



GEF/STAP/C.67/Inf.04
June 03, 2024

67th GEF Council Meeting
June 17 – 20, 2024
Washington DC, USA

**FOSTERING COOPERATION
AND MANAGING CONFLICT:
A STAP INFORMATION NOTE
ON GEF TRANSBOUNDARY
WATER PROJECTS**

Fostering cooperation and managing conflict: A STAP information note on GEF transboundary water projects

June 2024

STAP SCIENTIFIC AND TECHNICAL
ADVISORY PANEL
*An independent group of scientists that advises
the Global Environment Facility*



Fostering cooperation and managing conflict: A STAP information note on GEF transboundary water projects

Contents

Summary	1
Introduction	2
What does the science say?	4
The conceptual framework	6
Implications for GEF transboundary water investments	8
Areas for action	14
Conclusion	15
References	15

Summary

This Scientific and Technical Advisory Panel (STAP) information note summarizes recent Global Environment Facility (GEF) and non-GEF experience with transboundary water projects, develops a conceptual framework for such projects, and looks at implications for future GEF work in this area.

There have been frequent warnings from academics, policymakers, and the media about the prospect of increasing competition for shared water resources leading to conflict. However, shared water resources have also been a source of cooperation between States, with research confirming that cooperation is much more common than conflict. Challenges like climate change and the increasing pressure on water resources might alter this cooperation, however.

Fresh and marine water resources are rich in biodiversity and provide essential ecosystem services; however, these resources are deteriorating and face numerous threats. Effective management of fresh and marine water resources is often complicated by their transboundary nature, which transcends administrative and political boundaries, creating unique governance challenges.

Transboundary water projects are usually designed to support and enhance the benefits of inter-State cooperation. Such project design can promote a “virtuous cycle”: cooperation on a shared water resource could lead to cooperation *beyond* water (e.g. to environmental peacebuilding). Ideally, projects could also be designed to prevent or resolve conflict – for example, competition for natural resources. Left neglected, sources of competition and dispute can lead to a “vicious cycle” of instability, conflict, and deterioration of natural resources.

STAP supports the GEF further strengthening its monitoring and reporting efforts to clearly identify how (and which types of) cooperation, promoted through International Waters projects, contribute to preventing conflict and attaining global environmental benefits. Going forward, increased attention is warranted to assess how water-related cooperation can be maintained in times of crisis or can fulfil a peacebuilding function that leads to important co-benefits. In this way, GEF transboundary water projects can seek to achieve global environmental benefits, enhance water security, and provide broader co-benefits.

The note suggests that the GEF:

- Clearly define the intended global environmental benefits from individual International Waters projects and the cooperation mechanisms required to realize them and ensure appropriate and adequate monitoring of their achievement.
- [Identify, track, and communicate the co-benefits](#) emerging from water-related cooperation beyond the water sector itself (e.g. broader natural resource protection, livelihood improvement, peacebuilding).
- Analyze the underlying factors and trends contributing to water-related conflict or cooperation to inform and improve project design and implementation towards cooperation for GEBs (through the application of [systems thinking](#) and by [developing future narratives](#)).
- Continue to assess general conflict risks during project development, allowing for flexible project management to respond to conflict situations during project implementation and considering conflict and fragility in monitoring project outcomes.

Introduction

Together, fresh and marine water resources are rich in biodiversity and provide essential inputs to produce food and energy as well as other valuable ecosystem services – such as natural water storage, flood protection, and climate change mitigation and adaptation – in addition to having spiritual and tourism value.¹

Fresh and marine waters are under extreme pressure. Freshwater resources face a multitude of threats, including increasing and unsustainable use, land-based pollution, expanding hydropower, and climate change.² Since 1970, 30% of all freshwater ecosystems have been lost worldwide, along with 83% of freshwater species.³ Consequently, freshwater-dependent ecosystems are also rapidly deteriorating, with global wetlands having been reduced by more than 20% since the eighteenth century, vanishing three times faster than forests.⁴ People and communities that depend on freshwater resources for their survival are also being negatively impacted. Currently, about half the world's population experiences severe water scarcity for at least part of the year, and one-quarter of the world's population faces extremely high levels of water stress.⁵ Any further reduction in freshwater ecosystems will have severe economic and social effects on populations living in vulnerable basins.⁶

Marine ecosystems are also deteriorating due to rapid and widespread land-use change, ocean acidification, harmful algal blooms, overfishing, and rising temperatures, with negative effects on the people that depend on these ecosystems for their livelihoods.⁷ Humans have significantly altered two-thirds of the oceans (as of 2019), up from 40% in 2008.⁸ Over one-third of marine mammals and nearly one-third of sharks and shark relatives are threatened with extinction, and approximately one-third of all fish stocks are overfished.⁹

A key factor complicating the effective management of fresh and marine water resources is that they frequently cross political and administrative borders (Figure 1). Worldwide, more than 300 river

¹ Kaval 2019; Buonocore et al. 2021.

² IPCC 2023.

³ Tickner et al. 2020.

⁴ Fluet-Chouinard et al. 2023.

⁵ United Nations 2024.

⁶ Huggins et al. 2022

⁷ Georgian et al. 2022.

⁸ IPBES 2019.

⁹ NRDC 2019.

and lake basins, more than 300 wetlands, and almost 600 aquifers stretch across international political borders,¹⁰ while large parts of regional seas and oceans are shared between littoral States or are considered “areas beyond national jurisdiction”.¹¹

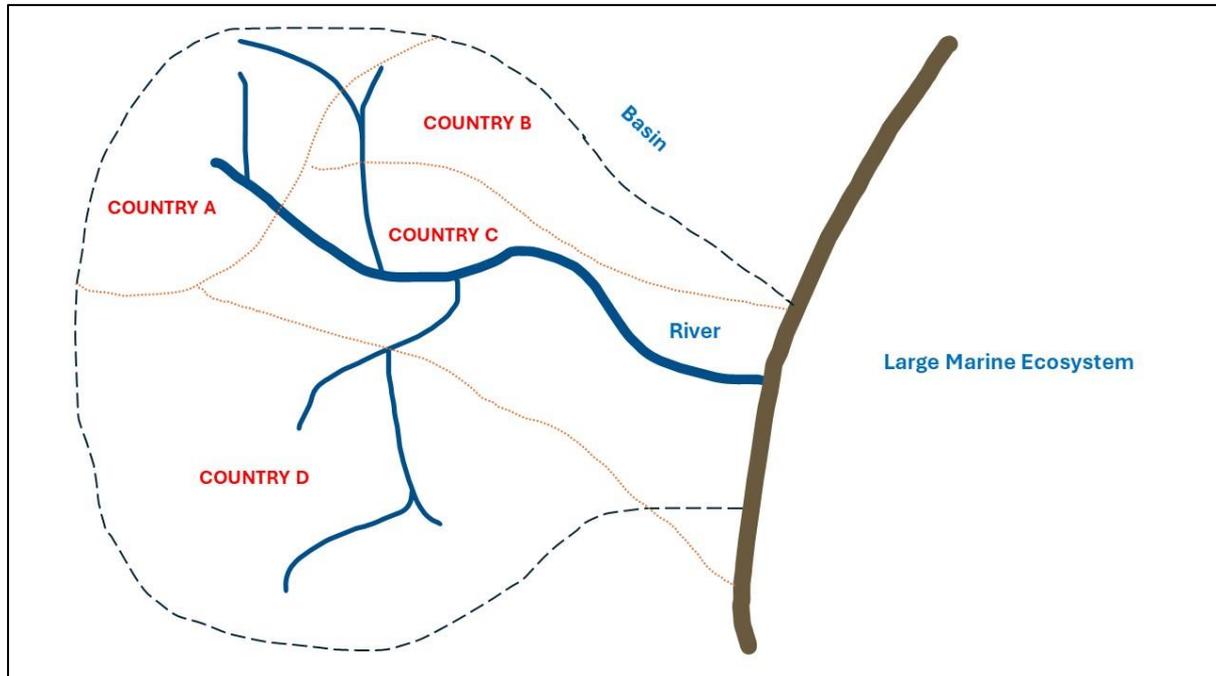


Figure 1. Schematic of a freshwater basin and large marine ecosystem, highlighting how rivers, tributaries, and the adjacent basin area can cross multiple countries before emptying into a sea or an ocean that is also shared by multiple countries along their coastlines. Source: STAP.

This mismatch between natural and political borders presents a unique challenge whereby the management, development, or protection of water resources is subject to and influenced by the interests of different users and stakeholder groups within and across countries. As a result, legal frameworks, institutions, governance instruments, management decisions, and investments in one country often differ from, or conflict with, those in neighboring countries that share the same resources.

For example, legislation intended to restore depleted fish stocks or marine mammals through strict regulation in one country will be ineffective if neighboring countries do not follow suit.¹² Likewise, wetlands in one country, even if under the protection of international legal instruments, such as the 1971 Ramsar Convention, can be affected by the investment of neighboring countries in dams or large-scale irrigation systems that alter a river’s flow regime.¹³ This dissonance can lead to tension and even conflict (Box 1), which can, in turn, result in increased environmental degradation, further undermining human well-being. For example, attempts to restore water levels in the Lake Chad basin to protect dependent ecosystems and populations are threatened by political instability and

¹⁰ Turgul et al. 2024; Rosenblum & Schmeier 2022; IGRAC & UNESCO-IHP 2021.

¹¹ Heinrich Böll Stiftung 2017.

¹² For instance, different requirements for limiting the effects of tuna fisheries on dolphins in the Americas led to a continued decline in dolphin populations before fishing regulations were coordinated under the Inter-American Tropical Tuna Commission in the mid-1970s (Thébaud 1997).

¹³ For instance, the Hamoun wetlands on the border between Afghanistan and the Islamic Republic of Iran, and protected as a Ramsar site in the Islamic Republic of Iran, have become severely depleted due to water abstraction and upstream dam construction. See opiniojuris.org and waterpeacesecurity.org.

the rise of illicit groups and local violence, impeding the effective management of water and other natural resources.¹⁴

Box 1: Defining conflict and cooperation in the context of shared water resources

Conflict is a long-term persistent disagreement involving perceived incompatible interests and/or goals, which may be over water resources or broader relations between actors,¹⁵ whereas a **dispute** is a short-term issue over a specific matter that may be resolved without the need to settle the broader conflict.¹⁶ Both conflicts and disputes are understood to have a broad possible intensity, ranging from mild verbal tensions to violence, persistent conflict, and latent or frozen conflict. **Insecurity** refers, in a water-specific manner, to the lack of safe and sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development; for ensuring protection against waterborne pollution and water-related disasters; and for preserving ecosystems in a climate of peace and political stability.¹⁷ In a broader societal sense, **insecurity** refers to people's, communities', and societies' vulnerability to dangers and threats against which they do not have adequate protection. **Cooperation** refers to interactions or joint actions that result in mutually beneficial outcomes among actors over water resources or broader issues,¹⁸ whereas **peace** often refers to the absence of conflict or violence.

This Scientific and Technical Advisory Panel (STAP) information note builds on previous STAP guidance on [environmental security](#)¹⁹ and [fragile and conflict-affected situations](#)²⁰ to explore the complex relationship between conflict, cooperation, and environmental benefits in the context of transboundary fresh and marine water resources. Through a review of the scientific and grey literature and evidence from Global Environment Facility (GEF) and non-GEF examples, the note outlines a conceptual framework for considering the links between transboundary water resources and conflict or cooperation, looks at implications for GEF investment in transboundary water projects, and identifies areas for further action as a first step to support GEF efforts to deliver, track, and communicate the environmental, socioeconomic, and cooperation benefits of strengthened support for international waters.

What does the science say?

The end of the cold war marked the beginning of increased interest and research on “water conflict and cooperation”,²¹ focusing on the relationship between freshwater resources and conflict and cooperation between people and countries. Initially, it was argued that population growth and economic development would spur competition over shared freshwater resources and likely lead to conflict and potentially violence or even inter-State war.²² Similar concerns were raised over marine water resources; however, the focus there was primarily on territorial disputes driven by riparian countries' interests in access to marine resources (e.g. oil, gas, fish).²³

Empirical research subsequently indicated that conflict over shared water resources was far less common than previously expected²⁴ and that when conflict *did* occur it was typically of limited

¹⁴ Griffin 2020.

¹⁵ McCracken et al. 2024.

¹⁶ Burton 1990; McCracken et al. 2024.

¹⁷ UN Water 2013.

¹⁸ McCracken et al. 2024.

¹⁹ STAP 2018.

²⁰ STAP 2024.

²¹ Starr 1991; Frey 1993; Lowi and Rothman 1993; Gleick 1994; Bächler et al. 1996; Butts 1997; Gleditsch 1997.

²² Starr 1991; Bulloch & Darwish 1993; Frey 1993; Gleick 1994; Butts 1997; Gleditsch 1997.

²³ Hassan 2000; Baviera 2005; Dutton 2011.

²⁴ Wolf 1999; Wolf 2000; Yoffe et al; Giordano & Wolf 2003; Elhance 2000; Turton 2000; Canter & Ndegwa, 2002; Jägerskog 2003; Kalpakian, 2004.

intensity²⁵ and often related to other, non-water factors (e.g. general conflict between States; type of political regime; broader ethnic, religious, or cultural differences).^{26, 27}

At the same time, it was argued that cooperation over shared fresh and marine water resources was necessary to ensure their efficient and effective management, despite their transboundary nature,²⁸ underlining the important role of institutions in reducing the risk of conflict and promoting cooperative outcomes.²⁹

As the impacts of climate change became more widely understood and acknowledged, greater attention was paid to the effect of rising temperatures and extreme weather on freshwater resource management³⁰ and to emerging threats to national and global security.³¹ A common narrative held that water scarcity would lead to human migration and conflict and/or that conflict over water resources would trigger migration,³² with an increasing focus on national and subnational water conflicts.³³ Conflicts over marine water resources, regional seas, and related territorial claims also received increasing attention,³⁴ particularly those areas projected to be heavily impacted by future environmental and geopolitical change, such as the Arctic³⁵ or coastal countries struggling with the socioeconomic and related impacts of declining fish stocks due to overfishing and illegal, unreported, and unregulated fishing by foreign vessels³⁶ (e.g. piracy off the Horn of Africa³⁷).

However, a more nuanced appreciation of the role of local and subnational water resources led many to conclude that water-related issues were typically not the sole source of conflict and that cooperation continued to prevail.³⁸ In fact, researchers observed that cooperation over water resources could lead to “spillover” peace or environmental peacebuilding by uniting societies or multiple countries over other (non-water-related) issues. For example, the 2002 Framework Agreement on the Sava River Basin was an early step towards reconciliation among Sava River basin States following years of fighting in the Balkans in the 1990s and paved the way for trust-building and subsequent cooperation in other policy fields.³⁹ In Africa, the first issue-specific protocol adopted by the member states of the Southern African Development Community was the 1995 Protocol on Shared Watercourse Systems, which set a precedent for governing matters of regional importance through protocols among all States in the region.⁴⁰

A consensus has therefore emerged that cooperation prevails over conflict in relation to shared water resources and that investment in preventing conflict and promoting collaboration over such resources can deliver both global environmental benefits (GEBs) and socioeconomic co-benefits, such as improved livelihoods, food security, and health. In addition, cooperation can help to avoid the costs of conflict and to open up opportunities for more collaboration.

²⁵ Wolf et al., 2003.

²⁶ Wolf et al., 2003.

²⁷ Brochmann & Hensel 2011.

²⁸ Canter & Ndegwa 2002; Ashton 2003; Duda & Sherman 2002; Moore et al. 2017.

²⁹ Giordano et al. 2003; Yoffe et al. 2004; Schmeier 2013.

³⁰ Swain 2015; Niyitunga 2019; Ide et al. 2021; Gleick & Shimabuku 2023.

³¹ Buhaug 2015; Daoudy et al. 2022; Mach et al. 2019; Theisen et al. 2013.

³² Adaawen et al. 2019; Brzoska & Fröhlich 2016; Xu & Famiglietti 2023; Adaawen et al. 2019; Balsari & Leaning, 2020; Brzoska & Fröhlich 2016; Kamta & Scheffran 2021; Stoler et al. 2022.

³³ Gleick 2014; Okpara et al. 2015; Theisen 2012; Unfried et al. 2022.

³⁴ Nemeth et al. 2014; Mackelworth et al. 2019; Govella 2023.

³⁵ Berkman & Vylegzhanin 2010; Pincus et al. 2015.

³⁶ Pomeroy et al. 2016.

³⁷ Farquhar et al. 2017; Sumaila & Bawumia 2014.

³⁸ Kåresdotter et al. 2023; Turgul et al. 2024.

³⁹ Aolakhodzid et al. 2014; Çolakhodžić 2008; Stec et al. 2011.

⁴⁰ Muller 2015.

A conceptual framework is useful as a starting point for understanding the causal pathways that connect shared water resources and their management (or the lack thereof) to cooperation or conflict and the associated environmental and socioeconomic costs and benefits.

The conceptual framework

The links between shared water resource management and conflict or cooperation can be perceived via two sets of causal pathways, or “dimensions”, that form **virtuous** or **vicious** cycles. Each of the cycles described in this note is intended to be illustrative and to highlight the need to clarify transboundary water management causal pathways. Such pathways are always context-specific and must be informed and developed by thoughtful engagement with experts and local stakeholders.

A **virtuous cycle** consists of two dimensions that begin with cooperation over a shared water resource and expand to cooperation beyond water to create the possibility of environmental peacebuilding (Figure 2).

- **Dimension 1:** Shared water resources require cooperation for their coordinated and integrated management across political borders to benefit nature and people and thus generate GEBs and co-benefits. For example, agreements by multiple countries to maintain a river’s flow regime beyond national borders can support greater protection and restoration of transboundary wetlands, with concomitant benefits for biodiversity, the climate, and human well-being.
- **Dimension 2:** Cooperation over shared water resources highlights the benefits of cooperative behavior and builds trust, fostering cooperation beyond water to contribute to environmental peacebuilding. For example, practised cooperation between government actors through the establishment of treaties and joint organizations can help solidify relations between States that share fresh or marine waters and thereby increase the likelihood of future cooperation in other fields.

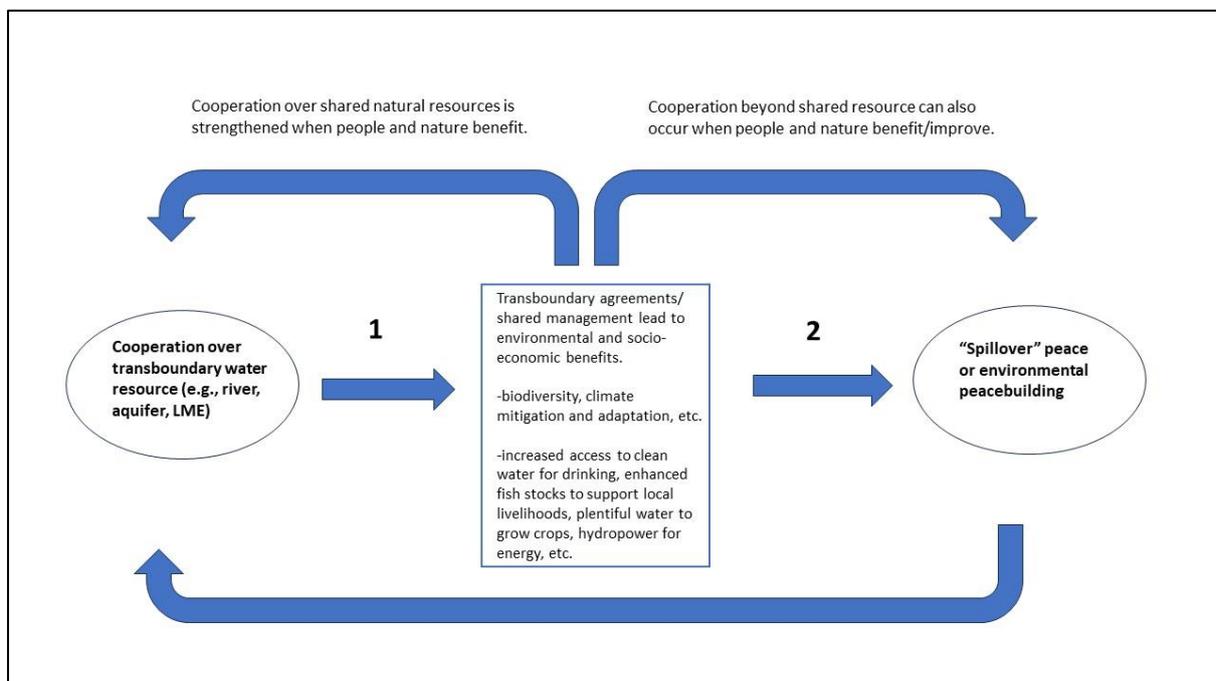


Figure 2. Dimensions of cooperation over shared water resources (virtuous cycle). LME = large marine ecosystem. Source: STAP.

A **vicious cycle** also consists of two dimensions, but these – in contrast – can develop around fragility, competition, and conflict over scarce or deteriorating natural resources (Figure 3).

- **Dimension 3:** The shared nature of transboundary water can lead to direct competition over the resource if countries consider their needs incompatible in the perceived zero-sum game of water allocation, paving the way towards instability or conflict. For example, if a country in a shared marine area wants to protect fish species while another country prefers to continue exploiting these species for economic gain, this will result in the inequitable distribution of costs and benefits and could ultimately lead to conflict.
- **Dimension 4:** Where fragility and/or conflict already exist in a transboundary water context, natural resources will likely be under pressure, as will the people who depend on them for their livelihoods due to lack of coordinated management, among other context-specific issues. This can lead to a further deterioration of these resources as well as increasing competition for the (declining) services they provide. For example, a lack of effective water resource management in a shared basin due to persistent conflict and fragility can decrease the availability and quality of water, thus diminishing GEBs.

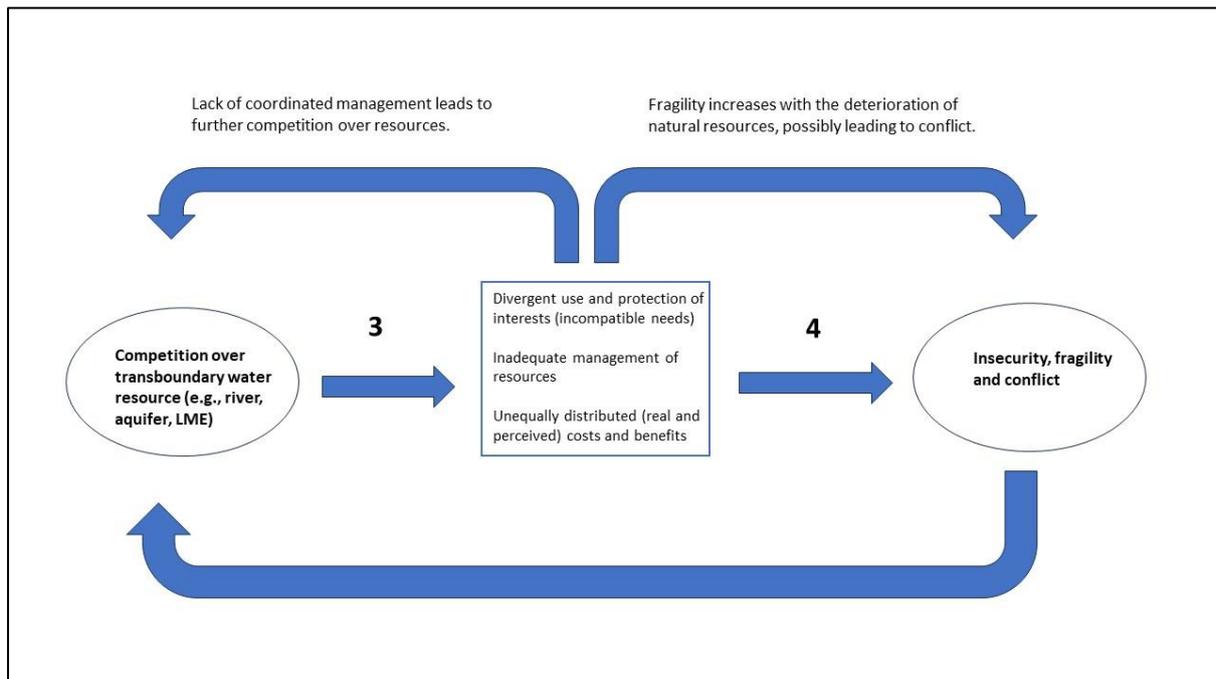


Figure 3. Dimensions of conflict over shared water resources (vicious cycle). Source: STAP.

Research and experience have shown that virtuous cycles generate benefits for people and for ecosystems, including GEBs (e.g. ecosystem restoration), socioeconomic co-benefits (e.g. food security), and other co-benefits (e.g. cooperation). Conversely, vicious cycles tend to lead to the destruction of ecosystems, loss of biodiversity, deterioration of water quality, and economic losses.

The exact costs and benefits of conflict and cooperation over shared water resources are difficult to quantify due to underdeveloped methodologies and context-specific factors.⁴¹ However, these are important considerations to be borne in mind in the design, implementation, and evaluation of projects.

⁴¹ Tilmant & Kinzelbach 2012; Pohl et al. 2017; Swain & Karim 2022.

Implications for GEF transboundary water investments

GEF investments in transboundary fresh and marine water management usually aim to promote a virtuous cycle and/or prevent or disrupt a vicious cycle (Figure 4). The conceptual framework outlined in the previous section can be applied to GEF transboundary water projects.

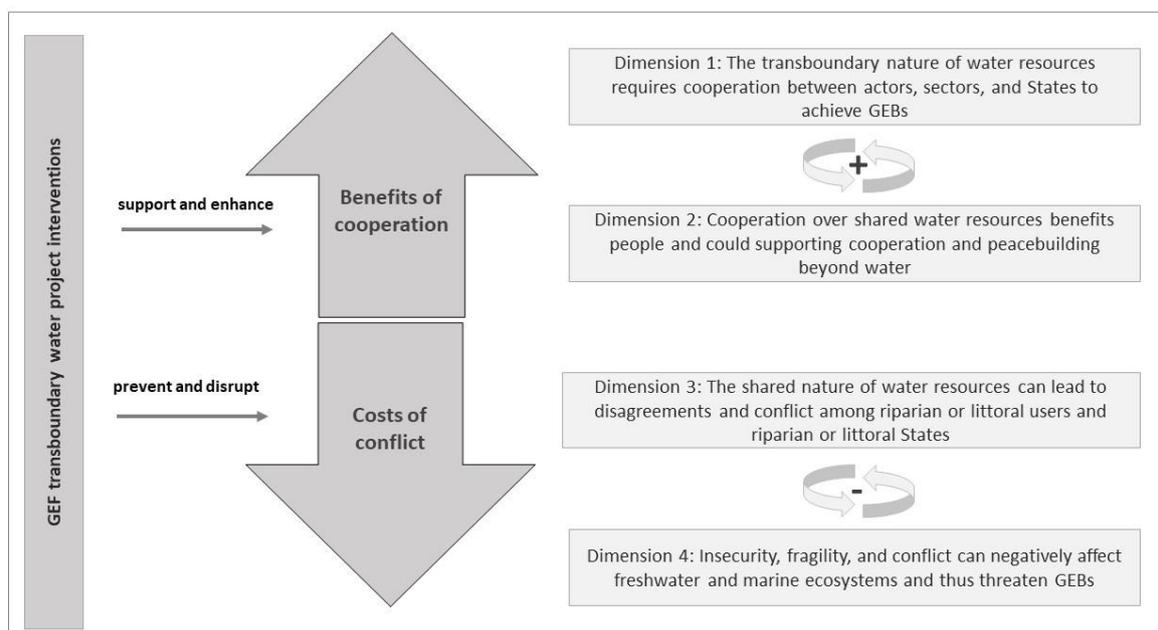


Figure 4. GEF transboundary water projects in relation to the four conflict/cooperation dimensions. GEB = global environmental benefit. Source: STAP.

Dimension 1: The transboundary nature of water resources requires cooperation between actors, sectors, and States to achieve GEBs

The rationale underlying GEF investment in transboundary waters is that cooperation through improved planning and management between States sharing basins, aquifers, and marine ecosystems will lead to GEBs.⁴² The GEF-8 Programming Directions emphasize that “the integrity of transboundary water ecosystems can only be achieved through cooperation across political borders and between sectors” and that “the GEF through its International Waters focal area is supporting cooperation in shared marine and freshwater ecosystems, to achieve long term benefits.”⁴³ GEF-8 Core Indicator 7 made this objective explicit by targeting 40 shared water ecosystems being under new or improved cooperative management.⁴⁴

Direct attribution of environmental improvements to GEF-supported transboundary cooperation is difficult. However, there is evidence to suggest that this positive relationship can hold true. For example, the GEF Independent Evaluation Office (IEO) evaluation of GEF projects in the Danube

⁴² The GEF has invested in transboundary fresh and marine water management and protection since its inception, including through support for the implementation of international legal and policy commitments that emphasize the need for cooperation over shared fresh and marine water resources either directly (e.g. the 1997 United Nations Watercourses Convention and the 1982 United Nations Convention on the Law of the Sea [UNCLOS]) or indirectly as a requirement for protecting and sustainably managing other environmental issues (e.g. the 1972 Ramsar Convention and the 1992 Convention on Biological Diversity). Most recently, the GEF has been selected to serve as one of the financial mechanisms for the UNCLOS Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction agreement (commonly known as the “BBNJ”).

⁴³ GEF/C.62/03. GEF 8 Programming Directions. June 15, 2022.

⁴⁴ Annex 3 of the GEF 8 Programming Directions. Table 1 The expected Global Environmental Benefits of GEF-8 along Core Indicators.

River region showed positive environmental outcomes as a result of transboundary action to address pollution (Box 2; see also Box 4 for examples from actors other than GEF), and GEF investment in transboundary cooperation in Lake Victoria over the past two decades has decreased hyacinth infestation and improved water quality.⁴⁵ In addition, the IEO evaluation of GEF investment to address regional transboundary issues in the South China Sea highlighted improved environmental conditions,⁴⁶ including better water quality and larger areas of mangroves.⁴⁷

For the GEF, it is necessary to clearly define the intended environmental outcomes from transboundary water investments and enhance efforts to monitor their achievement. It is also essential to identify the effective legal, institutional, policy, and investment interventions required to establish or strengthen the cooperation necessary for achieving these outcomes. Given the diverse interests of actors and countries usually involved in shared water ecosystems, interventions would need to address any incoherence in policy in and across countries.⁴⁸

Box 2. Cooperation for GEBs: GEF-supported cooperation in the Danube/Black Sea basin

The Danube River basin is Europe’s largest basin, with a total area of 801,463 km², flowing through the territory of 19 countries – making it the most international basin in the world. It is home to 79 million people. The Danube River basin is critical for the region’s economy, providing opportunities for navigation, drinking water production, fishing, and tourism. Beginning in the 1970s, the basin’s water quality and ecosystem deteriorated due to the development of new infrastructure, leading to severe hydro-morphological alterations combined with sharp increases in nitrogen and phosphate pollution. These changes also negatively impacted the Black Sea, the Danube River basin’s recipient waterbody, which is highly susceptible to pollution due to its semi-enclosed marine ecosystem. As environmental pressures and overfishing in the Black Sea began to take a toll on local livelihoods, riparian and littoral countries recognized the need to cooperate to reverse declining environmental trends.



Danube River basin. Source: [Danube GIS](#).

Black Sea hydrological catchment. Source: [EnviroGrids](#).

The Danube River Protection Convention was signed in 1994, providing the basis for the establishment of the International Commission for the Protection of the Danube River to address water resource management challenges in the basin. For the Black Sea, the 1992 Bucharest Convention established a basis for institutionalized cooperation in the form of the Commission on the Protection of the Black Sea Against Pollution (or the Black Sea Commission) to provide a platform for cooperation, negotiations, and data and information exchange to improve environmental conditions through transboundary water management.

⁴⁵ GEF IEO 2016.

⁴⁶ However, growing tension over the territory in the South China Sea is affecting cooperation and eroding environmental gains. There are reports of significant growth of algal blooms and biodiversity losses in the contested areas. See: [Geopolitical standoff in the South China Sea leads to environmental fallout](#) and [the environmental collateral damage of the South China Sea conflict](#).

⁴⁷ GEF IEO 2012.

⁴⁸ See Stafford Smith et al. 2022 for STAP advice on how projects might engage with the policy cycle to improve policy coherence.

GEF support for these efforts began as early as GEF-1, with the Developing the Danube River Basin Pollution Reduction Programme (GEF ID 342). Since then, there have been more than 30 GEF-funded projects in the region, including the first Transboundary Diagnostic Analysis (TDA) for the Danube River basin in 1999. This TDA and the subsequent Transboundary Diagnostic Analysis–Strategic Action Programme (TDA-SAP)⁴⁹ addressed numerous pollution pressures, including from land-based sources, using a source-to-sea approach,⁵⁰ with the goal of achieving GEBs.

Although recent conflicts in the region have affected cooperation⁵¹ and are eroding past environmental gains,⁵² evaluations of past GEF investments in the Danube’s cooperative frameworks had highlighted improvements in environmental conditions. For example, a 2007 terminal evaluation concluded that the Danube Regional Project (GEF ID 2042) contributed to the reduction of nitrogen and phosphate emissions into the Danube River by more than 20% and 30%, respectively, and that conditions in the north-west shelf of the Black Sea showed signs of restoration despite changing political and economic realities.⁵³ It is unlikely that these types of result could be achieved in the absence of cooperation among littoral and riparian States, with support from the international community, including the GEF.

Dimension 2: Cooperation over shared water resources benefits nature and people and could support cooperation and peacebuilding beyond water

In addition to GEBs, GEF transboundary water projects provide socioeconomic co-benefits.⁵⁴ STAP distinguishes between prerequisite and incidental co-benefits, with the former necessary to ensure the durability of GEBs and the latter defined as local environmental and socioeconomic benefits not critical to durable GEBs but helpful in increasing the overall impact of the GEF investment.⁵⁵

Examples of co-benefits delivered by GEF’s transboundary water projects include improved local livelihoods for coastal communities, increased availability of and access to clean water, job creation, and fostering of cooperation.⁵⁶ GEF investments in the Okavango River basin, for example, have achieved a variety of socioeconomic co-benefits in addition to the environmental benefits (Box 3; see Box 4 for examples from other actors).

Identifying co-benefits in context and achieving them should be integral to the design of projects and programs, as noted in [STAP’s paper on co-benefits](#).⁵⁷ The paper also noted that measurement of these co-benefits should be incorporated into ongoing monitoring, evaluation, and learning within projects and programs. Improved accounting of socioeconomic co-benefits from transboundary water projects can help secure widespread support for such projects, highlight their value for money, and guide future investments.

Hence, the GEF Results Measurement Framework needs to adequately capture specific co-benefits (the current Results Measurement Framework for socioeconomic benefits tracks the number of

⁴⁹ The TDA-SAP is a collaborative approach that serves as the main strategic planning tool for GEF International Waters projects. The TDA brings stakeholders together to gather and interpret information on the environmental impacts and socioeconomic consequences of identified transboundary water problems through an analysis of the immediate, underlying, and root causes for each and forms the basis for the SAP, which is a negotiated policy document that is meant to establish clear priorities for action to resolve the transboundary problems identified in the TDA. See <https://iwlearn.net/manuals/tda-sap-methodology/introduction/the-tda-sap>.

⁵⁰ The source-to-sea concept identifies six key flows that connect the source-to-sea system from land systems to open oceans – water, sediment, pollutants, biota, materials, and ecosystem services – to address the links between land, water, delta, estuary, coast, nearshore, and ocean ecosystems, leading to holistic natural resource management and economic development (Mathews et al. 2019).

⁵¹ The Russian Federation was removed from the Danube Commission following its invasion of Ukraine in 2022 (see [the Maritime Executive](#)).

⁵² Shumilova et al. 2023.

⁵³ GEF IEO 2007.

⁵⁴ STAP defines co-benefits as positive effects of GEF investments that are not included in the investment’s formal set of GEBs (Stafford Smith & Metternicht 2022).

⁵⁵ Stafford Smith & Metternicht 2022.

⁵⁶ The IEO found that nine of the 20 sampled GEF demonstration projects in the South China Sea not only led to reduced environmental stress but also helped foster cooperative relationships, improved livelihoods, and diversified sources of income as a direct result of improvements in environmental status (GEF IEO 2005). Similarly, the IEO found that “interventions such as those in the Dnipro, Caspian Sea, Lake Victoria, Lake Tanganyika, Lake Peipsi, and the Mekong, to name just a few, have promoted a productive dialogue between countries that have avoided conflicts over resource use” (GEF IEO 2005).

⁵⁷ See Stafford Smith & Metternicht 2022.

people benefiting from GEF-financed investments). The ongoing process to improve tracking and measurement of socioeconomic co-benefits of GEF investments⁵⁸ provides an opportunity to address this.

Box 3. Socioeconomic co-benefits from GEF support in the Okavango River basin

The Okavango River basin is shared by Angola, Botswana, and Namibia and supports important ecosystems and biodiversity hotspots, including the famous Okavango Delta – a UNESCO biosphere reserve and a Ramsar site. The basin is facing increasing development pressure, particularly upstream in Angola and Namibia, threatening the fragile ecological balance.

GEF's investments (e.g. [GEF ID 842](#), [GEF ID 5526](#)) have contributed to enhancing the institutionalized cooperation architecture for the basin. While the Permanent Okavango River Basin Water Commission (OKACOM) was originally established with the 1994 Okavango Agreement, it only became fully functional after support from external partners, including the GEF. Today, OKACOM is considered a well-functioning basin organization that effectively provides member states with a platform to address, and prevent conflict over, emerging water resource challenges.

Improved cooperation in the Okavango River basin has provided multiple socioeconomic co-benefits to riparian populations, especially those living in the Okavango Delta. The sustainable management of the delta has provided natural resources to sustain communities' livelihoods and allowed for the development of a valuable eco-tourism industry, which contributes more than 10% of Botswana's gross domestic product and provides tens of thousands of jobs.



Okavango River. Source: Britannica.

Okavango Delta. Source: Conservation Namibia.

In recent years, OKACOM member states have engaged in the negotiation of a new agreement that would better account for the environmental challenges the basin and its resources will be facing in the future. This includes a stronger commitment to protecting the basin's resources in a joint and cooperative manner. The negotiation of this new treaty – a rare development in transboundary basins, where treaty renegotiation or even the negotiation of a new treaty based on an existing one is rare – happened in a spirit of cooperation and good faith. This shows how the commitment of these States to cooperation in the basin has been enhanced over the past decades.

Dimension 3: The shared nature of water resources can lead to disagreements and conflict among riparian or littoral users and riparian or littoral States, with implications for GEBs

GEF transboundary water investments have sought to reduce potential conflict stemming from competing uses of shared water resources. For example, the GEF – along with other donors such as

⁵⁸ GEF/C.66/12. <https://www.thegef.org/council-meeting-documents/gef-c-66-12>.

the World Bank – has invested in the Lake Chad basin,⁵⁹ through support for comprehensive studies of the links between water, climate, and conflict in the area⁶⁰ and direct investments in conflict prevention and mitigation (including at the regional level with the Lake Chad Basin Commission) and local water- and agriculture-based crisis recovery.⁶¹

Several factors drive water-related conflicts, including population growth, economic expansion, environment degradation, infrastructure development (e.g. dams, diversions), weak institutions, and climate change.⁶² Climate change, for example, could further intensify the risk of conflict over transboundary fresh and marine water resources and challenge existing cooperation mechanisms.⁶³

Understanding the root causes and drivers of change that can lead to conflict is critical for designing appropriate and durable interventions that can achieve long-term cooperation, prevent or mitigate future conflicts, and deliver GEBs and co-benefits. This will require developing [simple narratives](#) of how the drivers of change could interact and unfold in the future and creating solutions that are robust to the plausible futures.⁶⁴

Dimension 4: Insecurity, fragility, and conflict can negatively affect freshwater and marine ecosystems and thus threaten GEBs

Armed conflict has the potential to disrupt the water systems that are crucial to environmental and human well-being,⁶⁵ particularly freshwater resources.⁶⁶ The 2020 GEF IEO evaluation of fragile and conflict-affected situations found that conflict and fragility generally have a negative impact on investment outcomes, including on overall effectiveness and efficiency.⁶⁷

The intensification of existing conflicts and the emergence of new conflicts in many parts of the world,⁶⁸ including those in shared water basins and large marine ecosystems, highlights the need for conflict-sensitive tools and resources within the GEF Partnership to guide the development and implementation of projects in fragile and conflict-affected situations.

A recent STAP brief on [environmental security](#)⁶⁹ suggested practical ways of increasing the likelihood of achieving durable GEBs from projects in fragile and conflict-affected situations by explicitly addressing environmental security during design, including through the safeguards process (as many other donors do – Box 4). This would include carrying out a context analysis, developing narratives of possible futures that recognize fragile and conflict-affected situations, incorporating co-benefits in design, identifying and addressing links between conflicts and environmental outcomes in the project theory of change, recognizing the dynamic nature of fragile and conflict-affected situations when developing risk assessment and mitigation strategies, and effectively engaging stakeholders throughout project design and implementation.

⁵⁹ GEF projects in the Lake Chad basin include [GEF ID 9446](#), [GEF ID 4748](#), and [GEF ID 767](#). See: GEF, UNDP, World Bank 2003; GEF and UNDP 2013; GEF and AfDB 2017.

⁶⁰ Fisker 2021; Defontaine & Castet 2021.

⁶¹ World Bank 2020.

⁶² Iceland 2020; Schmeier 2013.

⁶³ Munia et al 2020; Dinar et al. 2019; Klare 2020.

⁶⁴ See STAP simple future narrative primer (Stafford Smith 2023) for how to develop a simple future narrative.

⁶⁵ Schillinger et al 2020.

⁶⁶ Xenarios 2023; Shumilova et al. 2023.

⁶⁷ GEF IEO 2020.

⁶⁸ ACLED 2024; International Crisis Group 2024.

⁶⁹ STAP 2024.

Box 4. Engaging in the water conflict and cooperation space – Experiences from other donors and agencies

In addition to the GEF, several bilateral and multilateral donors and organizations support transboundary water actions that aim to mitigate conflicts and promote cooperation in support of GEBs and peace co-benefits in a variety of ways, largely aligned with the four dimensions outlined in this note.

The World Bank, for example, has invested heavily in transboundary water cooperation to achieve GEBs in Africa through initiatives such as the Cooperation in International Waters in Africa program, which supports riparian governments in Sub-Saharan Africa to unlock the potential for sustainable and inclusive growth, climate resilience, and poverty reduction by addressing constraints to the cooperative management and development of international waters.⁷⁰ Long-term World Bank support for the Senegal River Basin Organization,⁷¹ for example, facilitated the integration of the most upstream State, Guinea, into regional water cooperation to support basin-wide water management.

Some multilateral and bilateral actors support transboundary water cooperation with the aim of building and sustaining peace and thus generating peace co-benefits. For example, Switzerland's Blue Peace initiative⁷² supports countries in Central Asia, the Middle East, and West Africa to better manage shared water resources through a variety of means, including support for conflict resolution mechanisms, cooperative basin management, joint research, and educational efforts to build long-term trust between countries, with the goal of achieving broader regional cooperation and peace.⁷³ Similarly, the US Agency for International Development's support for countries in the South Caucasus explicitly aims to use water cooperation as an example of successful regional cooperation for shared priorities, conflict mitigation, and peacebuilding.⁷⁴

Other efforts focus more on water conflict prevention or mitigation. For example, in the Nile River basin several donors have supported riparian countries and the regional basin organization, the Nile Basin Initiative, to manage Nile River water resources cooperatively to prevent or mitigate conflict. For example, the German Agency for International Cooperation (GIZ) supports the Nile Basin Initiative in managing water resources collaboratively⁷⁵ and facilitates dialogue between States to address highly contested issues, such as the Grand Ethiopian Renaissance Dam and the Cooperative Framework Agreement.⁷⁶ GIZ also supports the Lake Chad Basin Commission in "conflict-reducing management of transboundary water resources"⁷⁷ including in managing transhumance- and water-related conflict arising from changes in water use across borders.⁷⁸

Understanding the risk of general and non-water conflict affecting water projects and water-related benefits has also led several donors to develop tools that can help identify conflict risks early in the project planning stage and adapt projects accordingly during implementation. GIZ, for instance, employs a comprehensive safeguard system that includes an integrated peace and conflict analysis to ensure that projects can be successfully implemented even under situations of conflict and fragility.⁷⁹

⁷⁰ World Bank 2021

⁷¹ World Bank 2024.

⁷² SDC/United Nations 2023.

⁷³ Blue Peace Central Asia/Swiss Agency for Development and Cooperation (SDC) (no year).

⁷⁴ HigherGov 2023/ Ministry of Environmental Protection and Agriculture of Georgia 2023.

⁷⁵ GIZ 2022.

⁷⁶ GIZ 2024.

⁷⁷ GIZ 2023a, GIZ 2023c.

⁷⁸ GIZ 2023a, GIZ 2023c.

⁷⁹ GIZ 2003b.

Areas for action

STAP suggests the following actions:

Dimension 1: Clearly define the intended GEBs from individual International Waters projects and the cooperation mechanisms required to realize them and ensure appropriate and adequate monitoring of their achievement.

In addition to clear identification of the GEBs targeted by the project, the GEF would need to identify (a) the cooperation necessary between the actors responsible for the shared water resource to achieve those benefits and (b) any necessary interventions to establish, or strengthen existing, cooperation between those actors. A key addition would be for the GEF to strengthen measurement and monitoring of the cooperation and its results to gain a better understanding of how this aspect of a project's design affects delivery of its environmental objectives.

The GEF could draw upon previous work to characterize different types of shared fresh and marine water resources and different cooperation mechanisms, through the GEF Transboundary Waters Assessment Programme.⁸⁰ Satellite remote-sensing offers promise for monitoring environmental change, especially in data-poor regions.⁸¹ Relevant data sets could also be made available through [IW:Learn](#)⁸² or the [GEF geospatial platform](#),⁸³ supported by in situ data collection, including through [citizen science](#)⁸⁴ and targeted in-country training to prioritize actions and monitor change over time. Cooperation mechanisms are monitored already in the [Transboundary Freshwater Diplomacy Database](#)⁸⁵ maintained by Oregon State University and its partners, which has been supported by the GEF before.

Dimension 2: Identify, track, and communicate the co-benefits emerging from water-related cooperation beyond the water sector itself.

Transboundary water projects result in important benefits beyond GEBs, such as improved local livelihoods for coastal communities, increased availability of and access to clean water, job creation, and fostering cooperation. For example, the establishment or strengthening of institutions that encourage joint water management and environmental peacebuilding contribute to trust and peace. Therefore, they are important to recognize in projects. Improved tracking and communication of these vital benefits will further strengthen support for investments in transboundary water management.

Dimension 3: Analyze the underlying factors and trends contributing to conflict to inform and improve project design and implementation.

A clear articulation of factors contributing to competition over shared water resources and associated conflict and security risks can inform and improve project design and implementation, including through a careful accounting of risks and opportunities. These factors are context-specific and should be developed through [multi-stakeholder dialogue](#).⁸⁶ Projects should develop [simple narratives](#) of how the drivers of change could interact and unfold in the future, and the project design should be robust to the plausible futures.

⁸⁰ The GEF Transboundary Waters Assessment Programme aims to provide a baseline assessment to identify and evaluate changes in water systems caused by human activities and natural processes and their consequences for human populations. Detailed assessments for each transboundary water system can be found on the programme website: <http://www.geftwap.org>.

⁸¹ Sheffield et al. 2018.

⁸² <https://iwlearn.net/>.

⁸³ <https://www.thegef.org/maps>.

⁸⁴ STAP 2024.

⁸⁵ Oregon State University 2024.

⁸⁶ Ratner & Stafford Smith 2020.

Dimension 4: Continue to assess conflict and related risks during project development, allowing for flexible project management to respond to conflict situations during project implementation and considering conflict and fragility in monitoring project outcomes.

Working in fragile and conflict-affected situations requires a sound understanding of the conflict context and the different factors that could potentially affect a project or negatively affect the environment and water resources.⁸⁷ This includes carefully assessing conflict and fragility during project development, allowing for flexible project management to respond to conflict situations, and considering conflict and fragility in monitoring project outcomes.⁸⁸

Conclusion

Transboundary fresh and marine water resources are intricately linked to both cooperation and conflict. Accordingly, they can generate multiple benefits for ecosystems, people, and countries, but they can also be the source of considerable environmental, economic, social, and political costs. GEF investments in transboundary water resource management are instrumental in ensuring that vicious cycles of water-related conflict are interrupted or mitigated and that virtuous cycles of water-related cooperation and associated GEBs and co-benefits are promoted.

STAP suggests four areas of action to further strengthen GEF investments in international waters and harvest the co-benefits of cooperation while also preventing water-related conflict and effectively maneuvering more general conflict that can affect GEBs. Some of these actions can be taken during project design (via the theory of change, future narratives, risk assessment, etc.). Others need to be addressed during project implementation in an adaptive manner. Yet others, such as defining and monitoring environmental outcomes, could be considered for future GEF programming.

The GEF International Waters focal area is unique in having a dedicated knowledge management platform ([IW:Learn](#)) that brings together the GEF's International Waters community of practice to cultivate and share information, including through in-person events and online learning opportunities. Additional opportunities via IW:Learn and other, more broad-based communities of practice can support further learning about how cooperation in managing water resources can help generate benefits for ecosystems, people, countries, and regions while reducing the costs associated with conflict over these vital resources.

References

- ACLED (2024). *ACLED Conflict Index*, January 2024. <https://acleddata.com/conflict-index/>.
- Adaawen, S., Rademacher-Schulz, C., Schraven, B., & Segadlo, N. (2019). Drought, migration, and conflict in sub-Saharan Africa: what are the links and policy options? Mapedza, E., Tsegai, D., Bruntrup, M. & McLeman, R. (eds.). *Current Directions in Water Scarcity Research*, Amsterdam: Elsevier, 15-31. <https://doi.org/10.1016/B978-0-12-814820-4.00002-X>.
- Aolakhodzid, A., Filipović, M., Kovandzić, J. & Stec, S. (2014). The Sava River: Transitioning to peace in the former Yugoslavia. Weinthal, E., Troell, J. & Nakayama, M. (eds.). *Water and Post-Conflict Peacebuilding*. London: Routledge. <https://www.routledge.com/Water-and-Post-Conflict-Peacebuilding/Weinthal-Troell-Nakayama/p/book/9781849712323>.
- Ashton, P. (2003). The search for an equitable basis for water sharing in the Okavango River Basin. Nakayama, M. (ed.). *International waters in Southern Africa*. Tokyo: UN University Press, 164-188. <http://the-eis.com/elibrary/sites/default/files/downloads/literature/The%20search%20for%20an%20equitable%20basis%20for%20water%20sharing%20in%20the%20Okavango%20River%20basin.pdf>.

⁸⁷ This includes the direct effects of conflict on water resources (e.g. destruction of water infrastructure) and the indirect effects of conflict (e.g. limitation or suspension of a government's ability to provide basic essential services, such as water management and delivery).

⁸⁸ STAP 2024.

- Bächler, G, Böge, V., Klötzli, S., Libiszweski, S. & Spillmann, K. (1996). *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Volume 1, Chur: Ruediger. <https://portals.iucn.org/library/node/23121>.
- Balsari, S., Dresser, C., & Leaning, J. (2020). Climate Change, Migration, and Civil Strife. *Current Environmental Health Reports*, 7, 4, 404-414. doi: 10.1007/s40572-020-00291-4.
- Baviera, A. (2005). South China Sea: Managing Territorial and Resource Disputes. Heijmans, A., Simmonds, N. van de Veen, H. (eds.). *Searching for Peace in Asia Pacific*. Boulder: Lynne Rienner Publishers, 505-524. <https://asi.upd.edu.ph/mediabox/archive/ASJ-33-1997/baviera.pdf>.
- Berkman, P. A., & Vylegzhani, A. N. (2010). *Environmental Security in the Arctic Ocean*. Dordrecht: Springer.
- Blue Peace Central Asia/Swiss Agency for Development and Cooperation (SDC) (no year). *About Blue Peace*. <https://www.bluepeace-centralasia.ch/about/hydrodiplomacy/>.
- Brochmann, M., & Hensel, P. R. (2011). The Effectiveness of Negotiations over International River Claims. *International Studies Quarterly*, 55, 3, 859-882. doi.org/10.1111/j.1468-2478.2011.00670.x
- Brzoska, M., & Fröhlich, C. (2016). Climate change, migration and violent conflict: vulnerabilities, pathways and adaptation strategies. *Migration and Development*, 5, 2, 190-210. doi:10.1080/21632324.2015.1022973.
- Buhaug, H. (2015). Climate–conflict research: some reflections on the way forward. *WIREs Climate Change*, 6, 3, 269-275. <https://wires.onlinelibrary.wiley.com/doi/full/10.1002/wcc.336>.
- Buonocore, E., Grande, U., Franzese, P.P. & Russo, G.F. (2021). Trends and Evolution in the Concept of Marine Ecosystem Services: An Overview. *Water*, 13, 15, 2060. <https://www.mdpi.com/2073-4441/13/15/2060>.
- Bulloch, J., & Darwish, A. (1993). *Water Wars: Coming Conflicts in the Middle East*. London: Victor Gollancz.
- Burton, J. (1990). *Conflict: Resolution and Prevention*, The Conflict Series 1, New York: St. Martin's Press. <https://search.worldcat.org/title/Conflict--resolution-and-prevention/oclc/829369596>.
- Butts, K. (1997). The Strategic Importance of Water. *Parameters: US Army College Quarterly*, 27, 1, 65-83. doi:10.55540/0031-1723.1809.
- Canter, M. & Ndegwa, S. (2002). Environmental scarcity and conflict: A contrary case from Lake Victoria. *Global Environmental Politics*, 2, 3, 40-62. [10.1162/152638002320310527](https://doi.org/10.1162/152638002320310527).
- Čolakhodžić, A. (2008). Environmental Security and the Role of River Regimes in Fostering (Environmental) Cooperation: Case of the International Sava River Basin Commission. Lagutov, V. (ed.). *Rescue of Sturgeon Species in the Ural River Basin Conference. Conference Proceedings*. Dordrecht; Springer, 5-27. https://link.springer.com/chapter/10.1007/978-1-4020-8924-4_1
- Daoudy, M., Sowers, J., & Weinthal, E. (2022). What is climate security? Framing risks around water, food, and migration in the Middle East and North Africa. *WIREs Water*, 9, 3, e1582. <https://doi.org/10.1002/wat2.1582>.
- Defontaine, C., Castet, A. (2021). *Lake Chad Regional Risk and Resilience Assessment*. Washington, D.C.: World Bank. <http://documents.worldbank.org/curated/en/099015001172333847/P17587202888020f209a4f0fc4dbab55ac8>
- Dinar, S., Katz, D., De Stefano, L., & Blankespoor, B. (2019). Do treaties matter? Climate change, water variability, and cooperation along transboundary river basins. *Political Geography*, 69, 162-172. <https://www.sciencedirect.com/science/article/abs/pii/S0962629817302561?via%3Dihub>.
- Duda, A. M., & Sherman, K. (2002). A new imperative for improving management of large marine ecosystems. *Ocean & Coastal Management*, 45, 11, 797-833. <https://www.sciencedirect.com/science/article/abs/pii/S0964569102001072?via%3Dihub>
- Dutton, P. (2011). China and the South China Sea. Three disputes and three objectives. *Naval War College Review*, 64, 4, 42-67. <https://digital-commons.usnwc.edu/nwc-review/vol64/iss4/6>
- Elhance, A. (2000). Hydropolitics: Grounds for despair, reasons for hope. *International Negotiation*, 5, 2, 201-222. https://brill.com/view/journals/iner/5/2/article-p201_2.xml.
- Farquhar, S. D. (2017). When Overfishing Leads to Terrorism: The case of Somalia. *World Affairs: The Journal of International Issues*, 21, 2, 68-77.

https://www.researchgate.net/publication/319680762_When_Overfishing_Leads_To_Terrorism_The_Case_of_Somalia.

Fisker, P. (2021). *Conflict and Climate Change in the Lake Chad Region*. Washington, D.C.: World Bank. <http://documents.worldbank.org/curated/en/603021636447190201/Technical-Paper-5-Conflict-and-Climate-Change-in-the-Lake-Chad-Region>.

Fluet-Chouinard, E., Stocker, B., Zhang, Z., Malhotra, A., Melton, J. R., Poulter, B., Kaplan, J. O., Goldewijk, K., Siebert, S., Minayeva, T., Hugelius, G., Joosten, H., Barthelmes, A., Prigent, C., Aires, F., Hoyt, A. M., Davidson, N., Finlayson, C. M., Lehner, B., Jackson, R. B., McIntyre, P. B. (2023). Extensive global wetland loss over the past three centuries. *Nature*, 614, 7947, 281-286. DOI: [10.1038/s41586-022-05572-6](https://doi.org/10.1038/s41586-022-05572-6).

Frey, F. W. (1993). The political context of conflict and cooperation over international river basins. *Water International*, 18, 1, 54-68. <https://www.tandfonline.com/doi/abs/10.1080/02508069308686151>.

GEF (2024). *Tracking and measuring the socio-economic co-benefits of GEF investments*. Washington, DC: GEF. <https://www.thegef.org/council-meeting-documents/gef-c-66-12>.

GEF (2022). *GEF/C.62/03. GEF 8 Programming Directions*. 15 June 2022. Washington, DC: GEF <https://www.thegef.org/council-meeting-documents/gef-c-62-03>.

GEF/UNDP/World Bank (2003). *Reversal of Land and Water Degradation Trends in the Lake Chad Basin Ecosystem*. Project ID 767. Washington, DC: GEF <https://www.thegef.org/projects-operations/projects/767>.

GEF/UNDP (2013). *Improving Lake Chad management through building climate change resilience and reducing ecosystem stress through implementation of the SAP*. Project ID 4748. Washington, DC: GEF. <https://www.thegef.org/projects-operations/projects/4748>.

GEF/African Development Bank (2017). *Regional Project for the Conservation and Sustainable Development of Lake Chad: Enhancing Transboundary Cooperation and Integrated Water Resources Management in the Lake Chad Basin*. Project ID 9446. Washington, DC: GEF. <https://www.thegef.org/projects-operations/projects/9446>.

GEF IEO (2020). *Evaluation of GEF Support in Fragile and Conflict-Affected Situations*. Washington, DC: GEF IEO. <https://www.gefio.org/evaluations/evaluation-gef-engagement-fragile-and-conflict-affected-situations-2020>.

GEF IEO (2016). *International Waters Focal Area Study*. Evaluation Report No. 114, Washington, DC: GEF IEO. <https://www.gefio.org/evaluations/international-waters-iw-focal-area-study-2016>.

GEF IEO (2012). *The GEF in the South China Sea (SCS) and Adjacent Areas. Impact Evaluation*. October 2012, Washington, DC: GEF IEO. <https://www.gefio.org/evaluations/scs-2012>.

GEF IEO (2007). *Final Evaluation of the UNDP/GEF Project RER/01/G32 – Danube Regional Project: Strengthening the Implementation Capacities for Nutrient Reduction and Transboundary Cooperation in the Danube River Basin*. Washington, DC: GEF IEO. <https://www.gefio.org/sites/default/files/documents/projects/tes/2042-terminal-evaluation.pdf>.

GEF IEO (2005). *Program study on international waters*. Washington, DC: GEF Independent Evaluation Office, <https://www.gefio.org/evaluations/iw-study-2005>.

Georgian, S., Hameed, S., Morgan, L., Amon, D.J., Sumaila, U.R., Johns, D. & Ripple, W.J. (2022). Scientists' warning of an imperilled ocean. *Biological Conservation*, 272: 109595. <https://doi.org/10.1016/j.biocon.2022.109595>.

Giordano, M. A., & Wolf, A. T. (2003). *Sharing waters: Post-Rio international water management*. Paper presented at the Natural Resources Forum. https://transboundarywaters.ceoas.oregonstate.edu/sites/transboundarywaters.ceoas.oregonstate.edu/files/Publications/narf_051_Giordano.pdf.

GIZ (2022). *Support to transboundary water cooperation in the Nile Basin*. Eschborn: GIZ. <https://www.giz.de/en/worldwide/138720.html>.

GIZ (2023a). *Promoting peaceful transhumance*. Eschborn: GIZ. <https://www.giz.de/en/worldwide/126936.html>.

GIZ (2023b). *Safeguards & Gender Management System (S+G). Integrated Peace and Conflict Assessment & Human Rights Analysis (iPCA)*. Presentation at the Workshop "Achieving durable global environmental benefits in fragile and conflict-affected situations." 27 November 2023.

- GIZ (2023c). *Applied Water Resource Management in the Lake Chad Basin II (GIZ-CBLT)*, Eschborn: GIZ. <https://www.giz.de/de/downloads/giz2023-en-factsheet%20CBLT.pdf>.
- GIZ (2024). *Avoiding water conflicts*. Eschborn: GIZ. <https://www.giz.de/en/workingwithgiz/waterconflicts.html>.
- Gleick, P., & Shimabuku, M. (2023). Water-related conflicts: definitions, data, and trends from the water conflict chronology. *Environmental Research Letters*, 18, 3, 034022. <https://iopscience.iop.org/article/10.1088/1748-9326/acbb8f>.
- Gleick, P. H. (2014). Water, Drought, Climate Change, and Conflict in Syria. *Weather, Climate, and Society*, 6, 3, 331-340. <https://doi.org/10.1175/WCAS-D-13-00059.1>.
- Gleick, P. H., Yolles, P. & Hatami, H. (1994). Water, War & Peace in the Middle East. *Environment: Science and Policy for Sustainable Development*, 36, 3, 6-42. https://atmos.washington.edu/academics/classes/2003Q4/211/articles_optional/Water_War_Middle_East.pdf.
- Gleditsch, N. (1997). *Conflict and the Environment*, Dordrecht: Kluwer, NATO ASI Series. https://link.springer.com/chapter/10.1007/978-94-015-8947-5_6.
- Govella, K. (2023). Avoiding and exploiting the tragedy of the commons: fishing, crime, and conflict in the South China Sea. *International Politics*, 60, 6, 1294-1314. <https://link.springer.com/article/10.1057/s41311-023-00501-4#citeas>.
- Griffin, T.E. (2020). Lake Chad: Changing hydrography, violent extremism, and climate-conflict intersection. *Expeditions with MCUP*, 2020, 1-30. <https://www.usmcu.edu/Outreach/Marine-Corps-University-Press/Expeditions-with-MCUP-digital-journal/Lake-Chad/>.
- Hassan, M. J. b. (2000). Disputes in the South China Sea: Approaches for Conflict Management. In C. Derek da (Ed.), *Southeast Asian Perspectives on Security*. Singapore: ISEAS Publishing, 98-113. <https://bookshop.iseas.edu.sg/publication/1541>.
- Heinrich-Böll-Stiftung (2017). *The Ocean Atlas. Facts and Figures about our Relationship with the Ocean*. Kiel: Heinrich-Böll-Stiftung. <https://www.boell.de/en/oceanatlas>.
- HigherGov (2023). *South Caucasus Regional Water Management Program*, Request for proposals. <https://www.highergov.com/contract-forecast/south-caucasus-regional-water-management-program-1046870/>.
- Huggins, X., Gleeson, T., Kummu, M., Zipper, S. C., Wada, Y., Troy, T. J., & Famiglietti, J. S. (2022). Hotspots for social and ecological impacts from freshwater stress and storage loss. *Nature Communications*, 13, 1, 439. <https://www.nature.com/articles/s41467-022-28029-w>.
- Iceland, I. (2020). *How to Solve Water-Related Conflicts*. Washington, DC: World Resource Institute. <https://www.wri.org/insights/how-solve-water-related-conflicts>.
- Ide, T., Lopez, M. R., Fröhlich, C., & Scheffran, J. (2021). Pathways to water conflict during drought in the MENA region. *Journal of Peace Research*, 58, 3, 568-582.
- IGRAC & UNESCO-IHP. (2021). *Transboundary Aquifers around the World. Update 2021*, Delft: IGRAC/United Nations. <https://unesdoc.unesco.org/ark:/48223/pf0000380193>.
- International Crisis Group (2024). *10 Conflicts to Watch in 2024*, 1 January 2024. <https://www.crisisgroup.org/global/10-conflicts-watch-2024>.
- IPBES (2019). *IPBES Global Assessment Summary for Policymakers*. <https://www.ipbes.net/global-assessment>.
- IPCC (2023). *Sections. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC, 35-115. https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf.
- Jägerskog, A. (2003). *Why states cooperate on shared water: The water negotiations in the Jordan Basin*. PhD-Thesis, Linköping. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=74580d7dff04bbe6521fdea4e9a1bbb90c2bd413>.

- Kalpajian, J. (2004). *Identity, conflict and cooperation in international river systems*. Ashgate, Aldershot. https://www.researchgate.net/publication/240704730_Kalpajian_Jack_2004_Identity_Conflict_and_Cooperation_in_International_River_Systems_Aldershot_Ashgate_vii_213_pp_ISBN_0754633381.
- Kamta, F. N., Schilling, J., & Scheffran, J. (2021). Water Resources, Forced Migration and Tensions with Host Communities in the Nigerian Part of the Lake Chad Basin. *Resources*, 10, 4, 27. <https://doi.org/10.3390/resources10040027>.
- Kåresdotter, E., Skoog, G., Pan, H., & Kalantari, Z. (2023). Water-related conflict and cooperation events worldwide: A new dataset on historical and change trends with potential drivers. *Science of The Total Environment*, 868, 161555. <https://www.sciencedirect.com/science/article/pii/S0048969723001705?via%3Dihub>.
- Kaval, P. (2019). Integrated catchment management and ecosystem services: A twenty-five-year overview. *Ecosystem Services*, 37, 100912. <https://ideas.repec.org/a/eee/ecoser/v37y2019ic8.html>.
- Klare, M. (2020). Climate Change, Water Scarcity, and the Potential for Interstate Conflict in South Asia. *Journal of Strategic Security*, 13, 4, 109-122. <https://www.jstor.org/stable/26965521>.
- Lowi, M. and Rothman, J. (1993). Arabs and Israelis: The Jordan River. Faure, G. & Rubin, J. (eds.). *Culture and negotiations: The resolution of water disputes*. Newbury Park: Sage, 156-175. <https://unesdoc.unesco.org/ark:/48223/pf0000103846>.
- Mach, K. J., Kraan, C. M., Adger, W. N., Buhaug, H., Burke, M., Fearon, J. D., Field, C., Hendrix, C., Maystadt, J.-F., Loughlin, J., Roessler, P., Scheffran, J., Schultz, K. & von Uexkull, N. (2019). Climate as a risk factor for armed conflict. *Nature*, 571, 7764, 193-197. doi: 10.1038/s41586-019-1300-6.
- Mackelworth, P. C., Teff Seker, Y., Vega Fernández, T., Marques, M., Alves, F. L., D'Anna, G., Fa, D., Goldborough, D., Kyriazi, Z., Pita, C., Portman, M., Rumes, B., Warr, S. & Holcer, D. (2019). Geopolitics and Marine Conservation: Synergies and Conflicts. *Frontiers in Marine Science*, 6. <https://doi.org/10.3389/fmars.2019.00759>.
- Mathews, R. E., Tengberg, A., Sjödin, J., & Liss-Lymer, B. (2019). *Implementing the source-to-sea approach: a guide for practitioners*. Stockholm: SIWI. https://siwi.org/wp-content/uploads/2019/07/source-to-sea-guide_webb.pdf.
- McCracken, M., Schmeier, S., Turgul, A., Van Den Hoek, J., Peters, L. & Wolf, A. (2024). *Navigating Troubled Waters: A Framework for the Effectiveness of Dispute Resolution Processes in Transboundary Waters*, Peaceworks Publication. Washington D.C.: United States Institute for Peace (forthcoming).
- Ministry of Environmental Protection and Agriculture of Georgia (2023). *Nino Tandilashvili discusses programs planned in the South Caucasus region*. 19 December 2023. <https://mepa.gov.ge/En/News/Details/21536>.
- Moore, S. A., Brown, G., Kobryn, H., & Strickland-Munro, J. (2017). Identifying conflict potential in a coastal and marine environment using participatory mapping. *Journal of Environmental Management*, 197, 706-718. doi:<https://doi.org/10.1016/j.jenvman.2016.12.026>
- Muller, M. (2015). *Contribution of cooperative management of water resources to regional integration in SADC, Trade & Industrial Policy Strategies*. South Africa. <https://policycommons.net/artifacts/4862330/contribution-of-cooperative-management-of-water-resources-to-regional-integration-in-sadc/5699385/>.
- Munia, H. A., Guillaume, J. H. A., Wada, Y., Veldkamp, T., Virkki, V., & Kummu, M. (2020). Future Transboundary Water Stress and Its Drivers Under Climate Change: A Global Study. *Earth's Future*, 8, 7, e2019EF001321. <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2019EF001321>.
- Nemeth, S. C., Mitchell, S. M., Nyman, E. A., & Hensel, P. R. (2014). Ruling the Sea: Managing Maritime Conflicts through UNCLOS and Exclusive Economic Zones. *International Interactions*, 40, 5, 711-736. <https://www.tandfonline.com/doi/abs/10.1080/03050629.2014.897233>.
- Niyitunga, E. B. (2019). A conceptual analysis for understanding water scarcity and its threats to international peace and security. *African Journal of Public Affairs*, 11, 3, 95-117. <https://journals.co.za/doi/pdf/10.10520/EJC-19606370bb>.
- NRDC (2019). Marine biodiversity in dangerous decline, finds new report. NRDC, 6 May 2019. <https://www.nrdc.org/bio/lauren-kubiak/marine-biodiversity-dangerous-decline-finds-new-report>.

- Okpara, U. T., Stringer, L. C., Dougill, A. J., & Bila, M. D. (2015). Conflicts about water in Lake Chad: Are environmental, vulnerability and security issues linked? *Progress in Development Studies*, 15, 4, 308-325. <https://journals.sagepub.com/doi/10.1177/1464993415592738>.
- Oregon State University (2024). *Transboundary Freshwater Diplomacy Database (Treaty Database/RBO Database)*, Corvallis. <https://transboundarywaters.ceoas.oregonstate.edu/transboundary-freshwater-diplomacy-database>.
- Pincus, R. H., Ali, S. H., & Speth, J. G. (2015). *Diplomacy on Ice: Energy and the Environment in the Arctic and Antarctic*. New Haven: Yale University Press. <https://yalebooks.yale.edu/book/9780300205169/diplomacy-on-ice/>.
- Pohl, B., Kramer, A., Hull, W., Blumstein, S., Abdullaev, I., Kazbekov, J., et al. (2017). *Rethinking Water in Central Asia – The costs of inaction and benefits of water cooperation*. Berlin. <https://climate-diplomacy.org/magazine/cooperation/rethinking-water-central-asia-costs-inaction-and-benefits-water-cooperation>.
- Pomeroy, R., Parks, J., Mrakovcich, K. L., & LaMonica, C. (2016). Drivers and impacts of fisheries scarcity, competition, and conflict on maritime security. *Marine Policy*, 67, 94-104. <https://www.sciencedirect.com/science/article/abs/pii/S0308597X16000105?via%3Dihub>.
- Ratner, B.D. & Stafford Smith, M. (2020). *Multi-stakeholder dialogue for transformational change. A STAP Advisory Document. Scientific and Technical Advisory Panel to the Global Environment Facility*. Washington, DC: GEF STAP. <https://www.stapgef.org/resources/advisory-documents/multi-stakeholder-dialogue-transformational-change>.
- Rosenblum, Z. H., & Schmeier, S. (2022). Global Wetland Governance: Introducing the Transboundary Wetlands Database. *Water* 14, 19, 3077. <https://www.mdpi.com/2073-4441/14/19/3077>.
- Schillinger, J., Özerol, G., Güven-Griemert, Ş. And M. Heldeweg. (2020). Water in war: understanding the impacts of armed conflict on water resources and their management. *WIREs Water*, 7:e1480. <https://doi.org/10.1002/wat2.1480>.
- Schmeier, S. (2013). *Governing International Watercourses. River Basin Organizations and the Sustainable Governance of Internationally Shared Rivers and Lakes*. London: Routledge. <https://www.routledge.com/Governing-International-Watercourses-River-Basin-Organizations-and-the-Sustainable-Governance-of-Internationally-Shared-Rivers-and-Lakes/Schmeier/p/book/9781138900509>.
- SDC/United Nations (2023). *Promoting transboundary water cooperation – the Blue Peace Initiative. Commitment under the 2023 UN Water Conference, SDG Action 50760*. <https://sdgs.un.org/partnerships/promoting-transboundary-water-cooperation-blue-peace-initiative>.
- Sheffield, J., Wood, E. F., Pan, M., Beck, H., Coccia, G., Serrat-Capdevila, A., & Verbist, K. (2018). Satellite remote sensing for water resources management: Potential for supporting sustainable development in data-poor regions. *Water Resources Research*, 54, 9724–9758. <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2017WR022437>.
- Shumilova, O., Tockner, K., Sukhodolov, A. et al. (2023). Impact of the Russia–Ukraine armed conflict on water resources and water infrastructure. *Nature Sustainability*, 6, 578–586. <https://doi.org/10.1038/s41893-023-01068-x>
- Stafford Smith, M. & Metternicht, G. (2022). *Refining the tracking of co-benefits in future GEF investments. A STAP Information Brief. Scientific and Technical Advisory Panel to the Global Environment Facility*. Washington, DC. <https://www.stapgef.org/resources/policy-briefs/refining-tracking-co-benefits-future-gef-investments>.
- STAP (2024). Citizen Science: a STAP background note. Washington DC: GEF STAP. <https://www.stapgef.org/resources/background-note/citizen-science>.
- STAP (2024). *Environmental security: Achieving durable outcomes in fragile and conflict-affected situations*. Washington, DC: GEF STAP, <https://www.stapgef.org/resources/policy-briefs/environmental-security-achieving-durable-outcomes-fragile-and-conflict>.
- GEF/STAP/C.66/Inf.03. (2024). Washington, DC: GEF STAP, <https://www.thegef.org/council-meeting-documents/gef-stap-c-66-inf-03>.
- STAP (2018). *Environmental security: dimensions and priorities. A STAP document*. Washington, DC: GEF STAP. <https://www.stapgef.org/resources/advisory-documents/environmental-security-dimensions-and-priorities>

- Starr, J. (1991). Water wars. *Foreign Policy*, 82, 17-36. <https://www.jstor.org/stable/1148639>.
- Stec, S., Kovandžić, J., Filipović, M., & Čolakhodžić, A. (2011). A river ran through it: post-conflict peacebuilding on the Sava River in former Yugoslavia. *Water International*, 36, 2, 186-196. <https://doi.org/10.1080/02508060.2011.558886>.
- Stoler, J., Pearson, A. L., Rosinger, A. Y., Lee, A. E., Bombardi, R., Brewis, A., Keough, S., López-Carr, D., Shrader, C. H., Stauber, C., Severson, E., Sullivan, A. & Tutu, R. A. (2022). The role of water in environmental migration. *WIREs Water*, 9, 3, e1584. [doi:https://doi.org/10.1002/wat2.1584](https://doi.org/10.1002/wat2.1584)
- Sumaila, U. R., & Bawumia, M. (2014). Fisheries, ecosystem justice and piracy: A case study of Somalia. *Fisheries Research*, 157, 154-163. <https://www.sciencedirect.com/science/article/abs/pii/S016578361400143X?via%3Dihub>.
- Swain, A. (2015). Water wars. In J. D. Wright (Ed.), *International Encyclopedia of The Social and Behavioral Sciences* (Vol. 25). Oxford: Elsevier, 443-447. https://www.researchgate.net/publication/275209001_Water_Wars.
- Swain, A., & Karim, S. (2022). *Understanding the costs of non-cooperation in the Ganges-Brahmaputra Meghna (GBM) basin*, Uppsala: Uppsala University/ICIMOD. <https://lib.icimod.org/record/35816#:~:text=Non%2Dcooperation%20over%20shared%20waters,over%20USD%2014.2%20billion%20annually>
- Thébaud, O. (1997). Transboundary marine fisheries management. Recent developments and elements of analysis. *Marine Policy*. 21, 3, 237-253. [https://doi.org/10.1016/S0308-597X\(97\)00005-5](https://doi.org/10.1016/S0308-597X(97)00005-5).
- Theisen, O. M. (2012). Climate clashes? Weather variability, land pressure, and organized violence in Kenya, 1989–2004. *Journal of Peace Research*, 49, 1, 81-96. <https://journals.sagepub.com/doi/10.1177/0022343311425842>.
- Theisen, O. M., Gleditsch, N. P., & Buhaug, H. (2013). Is climate change a driver of armed conflict? *Climatic Change*, 117, 3, 613-625. <https://link.springer.com/article/10.1007/s10584-012-0649-4>.
- Tickner, D., Opperman, J., Abell, R., Acreman, M., Arthington, A. et al. (2020). Bending the Curve of Global Freshwater Biodiversity Loss: An Emergency Recovery Plan. *BioScience*, 70, 4, 330-342. <https://academic.oup.com/bioscience/article/70/4/330/5732594>.
- Tilmant, A., & Kinzelbach, W. (2012). The cost of noncooperation in international river basins. *Water Resources Research*, 48. <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2011WR011034>.
- Turgul, A., McCracken, M., Schmeier, S., Rosenblum, Z., de Silva, L., & Wolf, A. (2024). Reflections on Transboundary Water Conflict and Cooperation Trends. *Water International*, 49, 3-4, 274-288. <https://www.tandfonline.com/doi/full/10.1080/02508060.2024.2321727>.
- Turton, A. (2000). Water wars in Southern Africa: Challenging conventional wisdom, Solomon, H. & Turton, A. (eds). *Water wars: Enduring myth or impending reality*, African Center for the Constructive Resolution of Disputes: Africa Dialogue No. 2, Mount Edgecombe: ACCORD, 35-63. <https://www.accord.org.za/publication/water-wars/>.
- Unfried, K., Kis-Katos, K., & Poser, T. (2022). Water scarcity and social conflict. *Journal of Environmental Economics and Management*, 113, 102633. <https://ideas.repec.org/a/eee/jeeman/v113y2022ics0095069622000171.html>.
- United Nations (2024). *The United Nations World Water Development Report 2024: Water for Prosperity and Peace*. Paris: UN. <https://www.unwater.org/publications/un-world-water-development-report-2024>
- UN Water (2013). *What is Water Security?* New York: UN Water, October 2013. https://www.unwater.org/sites/default/files/app/uploads/2017/05/unwater_poster_Oct2013.pdf.
- Wolf, A., Yoffe, S., & Giordano, M. (2003). International waters: identifying basins at risk. *Water Policy*, 5, 1, 29-60. https://transboundarywaters.ceoas.oregonstate.edu/sites/transboundarywaters.ceoas.oregonstate.edu/files/Publications/Wolf_et_al_Water_Policy_BAR.pdf.
- Wolf, A., 2000; Yoffe, S., Fiske, G., Giordano, M., Giordano, M., Larson, K., Stahl, K., & Wolf, A. T. (2004). Geography of international water conflict and cooperation: Data sets and applications. *Water Resources Research*, 40, 5, W05S04. [doi:10.1029/2003WR002530](https://doi.org/10.1029/2003WR002530).

- Wolf, A. (1999). Criteria for equitable allocations: the heart of international water conflict. *Natural Resources Forum*, 23, 1, 3-30. <https://onlinelibrary.wiley.com/doi/10.1111/j.1477-8947.1999.tb00235.x>.
- World Bank (2024). *Cooperation in International Waters in Africa (CIWA)*. <https://www.worldbank.org/en/programs/cooperation-in-international-waters-in-africa>.
- World Bank (2021). *Measuring success in transboundary water cooperation: lessons from World Bank engagements*, 7 October 2021. Washington, DC: World Bank. <https://blogs.worldbank.org/en/water/measuring-success-transboundary-water-cooperation-lessons-world-bank-engagements>.
- World Bank (2021). *World Bank Engagement in Transboundary Waters in West Africa: Retrospective and Lessons Learned*. Washington, DC: World Bank. https://www.ciwaprogram.org/wp-content/uploads/CIWA_World-Bank-Engagement-Transboundary-Waters-West-Africa.pdf
- World Bank (2020). *World Bank provides \$346 Million to Strengthen Resilience and Livelihoods in the Lake Chad Region*, 26 May 2020. Washington, DC: World Bank. <https://www.worldbank.org/en/news/press-release/2020/05/26/world-bank-provides-346-million-to-strengthen-resilience-and-livelihoods-in-the-lake-chad-region>.
- Xenarios, S. (2023). Water at time of war. *Nature Sustainability*, 6, 485–486. <https://doi.org/10.1038/s41893-023-01065-0>.
- Xu, L., & Famiglietti, J. S. (2023). Global patterns of water-driven human migration. *WIREs Water*, 10, 4, e1647. <https://wires.onlinelibrary.wiley.com/doi/10.1002/wat2.1647>.
- Yoffe, S., Fiske, G., Giordano, M., Giordano, M., Larson, K., Stahl, K., & Wolf, A. T. (2004). Geography of international water conflict and cooperation: Data sets and applications. *Water Resources Research*, 40, 5. <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2003WR002530>.