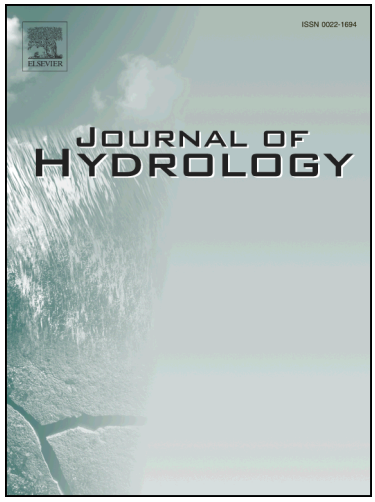

Editorial

Water Diplomacy: The Intersect of Science, Policy and Practice

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Abstract

Why water diplomacy? What does *diplomacy* have to do with water? Is cooperation over transboundary surface and ground waters the exclusive domain of diplomats and foreign policy experts? Or mainly the purview of water professionals negotiating agreements on shared water resources? Why should non-governmental stakeholders be involved in transboundary water dialogues? These questions lie at the heart of debates and dialogues around the theory and practice of *water diplomacy*.

The main aim of this Special Issue is to elaborate the intersect of science, policy, and practice and discuss ways knowledge can be distributed more equally and bridged across these spheres. In this editorial article, we summarize key messages on water diplomacy brought forward by authors in this Special Issue. We have identified the trends below as a possible future direction on water diplomacy research as well as issues that need to be addressed in

the policy debate. One of the overarching themes is how to ensure that available technical knowledge informs the political tracks of water diplomacy and how to build trust effectively to ensure sustainability of water cooperation processes.

I. Introduction

This Special Issue of the Journal of Hydrology introduces water diplomacy as a multi-disciplinary concept that draws on technical, political, and socio-economic knowledge; located at the intersect of science, policy, and practice, and including both state and non-state actors. Contributing authors were selected from a call for abstracts on the following themes: The Approaches, Methods and Tools of Water Diplomacy; The Governance Architecture of Water Diplomacy; Gender and Water Diplomacy; Water Diplomacy and Regional Cooperation; Water Diplomacy: Building Security and Peace; and Water Diplomacy and Conflict Management. In selecting articles for inclusion, the editors also prioritized innovative approaches to water diplomacy and involvement of in-country-based authors.

This Special Issue presents a set of articles representing different perspectives and approaches to addressing challenges and opportunities related to the management of shared water resources from researchers, foreign policy practitioners, thought leaders, and development practitioners. Through the collected articles, diverse entry points are identified aiming to leverage cooperation over shared freshwater resources to contribute to stability, community resilience, conflict transformation, peacebuilding and regional cooperation. Brought together, the assembled articles aim to facilitate knowledge and experience sharing across various water diplomacy[1] fields and basins and strengthen linkages between technical aspects of water cooperation and policy-oriented diplomatic efforts. Ensuring knowledge shared around

[1] *Water diplomacy* is also referred to as *hydrodiplomacy* (Vlachos, 1996; Wolf, 1999) or *blue diplomacy* (Geneva Water Hub, 2017; Salman, 2015).

the approach and toolkit of water diplomacy is essential to activate coordinated action when ripe opportunities for water cooperation arise.

Water diplomacy is an approach that enables a variety of stakeholders to assess ways to contribute to finding solutions for joint management of shared freshwater resources. It is a dynamic process that seeks to develop reasonable, sustainable and peaceful solutions to water management while promoting or informing cooperation and collaboration among riparian stakeholders. One of the prime tools of water diplomacy is dialogue facilitation and finding innovative ways to build trust and strengthen cooperation among stakeholders. This is not limited only to government stakeholders. Indeed, non-state actors and sub-basin processes also play important roles in water diplomacy as demonstrated in a number of the articles included in this Special Issue. Molnar et al. (2017) present a comprehensive overview of how water diplomacy and water cooperation are defined by different actors. They note that there is not a universally accepted definition of water diplomacy and the term is often used interchangeably with water cooperation (Molnar et al., 2017:7).

Building upon these arguments, we see water diplomacy as a process leading towards establishing and/or enhancing cooperation over shared freshwater resources among wide range of actors at multiple levels; formal and informal, intra and inter-state. In our interpretations of the term, water diplomacy is informed by technical tracks as it relies on its data. Across all contributions to the Special Issue, consensus emerged around the need to identify and enhance well-functioning linkages between the technical track tools and approaches, and the diplomatic tools to facilitate and enhance dialogue among riparian stakeholders.

How do we describe synergy between the technical and social science knowledge that can address incompatibilities and erode barriers over shared freshwater resources? Contextualizing data from technical, development, and foreign policy fields – water diplomacy leverages this knowledge to inform foreign policy decisions on shared international waters. In the absence of strong linkages between technical experts and policy makers, foreign policy/national security priorities inevitably prevail. This dynamic remains one of the ongoing challenges and fundamental intersects of the field; how to ensure that scientific evidence informs foreign policy decision-making on shared water resources and how to ensure that informal and experience from technical and political tracks are shared effectively and can inform overall strategies to achieve sustainable cooperation over shared water resources.

The remainder of this editorial elaborates on *why* there is increased urgency to find new approaches to make water diplomacy work effectively in today's polarized world with the subsequent section discussing *how* to put water diplomacy in action.

II. Why water diplomacy now

Growing water scarcity and climate change effects are having global impacts now. Many of the most affected regions are also, in parallel, impacted by political tensions, armed violence, and internal water mismanagement. Effective and sustainable solutions will require the strengthening of synergies across and between actors and sectors; foremost the political and technical tracks of transboundary water management.

In 2001, Kofi Annan, then UN Secretary General, ventured that competition over freshwater resources can become a source of future wars, adding an ensuing statement a year later that

shared water issues can also become a catalyst for cooperation.[2] Following the escalation of armed conflicts in Syria and parts of Iraq in 2011 and 2014, attention was also focused on whether the armed conflicts were triggered by the effects of a climate change (Gleick 2014; Selby 2018) and foremost inadequate access to water resources and internal mismanagement. While there is little scientific evidence that the armed conflicts in Syria and parts of Iraq were caused by the 2006-2011 drought in the region (Jägerskog, 2016) the Syrian crisis triggered a renewed interest among the general public in future *water wars* in the context of increasing effects of climate change.

Growing populations, expanding economies, mounting environmental pressures, and unsustainable consumption practices are exerting increasing strain on the world's shared water resources. While the planet's total population quadrupled over the past 100 years, global water use swelled almost *eightfold* from 1900 to 2010 (Wada et al. 2016). These effects are already seen in many major transboundary basins – including the Amu Darya, Colorado, Ganges, Indus, Lake Chad, Nile, and Tigris-Euphrates – where in each basin yearly water withdrawals nearly equal or exceed long-term flow balances and ecosystem needs, resulting in severe water stress.

Currently, 1.4 billion people live in rivers facing *basin closure*, meaning that under prevailing management practices, water commitments to agricultural, industrial, domestic, and environmental needs cannot be met during all or part of the year (Falkenmark and Molden 2008; Smakhtin 2008). Groundwater increasingly faces the same pressures as surface supplies. Abstractions have ballooned in recent decades as underground sources have come to provide half of the irrigation water for growing the world's food supply, and now account

[2] "Fierce competition for fresh *water* may well become a source of *conflict* and *wars* in the future," (Kofi Annan, speech, 97th Meeting of the Association of American Geographers).

for one third of total global water use. Withdrawals are well beyond sustainable levels in many major transboundary aquifers with abstraction surpassing natural rates of replenishment, progressively exhausting groundwater reserves (Famiglietti, 2014).

Stress on world water resources will continue to intensify in the near future. Global population projections predict the Earth will add 2.2 billion inhabitants by 2050, reaching 9.7 billion people (UN DESA 2017). The global Gross Domestic Product (GDP) is anticipated to grow some 2,6% per year through mid-century (PwC, 2017). Global water demand will climb in tandem with population and economic development. The Organisation for Economic Cooperation and Development (OECD) expects world water use will jump 55% by 2050, driven by a 400% surge in demand from manufacturing, a 140% rise in withdrawals for electricity production, and a 130% increase in domestic needs. According to these projections, 3.9 billion people – 40% of the global population – will then reside in basins experiencing severe water stress, including nearly all of Central and South Asia, the Middle East, North Africa and much of China (OECD, 2012).

The architects and champions of the Sustainable Development Goals (SDGs) understood the urgent and multidimensional roles of water in the social and economic wellbeing of a society when they crafted SDG Goal 6 on water and sanitation. The dedicated Goal 6 puts priority not solely on drinking water, sanitation, and hygiene but also on the quality and sustainable governance of global water resources. Equitable access and sustainable management of freshwater resources is in fact foundational to the entire SDG agenda with direct implications on food security, health and wellbeing, education, gender equality, affordable and clean energy, poverty reduction, sustainable cities and communities, and peace, justice and strong institutions. Transboundary waters are specifically highlighted by Target 6.5 of SDG Goal 6 which commits all UN member states by 2030 to ‘implement integrated water resource

management at all levels, including through transboundary cooperation as appropriate' (UN, 2015).

Water Diplomacy Actors

Adopting a broader definition of water diplomacy, inclusive of both inter and intra-state interactions requires engagement and inclusion of a wide array of stakeholders within water diplomacy processes to achieve and maintain effective water cooperation. The actors involved in multi-track water diplomacy can comprise various groups of state and non-state actors. Formal actors, which mainly encompass Ministry of Foreign Affairs, water line ministry, and other ministries and government agencies according to the specific context of interest are often the most visible. Informal or non-state actors also have an important role in water diplomacy dialogues as representatives of civil organisations, academia and think tanks, media, and faith based traditions and can likewise contribute to enhancing opportunities to build relations and contribute to shared knowledge on common water resources. External actors, such as multilateral development agencies and bilateral development partners, United Nations agencies and other international organisations, regional organisations, and development banks also play significant roles in contributing to creating an enabling environment for water diplomacy.

Creating space for the engagement of a broad cross-section of stakeholders in water diplomacy processes provides numerous benefits to the diplomacy process. As trust is a key component to water diplomacy, non-state actors have an important role in contributing to improved dialogue among riparian countries by clarifying misunderstandings and acknowledging ambiguities and uncertainties – information, action, and perception – pertaining to water management decisions (Susskind and Islam, 2012). Nationally, a higher participation of both state and non-state stakeholders in water diplomacy processes also

increases political buy-in, as well as data and information sharing (Namara and Giordano, 2017). Non-state actors can also provide social, political, financial and technical contributions that might not otherwise be accessed (Alam, 2002; Schiff and Winters, 2002).

Grech-Madin et al. (2018) argue in this Special Issue that there is a value in focusing on each level of actors and associated dynamics in detail as opposed to considering all water diplomacy stakeholders part of one uniform multi-stakeholder category. This implies that focus needs to be had on how these different stakeholder categories are linked and what enables or prevents their effective cooperation and contributions to water diplomacy processes (Klimes and Yaari, 2019). Many challenges remain; foremostly how to improve communication and collaboration between stakeholders from different sectors, with demonstratively different mandates and priorities. To improve synergies across different sectors, knowledge needs to be distributed more effectively – knowledge about water cooperation to foreign policy decision-makers and knowledge about foreign policy making to technical experts (Pohl and Swain, 2017).

III. Putting Water Diplomacy into Action

The concept of *water diplomacy* is defined in the previous section and presented together with the arguments elaborating why the time is ripe for advancing discussion on how to operationalize water diplomacy processes by strengthening linkages between science, policy, and practice. This section summarizes key messages from the Special Issue articles elevating different approaches and experiences of water diplomacy in action. The main arguments and key messages are grouped into the following subsections – Water Diplomacy and Governance; Water Diplomacy and Regional Cooperation; Water Diplomacy and Conflict Resolution; and Water Diplomacy and Participatory Approaches.

Water Diplomacy and Governance

All water management navigates multiple objectives and competing interests. The interconnected nature of the hydrological cycle entails that one user's withdrawals from, or discharges into, a shared water source can impact the quantity or quality of resources available to others. As such, water governance inherently raises *collective action* challenges.

Collective action dilemmas arise when agents in interdependent systems choose actions independently, rationally pursuing their own interests but imposing externalities on other participants and realizing lower joint utility than mutually beneficial outcomes that could have been achieved (Ostrom, 2010). One riparian's decision to build a hydropower plant, for example, generates electricity for itself but may alter river flows for irrigation-dependent farmers downstream and block migratory fish from reaching communities upstream. In the domestic sphere, national governments or other central authorities are often available and empowered to administer decision-making, adjudicate trade-offs, and enforce agreements among water claimants. International water law contains key principles enacted to govern transboundary waters. However, to date there are few precedents of leveraging legal recourse against violators at the international level.

Many analysts of international relations have long held that states create international organizations precisely to help surmount collective action problems (Axelrod and Keohane 1985; Abbott and Snidal 1998; Martin and Simmons 2012). International organizations, such as basin committees, commissions or authorities, can facilitate cooperation by providing an accepted forum for negotiating and implementing agreements. They also typically enable country partners to establish procedures for joint decision-making, monitor joint engagements, facilitate dispute resolution; foster knowledge exchange, establish norms and expectations; and diminish perceived risks to cooperation by reducing uncertainties and

information asymmetries between participants. Indeed, historical analyses find that the presence of international agreements among riparians notably reduces conflict over water in shared basins and promotes peaceful resolution where conflicts do occur (Yoffe et al. 2003; Wolf 2007; Mitchell and Zawahri 2015).

In this Special Issue, Shubber and Schmeier (2018) delve beyond questions of *whether* the formation of international organizations in transboundary basins can advance cooperation, to investigate more specifically *how* they influence riparians' conduct. Transboundary water cooperation may take different institutional forms. States entering into international water agreements often fashion formal River Basin Organizations (RBOs) to implement their accord and furnish an institutionalized framework for long-term cooperation. Shubber and Schmeier characterize RBOs as providing institutional anchors for collaboration, embodying agreed platforms for regular engagement between member states according to defined rules. In this capacity, RBOs can play crucial roles in conflict resolution, data collection and analysis, and managing processes such as prior notification or impact assessment, making institutions and their staff important actors in water diplomacy.

Not only do RBOs represent actors and arenas of negotiation and exchange, Shubber and Schmeier argue, but they are themselves products of water diplomacy. Deliberations between riparian states forge their specific structures, mandates, and procedures, thereby endowing them with their particular legal standing, objectives, and capacities. An RBO's legal and institutional characteristics then substantially shape its cooperative effectiveness, vesting it with certain capabilities in given areas while potentially constraining it in others. The Nile Basin Initiative (NBI), the authors note, was founded as a transitional body pending agreement on a comprehensive international organization. This *de jure* provisional status permitted important technical cooperation to go forward. But the temporary status markedly compromises the NBI's ability to engage with other organizations, states, and development

partners and banks, which cannot enter binding agreements with such an interim entity. Similarly, the treaties constituting the International Boundary and Water Commission between the US and Mexico assign it no explicit responsibilities regarding groundwater, engendering long-standing debates among stakeholders that have hampered the Commission's efforts to address this increasingly pressing issue (Shubber and Schmeier).

Empirical studies of transboundary water treaties demonstrate that many international arrangements exhibit such shortcomings. Many contain legal ambiguities. Many omit relevant riparians. Many lack key mechanisms such as defined procedures for dispute resolution or data sharing. Few establish appropriate entry points for stakeholder input such as multi-stakeholder platforms. None (to our knowledge) establish mechanisms to promote and ensure gender equality in decision-making fora. Most are limited to water allocation concerns while few tackle critical questions such as groundwater and water quality (Giordano et al., 2014). And finally, most transboundary water agreements do not specifically establish an RBO at all (Schmeier et al., 2016).

To be sure, many treaties, or other types of basin instruments (conventions, covenants, declarations, exchange of notes, protocols, or memorandum of understandings), are intentionally crafted to focus on narrower management problems or specific development projects. Likewise, many basin instruments were concluded before emerging threats like climate change were widely recognized. Yet mounting pressures on the world's shared freshwater resources will increasingly demand collaborative solutions to meet collective action dilemmas. Shubber and Schmeier make clear that analysts and practitioners must pay greater attention to the formation and evolution of RBOs as institutional vehicles for water cooperation, recognizing that early choices of design and mandate can significantly channel future cooperative possibilities. The continuing challenge for water diplomacy consists in aptly applying existing governance mechanisms where they are already available, appropriately

augmenting and adapting cooperative tools to new issues where possible and helping to advance and extend cooperative approaches to transboundary basins where they are absent.

Relatedly, SDG Target 6.5 requires that riparian countries cooperate to jointly manage water in efficient, equitable, and sustainable ways. To evaluate global progress, the United Nations formulated SDG Indicator 6.5.2, measuring the "Proportion of basin area with an operational arrangement for water cooperation" (UN, 2018). United Nations Educational, Scientific and Cultural Organization's International Hydrological Programme and the United Nations Economic Commission for Europe's (UNECE) Water Convention Secretariat were appointed custodian agencies for SDG Indicator 6.5.2, charged with assembling and verifying country reported data and developing regional and global data aggregates. The methodology formulated by these two agencies defines an 'operational cooperative arrangement' with four criteria. The arrangement must possess a joint body, commission, or mechanism (e.g., an RBO) for cooperation. It must hold formal meetings at the political or technical level at least annually. Joint or coordinated management plans or objectives must have been set. And regular data and information exchange must occur yearly, if not more frequently.

In this Special Issue, Melissa McCracken and Chloé Meyer (2018) examine how the particular methodology created to assess SDG Indicator 6.5.2 impacts how different types of transboundary cooperation are assessed and how they will evolve to meet the SDG Target 6.5. McCraken and Meyer present results of a simulation of the calculation of SDG Indicator 6.5.2 in two overview analyses - a global overview analysis and a national overview analysis of three case studies (Bangladesh, Honduras, and Uganda) that illustrate the high variability in the occurrence of operational cooperation across the globe, with countries in Europe and Africa meeting more of the criteria for operationality (2018).

McCraken and Meyer find the SDG Indicator 6.5.2 methodology offers significant advantages in that it is simple to calculate and yields a single value, readily comprehensible and comparable across countries. By emphasizing rules and procedures, the Indicator encourages states to develop the requisite institutional capacities for cooperation. Yet the requirement that collaborative arrangements meet all four "operational" criteria to fulfil the indicator may fail to capture substantial cooperation. By this measure, the 1996 Ganges Treaty between Bangladesh and India, for example, would not meet the threshold for an 'operational cooperative arrangement' because that accord does not require joint management plans. By the same token, tallying cooperation by basin area coverage at the country level may overweight the importance of large basins within individual states. The SDG framework necessitates national indicators, but the country-level focus contradicts the increasing global push toward integrated basin-scale management and may mask gaps in basin-level cooperation where arrangements include some, but not all, riparians. Indeed, effective collaboration can take myriad forms. Some partial agreements may significantly improve water security, while other accords deliver little tangible benefit (Tarlock, 2015).

With these caveats in mind, McCracken and Meyer suggest disaggregating the indicator to construct an index reporting separately on each of the four operational criteria. The indicator could likewise be refined to reflect specific issue areas, such as allocation mechanisms and environmental protections, and subnational scales. Such disaggregation would help elucidate the content and quality of cooperation, rather than simply register its presence. Given the importance of political will for generating and sustaining collaboration, the capacity to identify areas of partial or developing cooperation is essential to recognizing and encouraging further progress.

While SDG Indicator 6.5.2 tracks the existence and extent of collaborative arrangements on transboundary waters, another international initiative, undertaken by the parties to the 1992

UNECE Water Convention, has sought to synthesize organizational and operational tenets in the service of its member states who are obliged to create or strengthen regional basin organizations. The *Principles for Effective Joint Bodies*, adopted by the Meeting of the Parties to the UNECE Convention in 2015, set forth a non-binding framework for the establishment, structure, functioning, and financing of international institutions for riparian cooperation. In this Special Issue, Honkonen and Lipponen (2018) analyse Finland's transboundary arrangements with Norway, Russia, and Sweden in light of the UNECE's *Principles*, illuminating how their practical realization advances water diplomacy and can enhance broader regional cooperation.

Honkonen and Lipponen find that Finland maintains bilateral water agreements covering the transboundary basins shared with each of its neighbours and participates in the Frontier Water Commission with Norway, the Joint Finnish-Russian Commission, and the Finnish-Swedish Transboundary River Commission. Setting these bodies within the UNECE framework, Honkonen and Lipponen show how their adhesion to the *Principles* has facilitated effective water diplomacy and contributed to more extensive cooperation. Thus, they argue, the broad institutional mandates and inclusive representational structures of the Commissions have allowed the participating states to engage new stakeholders and expand collaboration to new issues over time. The Finnish-Norwegian Commission, for example, working closely with local authorities, has widened its cooperative scope to encompass building regulations and municipal planning, while the participation of energy companies in the Finnish-Russian Commission has enabled it to integrate a nexus perspective and address joint hydropower issues absent from the original water agreement.

By the same token, Honkonen and Lipponen aptly note that Finland's water diplomacy is embedded within its larger regional relations. As members of the European Union, for instance, both Finland and Sweden – and Norway to a lesser degree as a non-member – are

bound by the EU Water Framework Directive (WFD). Because the WFD enforces policy coordination among EU countries, the fact that neither Nordic Commission may issue legally binding decisions nor possesses strong dispute resolution mechanisms does not hinder cooperation. Many observers of transboundary water diplomacy maintain that successful interaction over shared waters can help pave the way for greater international cooperation in other areas *beyond the river* (Sadoff and Grey 2002; Ide and Detges; 2018). Honkonen and Lipponen's study helpfully reminds that the reverse may also hold - the bonds of regional collaboration in non-water realms can facilitate improvements in regional water cooperation.

Water Diplomacy and Regional Cooperation

The embedded linkages between water management and regional cooperation has prompted discussion on how water diplomacy can contribute to or even drive regional cooperation and integration. Although both terms are often used interchangeably, regional integration is understood to require a higher degree of institutional harmonization and cooperation than regional cooperation. Muller et al. (2015) looks at the two main theoretical approaches to regional integration that stem from either political or economic perspectives. The development of *new regionalism* has broadened the discussion regarding the basis of a *region*, i.e. territory versus network, state versus non-state, and its implications on the necessary institutional framework to support such regional integration. In the context of water management, there has also been a shift of looking at regional integration as a product of security concerns (Buzan, 1991and Buzan et al. 1998) to desecuritization (Turton 2003; Ashton and Turton, 2006), in which the interdependency of riparian countries is a key national interest and driver of cooperation.

One of the key challenges of establishing transboundary water cooperation is the predominate focus on the issue of water allocation, which essentially confines the benefits of water resources and services to water volume as a largely fixed (stock) resource. This approach fundamentally treats water as a zero-sum game, in which gains (or losses) for some parties must result in losses (or gains) for others; thus, water becomes a source, or potential source, of a conflict. Regional cooperation on transboundary water offers a shift beyond the zero-sum game approach to positive-sum outcomes.

In practice, regional cooperation is highly related to the concept of benefit sharing and issue-linkage. The benefit sharing approach proposes that negotiations should be based around the benefits derived from the water, rather than the water itself (Sadoff and Grey, 2002; Schiff and Winter, 2002; Phillips et al., 2006; Namara and Giordano, 2017). Phillips et al. (2006) also underscore that benefit sharing and equitable allocation are in fact complementary approaches (two sides of a coin), in which riparian countries attempt to arrive at a fair and just allocation of shared water resources and the benefits arising from these water uses. Issue-linkage occurs when an upstream-downstream issue is linked to another issue where the downstream state is in control and the upstream state is the party making a request (Le Marquand 1977; Golub 1996; Mostert, 2005). When issue-linkage takes place it can allow riparians to identify common ground to advance shared interests and the benefit sharing process can start to emerge (Philiips et al., 2006). Linking-issues also opens up value-creating opportunities to water diplomacy (Susskind and Islam, 2012).

Regional cooperation as an approach to water diplomacy conveys the main benefits of expanding the solution spaces for cooperation, inspires behavioural and institutional changes or significant shifts in riparian perspectives, thus enabling water diplomacy reframing. Three articles in this Special Issue illustrate those developments by discussing how regional

cooperation frameworks have evolved in different basin cases, i.e. Brahmaputra basin (Barua, 2018), the Caspian Sea (Akhmadiyeva and Abdullaev, 2018), and the Eastern Nile (Al-Saidi and Hefny, 2018). The contributing article authors discuss in detail the intersection of regional cooperation and water diplomacy and identify potential next steps to further enhance sustainable water cooperation.

By leveraging the benefit sharing concept, regional cooperation frameworks can generate water diplomacy transformations by reducing the role of the location of the water resources in deterring the creation and capture of benefits from water cooperation. Thereby it reduces the likelihood of the initial upstream/downstream blockage in the negotiation and provides opportunities to identify more optimal management options that can bring about greater benefits to the region (Namara and Giordano, 2017). In line with this view, Al-Saidi and Hefny (2018) advocate regional cooperation around the water, energy and food (WEF) nexus and promotes an understanding of a river basin as a resource basin, rather than merely a water basin. Al-Saidi and Hefny find that the three priority WEF nexus issues, i.e. trade, technical cooperation and agricultural technologies, are cross-sectoral and less directly connected with the river flow, in addition to being relatively low cost, politically feasible, and able to elevate the common challenge of climate change resilience. These three issues are identified as low-hanging fruit in transboundary cooperation in the Nile, which can help build trust, showcase cooperation benefits, and may indirectly foster regional integration. Al-Saidi and Hefny's findings demonstrate the potential of a hydro-supportive approach in providing a broader understanding of a river basin through a resource basin perspective.

Another key water diplomacy transformation brought by a regional cooperation framework is a higher participation of stakeholders beyond those traditionally involved in water diplomacy

and thus it broadens cooperation opportunities through the framework of multi-track water diplomacy.

Barua (2018) elucidates how the Brahmaputra Dialogue (BD) as an example of a multi-track water diplomacy framework can provide an innovative way to support and overcome the obstacles of Track 1 water diplomacy in a basin characterized by a unilateral approach of some riparian countries, non-existence of a transboundary water institutional mechanism, and the lack of and restricted public access to data and information, has created a trust deficit within and among riparian countries. The BD as a neutral platform for state and non-state actors provides a space for effective science-policy-society intersections and interactions. Over the four year period that the BD has evolved from initially serving as a bilateral Track 3 people-to-people water diplomacy process between India and Bangladesh (phase 1, 2013-2014), to a multilateral Track 3 and Track 2 process including the engagement of China and Bhutan (phase 2, 2014-2015), and finally adding Track 1,5 in phase 3 (2015-2017) to generate political willingness for a sustainable transboundary cooperation. The inclusion of a broader collection of stakeholders in the BD has built trust and confidence through increased transparency, and reduced misperceptions within and across riparian countries. The BD platform also facilitates capacity building for non-state actors, especially women and minority groups who are often marginalized from formal decision-making process on transboundary water management (Earle and Bazilli, 2013). Most importantly, the BD helps riparian countries to identify the drivers and incentives of cooperation for each country in order to jointly build a shared vision of cooperation.

Due to the geopolitical dynamics and underlying paradigm of society's relationships with water, the existence of institutional arrangement of regional cooperation does not necessarily lend itself to sustainable transboundary water management. Using the concept of the

hydrosocial cycle, Akhmadiyeva and Abdullaev (2018) review the effectiveness of regional cooperation by looking at the paradigm shifts in water management in the Caspian Sea and tracking the development of water management as represented by the changes in socioeconomic, technical, and environmental indicators during five historical periods, from the pre-modern water management until independent littoral states. The complementary institutional analysis of regional cooperation through an assessment of international agreements and protocols between littoral states sheds light on whether they have positive changes to the environment. The authors maintain that the water management trajectory in Caspian Sea still follows a trend described by Allan (2005) and that the littoral states are still in the hydraulic mission period, in which water is seen as a commodity resource for mainly economic goals. Although the littoral states have begun to move towards a more reflexive water management approach through the acceptance of the Tehran Convention and Protocols, the lack of effective regional cooperation in Caspian Sea has led to environmental degradation. To further advance the reflexive water management paradigm, Akhmadiyeva and Abdullaev propose an integrated technical system and a common natural resources management in the form of various platforms and local institutions.

The third key transformation that a regional cooperation framework brings to water diplomacy is the provision of more options for institutional arrangements, tools, and methods to support water cooperation within or beyond the watershed framework. As the emerging issues for transboundary cooperation in the Eastern Nile basin require common cooperative framework, Al-Saidi and Hefny (2018) explore options of existing and new institutional arrangements to incorporate these issues, such as the potential of the Intergovernmental Authority on Development (IGAD); development of a new community; or reform of a hydrocentric organization such as the Nile Basin Initiative (NBI) to effectively incorporate new issues. The choice of institutional arrangement will ultimately be affected by geopolitical

factors and trade-offs, and the chosen institution can lead to more resilient and deeper regional integration over time. Emerging issues also need to be incorporated at different phases of the cooperation and as such the cooperation agenda should be regularly revised to accommodate rising issues and changing contexts of the region.

The development of water cooperation as discussed by Al-Saidi and Hefny (2018), Barua (2018) and Akhmadiyeva and Abdullaev (2018) in basins characterized by different levels of trust, data sharing, common priority issues, cooperation levels, and institutional arrangements, demonstrates that the regional cooperation framework supports water diplomacy transformations. The inclusion of a broader selection of actors as part of multi-track water diplomacy exemplifies the opportunities to better realize strategies of benefit sharing and issue-linkages across water uses and stakeholders. The generation of more options for such institutional arrangements will enable long term success of transboundary water cooperation. The contributing authors also demonstrate that institutional arrangements that strengthen the political will for effective transboundary water cooperation need to be constantly updated, reformed, or even expanded to keep in step with geopolitical, economic, social and environmental changes.

Water Diplomacy and Conflict Resolution

The editors received a relatively small number of abstracts on the sub-theme *Building Security and Peace* and there is no article in the Special Issue specifically addressing the issue of water and security. Yet increasing water scarcity in regions affected by armed violence and political instability as well as poor internal management of water resources has direct impacts on the stability of affected countries and regions. This often creates a need and increased urgency for water diplomacy.

The United Nations defines water security as:

> the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability (UN Water, 2013: 1).

If people lack secure access to sufficient supplies of safe water, the consequences can be dire. Two-fifths of the world's entire labour force work in heavily water-dependent sectors such as agriculture, mining, and fisheries (UN Water, 2016). Rising water insecurity endangers these livelihoods and the economies they support. Together, inadequate water supplies and sanitation annually cost sub-Saharan African nations over 4 percent of GDP in health-related damages and lost economic production (WHO, 2012). Climate change will make matters significantly worse. Without substantial policy changes to adapt to climate change, water scarcity impacts are expected to depress GDP growth by 6-14% across much of Africa, Asia, and the Middle East by 2050 (World Bank, 2016).

Given the stakes of water insecurity, users could well be expected to vigorously protect their access to critical water supplies. Where neighbouring countries and communities rely on the same waters, many observers fear that impending shortfalls between rising demand and shifting supplies could foster heightened competition or open conflict as vulnerable nations scramble to secure crucial resources. Policymakers, pundits, and the press regularly proclaim that water has become the *new oil*, and worry over looming *water wars* (Barnaby, 2009; Chellaney, 2013; Engelke and Sticklor, 2015). In fact, no modern states have ever declared war over water. On the contrary, nations dependent on shared waters have collaborated far more

frequently than they have clashed over common resources (Wolf, 2007). Even so, history has seen several transboundary water conflicts, including armed hostilities, territorial invasions, and massive bombings (Yoffe et al. 2003; De Stefano et al. 2009).

Beyond inter-state frictions, a number of potentially combustible water disputes involve non-state actors such as insurgencies and rebel groups. One of the renown contemporary cases was the Islamic State militants/Daesh's brief conquest of Iraq's largest dam, the Mosul Dam, in August 2014 which significantly raised the risk for the millions of people who could be killed or displaced by even a partial dam breach (Annunziato et al.; 2016). In Myanmar the military regime launched multiple mega-dam projects in restive ethnic areas, pressing thousands into forced labour or forced relocations. Ethnic separatist forces have battled government troops for control of construction sites, seeking to block projects seen as dispossessing local populations and expropriating their water resources (Suhardiman et al.; 2017). Destabilizing water conflicts can also erupt among local users. In northern Nigeria, changing rainfall patterns have pushed migratory herders ever farther south in search of pasture, encroaching onto the lands of sedentary farmers. As crowding around wells and riverbanks has intensified, violent clashes sometimes overwhelm the arrangements that traditionally managed access to water and arable lands (International Crisis Group, 2017). Tensions surrounding water resources availability, access, and development – especially when aggravated or oriented along ethnic, religious, or other social or cultural fault lines – can stir grievances that may animate civil strife or fuel regional instability (Conca, 2012; Sadoff et al., 2017).

Research seeking to discern causal relationships between water stress and conflict has delivered mixed results. Some statistical analyses suggest that water scarcity can increase the likelihood of violent interactions between riparian states – without reaching the level of open warfare. Other investigations find that water scarcity and extreme variations in rainfall raise

the risks of civil conflict within states. Still other evaluations report weak or no correlation between changing water availability and violent confrontations. Even the most exacting of these quantitative studies confront data challenges and methodological questions that render it difficult to draw more general conclusions from the lack of consensus (Bernauer et al., 2012; Link et al., 2016).

Few analysts argue outright that resource scarcity or environmental change directly cause conflict. Rather, a range of indirect factors – political institutions, economic conditions, and social perceptions – mediate between environmental strains and conflict risks. The effects of water stress interact with contextual elements such as regional power asymmetries, ineffective governance, economic and social inequalities to create contingent combinations of circumstances that may catalyse disputes (Petersen-Perlman et al., 2018). Strain on shared resources may stimulate water *security dilemmas* (Jervis, 1978). Measures taken by one country to uphold its water security – constructing a dam to increase water storage capacity, for instance – may undermine the water security of others by disrupting the water supplies available to them (Wolf et al., 2003; Munia et al., 2016). Likewise, inequitable allocation of the costs and benefits of water development and inadequate access to decision-making procedures around shared waters often loom larger in generating conflict than unequal allocation or inadequate access to the physical resource itself. This discussion should be further contextualized by research which suggests that, in certain circumstances, cooperation to manage shared water resources can help foster and strengthen peaceful relations between riparian states, and contribute to peacebuilding, reconciliation, and recovery in post-conflict societies (Weinthal et al., 2013; Ide and Detges, 2018).

As stresses on the world's freshwater grow, policymakers have increasingly recognized the potential threats to peace and prosperity posed by water insecurity (Office of the Director of

National Intelligence 2012, Worldwide Threat Assessment of the U.S. Intelligence Community 2019, UN Security Council 2016 and 2017[3], Council of the European Union 2018, World Economic Forum 2019). Managing these threats entails both conflict risks and cooperative opportunities.

Ample research demonstrates that collaborative governance arrangements, embodied in international agreements and institutions, help enhance transboundary basins' resilience to environmental and socio-economic pressures and reduce their vulnerability to hydro-political tensions (Wolf, 2007; UNEP, 2016; De Stefano et al., 2017; Petersen-Perlman et al., 2018). On August 14, 2014 the 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses came into force, codifying customary international water law, and providing a framework for inter-state cooperation on shared water resources. The Convention proved another milestone for water diplomacy; even if most disputes over shared water resources do not lead to legal actions, the principles codified in the 1997 UN Convention provide guidance for many of the inter-state negotiations on shared water resources. SDG 6 of the UN Sustainable Development Goals specifically commits the international community to increase transboundary water cooperation and expand collaborative institutional arrangements (UN, 2015). Supporting riparians to achieve these commitments is the urgent role of water diplomacy.

When discussing water as a tangible entry point for conflict resolution orientated dialogue facilitation, it is important to distinguish if competition over freshwater resources is the main source of incompatibility or if the need to resolve humanitarian crisis and find opportunities for dialogue, for example on safe zones around water infrastructure, can be a possible

[3] Open debates were held in November 2016, June 2017 followed by open debates on climate and security in July 2018, November 2018, and January 2019.

dialogue entry point in disputes beyond water issues. Conflicts over shared water resources are not isolated from the context where they are happening and understanding the underlaying conflict drivers and roots of the incompatibility is instrumental to identify the appropriate conflict management tool.

In the Special Issue article 'Using Complexity Science and Negotiation Theory to Resolve Boundary-Crossing Water Issues' Islam and Susskind (2018) reintroduce their water diplomacy framework as an alternative to technical or values-focused approaches to water governance and management (Islam and Susskind, 2013; Islam and Rapella, 2015). Similarly, Grech-Madin et al. (2018) argue in their Special Issue article 'Negotiating Water across Levels: A Peace and Conflict "Toolbox" for Water Diplomacy' that traditional conflict resolution mechanisms are insufficient for the complex and often fragmented disputes over shared freshwater resources. Islam and Susskind further assert that complex governance and management processes require expanding the water diplomacy framework with additional conceptual and theoretical frameworks. Both Islam and Susskind and Grech-Madin et al. argue for wider stakeholder engagement in water diplomacy, including more thorough stakeholder identification and engagement through inclusive processes to widen the scope of shared knowledge (Islam and Susskind) and vertical stakeholder engagement (Grech-Madin et al.) to include stakeholders on sub-national levels. This argument resonates with questions that some water diplomacy and water cooperation practitioners may prompt regarding sub-basin level water diplomacy processes. Grech-Madin et al. argue that more information can be gleaned when moving to a small level analysis. While water diplomacy traditionally prioritizes the formal Track 1 processes, the authors highlight the importance of sub-state level for understanding water conflicts and opportunities for their successful and sustainable resolution.

Water diplomacy processes aimed at resolving or finding a settlement to water disputes are inherently political (Grech-Madin et al., 2018) and cannot be de-coupled from other processes (Islam and Susskind, 2018). Yet, practice suggests that technical tracks can be used in highly sensitive environments to establish channels of communication and advance mutual understanding of shared risks on a basin-level (Klimes and Yaari, 2019).

Following this strain of thought, Islam and Susskind postulate that negotiation theory should be to tailored to the specific needs of complex water challenges with an emphasis on identifying and engaging relevant stakeholders in decision-making. This then leads to exploring and integrating scientific inputs into political decisions through joint fact finding; and generating *value creating opportunities and options*. Islam and Susskind thus concur that negotiation processes are more effectively focused on benefit sharing rather than rights-based positions, provided a minimum level of trust between the riparians has been established to allow such agenda setting.

Water conflicts frequently nest within larger frictions between riparians. Thus, decades of turmoil in Afghanistan have strained relations with neighbouring Pakistan, exacerbating tensions around the Kabul River on which the two states rely. Drawing on the work of Sadoff and Grey (2002), Special Issue contributing authors Atef et al. argue (2018) that the parties can shift the confrontation around the Kabul River toward cooperation by focusing on creating concrete benefits rather than inflexibly asserting absolute rights to the river's waters. Looking beyond zero-sum claims, the authors assert that a benefit sharing approach to the Kabul River would support multiple common objectives, including regional food security, hydropower, and climate change adaptation.

Such benefits cannot be shared, however, unless they can first be identified and secured. Crucially, the long-term instability afflicting Afghanistan has both degraded the data base and decimated the infrastructure needed to effectively manage water resources. Pervasive uncertainty about water supplies, demands, and infrastructure projects on the Kabul River has fuelled a climate of mutual mistrust among users. To help fill this gap, Atef et al. formulate a decision support tool providing practical methods to specify basin needs and define mutual benefits. By enhancing Afghanistan and Pakistan's abilities to jointly apprehend and assess common goals and opportunities, such tools can help build greater trust indispensable to improved cooperation.

Water Diplomacy and Participatory Approaches

When targeted and context adapted, water diplomacy tools and approaches provide opportunities to strengthen participation in governance processes across multiple tracks with direct impacts on sustainable development as well as post-conflict recovery and peacebuilding. An inclusive, partnership orientated, multi-track approach in water diplomacy processes is critical to meet the ambitious aims of the SDGs, as well as to address the complex water-energy-food nexus issues at the heart of many of the world's water security challenges. Eroding inequalities within and between countries requires a human rights based approach (HRBA; Grönwall, 2017) to transboundary water management, encompassing inclusive participatory approaches, information transparency and improved accountability (UNDP Water Governance Facility/UNICEF, 2015). The absence of stakeholder engagement platforms well-linked to formal processes can result in an increase of tensions within the basin communities, increasing uncertainties around basic needs for vulnerable populations.

How far we can reasonably take participation principles into water diplomacy practice and the efficacy of doing so is up for debate with some recent scholarship cautioning that participatory approaches that do not sufficiently address 'economic, socio-political and cultural obstacles that constrain these communities from participation' can reinforce existing power asymmetries with unintended impacts for vulnerable communities (Wong, 2016). Continuing to challenge our practice of water diplomacy to enhance water governance at all levels is clearly vital to achieving the SDGs. Water diplomacy engagements require intentionally designed entry points to enable and elevate engagement of the most disadvantaged stakeholders into the water governance decision making space, particularly in conflict and post-conflict environments when opportunities often arise to redress social and environmental injustices.

Many of the contributing authors of this Special Issue including Carmi et al., Kittikhoun, and Farnum elaborate respective understandings of the challenges and strategies for further engagement of women, indigenous peoples, and people living in conflict affected communities, within water diplomacy processes.

Inclusive governance is not necessarily about quotas and giving each individual a seat at the decision-making table. It is not about having the exact right number of men and women and young people and each identity group or non-state actor equally represented. Providing more channels, opportunities, and engagement points adapted to the interests and needs of different communities to engage in water governance fosters behavioural change, influencing people to care more about their water, and elevates the fundamental agency of people to define the value of water in individual and community terms - as part of the environment and economy, as a commonality with their neighbours, as a protected public good. Principally,

fostering opportunities to increase participation in water governance creates engaged constituencies willing to invest and take risks to protect a valued resource.

As Farnum notes in her included article (2018), the field of 'diplomacy is changing, engaging non-traditional actors and methods.' Water diplomacy approaches and practices must likewise evolve accordingly to remain relevant. This 'big tent' approach to water diplomacy is reflected in the variety of case studies offered by the authors in this Special Issue which make the case that traditional and innovative tools of water diplomacy can serve multiple linked objectives to achieve sustainable management of shared water resources while fostering robust social engagement in governance processes with resultant impacts on peace and security.

River Basin Organizations (RBOs) remain central to all tracks of water diplomacy engagements. Institutional approaches to engage stakeholders at multiple tracks have 'evolved over time' within established RBOs, such as the Mekong River Commission (MRC) as described by Kittikhoun in his article entitled 'Water Diplomacy and Conflict Prevention in the Mekong Region' (2018). Kittikhoun asserts that institutional water diplomacy approaches focused on technical and data sharing, as espoused by the MRC, have found increasing success in identifying common understanding and advancing a shared regional vision at multiple levels. But the MRC and other RBOs like it are only recently achieving a level of institutional 'maturity' (Yaari, Neal and Shubber, 2016; NBI, 2011) to consider water diplomacy's functionality to contribute more effectively to associated conflict resolution processes, particularly salient in basins located in contexts of intractable conflicts (Bar-Tal, 2007), which often carry a long history of foreign intervention and interference. It remains to be seen the extent to which RBOs can successfully transition from predominately Track I high level diplomatic engagements to internalize an HRBA multi-track approach with informative, consultative, and

collaborative engagement functions as discussed by Kittikhoun. As seen in the Mekong and elsewhere, 'the absence of sincere engagement can increase tensions within the basin at the local or grassroots level, leaving vulnerable populations increasingly uncertain of their future food, water, and energy security (Chandrapanya et al., 2017).

Women continue to be underrepresented in water management, particularly transboundary water management decision making fora (Earle and Bazilli, 2013). Increasing women's participation and influence in water governance processes is critical to improve services, reduce inequalities, and mitigate conflicts. Addressing embedded inequalities requires enhanced awareness and 'understanding of the underlying power dynamics and structural barriers that reinforce gender inequalities' (Water Governance Facility, 2014). In their article 'Empowering Women in Water Diplomacy: New Perspectives and Approaches' Carmi et al. (2018) undertake a preliminary mapping of the current status of women working professionally in fields related to water diplomacy in Lebanon, Jordan and Palestine. They conclude that complementary processes, ensuring both leadership commitment to inclusive decision making and a high capacity of all actors involved is necessary for water diplomacy related policy development and programme delivery.

IV. Conclusion

We have identified the trends above as important future directions of water diplomacy research and policy discussion. It has been established that water diplomacy is needed as a multi-disciplinary approach that builds linkages between political and technical tracks. Future research will need to continue assessing how available technical knowledge on water resource management can better inform/contribute to tailored-made water diplomacy processes and how technical cooperation can contribute to advancing relations beyond the water sector.

One of the aims of this Special Issue is bringing water diplomacy closer to the technical community and demonstrating how the technical knowledge can help to advance cooperation over shared water resources.

Several articles in this Special Issue pointed to the dearth of scientific research on water diplomacy from the social science perspective while drawing on technical knowledge on water cooperation. Further analysis of how exactly water diplomacy processes relate to the different stages of conflict and conflict resolution cycles is needed and can further contribute to identifying the intersections between science, policy, and practice. Water diplomacy is a multi-disciplinary field and water conflicts are not about water alone – interest incompatibility can start with water but it is often embedded in the deeper political context.

One of the red threats identified throughout many of the contributed Special Issue articles is the need to find effective measures to build and advance trust not only among riparians but also across all water related sectors. Trust is needed for improved information and data sharing. There is a continuous need to communicate more effectively across science, policy, and practice, attempting to speak the same water diplomacy language and striving for integrated approaches to tackle complex issues like transboundary water cooperation in conflict-affected regions.

This Special Issue of the Journal of Hydrology aims to drive this important discussion forward and bring water diplomacy closer to the technical water community.

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