighboring states, provided that expansion of the KRB is achieved separately. This suggests that the geography and historical water flows of the KRB are attached to its cross-border nature, thus it requires a persuasive prospect for cooperative infrastructure

expansion and administration. In this regard, the author [3] suggests that the application of "a process-based distributed hydrologic model and a reservoir operation and routing model to simulate hydropower production potential and water balance impacts under future scenarios featuring differing dam development, reservoir operations, climate projections, and water management policies" is instrumental; it was further suggested that "under joint operation of reservoirs, winter hydropower generation in the downstream dams increases significantly due to the increased system wide storage capacity; this occurs without affecting upstream hydropower generation. The increase in winter hydropower generation is not at the cost of summer generation, which is minimally affected. The objective of reservoir operations was found to be the most dominant factor in determining winter hydropower. However, the entire storage capacity of the reservoirs is significantly smaller than the peak summer flows in the river. This means that for seasonal water flow, climate change impacts are slightly larger than those caused by reservoir operations." However, the study is limited to an optimization-based reservoir operation and routing model. The prototypes employed to replicate systems with extensive influence under historic and anticipated climate predictions utilize different infrastructure, constructions and dam operations, and freshwater management developments. The work is also important with regard to climate change issues and its influence on water flow, as it measures the effects of cultivating water needs and dispensing, and the likely application of reservoir maneuvers to lessen effects. The World Bank provided a hydro-economic model of the KRB to prioritize water resource development, and the model used to "optimize economic benefits of agricultural production and hydropower generation, highlighted the importance of reservoir storage on the Kabul River in accommodating local water requirements and compensating for energy shortfalls away in the basin. In addition to this, a water evaluation and planning system (WEAP) model was developed and used to optimize water infrastructure development in the KRB in Afghanistan while incorporating sectoral water supply-demand relationships, this work estimated the economic value of water in the basin" [7]. Yet, the aforementioned studies have lacuna in terms of overall cross-border strategies benefiting both riparian nations on the KRB.

3.4. Pakistan–Afghanistan Water Issues

In modern times, Pakistan–Afghanistan bilateral affairs are manifested by ceaseless allegations, such as training of militants and terrorists, safe havens for terrorists, mistrust, deteriorating economic reliance, encounters at territorial borders, intervention in domestic affairs, etc., due to the porous nature of the boundary between the two countries [12]. In 1921, the Treaty of Kabul was discussed and contracted between Afghanistan and Pakistan, although the treaty was initially contracted between Afghanistan and the colonial power of Britain. Pursuant to the terms of the treaty, Afghanistan was bound to allow present-day Pakistan to exploit the Kabul River for navigation while keeping prevailing cultivating rights from the water resources of the Kabul River for Afghanistan. Nevertheless, after the British left, Afghanistan refused to abide by the terms of the aforementioned treaty, with the main argument that Pakistan was no longer a dominion of Britain and was not an heir state to Britain; however, a new state emerged from British India does not have those rights. Furthermore, it was an arrangement with the British, and the British had no stakes in the KRB region [55,56]. However, this assertion got no transnational support.

Regardless of uncertainties in Pakistan–Afghanistan relations, there seems to be an improvement in bilateral relations, as joint meetings on water issues have been called. However, the water distribution concerns of the KRB remain unsettled. Additionally, India's proposal to construct the "Shahtoot" hydropower dam is a concern for Pakistan owing to possible repercussions on the river water course and the closeness of India at the adjoining border with Pakistan [6]. The Shahtoot dam is built on "River Maidan, a tributary of River Kabul, and is presumed to carry 146 million cubic meters of water. Once in full operation, the Shahtoot dam is estimated to deliver water to Kabul's 2,000,000 occupants, engulf 4000 hectares of the surrounding area, and source drinking water to Deh Sabz,

another city on the limits of Kabul. Construction of the Shahtoot dam fuels fears in the downstream area of River Kabul in Pakistan. There, it is believed that once in operation the dam will constrain the flow of the river in downstream regions. According to a report published in the Pakistani National daily Dawn, there could be a 16 to 17% drop in water flow in Pakistan after the completion of the Shahtoot dam and other arranged dams on the transboundary river" [57].

With regard to reaching an agreement on the KRB, Pakistan recalled the formation of a nine-member technical committee in 2003 to commence writing a water accord with Afghanistan; however, the working group failed to devise a draft due to the scarcity of data on the river flow from Afghan authorities [58]. Furthermore, in 2006, the World Bank (WB) presented backing for a meeting between the two neighbors as a new impetus to draft a "bilateral treaty"; however, the WB's offer did not help as the Afghan authorities refused. In the last decade, the two neighbors have been involved in several regional forums focusing primarily on trade matters. However, cross-border cooperation in the field of water was not on the agenda for any of these sessions [35,58]. In 2010, it was revealed for the first time that, besides the construction of the three dams already built (Naghlu dam, Surobi dam, and Darunta dam), Afghanistan was constructing a total of 12 water reservoirs in the KRB to produce more than 1177 megawatts of energy with the support of India and the WB. These water structures are anticipated to have a storage capability of 4.7 million acre-feet of freshwater on the Afghanistan side, thus possibly reducing the freshwater flow coming into Pakistan while severely affecting the Pakistani province of Khyber Pakhtunkhwa. Similarly, Pakistan is also constructing some water bodies and hydroelectric power projects on the KRB without informing Afghanistan (the top riparian) [59]. Concurrently, Pakistan initiated erection work of the "Mohmand Dam Hydropower Project" in the KRB in Swat in Khyber Pakhtunkhwa and the project is expected to be completed in 2025 as per the timelines from the Water and Power Development Authority [6]. Furthermore, the management of the KRB by head-region riparian Afghanistan exerts pressure in a way that unfavorably lessens the stream into tail-region riparian Pakistan. Moreover, Pakistan is apprehensive of the structures of the KRB, as Afghanistan has refused to enter diplomatic negotiations in spite of repeated appeals from Pakistan. However, it is worth noting that the two co-riparian states talked in the year 2013 about "a joint hydropower project development on River Kunar, which begins as River Mastuj, originating from Chitral Glaciers in Pakistan." This meeting between Afghanistan and Pakistan on freshwater concerns surfaced as a surprise, especially for the WB and the United States Aid for International Development [35].

Nevertheless, in 2013, a World Bank-funded study revealed that out of the aforementioned 12 projects, six main projects were planned in the KRB and the water flow in Pakistan would only shrink by three percent. The other remaining six projects would have nearly no influence and are not considered to be located on cross-border rivers. Moreover, the research highlighted that freshwater reservoirs in Afghanistan may possibly contribute to electricity generation, and such power supply is greatly required for Pakistan. Yet, this scholarship could not alter the attitudes and approaches of the Afghanistan bureaucracy toward "dialogue" and collaboration [35]. While top riparian Afghanistan presents a real "water threat", Pakistan can react by diverting River Chitral (being at the top riparian) away from its original doorway into Afghanistan. However, given Pakistan's unique landscape, such a change would undoubtedly be "extremely expensive," and changing the watercourse in Afghanistan would also provide significant benefits to Pakistan [6,60]. Pursuant to work carried out by the "Islamabad Institute of Policy Studies, there is a possible decrease of 15%–20% in the flow that was being supplied by River Kabul after the operation of 13 dams" [35]. In order to deal with this conflicting and competing situation, it is vital to reach an agreement by realizing water issues, sustaining "past irrigation rights", and reaching the "benefit-sharing" choices for co-riparian states. Moreover, a proper "water-sharing agreement" with the involvement of all stakeholders (including non-state actors) is similarly significant for an effective and prosperous water-sharing settlement [59].

Potential water scarcity has stimulated shared discomfort in Afghanistan and Pakistan, as habitual farmers and ranchers have suffered from water scarcity. Furthermore, due to changes in weather and climatic patterns, the possibility of an unavoidable water clash is primarily enlarged [61]. According to a survey led by the "Asia Foundation", Afghanistan is immensely reliant on buying energy resources from its bordering republics in Central Asia. Moreover, Pakistan is presently an energy-deficient country, and an estimated 51 million people have no access to electricity. Furthermore, the unpredictable electricity supply and power outages on a day-to-day basis put an additional 90 million at risk, ensuing in a grave bearing on the state's economy. As both Afghanistan and Pakistan have a scarce availability of electricity, offering support to each other in this regard can result in the groundwork of a partnership. Yet, the two neighbors are functioning in separation and are perceiving or creating lonely projects in the KRB [6].

3.5. Sustainable Cross-Border Water Management

Water management is characteristically a conflict management or resolution technique. Water resources function as manifold objectives across several societies and differ in time and space, thus the state of water resources frequently causes problems between societies that depend on a joint water source [62,63]. Conversely, cases exhibit that this kind of water intricacy can probably be dealt with through concomitance and shared appreciation of numerous activities, comprising legislative options and dialogues. Reaching an agreeable remedy for freshwater issues allows numerous nation states to attain more operative and justifiable use of their freshwaters [4,64]. The global community is fronting encounters concerning the preclusion of differences over freshwater wealth and the formation of supportive organized tools for freshwater resource management. Combined water control provides a pathway to circumvent the uncertainty, perils to civic wellbeing, and ecosystem harm often involved in water issues, and improved accommodation of the requirements of water consumers.

With regard to water management, there are four phases involved in the process of transformation, from "conflict to cooperation" [64]: in the opening phase, countries situated on the basins with cross-boundaries initiate an interpersonal approach while emphasizing "trust building" and analyzing competing "parties' position" and "interests". Though the talks are frequently adversarial and heavily stressed upon "rights of the parties", the second phase entails a shift of perceptions on basins and is inter-sectorial in nature. This phase concentrates on "skill building" and examines "the gap from the current state of affairs to future perspective." The deliberations in the phase convert from adversarial to reflexive and state parties describe their needs for each other. The third phase is marked by "enhancing benefits" and the process is shifted "beyond basin", with a prime target on "consensus building" with an aim on the "benefits of cooperation." Dialogue becomes holistic and "integrative" in this phase and state parties focus on and define benefits. The last phase concerns the creation of "Institutional and Organizational Capacity and Sharing Benefits." This stage is transnational in nature and targets "capacity building" and analysis of "institutional capacity." Consultations at this point are "in the action" where equity is challenged and institutionalized.

According to the author [4] "benefit sharing is a technique by which riverine collaborate with each other in improving rightful circulation of the goods, products, and services linked directly or indirectly to the river, or arising from the use of its waters." The main purpose of the "benefit sharing approach" is to change from "a logic of sharing of water quantities" to "a logic of sharing of benefits" so that water users can benefit from water resource usage. The authors of [65] define benefit sharing as the process through which co-riparian coordinates maximize and fairly distribute the goods, products, and services related to the watercourse, either directly or indirectly, or resulting from the usage of its waters. Benefit sharing is projected as a tactical method to avoid the quarrelsome issue of "water rights" to the "shared pool resource" through cross-border water resources. The focus is on emphasizing and categorizing the principles resulting from freshwater

resource consumption, expansion, and sharing such benefits between co-riverine parties. The social, economic, political, and environmental benefits can produce an accommodating and two-way setting in cross-border river water flows. The "economic benefits" may be referred to as energy production and dispatch, fisheries, agricultural advancement, and industrial progression. The "environmental benefits" can be considered as the management of river basins, water-related legislation, land preservation, and flood control mechanisms. The "social capital benefits" can be designated as "capacity building, training, and skill sharing" while "political benefits" can be described as "political stability, cooperation, and integration" [4]. "Benefit sharing" can be applied to cross-border riverine nation states, across different segments, inter-society, and different social groups. When freshwater passes from domestic terrain to another state's boundary, it then converts to a cross-border water resource, and, as a result, it becomes noticeably more complex to deal with. These freshwater-linked events in one state are highly expected to influence the freshwater position of other states. Therefore, freshwater-connected concerns may only be resolved through cross-border collaboration. However, cross-border freshwater can be demarcated as "freshwater resources shared by two or more states and comprising rivers, lakes, and aquifers" [66].

The authors of [65] argued that "negotiating on a project-by-project basis can easily result in a stalemate -whereas the basket of benefits approach means opportunities can be modified and changed until an acceptable outcome is agreed by all." The prices necessary for cooperation are financial, institutional, political, and any other prices of one-sided opportunities (benefits). The opportunities which can be altered or transformed are classified into three categories (security, economic, and environmental) [67] and these opportunities are provided by cross-border cooperation. Cross-border cooperation is characterized by four forms, each with its own advantages and challenges [68]. With regard to benefits or opportunities, the security benefits are those that arise from river benefits. Cooperation on a transnational river will lead to lower costs as a result of the river; these are interchangeably also regarded as political benefits, as the pressure between co-riverine nations will permanently be extant to a larger or minor degree and such pressure will incur costs. While expenses due to the river are not permanently visible or enumerated, they may appear as tangible and significant and may composite other strains resulting in increased expenses. Furthermore, as transnational river basins can be buffer agents, a collaboration that produces advantages from the river and minimizes costs because of the river can lead to the path of much greater mutual aid between neighboring states. It also helps economic integration between co-riparian states, generating "benefits beyond the river" which can create indirect economic benefits. Well-organized, cooperative management, and development of shared rivers can result in profit benefits from the river. Lastly, environmental benefits will help in the better management of ecologies, providing benefits to the river, and underpinning all other benefits that can be derived.

Over the past few years, emphasis has been placed on Afghanistan and Pakistan working together to achieve socio-economic development during existing tensions associated with the development of hydropower in the KRB. Thus, a benefit-sharing approach as an analytical framework to assess the intricacy of two-pronged interactions over sustainable development in the KRB is worthy of study. Furthermore, the type and significance of water resources propose opportunities for cooperation and benefit sharing across the states. For instance, hydropower generation in one country can benefit industries in another. The KRB offers watering benefits to riverine communities in both Afghanistan and Pakistan and has the potential for deluge control provided that storage reservoirs are established. Since the KRB hydroelectric power potential can produce electricity and additional benefits to both countries, a benefit-sharing procedure will probably be an important feature of scheme discussions. The immediate benefit of hydroelectric power development in the KRB is electricity generation, to encounter increasing power demand and ensure energy security in both countries. The location of the KRB, with its close proximity to the mainland in Afghanistan and the Pakistan border, can help electricity export.

Furthermore, water storage potential in the form of dams in the KRB can also offer irrigation and deluge control benefits for populations downstream in Afghanistan and Pakistan. The KRB's hydroelectricity potential may also rise socioeconomic progress in the Kunar province of Afghanistan and Khyber Pakhtunkhwa Province of Pakistan [13]. Ease of use of low-cost energy can operate as a significant driver of mutual cooperation for the two neighboring countries. In 2013, the two nations made an important development to engage in the establishment of a 1500 MW hydroelectric power project on the Kunar River, an effort towards a bilateral formula of cooperation (agreed minutes of the meeting between finance ministers of Pakistan and Afghanistan held on 25 August 2013). The shared operation of the KRB would build a collective objective, possibly enhancing discourse on other collective economic, social, environmental, and security interests, and therefore, it is highly likely to improve the relationship between the two neighboring countries. Moreover, cooperation through the KRB hydroelectric power engagement could result in persistent contemporary activities in the region. Such projects on the KRB can serve as a catalyst for regional prosperity as sustained interactions between the countries may lead to additional joint ventures and developments that deal with mutually beneficial development, helping better market assimilation in the region.

With upgraded energy access, the nation-states in the region can gain bonuses in the form of larger economic progress. In short, benefit sharing in connection with an all-inclusive basin reflects how consuming and managing water resources effectively through all segments in amalgamation can produce new benefits. In particular, it may instigate research into how a joint method of energy production or basin management can offer a novel outlook on water usage for food production. Cooperation between hydropower, agronomic, or ecological development schemes within a sole state can indeed end in new and supplementary benefits. For example, the schemes may allow the sharing of knowledge, skills, and apparatus, and as a consequence, it can lessen expenses and surge production. Correspondingly, schemes based in two diverse states could also collaborate on new methods to realize larger benefits. For instance, collective approaches to basin management can decrease investment expenses and can result in more effective management of the shared environment and resources.

Despite the enormous mutual benefits of riparian water collaboration, there are no successful cases of water cooperation between Pakistan and Afghanistan. Pakistan attempted several times to reach an agreement with Afghanistan, but these attempts were unsuccessful due to Afghanistan's lack of willingness, mainly due to government instability, episodes of terrorism, and insecurity in Afghanistan. They have not signed any agreement, nor have they begun any project to alleviate tensions between the two countries. Pakistan also faces the same issues with India. Despite mutual security concerns, they managed to establish the Indus Water Treaty, under which both countries successfully manage the Indus basin's water. This treaty is still in force, surviving three major Indo–Pak wars of 1965, 1971, and the Kargil War. This treaty is regarded as a successful example of water sharing management between unfriendly riparian states.

4. Conclusions

This study provided an overview of the Kabul River Basin's historical and current freshwater concerns, resource management approaches, and sustainable water administration practices. Aspects of future freshwater administration and cross-border water resource control, with a focus on the KRB for long-term development in Afghanistan and Pakistan, were examined. The study finds that the management of transboundary water resources based on cooperation and benefit sharing between riparian states is vital. For the effective realization of benefits from the Kabul River Basin, a combined institution, similar to the cross-border basin authority, is proposed for both Afghanistan and Pakistan. Such institutions may comprise water experts and policy consultants for on-going consultations and joint management of water resources. This mechanism will facilitate cost-effective benefits of improving water supply, hydroelectric generation, and agricultural production,

as well as future social and economic developments for people who live and work in the Kabul River Basin. Furthermore, the paper also proposes a behavioral approach of participant involvement with all stakeholders that can help the River Basin Authority gain wider acceptance of river water management strategies. The paper also posits that the implementation of a benefit sharing scheme appears viable and does not necessitate any significant changes to future strategies. The results of collaborative efforts in both head-stream and tail-stream nations can profit from a "pack of benefits" including, but not limited to, flood resistance, sedimentation reduction, the convenience of additional water in the basin, electricity production, and various ecosystem functions. Aside from that, the collaborative approach can ensure food security, alleviate famine, and benefit renewable energy.

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References

1. Zeitoun, M.; Allan, J.A. Applying hegemony and power theory to transboundary water analysis. *Water Policy* **2008**, *10*, 3–12.
2. Talozi, S.; Altz-Stamm, A.; Hussein, H.; Reich, P. What constitutes an equitable water share? A reassessment of equitable apportionment in the Jordan–Israel water agreement 25 years later. *Water Policy* **2019**, *21*, 911–933.
3. Hussain, S.; Malik, S.; Cheema, M.M.; Ashraf, M.U.; Waqas, M.; Iqbal, M.; Ali, S.; Anjum, L.; Aslam, M.; Afzal, H. An overview on emerging water scarcity challenge in Pakistan, its consumption, causes, impacts and remedial measures. *Big Data Water Resour. Eng. (BDWRE)* **2020**, *1*, 22–31.
4. Atef, S.S.; Sadeqinazhad, F.; Farjaad, F.; Amatya, D.M. Water conflict management and cooperation between Afghanistan and Pakistan. *J. Hydrol.* **2019**, *570*, 875–892.
5. Mahmoodi, S.M. Integrated water resources management for rural development and environmental protection in Afghanistan. *J. Dev. Sustain. Agric.* **2008**, *3*, 9–19.
6. Ranjan, A. *Water Issues in Himalayan South Asia: Internal Challenges, Disputes and Transboundary Tensions*; Springer: Berlin/Heidelberg, Germany, 2019.
7. Sadoff, C.; Greiber, T.; Smith, M.; Bergkamp, G. *Share: Managing Water across Boundaries*; IUCN Gland: Gland, Switzerland, 2008.
8. Yanow, D.; Schwartz-Shea, P. *Interpretation and Method: Empirical Research Methods and the Interpretive Turn*, 2nd ed.; Routledge: New York, NY, USA, 2004.
9. Shah, W.; Nafees, M. Trans-Boundary Water Conflict between Pakistan and Afghanistan and need of Water Treaty on Kabul River. *Int. Rev. Basic Appl. Sci.* **2020**, *8*.
10. Thomas, V.; MAzizi, A.; Behzad, K. *Developing Transboundary Water Resources: What Perspectives for Cooperation between Afghanistan, Iran and Pakistan?* Afghanistan Research and Evaluation Unit Kabul: Kabul, Afghanistan, 2016.
11. United Nations Economic and Social Commission for Asia and the Pacific. *Water Security & the Global Water Agenda: A UN-Water Analytical Brief*; United Nations University (UNU): Tokyo, Japan, 2013.
12. Ali, G. China–Pakistan cooperation on Afghanistan: Assessing key interests and implementing strategies. *Pac. Rev.* **2022**, *35*, 506–528.
13. Rubin, B.R.; Armstrong, A. Regional issues in the reconstruction of Afghanistan. *World Policy J.* **2003**, *20*, 31–40.
14. Sadeqinazhad, F.; Atef, S.S.; Amatya, D. Benefit-sharing framework in transboundary river basins: The case of the Eastern Kabul River Basin-Afghanistan. *Cent. Asian J. Water Res.* **2018**, *4*, 3849.
15. Caponera, D.A.; Nanni, M. *Principles of Water Law and Administration: National and International*; Routledge: London, UK, 2019.
16. Shams, A.K.; Muhammad, N.S. Towards sustainable transboundary water cooperation between Afghanistan and Pakistan: A case study of Kabul River. *Ain Shams Eng. J.* **2022**, 101842. [CrossRef]
17. Mianabadi, A.; Davary, K.; Mianabadi, H.; Karimi, P. International environmental conflict management in transboundary river basins. *Water Resour. Manag.* **2020**, *34*, 3445–3464.
18. Moorthy, R.; Jeyabalan, G. Environmental Ethics in River Water Management. *Am. J. Environ. Sci.* **2011**, *7*, 370–376.
19. Moorthy, R.; Jeyabalan, G. Ethics and Sustainability: A Review of Water Policy and Management. *Am. J. Appl. Sci.* **2012**, *9*, 24–31.
20. Omrani, B. The Durand line: History and problems of the Afghan-Pakistan border. *Asian Aff.* **2009**, *40*, 177–195.

21. Ranjan, A.; Chatterjee, D. Cutting across the Durand: Water dispute between Pakistan and Afghanistan on river Kabul. *World Water Policy* **2020**, *6*, 246–258.
22. Ahmed, T.; Scholz, M.; Al-Faraj, F.; Niaz, W. Water-related impacts of climate change on agriculture and subsequently on public health: A review for generalists with particular reference to Pakistan. *Int. J. Environ. Res. Public Health* **2016**, *13*, 1051.
23. Ali, F. Decades on, Pakistan is still Seeking a Kabul River Agreement. 2022. The Third Pole. Available online: https://www.thethirdpole.net/en/regional-cooperation/decades-on-pakistan-still-seeking-kabul-river-agreement%EF%BF%BC/ (accessed on 12 October 2022).
24. Rodda, J.C. Water under pressure. *Hydrol. Sci. J.* **2001**, *46*, 841–854.
25. Sahoo, S.; Dhar, A.; Debsarkar, A.; Pradhan, B.; Alamri, A.M. Future water use planning by water evaluation and planning system model. *Water Resour. Manag.* **2020**, *34*, 4649–4664.
26. Gephart, R.P. Qualitative Research and the Academy of Management Journal (Editorial). *Acad. Manag. J.* **2004**, *47*, 454–462. [CrossRef]
27. Given, L.M. Interpretive Research. In *The SAGE Encyclopedia of Qualitative Research Methods*; Sage Publications Inc.: Thousand Oaks, CA, USA, 2008; pp. 465–467.
28. Moorthy, R.; Choy, E.A.; Selvadurai, S.; Lyndon, N. Bioethics Principles in the Teaching of Climate Change. *Am. J. Appl. Sci.* **2011**, *8*, 962–966. [CrossRef]
29. Bevir, M.; Kedar, A. Concept Formation in Political Science: An Anti-Naturalist Critique of Qualitative Methodology. *Perspect. Politics* **2008**, *6*, 503–517. [CrossRef]
30. Khan, H.F.; Yang, Y.E.; Wi, S. Case study on hydropolitics in Afghanistan and Pakistan: Energy and water impacts of Kunar River development. *J. Water Resour. Plan. Manag.* **2020**, *146*, 05020015.
31. Postel, S.L.; Daily, G.C.; Ehrlich, P.R. Human appropriation of renewable fresh water. *Science* **1996**, *271*, 785–788.
32. Wolf, A.T. *Sharing Water, Sharing Benefits: Working towards Effective Transboundary Water Resources Management*; UNESCO: Paris, France, 2010.
33. Taraky, Y.M.; Liu, Y.; McBean, E.; Daggupati, P.; Gharabaghi, B. Flood Risk Management with Transboundary Conflict and Cooperation Dynamics in the Kabul River Basin. *Water* **2021**, *13*, 1513.
34. Klotz, A.; Lynch, C. *Strategies for Research in Constructivist International Relations*, 1st ed.; Routledge: New York, NY, USA, 2007.
35. Tariq, M.A.U.R.; van de Giesen, N.; Janjua, S.; Shahid, M.L.U.R.; Farooq, R. An engineering perspective of water sharing issues in Pakistan. *Water* **2020**, *12*, 477.
36. De Stefano, L.; Petersen-Perlman, J.D.; Sproles, E.A.; Eynard, J.; Wolf, A.T. Assessment of transboundary river basins for potential hydro-political tensions. *Glob. Environ. Chang.* **2017**, *45*, 35–46.
37. Rasul, G.; Sharma, B. The nexus approach to water–energy–food security: An option for adaptation to climate change. *Clim. Policy* **2016**, *16*, 682–702.
38. Phillips, D.; Daoudy, M.; McCaffrey, S.; Öjendal, J.; Turton, A. *Trans-Boundary Water Cooperation as a Tool for Conflict Prevention and Broader Benefit-Sharing*; Ministry for Foreign Affairs: Stockholm, Sweden, 2006.
39. Moorthy, R.; Gill, S.S.; Selvadurai, S.; Gurunathan, A. Vaccine Justice and Bioethical Reflections of COVID-19 Immunization in Malaysia. *Sustainability* **2022**, *14*, 12710. [CrossRef]
40. Mustafa, D.; Akhter, M.; Nasrallah, N. *Understanding Pakistan's Water-Security Nexus*; United States Institute of Peace: Washington, DC, USA, 2013.
41. Damkjaer, S.; Taylor, R. The measurement of water scarcity: Defining a meaningful indicator. *Ambio* **2017**, *46*, 513–531.
42. Prasad, P. *Crafting Qualitative Research: Working in the Postpositivist Traditions*, 1st ed.; Routledge: New York, NY, USA, 2005.
43. Baloch, S.M. *Water Crisis: Why Is Pakistan Running Dry*; Deutsche Welle: Bonn, Germany, 2018.
44. Connor, R. *The United Nations World Water Development Report, 2015: Water for a Sustainable World*; UNESCO Publishing: Paris France, 2015.
45. Chimni, B.S. Refugees and Post-Conflict Reconstruction: A critical perspective. In *Recovering from Civil Conflict*; Routledge: London, UK, 2014; pp. 163–180.
46. Akhtar, F.; Shah, U. Emerging Water Scarcity Issues and Challenges in Afghanistan. In *Water Issues in Himalayan South Asia*; Palgrave Macmillan: Singapore, 2020; pp. 1–28.
47. Moorthy, R.; Jeyabalan, G. Inter-Agency Cooperation in River Management as a Precondition for Realizing Water Ethics Principles in Malaysia: The Case of the Gombak River. *Water Policy* **2012**, *14*, 746–757. [CrossRef]
48. Zareie, S.; Bozorg-Haddad, O.; Loáiciga, H.A. A state-of-the-art review of water diplomacy. *Environ. Dev. Sustain.* **2021**, *23*, 2337–2357.
49. Bernauer, T.; Siegfried, T. Climate change and international water conflict in Central Asia. *J. Peace Res.* **2012**, *49*, 227–239.
50. Hefny, M.A. *Water Diplomacy: A Tool for Enhancing Water Peace and Sustainability in the Arab Region*; Technical Document, Presented in Preparation for the Second Arab Water Forum. Theme; USAID: Washington, DC, USA, 2011.
51. Times of India, Afghanistan Needs Dams on Kabul River for Better Water Management: Report. Available online: https://timesofindia.indiatimes.com/world/south-asia/afghanistan-needs-dams-on-kabul-river-for-better-water-management-report/articleshow/94703423.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst (accessed on 7 October 2022).

52. Hussein, H.; Menga, F.; Greco, F. Monitoring transboundary water cooperation in SDG 6.5. 2: How a critical hydropolitics approach can spot inequitable outcomes. *Sustainability* **2018**, *10*, 3640.
53. Honkonen, T.; Lipponen, A. Finland's cooperation in managing transboundary waters and the UNECE Principles for Effective Joint Bodies: Value for water diplomacy? *J. Hydrol.* **2018**, *567*, 320–331.
54. Akhtar, S.M.; Iqbal, J. Assessment of emerging hydrological, water quality issues and policy discussion on water sharing of transboundary Kabul River. *Water Policy* **2017**, *19*, 650–672.
55. Biswas, A. *Durand Line: History, Legality & Future*; Vivekananda International Foundation: New Delhi, India, 2014.
56. Naidu, L.; Moorthy, R. A Review of Key Sustainability Issues in Malaysian Palm Oil Industry. *Sustainability* **2021**, *13*, 10839. [CrossRef]
57. Hessami, E. Afghanistan's Rivers Could Be India's Next Weapon Against Pakistan. Foreign Policy. 2018. Available online: https://foreignpolicy.com/2018/11/13/afghanistans-rivers-could-be-indias-next-weapon-against-pakistan-water-wars-hydropower-hydrodiplomacy/ (accessed on 26 June 2022).
58. Basin, K.R. *Towards Kabul Water Treaty: Managing Shared Water Resources–Policy Issues and Options*; IUCN: Quetta, Pakistan, 2010.
59. Hayat, E.; Elci, S. Adopting a strategic framework for transboundary water resources management in Afghanistan. In Proceedings of the IWA 2nd Regional Symposium on Water, Wastewater and Environment, Izmir, Turkey, 22–24 March 2017.
60. Ranjan, A. Inter-provincial water sharing conflicts in Pakistan. *Pak. J. Pak. Stud.* **2012**, *4*, 102–122.
61. Hanasz, P. The politics of water security in the Kabul River basin. *Atl. Mon.* **2011**, *10*, 1–7.
62. Islam, S.; Repella, A.C. Water diplomacy: A negotiated approach to manage complex water problems. *J. Contemp. Water Res. Educ.* **2015**, *155*, 1–10.
63. Islam, S.; Susskind, L.E. *Water Diplomacy: A Negotiated Approach to Managing Complex Water Networks*; Routledge: London, UK, 2012.
64. Vollmer, R.; Ardakanian, R.; Hare, M.; Leentvaar, J.; van der Schaaf, C.; Wirkus, L. *The United Nations World Water Development Report–N° 3-2009–Institutional Capacity Development in Transboundary Waters*; UNESCO: Paris, France, 2009.
65. Ososkova, T.; Gorelkin, N.; Chub, V. Water resources of Central Asia and adaptation measures for climate change. *Environ. Monit. Assess.* **2000**, *61*, 161–166.
66. Uitto, J.I.; Duda, A.M. Management of transboundary water resources: Lessons from international cooperation for conflict prevention. *Geogr. J.* **2002**, *168*, 365–378.
67. Phillips, D.; Allan, J.; Claassen, M.; Granit, J.; Jägerskog, A.; Kistin, E.; Patrick, M.; Turton, A. *The Two Analysis: Introducing A Methodology for the Trans-Boundary Waters Opportunity- report no.23*; Prepared for the Ministry of Foreign Affairs: Stockholm, Sweden, 2008.
68. Phillips, D.; Woodhouse, M. *Benefit Sharing in the Nile River Basin: Strategies for Fresh Water Use at the Country and Sub-Basin Levels*; Report Prepared for the Socio-Economic Development and Benefit Sharing Unit of the Nile Basin Initiative; Nile Basin Initiative: Entebbe, Uganda, 2009.