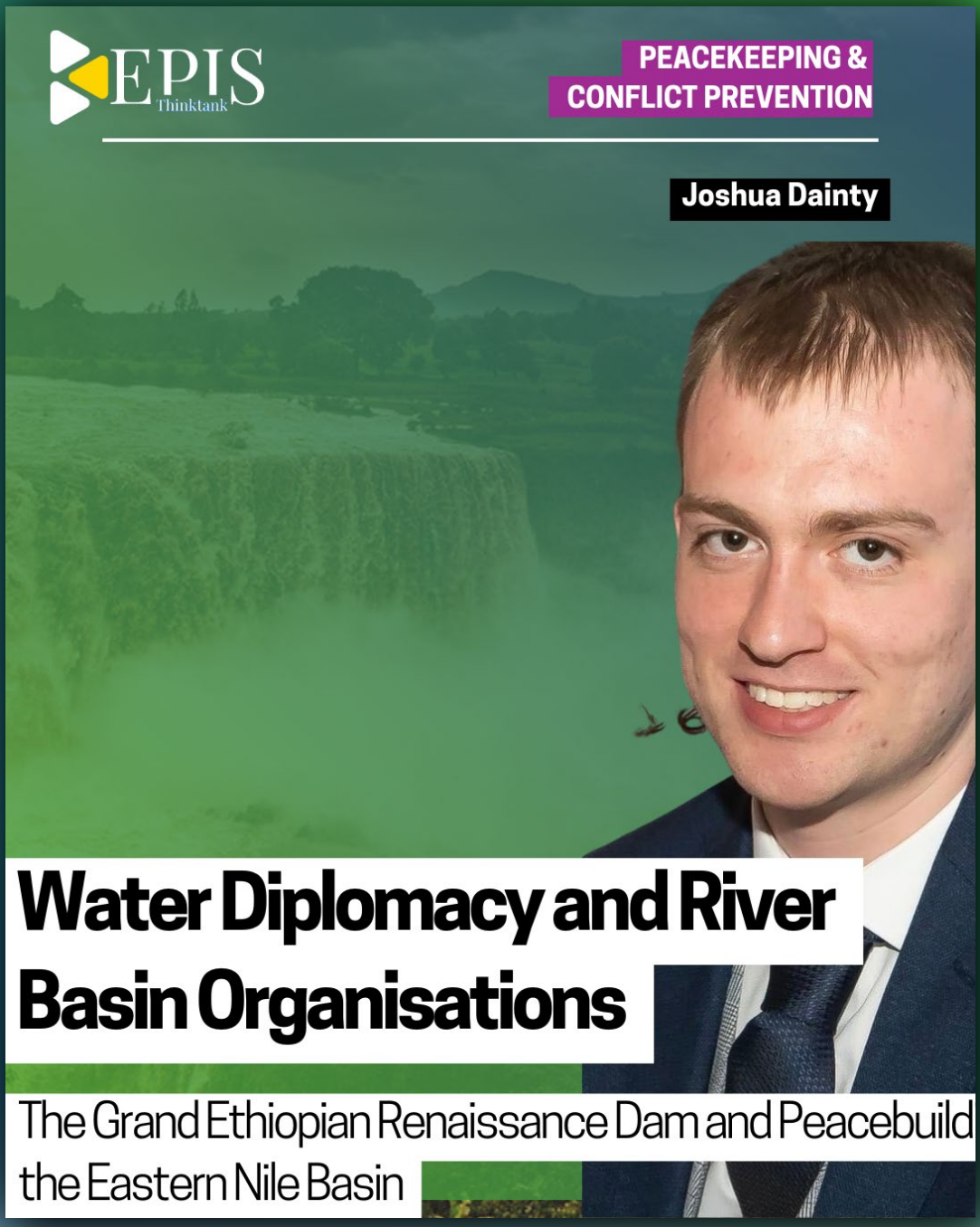

About the Article

As climate change and mega-infrastructure projects intensify competition over shared river basins, it is more important than ever before to explore the capacity and limitations of transboundary water governance in preventing hydropolitical conflict. This article asks how river basin organisations and technological innovations in hydrological modelling serve as peacebuilding measures in East Africa.

About the Author

Joshua Dainty is a student of Politics & International Relations with a strong academic interest in the intersection of economy, geography, and political violence, with a particular research focus on war zones deeply affected by civil conflict and instability. Joshua firmly believes in the potential for politics to provide careful and considered approaches towards the humane resolution of civil conflict.

1. Introduction to Peacebuilding

East Africa is presently experiencing a profound shift in the balance of hydropower along the River Nile. The Nile Basin Cooperative Framework Agreement (CFA), which finally entered into force in October 2024, marks a new chapter of transboundary water governance for the region. Meanwhile, the official opening of the Grand Ethiopian Renaissance Dam (GERD) in September 2025 has reshaped the geopolitical terrain on which questions of water rights, national security, and resource utilisation have long been contested. Within a month of its inauguration, Egypt has blamed surging floodwater levels and population displacement on this controversial water development project, with GERD now emerging as a major diplomatic faultline. Hydropolitical pressures on water availability, rising regional energy demands, and the compounding effects of climate change and environmental degradation add further urgency to these recent developments. This article examines various challenges facing the Eastern Nile Basin, a region increasingly defined by water stress. In doing so, it assesses the performance of river basin organisations in supporting peaceful Nile riparian relations, facilitating the equitable utilisation of shared water resources, and therefore mitigating hydropolitical conflict. Most importantly, this article asks whether data-driven mechanisms can meaningfully address power imbalances in the Eastern Nile Basin. Johan Galtung's (1975) distinction between negative and positive peace provides the theoretical foundations for a peacebuilding approach to conflict prevention. His writings draw attention to relations of power and violence between conflict actors, examining a broad typology of harms that may be inflicted in the course of conflict. Galtung identifies the uneven distribution of power as a form of structural violence, particularly when legal-political arrangements reinforce power asymmetries between actors (Parsons 2007). Applied to water diplomacy, Galtung's perspective on relations of dominance allows us to move beyond strict environmental determinism and invites us to consider the latent influence of structural violence on hydropolitical conflict. In the case of the Eastern Nile Basin, uneven allocations of waterflow and the unequal utilisation of freshwater resources may constitute forms of structural violence. In other words, water development projects are communications of structural power. These conditions render water availability politically salient, even in the absence of physical water scarcity. Conversely, a peacebuilding approach to conflict prevention requires embedding „peace structures" into existing legal-political infrastructure, where river basin organisations and transboundary water governance agreements provide the institutional space to peacefully negotiate divergent interests on water resource development. However, it remains an open question whether such arrangements provide the prerequisite conditions for transboundary cooperation in East Africa. The Nile Basin Initiative (NBI) has historically failed to garner sufficient political support among Nile riparians, with poor trust weakening formal agreements. The trust-building and knowledge-sharing capacity of emerging technological innovations may fortify transboundary water governance against the threats posed by climate change and geopolitical tensions in East Africa (Döring and Kim 2025). Therefore, this article shall hold both institutional design and technological mechanisms to be essential in understanding the future of water diplomacy for the Eastern Nile Basin. Viewed through this analytical lens, the GERD and CFA will test whether transboundary governance can resolve long-standing hydropolitical disputes surrounding shared river basins.

2. Conceptualising Hydropolitics for the Eastern Nile Basin

Hydrology has long been recognised as a national security issue, particularly in arid and semi-arid regions where water stress may significantly constrain economic growth and development opportunities. Access to reliable water supplies underpins irrigation, hydropower generation, and inland navigation, while also providing the critical infrastructure necessary for sanitary drinking water and industrial, agricultural, and aquacultural

development. Consequently, water resources are framed as strategic assets within highly securitised political discourses. The impacts of inequitable utilisation on national security create the structural conditions under which resource inequities are weaponised as instruments of violence (Gleick 1993). The adverse effects of large-scale water development projects on shared river basins and underground aquifers are often central to hydropolitical disputes. Ownership of shared watercourses is a heavily securitised policy domain, with hydropolitical conflicts typically foregrounded by contested water rights under international law, with upstream legal-political demands for „equitable and reasonable" utilisation placed in direct contravention of historical rights involving downstream water allocations (Genderen and Rood 2011). Any water development project affecting the regularity, volume, and sedimentation of waterflows may produce serious ecological and economic costs for other riparians. The risk of conflict escalation is further inflamed by the absence of formal transboundary water governance agreements combined with poor regulatory enforcement capacity (Wolf 2007). Conceptions of human security emphasise freshwater availability as a national security issue, which sets the stage for hydropolitical analyses of shared water resource development. However, these analytical frameworks fail to account for how inequitable utilisation and domination are successfully normalised in transboundary water governance. Power asymmetries between riparian states make room for dominant actors to assert agenda-framing powers, secure access and control of freshwater resources, leverage bilateral ties and development objectives in the face of resource-related competition, and satisfy domestic demands almost entirely at the disadvantage of other riparians. To borrow a term from Zeitoun and Warner (2006), „hydro-hegemony" adequately describes how power is exercised by dominant actors and distributed between upstream and downstream Nile riparians. This seminal paper establishes how hydro-hegemony is communicated through various strategic practices, with the Nile Basin largely shaped by resource capture and active unilateralism expressed through hydraulic nationalism, research nationalism, technocratic centralisation, securitised discourses of water policy, and even covert action against riparians. Most importantly, hydro-hegemony demonstrates how the hydrogeological control of water resources is mobilised to structure power relations, which in turn influences the scope and intensity of hydropolitical conflict. Hydro-hegemony within transboundary river basins is neither fixed nor uncontested, but is dynamic and continually challenged by institutional and legal-political pressures. Whereas active unilateralism generally occurs in the absence of cooperative agreements and effective international law, counter-hegemony exists as a series of normative and institutional mechanisms that may offset existing dominative arrangements of inequitable utilisation (see: Ali 2025).

Figure 1: The River Nile

3. Water Stress and the Grand Ethiopian Renaissance Dam

Water stress exists when riparian states fail to meet resource demands, whether due to intentional obstruction or uneven allocation of water supply (Gleick 1993). Egypt invokes historical rights and fixed water allocations enshrined by the 1959 Nile Waters Agreement. Upstream states reject these provisions as a violation of riparian water rights, instead advocating for an international regime to replace colonial-era bilateral agreements, culminating in the ratification of the CFA (Ani et al. 2018). Spanning across eleven riparian states, the Nile represents one of the most geopolitically sensitive and hydrologically interdependent waterways on Earth. Ethiopia is home to the Nile's largest tributary by volume, the Blue Nile, which contributes over eighty-five per cent of total streamflow. With GERD now fully operational for hydropower generation, this hydraulic project will host the largest reservoir in Africa and increase Ethiopia's energy capacity. This significantly enhances Ethiopia's ability to address domestic energy shortages, with a majority of the Ethiopian population without reliable access to electricity (Matthews and Vivoda 2023). The implications for downstream riparians are huge. Dam construction poses an especially serious risk to Egyptian water security, with GERD predicted to affect Egypt's energy capacity, flood management, crop yields, agricultural deficits, unemployment, industrial production, and rural development rates (El-Nasher and Elyamany 2023; Hussain 2025; Mlambo and Masuku 2025). Water resources management is further complicated by climatic pressures on hydrological extremes, with increasingly unpredictable long-term forecasts of high-water and low-water variability that may disrupt existing streamflow patterns. East Africa is particularly vulnerable to the effects of climate change on water stress, where transboundary cooperation remains weak with precarious political support and riparian state fragility. Mega-infrastructure projects like GERD will play a pivotal role in the future of transboundary governance and water allocations (Amin et al. 2025). In the past, the African Union has expressed concerns over humanitarian costs associated with unilateral mega-infrastructure projects and the resulting weaponisation of shared river basins in hydropolitical conflict (Ani et al. 2018). In October 2025, the GERD dispute reached a new climax after severe flooding affected the Nile Delta, with Egypt's Ministry of Irrigation blaming Ethiopia's flagship water development project for exacerbating floodwater levels. GERD has already been implicated in record-breaking floods and mass displacement of several villages in Sudan's Bahri District. Hydropolitical conflicts surrounding dam construction are not without precedent, with the Aswan High Dam alone responsible for the forced resettlement of Nubian communities, affected waterflows and floodwater levels, disturbed disease ecologies, and economic dislocation. These dynamics constitute a form of structural violence, where active unilateralism disrupts water systems, damages livelihoods, and systemically exposes populations to social harms. Egypt's response to water stress along the River Nile is widely cited as a case of hydro-hegemony, characterised by resource capture and containment strategies wherein dominance is maintained via coercive, diplomatic, financial, and normative mechanisms. Centralised water management systems and securitised water policy leave little room for participatory reforms and transboundary cooperation (Azeez et al. 2025). Attempts to build mega-infrastructures on the Blue Nile are usually met with war rhetoric, with explicit threats of military force against Ethiopia a frequent fixture in domestic Egyptian politics (Tekuya 2020). Water stress in the Eastern Nile Basin also holds wider regional security implications, with Egypt's expanding military presence in Somalia increasingly considered a proxy operation for the GERD dispute (Tessema 2025). At its most fundamental level, the political impasse surrounding the GERD reservoir highlights a triangular antagonism between Egypt,

Hydro-hegemony within transboundary river basins is neither fixed nor uncontested, but is dynamic and continually challenged by institutional and legal-political pressures

Sudan, and Ethiopia. GERD simultaneously satisfies Ethiopia's domestic energy demands, provides opportunities to export cheaper energy to neighbouring riparians, but also holds the potential to negatively impact downstream livelihoods (Mlambo and Masuku 2025). Mega-infrastructure projects function as a counter-hegemonic mechanism and signal a departure from the status quo of downstream hydro-hegemony. Counter-hegemony in the Eastern Nile Basin is not limited to GERD, but is also found in river basin organisations and formal agreements which take agenda-setting powers away from hydro-hegemonic actors (Ali 2025). Together, these mechanisms shake the normative foundations of hydro-hegemony, creating the space for transboundary water governance. However, attempts to formalise water rights and cooperation only highlight the institutional gap that exists in East Africa, through which mega-infrastructure projects become contested faultlines of hydropolitical conflicts (Almesafri et al. 2024). Repeated third-party mediations hosted by the African Union and ad hoc bilateral engagements between Ethiopia and Egypt underscore the limits of water diplomacy and the demand for basin-wide regional cooperation (Ranjan 2024).

> **"Water development projects are communications of structural power. These conditions render water availability politically salient, even in the absence of physical water scarcity"**

4. Water Diplomacy and River Basin Organisations

River basin organisations, such as the Nile Basin Initiative (NBI), are conceptualised as „peace structures" in both functionalist and constructivist terms. Transboundary water governance is hypothesised to generate spillover effects in other transnational policy domains, while the resulting socio-economic integration discourages the use of violence, thereby fostering peaceful riparian relations (Ide and Detges 2018). In the Eastern Nile Basin, this logic is complemented by the political appetite to institutionalise transboundary cooperation through knowledge-sharing and trust-building mechanisms as a means of conflict prevention (Ani et al. 2018). Amid the GERD dispute, Egypt and Ethiopia signed the 2015 Declaration of Principles (DoP), which provided a mutual framework for the equitable utilisation of Blue Nile waterflow and committed signatories to implement recommendations issued by the International Panel of Experts (Almesafri et al. 2024). However, the non-binding nature of DoP limited its capacity to guarantee information exchange and operational integrity concerning GERD, leaving water resources management politically contested. Certain institutional designs of river basin organisations are found to be more effective at managing hydropolitical conflicts. Data-sharing mechanisms establish the necessary conditions for cooperative planning and water resources management. Prior notification procedures ensure that mega-infrastructure projects meet the standards for equitable utilisation and that water resources development causes no significant harm to other riparians. Lastly, conflict resolution mechanisms facilitate the peaceful mediation of resource-related disputes (Zawahri 2025). These institutional designs may transform the GERD conflict by safeguarding against hydraulic and research nationalisms as well as mitigating the hydrological risks associated with poor-quality hydroclimatic data, such as sub-optimal irrigation and unpredictable floodwater levels (Bulti 2025). Information exchange informs basin-wide water resource development decisions on dam operation, crop cultivation, renewable energy, irrigation, and evaporation controls. These knowledge-sharing technological innovations may transform the GERD dispute from a zero-sum human security dilemma into a „win-win" scenario for riparians (El-Nasher and Elyamany 2023). The NBI was established in 1999 as a transitional international organisation for the implementation of basin-wide cooperation in East Africa. The ratification of the CFA was contingent on the progression of the NBI's political track, but with Egypt suspending its membership in 2010 and the stalling of negotiations, the NBI

adopted a much more lasting role in hydropolitical cooperation than previously intended. The organisation's Council of Ministers (Nile-COM), technical regional offices, and subsidiary action programmes provide formal governance structures that support intergovernmental dialogue and stakeholder engagement among local, national, and international actors (Okoth 2021). The NBI's technical track arguably plays an equally indispensable role that reinforces its institutional mechanisms. The Nile Basin Decision-Support System (NB-DSS) alone is responsible for maintaining a relational database including spatial, time series, and scenario data on hydrological objects, events, and variables such as reservoirs, canals, catchment hydrology, floodwaters, sediment yield, irrigated agricultural production, and rainfall among others (Papathanasiou 2016). The modelling of different scenarios through NB-DSS has enabled more coordinated decisions in water resource planning and even transboundary dam reservoir cascade management. Despite the diplomatic quandaries left unaddressed by the NBI's political track, a case can be made that these data practices constitute water diplomacy and even amount to peacebuilding (Kittikhoun and Schmeier 2021). NB-DSS shows how river basin organisations can operationalise peacebuilding through knowledge-sharing databases and transform hydropolitical conflict into data-driven coordinated water resource development. Integrated water resources management requires the bridging of all water sub-sectors both vertically and horizontally, meaning that it reconciles all competing sectoral interests and political demands through intergovernmental transparency and information exchange, as opposed to active unilateralism

Figure 2: Water Diplomacy and River Basin Organisations

(Grigg 2008).

While NB-DSS serves as an operational backbone for hydropolitical peacebuilding in the Eastern Nile Basin, this overlooks several obstacles in the unique case of the GERD dispute that have yet to be resolved. The Egyptian-Sudanese Permanent Joint Technical Commission has rejected the CFA as incomplete and unrepresentative of basin-wide interests (Yihdego et al. 2025). Third-party interventions by the African Union and UN Security Council have so far been fruitless in reaching consensus on the filling of the GERD reservoir (Ranjan 2024). Basin-wide cooperation is also undermined by bilateral development

assistance being instrumentalised as a diplomatic tool in hydropolitical disputes, such as Egyptian diplomatic overtures to DR Congo in state reconstruction efforts at a critical stage in CFA negotiations (Roach et al. 2025).

5. Conclusion

Water diplomacy conclusively holds a place in future peacebuilding efforts in the Eastern Nile Basin. Hydropolitical conflicts over unilateral mega-infrastructure projects must be understood as communications of structural power, reinforced by the securitisation of water policy. As the hydrological effects of climate change and political constraints posed by state fragility unfold in East Africa, the institutional designs of river basin organisations that are most responsive to structural iniquities and power imbalances requires the continued attention of peacekeeping scholars.

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