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Models and Mandates in Transboundary Waters: Institutional Mechanisms in Water Diplomacy

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Abstract: The majority of existing institutional mechanisms center on geographical, basin-related and national political interests and needs. Few institutional mechanisms have emerged as model organizations that effectively advance resilient and equitable diplomatic commitment alongside more technically driven modalities of cooperation. Using the Four Frames of Cooperation Framework, this paper assesses three institutional mechanisms in transboundary water cooperation for their effectiveness in supporting transboundary water cooperation and transboundary water diplomacy toward positive peace processes. The results support the need for institutional mechanisms that govern transboundary water cooperation to promote resilient political as well as technical engagement to support water conflict prevention by advancing constructive transboundary water cooperation. Without advancing water diplomacy through institutional mechanisms that govern transboundary water cooperation, the resilience of the institutional mechanism risks becoming limited by a lack of political will.

Keywords: institutional models; transboundary water; water cooperation; water diplomacy

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1. Introduction

The demand for freshwater is increasing globally. The threat of climate change alongside population growth stands to increase tension over the availability, allocation, and access to water. Much of the world's available water is transboundary with 310 transboundary river basins shared by two or more countries covering roughly 47.1% of Earth's land surface [1]. That said, around two-thirds of transboundary rivers do not currently have cooperative agreements in place [2]. The implications of this make conflict and instability more likely, particularly as climate-change effects continue to reduce available water in many basins. Whereas historical experience suggests it is unlikely that countries will go to war over water issues, increasingly scarce water resources require resilient multifaceted approaches that go beyond technical water management to incorporate robust water diplomacy pathways for sustained transboundary cooperation [3,4].

Although cooperation around water may not necessarily lead to peace, it can encourage peacebuilding [3,5]. Transboundary cooperation on environmental issues often reinforces interdependencies between nations. Transboundary cooperation on water thus holds the potential to discourage the use of violence by facilitating a transnational culture of cooperation. Facilitating such a culture of cooperation, particularly doing so for conflict prevention, however, is complex. Structural violence may be evident in the form of dominance or selective engagement by a riparian hegemon over transboundary water cooperation structures. Under-representation of marginalized basin communities or inequitable allocation agreements based on outdated hydrological data are further examples of structural violence. Conversely, institutional cooperation can also serve to strengthen existing power imbalances [6]. Effective conflict prevention in transboundary water cooperation contexts requires the institutionalization of processes and policies that enable positive norms that enforce conflict prevention mechanisms to evolve and endure over time [7].

How institutional mechanisms inform the legal, institutional, relational and outcome governance of transboundary water cooperation informs the extent to which peacebuilding can be facilitated between riparian nations. What differentiates negative and positive peace is important to note here. Whereas negative peace is singular in its goal of attaining the absence of direct violence, positive peace is understood as preventing violence through structural and social justice reform that addresses the inequitable distribution of power and resources. These dimensions of equitability and sustainability are central to what is considered effective transboundary water cooperation across the literature and existing frameworks [8]. By addressing the underlying causes of conflict toward durable peace, institutional mechanisms can contribute to positive peacebuilding. For positive peace to be facilitated, political will and high-level diplomatic engagement must be cultivated and sustained by the institutions that govern transboundary waters.

This paper assesses three operational institutional mechanisms for transboundary water cooperation: the river basin organization (RBO), the transfrontier conservation area (TFCA) and the third-party inter-governmental organization (IGO) model used by the Middle East Desalination Research Center (MEDRC). By applying the Four Frames of Cooperation Framework, these institutional mechanisms are assessed for their ability to effectively facilitate transboundary water cooperation and water diplomacy [8]. Although each institutional mechanism has been established for varying reasons, they are all multilateral institutions set up in support of transboundary water governance. The three mechanisms have been selected because they all have the potential to support conflict prevention and water diplomacy at an interstate level.

The study proceeds as follows: Section 2 presents an overview of the literature on transboundary water cooperation and diplomacy alongside the role prominent institutional mechanisms have played in supporting technical cooperation and environmental peacebuilding. Section 3 outlines the research questions that guide this assessment of institutional mechanisms and outlines the reasons and relevance for the methods used. Section 4 assesses RBOs, a TFCA and the MEDRC model through the Four Frames of Cooperation Framework. Section 5 discusses the qualitative findings and presents lessons learned and recommends future pathways.

2. Institutional Mechanisms in Transboundary Water Cooperation, Diplomacy and Positive Peace

For conceptual clarity, it is important to recognize that whilst transboundary water cooperation and water diplomacy are interrelated, they are separate concepts. Both water diplomacy and transboundary water cooperation link political and technical tracks of engagement between riparian nations [5]. Whereas transboundary cooperation is more oriented towards technical engagement, water diplomacy is focused on the political track. Concerned more with the process of cooperation rather than the outcome, water diplomacy looks to prevent or peacefully resolve (emerging) conflicts through engaging with measures undertaken by state and non-state actors. In its broadest definition, water diplomacy refers to the potential cooperation that can be harnessed both in cross-border contexts and internal trans-sectoral issues about water [5,9]. This complementary space means that transboundary cooperation works under a politically defined mandate, whilst water diplomacy becomes informed by the knowledge sharing that more technical transboundary cooperation advances.

Notwithstanding the complex space within which transboundary water cooperation exists, water is increasingly recognized as an essential tool for maintaining peace and security at international, national and sub-national levels [10–13]. Effective water management can be used as an entry point to prevent conflict in transboundary water diplomacy and cooperation [9,11,13]. There are several prominent examples of water cooperation taking place despite the presence of war and the absence of a peace agreement. For example, the 'picnic table talks' between Jordan and Israel in the 1950s, the resilience of the International Commission for the Protection of the Danube River during the Yugoslav Wars in the 1990s

and the Indus Treaty, which has remained intact despite three wars between India and Pakistan. Coined 'islands of cooperation' [14] (p. 1), these successes demonstrate that water can be effectively managed in conflict but that the spillover to a positive peace from such management is more challenging. Peacebuilding demands the development of functional institutional mechanisms that use water as a platform for potentially wider systemic and eventual whole-of-government cooperation and agreement.

Multi-track diplomacy pathways can strengthen capacity-building, financial, legal, and political coordination at national, sub-national and global levels. Typically, across the literature, diplomatic engagement is placed within three predominant categories of engagement: Track 1, Track 1.5 and Track 2 diplomacy. Track 1 references official governmental diplomacy that involves formal dialogue organized by and for the state. It requires high-level political will and engagement. Track 2, in contrast, is informal unofficial dialogue designed to improve communication and build trust between non-governmental actors such as influential academics or local and religious leaders. Track 1.5 typically constitutes informal dialogue organized by a non-state actor with state-level support and participation. At Track 1.5 diplomatic engagement level, both official and unofficial discourse take place [15,16]. In practice, demarcating Track 2 and Track 1.5 can be challenging. The key element that differentiates these two tracks of diplomatic engagement is that in Track 1.5 state-level support toward the discourse is assured systemically, and there is potential for informal discourse to move into a state of formal discourse. In recent years, literature has also emerged looking at what has been referred to as Track 3 diplomacy, which encompasses people-to-people engagement and diplomatic mobilization [17]. The classification of different levels of diplomatic engagement in this way positions high-level political engagement at Track 1 and Track 1.5 level. Although this paper recognizes that water issues affect all levels of society, it is particularly concerned with multilateral institutions at Track 1 and Track 1.5 level.

Within the conflict resolution literature, there is debate over whether cooperation is valuable in contributing to positive peace and whether it may also cause harm in certain contexts [18–20]. Research conducted by Daoust and Selby [21] highlights the need for a more nuanced approach to unpacking and understanding cooperation. A lack of conflict in a basin does not necessarily mean willful cooperation between riparian nations. Instead, it may be a sign of the regional hegemon asserting control, presenting domination as cooperation. [22]. Similarly, at times conflicting interactions have also created enabling conditions for cooperative dialogue to take place thereafter [22,23]. Where basin treaties do exist, these often reflect the status quo with regard to political power and hegemony. As Pohl [3] argues, basin management is often secondary to intra-basin politics and established power asymmetries. Therefore, political engagement is crucial to ensure effective cooperation and coordination and 'the absence of political will represents the key obstacle for materializing benefits of water cooperation' [24] (p. 4). Unilateral action tends to be more predominant in basins where neighbors do not have good relations or where a basin hegemon dominates [13,25,26]. Moreover, many treaties lack specific conflict resolution mechanisms at their establishment and therefore, the existence of a treaty itself is not enough on its own to prevent conflict [27,28]. Nevertheless, as Wolf et al. [29] (p. 45) contend, basins without treaties in place are 'significantly more conflictive than basins with treaties.' In reality, it is fairly easy to compel states to cooperate if the political situation allows it because the benefits of cooperation often outweigh the gains of unilateral action. Basins with cooperative water agreements also tend to remain resilient, and cooperation in line with the treaty tends to continue even if there are hostilities between riparian countries on non-water-related issues.

Several benchmarks of equitability and sustainability have emerged as guiding criteria for determining whether transboundary water cooperation is constructive [8] (p. 212). The 1997 UN Convention on the Law of the Non-Navigational Uses of International Waters legally binds signatory states to cooperate within international law. Article 5 and Article 7 of the UN Convention call for equitable and reasonable use as well as

the development and protection of watercourses. Equitability in transboundary water cooperation is achieved through addressing disparities in outcome and process that may exist among actors committed to a cooperative agreement. In addition, sustainability is considered achieved when 'trade-offs between social, economic, and environmental dimensions can be made to meet desirable goals' [8] (p. 8). Achieving equitability and sustainability benchmarks in transboundary water cooperative arrangements, however, remains challenging. Ultimately, the UN Water Convention has been ratified by relatively few states and its framework does not provide much in the way of enforcement capabilities for those who are signatories.

An extensive analysis by McCracken [8] illustrates why effective transboundary water cooperation and agency is difficult to ascertain by expanding on the variability in conceptualizing what effective cooperation looks like. This variability exists largely due to the normative nature of agreed-upon principles of effective water governance, which positions determining, measuring, and evaluating the extent of effective transboundary water cooperation in a problematic space [30]. The study outlines that there are common aspects of effective transboundary water cooperation that emerged across different conceptualizations analyzed, including achieving outcomes, having and sustaining resilient institutional capacity and ensuring participation. Even in identifying these, however, it is noted how ambiguous the parameters can be when looking at practical transferable models for effective transboundary water cooperation.

The nuanced interplay between conflict and cooperation affirms that transboundary water interaction is an inherently political process determined by the changeable, broader external context. Such changes are dependent also on the many different actors involved in water diplomacy who all fulfil different roles, from states to companies, as well as non-governmental organizations, civil society groups and international organizations. Third parties in the form of international organizations or intergovernmental organizations have shown to contribute positively in their ability to mediate because of the lower sovereignty costs that they bear [31,32].

As the existing literature attests, the international community has long grappled with what effective institutional arrangements for managing shared water resources entail [3,26,27]. Successful multilateral institutions can maintain impartiality while carefully maintaining relationships with all core stakeholders [6,28]. However, the effectiveness of multilateral institutions in contributing positively to conflict prevention depends on a myriad of elements. The lack of agency at the international level in this field is equally well established. However, the empirical evidence on whether different forms of institutional mechanisms that govern transboundary water cooperation reinforce negative or positive structural peace remains scarce [5,9,13].

3. Research Questions and Methods

The existing literature highlights a gap that exists in understanding how the institutional form that multilateral platforms, such as RBOs, a TFCA and the MEDRC model, impact the function they hold on resilient diplomatic and technical transboundary water cooperation. This study contributes to this knowledge gap by extending on the Four Frames of Cooperation Framework as developed by McCracken [8]. In using this neutral integrated framework, this study advances an explanatory assessment of how institutions may either enable or restrict resilient diplomatic and technical functions toward equitable and sustainable transboundary water cooperation [8].

The following research questions underpin this explanatory assessment.

3.1. Research Questions

Q1. ***To what extent do different institutional models (RBOs, TFCAs, and third-party IGOs such as MEDRC) facilitate equitable and sustainable technical and diplomatic engagement in inter-state transboundary water cooperation?***

This question is evaluated in terms of two different aspects:

a. *The extent to which the different institutional models advance constructive water cooperation and water diplomacy.*
b. *The extent to which the different institutional models inform the function of advancing equitable and sustainable transboundary water cooperation.*

Q2. ***Do institutional mechanisms that govern transboundary water cooperation and diplomacy support water conflict prevention?***

3.2. Methods

To answer the research questions, three institutional mechanisms are assessed qualitatively according to the criteria outlined by the Four Frames of Cooperation Framework. The institutional mechanisms chosen for this analysis are river basin organizations, a transfrontier conservation area, and third-party inter-governmental organizations such as the MEDRC model. These three institutional mechanisms were selected for three reasons. Firstly, they all actively operate at river-basin-wide scales. Secondly, they have state-to-state governance structures. Lastly, cooperation is in the form of multilateral political engagement.

Within these chosen three institutional mechanisms, the Four Frames of Cooperation Framework is used to assess four case studies: the Senegal River Basin Development Organization (OMVS), Mekong River Commission (MRC), the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) and MEDRC as an intergovernmental organization. The authors acknowledge that there are many potential RBOs to choose from. OMVS and MRC have been selected on the premise that one (OMVS) is championed for its systemic implementation of equitable principles [33,34], whilst the other (MRC) has been criticized for lacking to do so [35,36].

This framework was chosen because it offers a context-specific, consistent, and neutral explanatory framework through which cooperation can be assessed as either constructive or destructive. Transboundary cooperation under the Four Frames of Cooperation Framework is defined as '*interactions between actors over shared waters that result in establishing mutually beneficial outcomes through a decision-making process; this process could include formal and informal legal and institutional mechanisms depending on the scale and context'* [8] (p. 8). The framework allows for a comprehensive understanding of the geographic and governance scale and context in which the respective institutional mechanisms operate. It separates cooperation into four frames of analysis—legal, institutional, relational and outcome. As cooperation gets unpacked qualitatively in this way, the range of political, social, economic, and administrative processes that inform the transboundary cooperation can be established with greater clarity. The framework presents the theoretical foundations to allow this paper to assess whether institutional mechanism form effectively advances water cooperation (technical functionality) and water diplomacy (political functionality) in transboundary water cooperation settings.

The core insights of this work are derived from desk research and an in-depth literature review. This anecdotal evidence limits the extent to which this paper can assess all dimensions outlined in the Four Frames of Cooperation Framework (see Appendix A, Tables A1 and A2). This study did not have direct access to actors actively involved in the operational activities of all the case studies being analyzed. This work therefore only assesses the three different institutional mechanisms and their corresponding case studies using the 'current point in time' guiding questions outlined in Appendix A, Table A1. When it comes to evaluating the extent to which each institutional mechanism has been constructive in advancing water cooperation and water diplomacy, this paper can engage in evaluative discussion using goal attainment as a parameter of evaluation as outlined in Appendix A, Table A2.

By assessing the relative institutional mechanisms of RBOs, a TFCA and the MEDRC model through the Four Frames of Cooperation Framework, the parameters of assessment

are particularly context specific. This nuanced approach means that no comparison will be made across the three different institutional mechanisms. Instead, an explanatory assessment of each institutional mechanism will be assessed for the legal, institutional, relational and outcome functions that have been advanced through the institutional form. Although this study's analysis focuses on the institutional dimension of the Four Frames, to assess how the institutional form has enabled or limited technical water cooperation and high-level political water diplomacy, all frames must be assessed. Appendix A, Tables A1 and A2 provide an overview of the Four Frames of Cooperation Framework that is used to assess and test the three institutional models. Appendix A, Table A2 offers more details on the dimensions that guide how the institutional models are evaluated in Section 4.

4. Results

4.1. Four Frames of Cooperation Qualitative Assessment of RBOs

The potential range in composition and mandates that RBOs can embody infer that they hold institutional adaptability and, in theory, have the potential to advance water cooperation and water diplomacy. The following assessment of OMVS and MRC offers a more in-depth exploration of the extent to which constructive transboundary water cooperation and water diplomacy may be advanced.

4.1.1. The Senegal River Basin Development Organization (OMVS)

In response to several years of severe drought, the OMVS was set up in 1972 to work on technical issues between riparian states of the Senegal River Basin. OMVS is a formal RBO that is built on earlier cooperation dating back to 1802. Current membership of the organization includes Mali, Mauritania, Senegal, and Guinea (joined later in 2005). The OMVS has a strong yet flexible mandate wherein there is an explicit understanding and mutual commitment between riparian countries that the best way to reap benefits from the basin resources is through cooperative joint action [37]. As an institution, the OMVS functions at a basin-wide scale and a Track 1 state-to-state level of governance with The Conference of Heads of State and Government existing as the chief decision-making body.

Table 1 presents a summary of the OMVS through the Four Frames of Cooperation Framework.

Table 1. Summary table of the OMVS through the Four Frames of Cooperation Framework.

RBO	Senegal River Basin Authority (OMVS)
Legal	• Formal agreements signed, including several Conventions from 1972 to 2002. • Holds full legal authority through substantive and procedural mechanisms that give the OMVS regulatory capacity of networks, electrical grids and industrial development in the geographical area. • National laws of all four riparian states are substantively integrated and adhered to. • A dispute resolution mechanism is present.
	• RBO with a key focus on joint infrastructure. • All basin-related developments are co-owned by all riparian countries. ○ Water rights are allocated by the Permanent Water Commission at a basin-wide, sub-basin and inter-basin scale. • Technical cooperation present: the Standing Water Commission, which is an advisory. • Diplomatic cooperation present. • Political will present. • Joint projects, data and information sharing and assessment present. • Joint financing mechanism. ○ Unilateral funding is not easily acquired by member states. ○ Each member state contributes to an ordinary budget in the OMVS and all costs and expenses are shared in proportion to benefits received from basin developments. ○ The Convention Regarding the Methods of Financing Joint Works (signed in 1982) provide a framework and methods for joint financing. • Upon the request of at least two member states, the RBO can be dissolved. • Local coordination committees and national coordination committees

Table 1. *Cont.*

RBO	Senegal River Basin Authority (OMVS)
	• Mutual decision-making present. ○ Every member state is represented in expert committees that meet every three months to discuss joint plans and processes. Expert committees comprise of ecologists, scientists, academics, and politicians. • Decisions made by the Conference and Council of the OMVS are binding to all member states. • Inclusive of all sectors thereby enabling cross-sectoral participation.
	• Shared infrastructure. • Equitable and reasonable sharing through allocation and regulated benefit sharing. • Adaptation capacity present. • Resilient cooperation despite the conflict. • Mutual benefits through mutual goal setting and implementation.

Note: Source [8]. Adaptation by Dané Smith.

The legal mandate of the organization is very broad allowing both for exploitation of the basin as well as regional economic growth and development. As such, OMVS has a strong basis to contribute to conflict prevention through socio-economic development. Despite a complex political situation, particularly between Mauritania and Senegal where the officially recognized border is not accepted by the local population in both states, bilateral conflicts have rarely affected the member states' commitment to jointly using the basin's resources [13].

OMVS maintains the support of the Council of Ministers through a Permanent Water Commission. This functions as a consultative body to the council and allows propositions to go as far as possible before receiving the final approval from the government at the Council of Ministers level or even at the head of state level. By ensuring that the representatives are predominantly governmental, issues over a lack of high-level state commitment are mitigated. Furthermore, the institutional mechanism created by OMVS ensures that both technical and political capacity is entrenched at multiple levels. Stakeholders, in this way, are appropriately represented and have a high level of decision-making power.

The RBO seeks to use co-financed joint infrastructure in its efforts to cooperate and reduce potential tensions in the basin. This so-called 'basket of benefits' focuses on benefits rather than allocation and enables states a win–win situation by looking at the knock-on, wider effects of an action [38]. The experience of benefit sharing in the Senegal Basin has created an allocation key, wherein each state contributes to joint infrastructure based on the different benefits received by the project. By ensuring that decisions are sought through consensus, OMVS reduces potential conflict between the riparian states. The basin also benefits from the fact that the riparian states are fairly evenly matched in terms of power and capabilities and therefore there is little need to capacity build as in other basins. These mutual benefits motivate states to cooperate, and this cooperation can then lead to increased trust between riparian countries, consequently reducing future tensions.

4.1.2. The Mekong River Commission (MRC)

Established in 1995, the agreement recognizes the need to cooperate for sustainable development, utilization, conversation, and management of the Mekong River Basin.

Thailand, Laos, Cambodia and Vietnam are formal member states of the MRC. China and Myanmar, riparian states to the Upper Mekong Basin, are not signatories. The formal agreement emerged after more than 40 years of regional and supra-regional efforts including a Joint Declaration, a 1957 Legal Statute and an Interim Mekong Committee Declaration to manage the Mekong River Delta resources. There is no specific mention of peace and stability although the raising of living standards of the people living in the riparian states is referenced alluding to a potential conflict prevention mandate. The structure of the organization ensures technical research capacity as well as a multi-level governance structure and engages with senior civil servants from both technical ministries and the Ministry of Foreign Affairs.

Table 2 presents a summary of the MRC through the Four Frames of Cooperation Framework.

Table 2. Summary table of the MRC through the Four Frames of Cooperation Framework.

RBO	Mekong River Commission (MRC)
Legal	• Formal agreement in 1995: the Agreement on the Cooperation of Sustainable Development of the Mekong River Basin. • Assumes all the assets, rights, and obligations of the Committee for the Coordination of Investigations. • Substantive and procedural mechanisms included that enforce equitable and reasonable use of water. ○ Article 7 and Article 8 and the Preamble of the 1995 Agreement • Dispute resolution mechanism integrated into the agreement.
Institutional	• RBO with a focus on governing water allocation and use. • Hierarchical structure of governance with three core bodies: the Council, the Joint Committee, and the Secretariat. • Joint projects, coordinated by the Joint Committee. • Technical cooperation. ○ Centrally coordinated by the Secretariat under the supervision of the Joint Committee. • Diplomatic representation in the Council and the Joint Committee. • Data and information sharing by the Joint Committee and Secretariat. • Multiple funding streams are supported, including equal contributions from member states and donor countries.
Relational	• The Council and the Joint Committee have representatives of select diplomatic standing. • Each member state is represented at the highest level on the Council at a ministerial or cabinet level. • The Council meets at least once a year, by may convene more sessions should a member state request for it. • The Secretariat is directed by a Chief Executive Officer appointed by the Council from a list of nominations from the Joint Committee. • Unanimous decisions must be reached between the Council and the Joint Committee to proceed unless otherwise stated in the Rules of Procedures. • Welcomes public participation in the MRC by inviting civil society representatives to participate in Council and Joint Committee meetings. • The notification system through required information sharing advanced dialogue through the institutional mechanism. • China and Myanmar are represented as dialogue partners.
Outcome	• Strong substantive elements. • National interest representation through establishing a National Mekong Committee in each member state. • Information reporting requirements must be met before utilizing the Mekong River waters. • Hydrological monitoring network that member states provide data for, and riparian but non-member State, China, contributes to.

Note: Source [8]. Adaptation by Dané Smith.

Water allocation and use at a basin-wide and inter-basin level is the MRC's focus. The legal and institutional dimensions highlight the importance of equitable and sustainable principles. Disparities are addressed in how outcomes and processes are substantively addressed through advancing fair representation and robust legal mechanisms of responsibility. All technical staff positions that fall under the RBO umbrella, for instance, must be assigned on an equal basis among the member states. Any dispute related to matters outlined under the 1995 Agreement can be settled by any member of the Council, the Joint Committee, or any member states [39]. If a dispute cannot be resolved within the framework of the MRC, then it may be resolved by member states' governments directly through preferred diplomatic channels. Should member states not be able to resolve the dispute through preferred diplomatic means, then third-party mediation becomes an option. This tiered approach highlights adaptability in legal and institutional dimensions of the MRC and highlights embedded procedural equitability.

The integration of inter-state transboundary water cooperation with intra-state water resources management through the establishment of national committees by each member state, further advances sustainable transboundary water cooperation. Although these

national committees have varying organizational structures vary across the MRC member states, the goal of policy harmonization is enabled by ensuring trade-offs can be made that serve the Lower Mekong Basin, thereby advancing the principle of sustainability in transboundary water cooperation. Such sustainability is advanced by institutional requirements such as required information reporting by member states through a notification procedure to the Joint Committee of Basin-Related Activities.

Technical and diplomatic representation is reinforced by the way the Council, Joint Committee and Secretariat are structured. In theory, this should advance resilient Track 1 and 1.5 political engagement in the decision-making and enable dialogue, inclusion, and reciprocity. Despite not being formal signatories to the 1995 Agreement, China and Myanmar are considered official partners in dialogue and are represented in the Joint Committee and Council meetings. This advances the relational dimension of the MRC but undermines the legal and institutional procedural mechanisms.

The assessment of legal, institutional, relational and outcome parameters of the OMVS and MRC highlights how an RBO can institutionalize transboundary water cooperation through binding international agreements. They operate primarily in geographical basins although this does not necessarily mean that every riparian is represented in the RBO. RBOs can range in the form of their establishment from 'informal mechanisms or formal committees to facilitate planning and coordination to more formal structures including hands-on management' [37] (p. 52). RBOs may be engaged in scenario planning and joint fact-finding to some extent. This can be conducted in several different ways and can be scaled depending on the level of trust between riparians and the legal framework involved. This could include joint hydrological monitoring and assessment, sharing of information and dates or even joint infrastructure. Some RBOs are set up specifically to focus on the sharing of information, whereas others are focused on the exploitation of the resource through joint infrastructure projects, which may include joint financing between riparian states. As the case studies highlight, RBOs are established by treaties in the first instance but are not wholly static bodies. Many are under a consistent process of institutional change and organizational learning meaning they can respond flexibly to challenges, opportunities, and threats. This may mean that their mandate can develop as their institution capabilities grow or as the conditions in the geographical area, they serve change. This is particularly important considering climate change and is crucial for RBOs wishing to effectively engage in equitable and sustainable water cooperation and water diplomacy.

4.2. Four Frames of Cooperation Qualitative Assessment of a TFCA

Positioned within a multi-level governance process, transfrontier conservation areas (TFCAs) involve different actors. Depending on what institutional classification they fall into—Category A, B or C—TFCAs are either conceptual, emerging, or formally operational in their institutional set-up. In 2011 the Kavango–Zambezi Transfrontier Conservation Area (KAZA TFCA) was established as a 'Category A' TFCA through a treaty between Angola, Botswana, Namibia, Zambia and Zimbabwe. With peace clauses clearly outlined in its formal agreement, the institutional mechanisms of the KAZA TFCA inform technical water cooperation and high-level political water diplomacy amongst the riparian nations.

The KAZA TFCA hosts most of the Kavango and part of the Zambezi River basins and includes several ecologically significant wetlands and water flows. The area is densely populated with 29% of the land within the KAZA-TFCA not protected for wildlife experiencing a human population density of 5.25 pp km^2 [40] (p. 6). With an average of 2% population growth, strain has been placed on the management of natural resources and there has been an increase in human-wildlife conflict [40]. Wetlands in the KAZA-TFCA are supplied from the highlands in Angola, Zambia, and the Democratic Republic of Congo, with over 70% of the Okavango Delta water flowing from Angola [40] (p. 14). As a transboundary water source between Angola, Zambia, Botswana and Namibia, only one-fifth of the Kwando basin falls within the KAZA-TFCA.

Table 3 presents a summary of the KAZA-TFCA through the Four Frames of Cooperation Framework.

Table 3. Summary table of the KAZA-TFCA through the Four Frames of Cooperation Framework.

TFCA	Kavango–Zambezi Transfrontier Conservation Area
Legal	• MoU signed by all member states (2006). • Treaty signed by all member states (2011). • Signatory to several formal international conventions and protocols. • Harmonizing policy priorities with the national legislation of member states are incorporated into the legal elements.
Institutional	• A TFCA with RBOs embedded within its governance structure. • Technical cooperation present. • Diplomatic cooperation present. • Political will present. • Joint projects, data and information and assessment present. • Large-scale natural resources management across
Relational	• Common goals guide policy development and decision-making. • Shared understanding is supported through data and information sharing mechanisms. • Trust between different stakeholders through inclusion and participation.
Outcome	• Mutual benefits through integrating the goals of the TFCA projects with national interests. • Policy harmonization as intra-state, interstate and regional integration of policy goals around natural resources management are substantively and procedurally advanced.

Note: Source [8]. Adaptation by Dané Smith.

Extending from the treaty, the KAZA-TFCA's organizational structure consists of the Ministerial Committee, the Committee of Senior Officials, the Joint Management Committee, and the National Committee. Under the KAZA Secretariat, a project team is responsible for developing an Integrated Development Plan, which proceeds to inform the national development strategies of the member states on transboundary resources management [41,42]. This highlights how the inter-state commitments around the KAZA-TFCA support the entry of water diplomacy with spillover of all stakeholder commitments into guided plans that aim to implement appropriate management strategies for each riparian. As part of the multi-level governance structure of the KAZA-TFCA, the Joint Management Committee has institutional mechanisms in place that can ensure appropriate stakeholders are represented across the different geographical wildlife dispersal areas and can implement appropriate management strategy for each water network that falls within the TFCA.

As cooperative modalities that complement the TFCA on transboundary water cooperation of the Kavango and Zambezi River basins, two RBOs—the Zambezi Watercourse Commission (ZAMCOM) and the Permanent Okavango River Basin Water Commission (OKACOM)—are important to consider. Of the TFCA member states, Angola, Botswana and Namibia are members of OKACOM. All the TCFA member states are part of ZAMCOM alongside Malawi, Mozambique and Tanzania, who are not members of the TFCA.

Notable successes that OKACOM has had in contributing to transboundary water cooperation of the Kwando River system between Angola, Namibia and Botswana include effective data sharing, trust-building among the riparian states and policy harmonization. Its Strategic Action Programme directs developments along the Kwando River system and informs the National Action Plans of all riparian nations with specific time-bound interventions that each nation commits to [43,44]. Although the trajectory of development is for twenty years, revision takes place every five years, thus ensuring that it does not challenge member state sovereignty. As an effective information sharing and policy coordination platform, OKACOM fosters cooperation in a way that promotes the de-securitization of riparian states.

In contrast, ZAMCOM holds less clout in directing benefit sharing and informing national agendas. Composed of a council of ministries, the technical committee, and the

secretariat, ZAMCOM's institutional structure hosts a similar hierarchical structure as OKACOM. It has had success in developing a basin-wide strategic plan, the development of legal instruments and communication strategies and a basin-wide resource information system [45]. However, as a governance model on the principle of the equitable and reasonable use of water, ZAMCOM has had less relative success in mobilizing political commitment. Considered a weak institutional mechanism for not being able to cultivate political will, ZAMCOM has faced issues with policy harmonization, challenges in data collection and inadequate coordination of environmental management across interlinking sectors. Before it formally entered into effect in 2011, most riparian states to the Zambezi River basin engaged with transboundary water unilaterally. The lack of political commitment from riparian states suggests that ZAMCOM is sandwiched between strong economic imperatives of unilateral and bilateral cooperation and regional cooperation incentives [46]. Despite this, unilateral arrangements have been mitigated due to the inclusion of basin-wide and SADC (Southern African Development Community) regional targets related to transboundary cooperation. Moreover, historically, the liberation struggles of the 1970s enabled a spirit of cooperation on the Zambezi that has arguably aided transboundary cooperation through heightened regional solidarity [47].

The KAZA-TFCA exists as a large-scale terrestrial multilateral platform with priority areas that extend beyond water resource management. Nonetheless, water security is a strategic priority across the KAZA TFCA and the RBOs that fall within the geographical area it governs. The emergence of common policy priorities has enabled the KAZA-TFCA to influence transboundary water cooperation and water diplomacy even where water catchment areas lie outside of its influence. Its integrated governance structure, including its links to OKACOM and ZAMCOM, highlights how multilateralism can advance benefit sharing and awareness toward transboundary reciprocity.

4.3. Four Frames of Cooperation Qualitative Assessment of the MEDRC Model

As an existing institutional mechanism in the form of a multilateral research institute, MEDRC emerged out of the Working Group for Water from the Madrid Peace Conference in 1991 and the subsequent 'Madrid Process'. It has two primary mandates, the first, to support the Middle East Peace Process, and the second, to support the development of solutions to freshwater scarcity in the Middle East and North Africa region [48]. Established in 1996 through an international agreement, its membership is made up of conflict parties to the Middle East Peace Process and supporting states. Not all riparian countries in the Jordan basin are part of the organization. Whilst originally focused on the issue of desalination as a uniting technology for the region, the Center considers broader environmental issues relating to water including climate change, the water-energy-food nexus and wastewater reuse amongst others.

Each member state nominates both a diplomatic representative (known as an Executive Council Member) and a Technical Representative, who generally works within the national water agency/ministry, to represent their interests at a bi-annual executive meeting [48]. Supporting states create the wider multilateral framework of the organization as well as provides financial support to the Center on a project-by-project basis. Some of these supporting states were part of the original Working Group on Water whereas others joined the organization later on. To mitigate the potential risk of pressure from member countries to the organization on MEDRC activities and to maintain independence, the organization ensures that multiple funding streams are present at all times.

Table 4 presents a summary of the MEDRC model through the Four Frames of Cooperation Framework.

Table 4. Summary table of the MEDRC model through the Four Frames of Cooperation Framework.

Third Party IGO	MEDRC Model
Legal	• International agreement engaging core parties (riparians) and supporting states—Agreement Establishing the Middle East Desalination Research Center (1996). • Headquarters Agreement between the Center and the Sultanate of Oman (1997) and associated Royal Decree 19/18. • Additional member state resolutions • Procedural elements (dispute resolution as part of the initial agreement).
Institutional	• Diplomatic cooperation enabled through an Executive Council Member (MFA representative). • Technical cooperation through a Technical Representative (Water Ministry representative). • Political will engaged at a ministerial or cabinet level. • Joint projects. • Financial support mechanisms that enable multiple funding streams. • Joint ownership through the structure of the Executive Council.
Relational	• Relationships are enabled through director-level officials being engaged. • Communication is enabled through various meetings at the technical and diplomatic levels. • Trust present. • Confidence-building measures through technical programming • Co-equal participation • Mutual respect present as the operation of MEDRC is solely dependent on the will of member states to participate.
Outcome	• Reduction in conflict • Mutual benefits • No water governance specific outcomes, all peace-process-linked (utilizing technology as a reason to meet)

Note: Source [8]. Adaptation by Dané Smith.

MEDRC engages in capacity-building projects relating to technical water issues with member countries to the organization that are on the OECD-DAC list for overseas development assistance on an individual basis. These projects assist in addressing capacity disparities between core parties and serve as confidence-building activities at a technical level.

For each of the core party states, there are both benefits and challenges associated with being a member of the organization. This delicate balance is stabilized by the supporting states who help to set the behavioral and diplomatic norms on acceptable conduct within the organization. Perhaps the biggest success of the model is the fact that despite existing in a complex and protracted conflict, the organization continues to exist, operate and carry out its mandate. This can be attributed to how MEDRC reinforces informal problem solving and directly seeks consensus on all issues. The MEDRC model draws on the lessons learned from the Northern Irish peace process in entrenching the principles of parity of esteem and co-equal partnership. This benefit may mean that the model could effectively be utilized for conflict prevention in both intra-state and inter-state contexts. By remaining small, and outside of formal systems of the United Nations, MEDRC does not set a diplomatic precedent. Whilst states can exist within MEDRC as co-equal parties on the principles of respect and parity of esteem, they do not necessarily recognize one another formally outside the space created. As a result, the model allows states without good or any, diplomatic relations to engage in a controlled environment whilst still working towards conflict prevention in the long term. This is also where a multilateral process can be beneficial as outsider states play a role in generating and sustaining political will that would be less forthcoming without their engagement.

5. Discussion

The exploration of the operational institutional mechanisms in transboundary water cooperation through the Four Frames of Cooperation Framework shows that majority of

them are stronger in their legal and institutional frameworks than in operational practice. This highlights how crucial relational goal attainment is when harnessing water diplomacy.

Table 5 presents an overview evaluation of the three institutional mechanisms extending from the assessment in Section 3 based on goal attainment as a parameter of evaluation. Refer to Appendix A, Table A2 for the guiding questions that informed the evaluation.

Table 5. Summary table on the evaluation of goal attainment.

Evaluation of Goal Attainment in Transboundary Water Cooperation and Diplomacy	
	OMVS
Legal	Relevant mechanisms are included in the agreement.
Institutional	Core policies and decisions have been implemented at the relevant governance scale. Targets set out by the policy documents have been largely advanced but not met in full, with targets being higher than realities achieved.
Relational	Process has been equitable as depicted through the periodic communication, meeting and joint project planning and implementation by all member states.
Outcome	Central outcomes achieved. Large-scale adaptations were made to meet revised needs at different points in time and with different variables considered. Institutional adaptability and resilient institutional capacity and a concern for sustainability in making trade-offs between social, environmental and economic dimensions to meet the shifting goals of all member states.
	MRC
Legal	Relevant mechanisms are included in the agreement.
Institutional	Policies have been advanced substantively but less so procedurally.
Relational	An inequitable and unsustainable process with little implementation success.
Outcome	With two key riparian—China and Myanmar—not being signatories to the agreement, it has proved difficult to procedurally advance strong substantive norms.
	KAZA-TFCA
Legal	Relevant mechanisms are included in the treaty.
Institutional	Policies and decisions have been implemented but to varying degrees of success and in some cases to a greater extent by some member states than others.
Relational	A multi-level governance structure advances elements of equitability.
Outcome	Greater policy harmonization has been achieved across multiple levels of governance. Policy harmonization has been able to advance the principles of sustainability substantively but less so procedurally.
	MEDRC Model
Legal	Relevant mechanisms are included in the agreement.
Institutional	Policies have been implemented and behaviors have advanced through greater political will and joint projects.
Relational	The manner in which program activities are structured and relationships are advanced reflects an equitable process.
Outcome	The outcome of having continued dialogue, inclusion and participation of all core states as part of the Middle East Peace Process has been advanced. Evaluating the extent to which sustainability has been advanced on transboundary water cooperation in areas of social, economic and environmental trade-offs is not possible in this paper.

Note: Source [8] (p. 239). Adaptation by Dané Smith.

The assessment of OMVS shows that genuine commitment has been leveraged by enabling both technical and political capacity through the multi-level governance framework. The centrality of joint ownership in OMVS advances equitability through high-level authority being granted in goal setting, decision-making, implementation, and adaption. Joint ownership that engages at a high political level means that any disparities between

member states can be discussed on equal footing, thereby advancing shared understanding and reciprocity. Technical and diplomatic representation also enables resilient cross-sectoral governance and supports conflict prevention by facilitating sustainable and equitable use of water substantively as well as procedurally.

This multi-level governance has also enabled for a resilient cost-sharing financial mechanism to be institutionalized within the RBO. This cost-sharing mechanism has substantive and procedural potential for advancing economic, environmental, and social outcomes. Through this mechanism, common goals and actions could be activated as outcomes through OMVS at a project activity level. In effect, 20,000 hectares of irrigated land was developed, and disease and invasive species have been managed [49]. Despite this progress, the 20,000 hectares of developed irrigated land falls far below the target of 375,000 hectares outlined in the OMVS goals in the 1970s.

Although the cost-sharing mechanism has supported shared understanding and decision-making around shared issues, there have been issues due to a lack of funding streams, particularly with hydropower production and watercourse navigational improvements like docks and channelization. Furthermore, there have been several drawbacks faced in water resources management over time when considering sustainability in particular. The operationalization of Diama Dam (completed in 1986) and Manantali Dam (completed in 1987) enabled greater water security and drought resilience but was criticized for causing social, environmental and economic damage. This damage arose primarily in the years after the operationalization of the Diama and Manatali Dams. Designed to maintain the minimum water levels needed for irrigation in times of dry seasons, the dams were used as sources of artificial floodwaters. The artificial floodwaters were released during the wrong seasons, however, which resulted in the forced relocation of farmers, destruction of crop fields and death of livestock as the prevalence of waterborne diseases rose with still waters. It is important to note that during the period of dam construction and operationalization, environmental impact assessment was not required. In light of these failures to support sustainable outcomes, OMVS signed the 1997 UN Watercourses Convention and the 2002 Charter of Senegal River Waters, which impose substantive obligations to protect the environment by developing an Environmental Action Plan aimed at evaluating water quantity, quality, distribution and use [49]. This adaptability in legal and institutional dimensions highlights the resilience of the OMVS as an institutional mechanism [33]. Despite some challenges, it is clear that the inter-sectoral governance that is built into the legal and institutional elements of OMVS has strengthened the relational and outcome dimensions according to the Four Frames of Cooperation Framework.

The Four Frames of Cooperation Framework assessment conducted on the MRC demonstrates limited advancement of equitable and sustainable transboundary cooperation and water diplomacy. This is perhaps unsurprising given the way in which the member states interact with the organization. Rather than promoting basin-wide ecological benefits, the agreements 'often promote state-centric environmental securitization' [45] (p. 238). Although the MRC has provided significant amounts of data and information, it has done little to address the disparities in capacity, financial interest and political positions of member states, which has led to different goals emerging for the regime [50]. This further reinforces that unless political will is ascertained and commitment to collective action reinforced through the institutional cooperation mechanism.

Despite incorporating technical and diplomatic representation into its structure alongside a seemingly good level of stakeholder engagement, some governments involved in the MRC prefer the organization to remain weak so that control over external funds and development remains the responsibility of the states themselves [35]. Furthermore, the organization is challenged by China—not only the regional hegemon but also the upstream country—and its lack of engagement in the MRC. China's absence makes consensus and mediation over potentially inflammatory decisions difficult to attain [41]. Joint fact-finding missions or joint monitoring lack important information from the upstream country. As a result, the mechanism provided does not necessarily lead to the sustainable and equitable

use of water as China has full control over the resource as the upstream country, leaving the RBO somewhat limited in its resource management.

In light of its institutional form not advancing equitable and sustainable transboundary water cooperation processes, it is perhaps unsurprising that the MRC does not have a particularly strong mandate for conflict prevention. Notwithstanding, Kittikhoun and Staubli [51] contend the potential for the MRC to engage in water diplomacy has developed since its establishment. Despite the challenges, the four riparian states who are signatories continue to support the organization, electing officials and engaging in the day-to-day operation of the organization. The organization has undergone a series of reforms and changes in strategy in recent years, suggesting that the previous failings or challenges have been recognized and that there is a renewed interest in cooperation between riparian countries.

Whilst RBOs can provide a starting point for broader peacebuilding, by offering the benefits of cooperation [52], there should be a direct and decisive effort to use RBOs for water diplomacy as the spillover between water cooperation and peacebuilding is not guaranteed. RBOs do not tend to have strong peace mandates despite stability and development often being highlighted in their establishing agreements. RBOs tend to be designed as tools for transboundary cooperation and, dependent on their composition, may not be effective mechanisms for water diplomacy. Furthermore, by engaging in water diplomacy where the prerequisite features are not evident, RBOs risk securitizing water.

To adapt to the stresses of climate change, the most recent (2015–2020) Integrated Development Plan [40] developed by the Secretariat of the TFCA prioritized the development of six wildlife dispersal areas, each with varying priorities based on the situational needs. All the development projects, however, have to be designed in compliance with the TFCA objectives as outlined in the KAZA-TFCA treaty and are administered, managed and developed under the auspices of the TFCA's Joint Management Committee. This institutional adaptability that the TFCA has been able to cultivate is constructive. Nonetheless, resilient systemic processes that advance positive peace through inclusion, legal robustness and political legitimacy still fall short. This can be seen in the poor manner in which human–wildlife conflict has been addressed through the TFCA as an institutional mechanism.

Across several of the wildlife dispersal areas human–wildlife conflict has been identified as a strategic area to address that also overlaps with water resources management. The stresses of climate change, population growth of human and wildlife populations, inappropriate land-use planning and conflicting sectoral policies have been identified as key drivers to human–wildlife conflict. This shows that the TFCA, as an institutional mechanism, has been effective in diagnosing shared concerns around transboundary waters. Yet in terms of effective institutional responses, the TFCA has been weak. With poor local-level planning integrated into regional wildlife management through the KAZA-TFCA, drivers to human–wildlife conflict become exacerbated. For water diplomacy to effectively continue to take place as a means of conflict prevention, value creation and context-specific management approaches need to be established that will prevent conflict related to water resources management and cooperation. This also shows that when considering transboundary water management and cooperation across the TFCA, it is important to ensure that institutional mechanisms are extended on through actionable project activities.

Being part of the KAZA-TFCA and SADC water mandate places ZAMCOM and OKACOM within a regional water framework that contributes to sustaining dialogue toward positive water cooperation. SADC has also helped to drive the direction of transboundary cooperation toward regional environmental security in the form of joint water management, peace and security initiatives, and efforts to combat drought and increase food supply and cooperation on infrastructural developments. In addition, SADC's Protocol on Shared Water Courses has created a vital institutional framework that has further supported the norm of cooperation on transboundary waters.

The institutional arrangements that established the KAZA TFCA demonstrate the potential for TFCAs to contribute to conflict prevention through the water diplomacy they enable across a multilateral platform. It is evident from the treaty that the riparian nations

had sufficiently aligned interests. Through engaging in shared resource management diplomatically as well as technically, the KAZA TFCA is a multilateral platform that allows for informal problem solving and consensus-seeking to take place. Subsequently, formal institutional mechanisms have been put in place to create more resilient transboundary cooperation processes. This has had a spillover effect on transboundary cooperation processes adopted regionally, thereby contributing to conflict prevention through sustaining peace in the form and function by which natural resources are managed. Despite the multiple actors involved in the governance of transboundary water cooperation in the KAZA TFCA, the institutional arrangements have enabled water cooperation and water diplomacy to complement one another.

The institutional design of the MEDRC model reinforces Track 1 and Track 1.5 engagement by ensuring state-level support is always present. MEDRC was explicitly set up against the backdrop of the peace process and therefore its primary mandate is one of supporting peace and stability, with water cooperation initiatives and opportunities coming second. This foundation for water diplomacy is cultivated through the core parties to conflict acting as co-equal partners and joint guarantors of the organization. Relational development as such enables conflict states to engage in dialogue around technology that stands to mutually benefit and advance reciprocity in communication and exchange. This relational dimension highlights the potential of third-party intergovernmental organizations to advance peacebuilding and conflict prevention measures. As much as its institutional set-up has enabled strong relational dimensions to evolve, its potential weaknesses lie in the legal dimensions of the model. With member states being able to withdraw at any point in time with a six-month written notice, MEDRC's legal dimension does not hold members accountable to financial or participatory commitments beyond what they volunteer. Whilst in practice this has not proven to be an issue to date, more robust financing commitments would enable better forward planning. Furthermore, the voluntary nature of participatory commitments risks MEDRC becoming a 'talking shop' or not reaching its full potential due to a lack of engagement from member states. This is both a strength and a weakness. On the one hand, MEDRC can be viewed as a resilient pipeline wherein a wide range of activities can be undertaken if that outside context allows including joint monitoring, dialogue, and data sharing. On the other, the context of the Middle East Peace Process makes this challenging as in the absence of a peace process, the level of activities relating to cooperation on the management of the water resource is heavily limited. Despite this, however, the MEDRC model has proven to be durable with it being the only fully operational organization remaining from the Working Group on Water from the Madrid Peace Process.

The MEDRC model's durability, despite the volatile political and security situation, can be attributed to a strong level of political support and a robust, clear mandate. As shown by the Four Frames of Cooperation Framework assessment, stakeholder representation is clear and at a high political level across the legal, institutional, and relational frames. This strength in relational commitment through MEDRC's organizational structure was achieved by using desalination as a uniting technology to provide the core parties with a reason to meet. The participation of a diplomatic official alongside a technical expert ensures that politics and diplomacy are central to the organization. Track 1 and Track 1.5 are engaged through trilateral dialogue programs and development cooperation capacity-building activities that complement each other. These activities are designed and implemented to ensure that civil servants at the deputy director level and above are continuously involved in programing. Focus issues such as climate change or transboundary cooperation models are selected through a needs assessment and joint gap analysis of the core parties that is undertaken on an annual basis. The fact that participation in the MEDRC model is voluntary and yet has been participated actively across by the core party states is telling of its success in advancing equitability. Its capacity to advance sustainability through directing trade-offs between social, environmental, and economic dimensions for shared goals to be met cannot be assessed and evaluated within the scope of this paper.

The institutional dimension of the MEDRC model is therefore constructive in advancing transboundary water cooperation between conflicting states through technical channels of participation that remain active even if political tensions result in a stop of relational engagement at the high political level. As a third-party entity engaged with its member states on a shared environmental issue, MEDRC bears low costs of sovereignty, which allows for disparities in representation to be addressed through resilient relational engagement between core states.

From assessing three institutional mechanisms according to the Four Frames of Cooperation Framework, it is highlighted that the institutional mechanisms typically used to facilitate or mediate transboundary water cooperation are limited in their ability to move beyond transboundary cooperation toward more sustainable positive peace processes through water diplomacy. To actively utilize water diplomacy in the service of conflict prevention, cooperative frameworks must move beyond the idea of cooperation as an end goal. Instead, cooperative frameworks should deliberately include activities where cooperation on water may spill over to equitable and sustainable water diplomacy to enable positive peacemaking efforts.

6. Conclusions

This paper advances a theoretical framework on transboundary water cooperation—the Four Frames of Cooperation Framework—into an operational space by assessing practical models for their institutional ability to enable equitable and sustainable transboundary water cooperation and water diplomacy. In assessing and evaluating three institutional mechanisms operating in transboundary water cooperation through four case studies, this work emphasizes that apolitical interventions at a technical or water resource management level are not satisfactory for conflict prevention. The assessment of the MRC demonstrates the shortcomings of this apolitical technical cooperation. Water diplomacy offers tools through which states can engage with one another to improve relations through mechanisms such as joint fact-finding, resilient diplomatic contact and dialogue, value creation and collaborative adaptive management. As a means of operationalizing water diplomacy constructively toward positive peace and conflict prevention in transboundary water contexts, multilateral platforms represent an ideal mechanism. Central to this, however, is the inclusion of the political/diplomatic dimension of Track 1 actors.

Diplomacy can be effectively harnessed within institutional settings at multi-track levels in order to facilitate different instruments of engagement for core parties and support states toward resilient multilateralism. At present, no established institution exists for global engagement on transboundary water issues that enables systemic and proactive water diplomacy. Interstate politics can threaten the potential for constructive cooperation and promote negative peace when disproportionate control of a watercourse is gained or an asymmetry around transboundary water is maintained. Diplomatic engagement alone is therefore not enough to advance resilient water diplomacy in transboundary waters toward positive peace. Extending on the theoretical dimensions of the Four Frames of Cooperation Framework the overlap between legal, institutional, relational and outcome dimensions in governance is highlighted by looking at operational models in the space. The extent to which these different institutional mechanisms have been able to facilitate equitable and sustainable processes and outcomes in transboundary water cooperation relies strongly on the robustness with which all these dimensions are enforced substantially and procedurally. This suggests that for transboundary water cooperation to advance equitable and sustainable principles, both resilient technical and political engagement must be maintained across the governance structures of institutional mechanisms operating in transboundary waters.

The diverse political, hydrological, and socio-economic nature of different transboundary basins favors differentiated approaches to cultivating resilience. Through assessing how institutional mechanisms stand to advance equitable and sustainable technical and diplomatic inter-state cooperation in transboundary waters, this paper contributes to exist-

ing gaps in the governance of hydropolitics and the advancement of suitable institutional mechanisms. There remains a great deal of scope for further assessment and evaluation of institutional mechanisms and how and to what extent they can be harnessed to advance constructive transboundary water cooperation and diplomacy. This paper is limited in being able to fully assess the case studies against the Four Frames of Cooperation Framework. The baseline and ideal questions require further non-anecdotal evidence to be gathered to be adequately assessed. Similarly, ranking trust and communication as it relates to the relational frame under 'standardized questions' moves beyond the scope of this paper. Further work needs to look beyond the 'current point in time' parameters of assessment through the Four Frames of Cooperation Framework, and more applied TFCAs and third-party IGO models such as the MEDRC model ought to be assessed.

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Appendix A

Table A1. Four Frames of Cooperation Framework Assessment.

	Definitions of Frames and Example Questions to Guide an Assessment
Legal	The legal frame views cooperation as formal legal elements, including the existence of a treaty or agreement, adherence to conventions, and inclusion of key substantive and procedural principles.
Baseline/Ideal Questions	• To resolve the problem identified, what procedural and substantive mechanisms should be included in the agreement? • Is a formal legal agreement needed? • What procedural and substantive mechanism(s) were included in the agreement at the baseline point in time? • What customary law elements, procedural or substantive mechanisms highlighted by the literature review are relevant to solving this problem? • Does the baseline agreement establish an institution?
Current Point in Time Questions	• Is there a formal or informal agreement between actors? • What procedural or substantive mechanisms are included in the agreement? • To what extent is the mechanism being complied with?
Standardized Questions	• Is there a dispute resolution mechanism? Allocation? Variability? • Is sharing equitable and reasonable? • Are benefits shared mutually? Sustainably?

Table A1. *Cont.*

	Definitions of Frames and Example Questions to Guide an Assessment
Legal	The legal frame views cooperation as formal legal elements, including the existence of a treaty or agreement, adherence to conventions, and inclusion of key substantive and procedural principles.
Institutional	The institutional frame includes formal institutions such as river basin organizations that support the development and implementation of joint basin planning and other activities that are needed to manage shared water resources. In addition, it captures the political nature of these institutions and the will of stakeholders to support their operation, function and scope.
Baseline/Ideal Questions	• At the baseline point in time, is there an institution? What are its functions? • In the ideal, is there an institution? What are its ideal functions? • What is the scope of financing for the institution? • What is the scope of the capacity of the actors and the institutions at the baseline or ideal? • In the baseline or ideal, how does the institution link with other governances or geographic scales? • Who is participating in the institution?
Current Point in Time Questions	• Is there an institution? • Are the procedures being followed? • Are decisions implemented? • What functions and role does the institution play? • What is the institutional design structure? • What is the sustainability and reliability of financing?
Standardized Questions	• What actors are involved and is it equitable? • Is there data and information sharing? • Is there joint planning and assessment programs? • Regular meetings? At multiple governance and geographic scales?
Relational	The relational frame includes the processes and relationships between all relevant stakeholders, including trust and shared understandings, while working transparently with communication to identify and pursue mutually beneficial outcomes.
Baseline/Ideal Questions	• Was there trust in the baseline? • How would trust manifest in the ideal? • What level is intra-state trust and communication between actors as well as inter-state? • What level of communication exists in the baseline/ideal? • Are there long-term positive relationships between actors in the baseline/ideal? • What actors are included in the process in baseline/ideal? • Is public consultation included in the baseline/ideal? • What is the level of transparency? • What is the level of political will? • How is benefit sharing equitable and mutual in baseline/ideal?
Current Point in Time Questions	• Who are the actors in the process? Are they all the relevant actors? • What is the level of trust between actors, within parties? • Is there a trusting relationship between actors? At multiple scales? Long-term? • Is there a shared understanding of the basin/aquifer? Of the problems? Of the benefits? • Are the interests of all actors included? Equitably?
Standardized Questions	• Rank the trust between each actor and as a whole, 1 to 5? • Rank the communication between each actor as a whole, between governance scales, 1 to 5?
Outcome	The outcome frame includes the benefits, goals, actions, or specific outputs of cooperation.
Baseline/Ideal Questions	Party Defined • What was the problem of interest in the baseline? What outcomes/benefits were decided on? • What benefits or outcomes would need to be achieved to reach the ideal? • What does the ideal look like in terms of outcomes for each actor?

Table A1. *Cont.*

	Definitions of Frames and Example Questions to Guide an Assessment
Legal	The legal frame views cooperation as formal legal elements, including the existence of a treaty or agreement, adherence to conventions, and inclusion of key substantive and procedural principles.
Current Point in Time Questions	Party Defined • What outcomes, results, benefits have been achieved? • What progress has been made in achieving the outcomes, benefits, results? • To what extent are the benefits achieved equitably distributed? • To what extent are they equitable?
Standardized Questions	• Are these outcomes defined to equitably increase social goals? Environmental goals? Economic goals? • If so, have these been redefined based on changes in the basin/aquifer, improved relationships, new information/data? • Is there a process for adaptation?

Note: Source [8] (p. 145). Adaptation by Dané Smith.

Table A2. Four Frames of Cooperation Framework Evaluation Sample. Goal attainment highlighted as the focus point of this paper.

Four Perspectives from which to Evaluate Assessment Results				
	Compliance	**Goal Attainment**	**Interest-Based**	**Problem Solving**
Legal	Are procedural and substantive mechanisms being complied with?	Are relevant mechanisms included in the agreement?	Are all actors' interests included? Are the benefits mutual and equitable?	N/A
Institutional	Are the procedural rules for the institutions being complied with?	Have policies and decisions been implemented? Have behaviors changed at the relevant governance scale?	N/A	N/A
Relational	N/A	Was the process equitable? Have trust, communication and relationships developed/improved/been maintained?	Were all the interests of the actors included and/or addressed in the process? Were all relevant actors included in the process?	N/A
Outcome	N/A	Were the outcomes identified by the actors achieved? Were relevant outcomes towards economic, environmental and social goals achieved?	N/A	Was the problem(s) that spurred the cooperation process resolved?

Note: Source [8] (p. 239). Adaptation by Dané Smith.

Table A3. Contents.

Table A3. *Cont.*

Table A4. Abbreviations.

IGO	Intergovernmental Organization
KAZA-TFCA	Kavango-Zambezi Transfrontier Conservation Area
MEDRC	Middle East Desalination Research Center
MRC	Mekong River Commission
OMVS	The Senegal River Basin Development Organization
OKACOM	The Permanent Okavango River Basin Water Commission
RBO	River Basin Organization
SADC	Southern African Development Community
TFCA	Transfrontier Conservation Area
ZAMCOM	The Zambezi Watercourse Commission

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