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Bridging Gaps in Water Governance: Addressing Conflict and Climate Challenges

Despite frequent warnings of 'water wars', conflicts over water rarely escalate into violence. While most disputes over water access, quantity, or infrastructure remain non-violent, the gap between national water diplomacy and local water disputes presents a critical governance challenge. Such challenges are more severe in regions affected by armed conflict and climate stress, with water shortages disrupting livelihoods and aggravating inequalities. This policy brief examines conflict- and climate-related challenges to water governance and explores how multi-level collaboration can bridge the gap between global policies and lived realities.

Brief Points

- Gaps between country-level water diplomacy and unresolved local-level water disputes hinder effective water governance.
- Areas impacted by both armed conflict and climate change are at higher risk of water scarcity.
- Environmental stressors can amplify war-induced intergroup tensions.
- Empowering local actors strengthens resilience and can connect global policies to local realities.
- Resource scarcity can undermine cooperation by furthering in-group biases.
- Effective water governance integrates national policies, regional frameworks, and grassroots actions to address interconnected challenges.

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Introduction

The gap between national water diplomacy and unresolved local water disputes is a critical water governance challenge. *Water governance* refers to the systems, rules, and practices that guide water management decisions. It determines how different groups express concerns and interests, and how key management actors are held accountable.[1]

Transboundary water treaties, such as those for the Nile or Mekong, tend to focus on macro-level water-sharing arrangements, but often fail to address local water allocation issues. For example, disputes between agricultural communities over irrigation priorities or between urban and rural populations over access to water often persist despite broader agreements. For instance, the Nile River Basin Commission promotes regional cooperation, yet its framework remains contested – Ethiopia, Rwanda, and Uganda signed the Cooperative Framework Agreement (CFA), while Egypt and Sudan withheld their signatures. This divergence highlights the challenge of balancing national priorities with equitable resource sharing. Figure 1 illustrates that armed conflicts persist even in regions with high transboundary water cooperation. Meanwhile, local farmers, pastoralists, and water users too often bear the burden of unresolved governance disputes.

Grassroots initiatives seek to fill governance gaps with varied success. For instance, Sahel pastoralist communities have developed informal water agreements, but political instability and weak national support often undermine these efforts. Similarly, in South Asia, India's national water management policies often overlook local conflicts, such as disputes between farmers and neighbouring communities dependent on the same resources. These local tensions can escalate because national frameworks prioritize industrial or urban needs over local concerns. This disconnect highlights the need to bridge national water diplomacy with local realities. Without mechanisms that integrate grassroots concerns into broader governance frameworks, national agreements risk worsening local disputes. Embedding local-level governance in national strategies, supported by state and non-state actors, ensures water cooperation benefits reach the communities most affected by scarcity.

Water governance challenges are more severe in regions with weak political institutions, armed conflict and climate change pressure. Severe water scarcity disrupts livelihoods and exacerbates tensions. Armed conflicts often destroy vital water infrastructure, adding to climate change impacts like droughts or erratic rainfall. In South Sudan, ongoing conflicts have left millions without reliable water access, straining agricultural and pastoral livelihoods. Similarly, in Syria, water mismanagement, conflict and drought together contributed to harvest failures.

Environmental stressors and political instability create feedback loops where water scarcity both results from and worsens insecurity. Drought, groundwater depletion, and desertification amplify intergroup tensions in regions with weak governance. In the Sahel, prolonged dry seasons have intensified disputes between herders and farmers. Without inclusive water-sharing frameworks, such conflicts can escalate. Addressing such challenges requires coordinated, inclusive water governance that integrates all stakeholders, including marginalized communities, to provide opportunities for collaboration.

Impacts of War on Water Access

Wars disrupt immediate access to water, including drinking water and water for sanitation, often with devastating effects on health and nutrition. Armed conflicts frequently target water infrastructure such as dams, reservoirs, and wastewater treatment facilities, as seen in Ukraine and Syria. The destruction of water pipes, pumping systems, and treatment plants leads to contamination and unsafe water supplies, which can cause outbreaks of waterborne diseases in affected areas. For example, in southern Syria, access to piped water supply drastically decreased within a year of intense fighting, illustrating the immediate health crises that wars can trigger. Refugees and displaced populations are particularly vulnerable, with water access in camps often falling far below minimum requirements, exacerbating hygiene challenges and exposing women and girls to heightened risks of gender-based violence during water collection.

Beyond immediate impacts, wars inflict long-term damage on water infrastructure, leaving societies vulnerable to extreme weather events and water scarcity. The lack of regulated water access also hinders agricultural productivity, disrupts ecosystems, and undermines economic recovery efforts. Pollution caused by damaged infrastructure and military activity further contaminates critical water sources, with toxic pollutants lingering in aquifers and freshwater bodies, as observed in Ukraine and Iraq. Such prolonged disruptions diminish the ability of already weakened communities to adapt to climate challenges and impede the rebuilding of resilient, sustainable societies.

Wars also destabilize the governance systems and agreements that regulate water use across levels, from local to transboundary. Conflicts often divert resources away from water governance, undermining cooperative frameworks and institutional resilience. For example, maintenance of water infrastructure is deprioritized during war, leading to deregulated use and overexploitation of resources. More generally, without democratic oversight, military construction projects can fail to adhere to environmental guidelines, further exacerbating governance failures. The breakdown of formal agreements and oversight leaves room for unregulated and inequitable access, creating tensions that can escalate into local conflicts. In areas where rebuilding trust and cooperation is critical, war erodes the institutional foundations necessary for sustainable water management, perpetuating cycles of scarcity and instability.

Addressing the impacts of water scarcity in conflict-prone regions requires bridging the gap between national policies and local needs, especially where environmental and conflict risks intersect. This involves rebuilding damaged infrastructure, restoring governance systems, and fostering trust among communities deeply affected by war and resource competition. In post-conflict settings, integrating conflict-sensitive water management strategies into broader frameworks is essential for mitigating tensions and supporting long-term resilience. While armed conflict severely disrupts governance systems, examples from more stable contexts – such as the Senegal River Basin Development Organization – illustrate the potential of collaborative water governance to mediate disputes and promote regional stability. By designing water-sharing frameworks that account for both environmental and social vulnerabilities, stakeholders can strengthen climate resilience and reduce the risk of future conflicts.

Cooperative water-sharing efforts often arise in response to pressing local needs, showcasing the resilience of communities. Informal agreements between farmers, herders, and local water users demonstrate how grassroots solutions can mitigate resource conflicts. For instance, in Burkina Faso, community-led irrigation schemes have enabled equitable water distribution during dry seasons, fostering collaboration

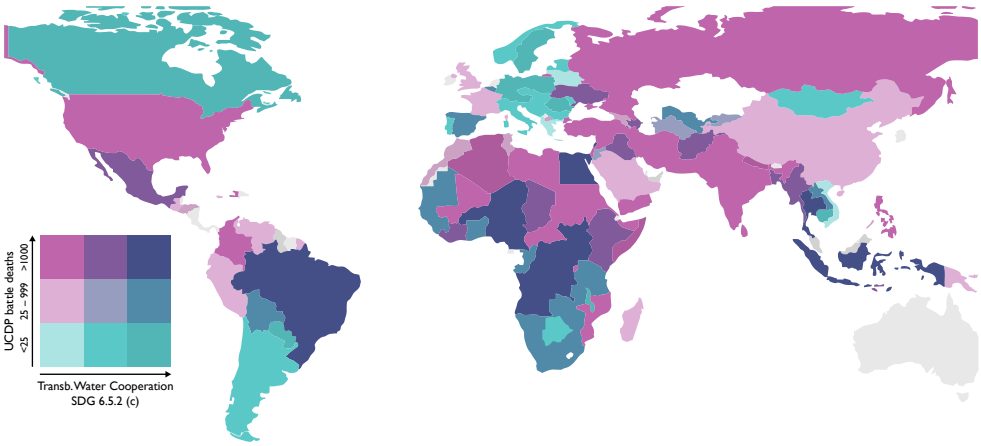

Figure 1: Armed conflict and transboundary water cooperation[2]

across ethnic and livelihood groups. Similarly, in India's drought-affected regions, village-level water management committees have successfully implemented rotational water-sharing schedules to sustain agriculture and domestic needs. These initiatives highlight the potential of local actors to craft solutions tailored to their specific environmental and social contexts.

However, institutional and resource gaps often limit the scalability and sustainability of these cooperative efforts. Many grassroots initiatives lack formal recognition or support from national governments, leaving them vulnerable to collapse under resource pressures or broader political conflicts. In regions with limited infrastructure, such as rural Ethiopia, efforts to share groundwater or irrigation facilities can be undermined by insufficient access to technical expertise or funding for maintenance. Additionally, the absence of clear legal frameworks for water rights exacerbates disputes, as seen in areas where upstream users dominate water access to the detriment of downstream communities. These institutional voids not only hinder local initiatives but also prevent their integration into broader water governance strategies.

To scale up these cooperative solutions, it is essential to bridge the gap between grassroots efforts and formal governance structures. Governments and international organizations can play a pivotal role by providing financial and technical support, formalizing water-sharing agreements, and ensuring equitable access to resources. By embedding local solutions within larger frameworks, such as river basin organizations or transboundary water treaties, stakeholders can enhance the resilience and reach of cooperative water management. These efforts can transform isolated successes into scalable models, ensuring that the benefits of local ingenuity are shared across broader communities, with potential impact on peacebuilding efforts.

Bridging National, Regional, and Local Water Governance

Effective water cooperation requires a governance framework that links national agreements, regional coordination, and local implementation. While transboundary treaties like those for the Nile or Jordan River set principles for resource sharing, their success depends on institutional mechanisms that ensure compliance and conflict resolution.

At the regional level, frameworks like the United Nations Watercourses Convention are pivotal in harmonizing policies across water-sharing countries. Regional collaboration is vital for managing upstream-downstream tensions, pollution, and over-extraction. Frameworks like the EU's Water Framework Directive are better equipped to mediate conflicts and foster cooperative solutions. However, local implementation remains key to translating these agreements into tangible benefits for communities. The success of localized efforts often depends on aligning them with broader national and regional strategies. For instance, research from drought-prone regions shows that grassroots engagement in water cooperation can create innovative solutions that improve resource allocation[2].

Additionally, coherent multi-level governance frameworks are key to addressing climate change, demographic changes, and competing water demands. By fostering collaboration across governments, regional institutions, and local communities, such governance enhances resilience and can make water cooperation a driver of peace and sustainability. As extreme weather events become more common, we need more adaptive policies.

Microlevel Perspective

Understanding individual perspectives is crucial for addressing the compounded challenges of water scarcity and armed conflict, as personal experiences will shape future responses to crises. Climate change is reshaping the world in unexpected ways, including the increasing frequency and severity of drought. While much research focuses on its environmental and economic impacts, less attention is given to its effects on social behaviour, particularly cooperation. A key aspect of cooperation is altruism, willingness to help others even at a personal cost. Drought can alter social dynamics, especially in conflict-affected regions, as scarcity often leads individuals to prioritize their own needs over assisting others, particularly outside their immediate group. This means that understanding psychological responses to resource scarcity is key. When resources become limited, people tend to focus on their own survival, often at the expense of cooperation. This effect can be particularly pronounced in areas where livelihoods depend heavily on natural resources, such as agriculture. In these situations, people may become less willing to compromise their welfare for the benefit of others, leading to broader societal impacts and potentially exacerbating existing tensions.

Group identity can play a significant role in determining how people respond to scarcity. Under scarcity conditions, individuals may be more inclined to help those within their own community, rather than those from different backgrounds. Historical tensions can further amplify this effect, making it harder for people to extend support to those they perceive as outsiders. However, as conditions improve, this bias can also diminish, suggesting that cooperation can be fostered when resources are more abundant. Resource scarcity linked to climate change risks deepening pre-existing social divisions. This highlights the importance of strategies that foster cross-group empathy and cooperation in the face of climate-induced challenges.

Governance that bridges such micro-level dynamics with macro-level frameworks is crucial for reaching all water users. Individual responses to resource scarcity, such as reduced altruism or heightened in-group bias, often manifest in local disputes. These behaviours can create ripple effects that influence the success or failure of larger agreements like transboundary water treaties. For instance, unresolved tensions between local communities may undermine broader macro-level frameworks if local stakeholders perceive treaties as neglecting local needs. Conversely, grassroots initiatives that foster collaboration, such as rotational water-sharing schemes, can support macro-level stability by reducing competition and strengthening the foundation for regional agreements. By incorporating micro-level insights into macro-level policy design, stakeholders could improve the resilience within water governance systems, ensuring that treaties address both immediate community concerns and broader transboundary challenges. Yet, if power structures are imbalanced or democratic values are weak, local inclusion can exclude minorities. Thus, ensuring fair representation, transparency, and inclusive decision-making in water governance is essential.

Technological innovation offers a critical pathway for bridging gaps between grassroots efforts and broader governance strategies, but its success depends on trust and knowledge-building. Data-driven tools, such as satellite monitoring and mobile applications, can empower local communities with access to real-time climate information, water availability, and quality metrics. For instance, sustainable irrigation systems equipped with sensors can optimize water use for smallholder farmers, reducing conflicts over limited resources. At the same time, regional actors and governments can use similar tools to capture subnational differences in water demand, which helps to identify priority areas for intervention. However, while artificial intelligence (AI) and other big data tools are often universally promoted, technology alone is no panacea, particularly in areas plagued by corruption or low trust in governance. Open data and AI use require transparent processes, robust accountability measures, and active stakeholder engagement to avoid misuse. Without addressing systemic issues such as unequal access to technology or weak institutions, even the most advanced tools risk reinforcing existing disparities rather than solving them. By fostering trust, transparency, and collaboration, technology can support adaptive and equitable water governance systems.

Implications for Bridging Governance Gaps

Water governance requires proactive adaptation, particularly in democratically less stable and conflict-prone states. Research can identify best practices for climate-resilient infrastructure, such as drought-resistant crops and community-level water storage systems, to reduce vulnerability to extreme weather events. Integrating climate risk assessments into planning processes ensures water-sharing agreements remain viable under shifting environmental conditions. Additionally, research can underscore the need for conflict-sensitive adaptation strategies that prioritize equitable resource distribution and foster trust-building among diverse stakeholder groups.

Evaluating policy initiatives and interventions is another critical area where research can bridge national and local water governance. Rigorous assessments, such as randomized controlled trials, can help identify effective strategies and improve accountability mechanisms. Such evaluations can reveal which grassroots initiatives more successfully scale sustainable water management practices.

While researchers are not policymakers, their findings can inform evidence-based decision-making, enabling international donors and regional organizations to offer targeted technical expertise and foster cross-border knowledge sharing. Evidence-based policymaking, grounded in strong scientific methodologies, provides a foundation for moving beyond ad hoc solutions and toward systematic, adaptive governance.

Water governance intersects with climate resilience, conflict prevention, and equitable development. While global agreements and national policies provide frameworks for resource management, their success depends on local implementation and the inclusion of grassroots voices. Conflict-affected and environmentally stressed regions need coordinated efforts to rebuild infrastructure, restore trust, and foster cooperation. By integrating scientific insights, innovative technologies, and inclusive governance strategies, stakeholders may be able to transform water challenges into opportunities for sustainable growth and stability. Ensuring evidence-based, adaptive solutions is crucial for addressing water scarcity, governance, and peacebuilding. ■

Notes

1. The definition is based on OECD Principles on Water Governance, adopted by the OECD Regional Development Policy 2015.
2. Conflict data for years 2000–2023 based on: Davies et al. (2024) Organized violence 1989–2023, and the prevalence of organized crime groups. *Journal of Peace Research* 61(4) 673–693. Water data represents the proportion of transboundary river and lake basins with an operational arrangement for water cooperation, as of 2023, see SDG 6.5.2 (c), UN SDG Global Database. White areas mean no data available.

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THE PROJECT

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