

FROM PARTICIPATION TO SHARED AUTHORITY: STAKEHOLDER INFLUENCE, DECISION-MAKING AND RESILIENCE IN TRANSBOUNDARY WATER GOVERNANCE

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ABSTRACT

Transboundary rivers, lakes and aquifers support livelihoods, ecosystems, energy systems and public health across national borders, yet the institutions governing them often distribute voice and authority unevenly. This structured narrative review examines whether stakeholder participation in transboundary water governance produces substantive influence over decisions or merely procedural consultation. The review synthesises international legal and policy reports and peer-reviewed scholarship published mainly between 2006 and 2025, with comparative attention to the Lake Chad, Nile, Senegal, Incomati and Danube basins. The evidence indicates that participation improves legitimacy, information quality and implementation only when stakeholders possess recognised representation, access to timely data, agenda-setting opportunities, and mechanisms through which their recommendations affect allocation, investment, monitoring and dispute-resolution decisions. Recent global reporting shows that progress remains slow: the average proportion of transboundary basin area covered by operational cooperation arrangements is about 59%, and only a minority of countries sharing waters achieve near-complete coverage. The comparative synthesis further shows that strong basin organisations, legal clarity, sustained financing, transparent data systems and multilevel participation strengthen absorptive and adaptive resilience. Transformative resilience remains weaker where hydro-hegemony, non-decision-making, fragmented mandates and donor dependence preserve existing power relations. The paper proposes an authority-centred participation framework and a practical governance scorecard for river-basin organisations. It concludes that resilient transboundary governance requires a shift from inviting stakeholders into meetings to embedding their influence in enforceable rules, budgets, monitoring systems and accountability mechanisms.

KEYWORDS: Transboundary water governance; stakeholder participation; decision-making authority; water diplomacy; institutional resilience; Africa; climate adaptation.

I. INTRODUCTION

Transboundary waters account for approximately 60% of global freshwater flows and connect 153 countries through shared rivers, lakes and aquifers. They therefore sit at the intersection of public health, food and energy security, ecosystem integrity, diplomacy and regional development. Cooperation can generate benefits that exceed those available through unilateral action, yet the governance of shared waters remains incomplete and uneven. The 2024 global assessment of Sustainable Development Goal indicator 6.5.2 reported an average operational-cooperation coverage of about 59% among countries for which the indicator could be calculated, with little overall change since earlier reporting cycles (UNECE & UNESCO, 2024). UNESCO further noted that only 32 of 153 countries sharing transboundary waters had at least 90% of their shared basin area covered by operational arrangements (UNESCO, 2024).

The central challenge is not simply the absence of treaties. Many basins possess agreements, commissions or consultation forums, but these arrangements vary substantially in legal authority, financing, data-sharing capacity, stakeholder representation and enforcement. Contemporary research shows that transboundary decision-making is embedded in power relations: dominant states can shape agendas, delay action, limit participation or maintain a politically convenient status quo (Zeitoun & Warner, 2006; Vij et al., 2024). Participation may consequently be visible but weak, especially where community representatives, women, pastoralists, farmers, local governments and civil-society organisations lack access to technical information or a recognised route for influencing final decisions.

This paper advances an authority-centred interpretation of participation. It distinguishes attendance, consultation and information sharing from substantive influence over agendas, resource allocation, investment priorities, compliance monitoring and dispute resolution. The applied contribution is a practical framework for assessing whether stakeholder engagement redistributes decision-making authority and improves resilience. The analysis is particularly relevant to vulnerable states, where climate variability, institutional fragility, fiscal constraints and cross-border insecurity magnify the consequences of weak water governance.

A. Problem Statement

Despite decades of treaty development, river-basin institution building and participatory reform, many shared-water systems remain exposed to environmental degradation, climate shocks and political contestation. Operational cooperation arrangements do not yet cover large portions of the world's transboundary basins, and existing arrangements often lack the adaptive provisions, financial resources and inclusive mechanisms needed to respond to changing hydrological and social conditions (UNECE & UNESCO, 2024; IUCN, 2024). In vulnerable African basins, fragmented mandates, dependence on external funding and asymmetrical state power can weaken implementation even where formal institutions exist.

The policy problem is therefore qualitative as well as quantitative: it concerns not only whether stakeholders participate, but whether participation changes decisions. Consultative meetings may improve communication while leaving agenda control, technical expertise, finance and legal authority concentrated among national ministries or dominant riparian states. Recent scholarship on non-decision-making demonstrates that governance outcomes can be shaped through abstention, non-participation, delayed deliberation and non-action, all of which can preserve unequal arrangements without overt conflict (Vij et al., 2024). A rigorous assessment must therefore examine participation, authority, institutional capacity and resilience together.

B. Aim, Objectives and Research Questions

The aim of this review is to critically evaluate how stakeholder participation and decision-making arrangements influence the effectiveness and resilience of transboundary water governance, with particular attention to vulnerable states and African river basins.

1. Analyse the structural, climatic, institutional and political drivers that shape transboundary water governance.
2. Assess the depth and effectiveness of stakeholder participation in selected transboundary governance systems.
3. Evaluate how participation contributes to absorptive, adaptive and transformative governance resilience.
4. Identify institutional and political gaps and propose an applied framework for authority-centred participation.

The review addresses three questions: (1) Under what conditions does participation influence transboundary decisions? (2) Which institutional features strengthen governance resilience? and (3) What reforms can convert procedural consultation into accountable shared authority?

II. MATERIALS, METHODS AND TECHNICAL PROCEDURES

A. Review Design

A structured narrative review design was used because the research question spans law, political economy, environmental governance, public policy and basin-level practice. Unlike a statistical meta-analysis, the purpose was to compare concepts, institutional mechanisms and case evidence across heterogeneous studies and official reports. The review followed a transparent sequence of problem definition, source identification, eligibility screening, thematic coding, case comparison and synthesis.

B. Information Sources and Search Strategy

Sources included peer-reviewed journal articles, books, international legal and policy reports, and institutional publications. Priority was given to documents from UNESCO, UN-Water, UNECE, IUCN, OECD, river-basin organisations and peer-reviewed water-governance journals. Search concepts combined terms such as transboundary water governance, stakeholder participation, shared authority, river basin organisation, hydro-hegemony, adaptive governance, water diplomacy, resilience, Lake Chad, Nile, Senegal, Incomati and Danube. Recent sources from 2024–2025 were used to update the governance status and incorporate emerging evidence on non-decision-making, multistakeholder platforms, third-party facilitation and mega-basin governance.

C. Eligibility and Appraisal

Documents were included when they addressed at least one of four analytical domains: stakeholder participation; allocation of decision authority; institutional performance; or resilience in a transboundary basin. Sources were excluded when they discussed water scarcity without a governance dimension, focused exclusively on national water services, or lacked sufficient methodological or institutional detail. Evidence was appraised for relevance, transparency of method, institutional specificity, recency and consistency with other sources. Official statistics were

used for global cooperation coverage, while peer-reviewed studies were used to interpret mechanisms and power relations.

D. Analytical Framework

The synthesis used four linked dimensions. First, participation depth was classified as information, consultation, collaboration, delegated influence or shared decision authority. Second, institutional capacity was assessed through legal mandate, financing, data exchange, technical capacity, enforcement and dispute-resolution mechanisms. Third, power conditions were assessed through agenda control, asymmetry among riparians and the capacity for non-decision or non-action. Fourth, resilience was assessed as absorptive capacity (maintaining essential functions during shocks), adaptive capacity (learning and adjusting rules and operations) and transformative capacity (changing institutions and power relations that reproduce vulnerability).

E. Quality Control and Limitations

Triangulation across official reports, peer-reviewed studies and comparative cases reduced dependence on any single narrative. Nevertheless, the evidence base is heterogeneous and case documentation is uneven. The paper does not estimate causal effect sizes and should be interpreted as an analytical synthesis rather than a systematic review with exhaustive database coverage. Some basin institutions also publish more information than others, creating a risk that transparency is mistaken for effectiveness. These limitations are addressed by distinguishing documented institutional design from demonstrated stakeholder influence.

III. RESULTS AND TECHNICAL FINDINGS

A. Global Cooperation Coverage and the Implementation Gap

The latest global reporting confirms that transboundary cooperation is essential but incomplete. Transboundary basins support a large share of the world's population and freshwater flows, yet the average national coverage by operational arrangements remains approximately 59% (UNECE & UNESCO, 2024). Operational status requires more than a signed agreement: it includes a joint body or mechanism, regular communication, coordinated management objectives and exchange of data or information. The persistence of limited coverage indicates that treaty adoption alone is an insufficient indicator of effective governance.

B. Participation Quality: From Presence to Influence

Across the reviewed literature, participation generated the greatest benefit when four conditions were present: representative selection, access to usable information, repeated engagement across decision stages and a formal link between stakeholder input and final decisions. Where these conditions were absent, participation tended to remain procedural. Reed (2008) established that early, context-sensitive and well-facilitated engagement can improve environmental decisions, while more recent scholarship emphasises that engagement must be interpreted within political and institutional structures rather than treated as a neutral technical exercise (Gerlak et al., 2025; Mozumder et al., 2025).

Vij et al. (2024) add an important insight: power can operate through non-decisions. A stakeholder forum may meet regularly while contested issues are excluded from the agenda, deferred to technical committees or prevented from reaching high-level negotiations. Accordingly, governance assessments should track not only who attends meetings, but which issues reach decision points, whose evidence is accepted, who controls budgets and whether recommendations receive written responses.

Table 1. Comparative governance characteristics of selected transboundary basins

Basin/system	Institutional strengths	Participation limitations	Resilience implication	Key lesson
Danube	Mature legal architecture, basin commission, monitoring and data coordination.	Participation is structured but can remain expert-led and uneven across scales.	Strong absorptive and adaptive capacity; implementation supported by EU law and institutions.	Participation is most effective when linked to binding rules and monitoring.
Senegal River	Joint institutions and benefit-sharing orientation; long history of basin cooperation.	Local and livelihood voices may be less influential than state and infrastructure priorities.	Regional cooperation can support shared development benefits.	Benefit sharing can create incentives for cooperation when distribution is perceived as fair.
Incomati	Formal agreements and opportunities for third-party facilitation.	Power and capacity differences among states and actors affect bargaining and implementation.	External facilitation can strengthen dialogue and institutional learning.	Third parties add value when they build capacity without replacing basin ownership.
Nile	Multiple cooperation platforms, growing	Hydro-hegemony, sovereignty concerns and	Adaptive learning exists, but transformation is	Technical cooperation cannot substitute for

Basin/system	Institutional strengths	Participation limitations	Resilience implication	Key lesson
	technical exchange and basin-wide knowledge.	contested infrastructure limit shared authority.	constrained by high-level political conflict.	equitable political negotiation.
Lake Chad	Regional commission and shared recognition of environmental and security risks.	Institutional, financial and security constraints weaken local influence and implementation.	High exposure and limited adaptive capacity create recurring humanitarian and livelihood risk.	Participation must be connected to finance, security, ecosystem restoration and local livelihoods.

C. Case Synthesis

The Danube illustrates the advantages of a comparatively mature legal and institutional architecture. Its governance system combines interstate cooperation, monitoring, public-information obligations and formal opportunities for stakeholder engagement. The lesson is not that participation is automatically equal, but that engagement has greater effect when basin decisions are embedded in enforceable regulatory systems, stable technical institutions and transparent reporting.

African cases demonstrate both innovation and constraint. The Senegal River system shows how benefit sharing and joint institutions can support cooperation beyond volumetric allocation. The Incomati experience highlights the potential value of neutral third parties in convening dialogue, building capacity and maintaining momentum, provided that facilitation does not displace local ownership (Zikhali-Nyoni et al., 2025). In the Nile Basin, technical and knowledge cooperation coexist with unresolved political disputes and strong asymmetries in agenda-setting power. Recent comparative work stresses the need to adapt international lessons to the Nile's legal, political and development context rather than importing institutional models mechanically (Deribe et al., 2024).

The Lake Chad Basin illustrates the interaction of environmental stress, livelihood dependence, insecurity and institutional capacity. It is frequently described through a dramatic shrinkage narrative; however, scientific and policy interpretation should distinguish long-term variability, seasonal change and governance drivers rather than relying on a single percentage as a complete explanation. The governance priority is therefore not merely restoring water quantity, but integrating ecosystem management, livelihoods, conflict sensitivity, local knowledge, climate adaptation and accountable regional coordination.

D. Resilience Outcomes

Absorptive resilience improves when basin organisations maintain shared monitoring, early-warning arrangements, contingency procedures and communication during droughts, floods or pollution events. Adaptive resilience requires periodic review of agreements, climate-responsive allocation rules, interoperable data systems and the capacity to incorporate new evidence. UNESCO's 2024 assessment emphasises that flexible arrangements, climate adaptation provisions, consultation and dispute-resolution procedures are increasingly necessary as water pressures intensify (UNESCO, 2024).

Transformative resilience is the most demanding dimension because it requires changes in authority, not only technical operations. It is visible when marginalised groups gain durable representation, budgets are opened to scrutiny, local knowledge changes project design, and agreements are revised to address inequitable risk and benefit distribution. The reviewed evidence suggests that many governance systems have improved information sharing and consultation without fully transforming the political structures that determine allocation and investment.

Table 2. Authority-centred participation scorecard for river-basin organisations

Dimension	Weak practice	Intermediate practice	Strong practice
Representation	Invited actors are selected ad hoc.	Stakeholder categories are defined but unevenly represented.	Transparent selection, gender and livelihood balance, and periodic rotation.
Information	Technical data are inaccessible or released late.	Reports are shared, but not in usable formats.	Timely open data, local-language summaries and independent verification.
Agenda setting	Government or dominant riparian controls all topics.	Stakeholders may propose issues informally.	Formal right to submit agenda items and receive documented decisions.
Decision influence	Consultation has no traceable effect.	Recommendations receive discretionary consideration.	Decision rules require written responses and explain acceptance or rejection.
Resources	Participation is unpaid and inaccessible.	Limited travel or meeting support.	Dedicated budget, capacity building and support for marginalised groups.

Dimension	Weak practice	Intermediate practice	Strong practice
Accountability	No follow-up or appeal mechanism.	Meeting minutes and periodic reports.	Public action tracker, grievance mechanism, audit and dispute-resolution pathway.
Learning and adaptation	Rules remain fixed despite new risks.	Occasional review after crises.	Scheduled adaptive review using climate scenarios, monitoring evidence and stakeholder evaluation.

IV. DISCUSSION AND APPLIED IMPLICATIONS

A. Why Participation Often Fails to Redistribute Authority

Participation is frequently designed as an administrative event rather than a governance right. Meetings are scheduled after strategic options have already been narrowed, technical evidence is controlled by specialised agencies, and stakeholders are asked to comment without authority over budgets, allocation rules or enforcement. This design can improve legitimacy without changing outcomes. The result is a participation paradox: the number of meetings increases while the distribution of decision power remains stable.

Power asymmetry operates at both interstate and intrastate levels. Hydro-hegemony allows stronger riparians to shape narratives, infrastructure priorities and negotiating timelines, while national institutions may centralise authority and marginalise subnational governments or water users (Zeitoun & Warner, 2006). Vij et al. (2024) show that non-participation and non-action can be strategic rather than accidental. A robust participation model must therefore make silence, delay and excluded agenda items visible and accountable.

B. Institutional Design Matters More Than Participation Frequency

The comparative evidence indicates that participation frequency is a weak proxy for governance quality. More consequential are the legal status of participatory bodies, clarity of representation, access to data, continuity of funding, and the existence of pathways from recommendations to decisions. IUCN's multilevel water-diplomacy approach similarly emphasises that effective cooperation depends on a plurality of arrangements linking governments, technical agencies, municipalities, civil society, economic sectors and water users (IUCN, 2024).

This finding has practical implications for basin organisations. Stakeholder engagement should be incorporated into constitutive instruments, rules of procedure, investment appraisal, environmental assessment, monitoring and dispute resolution. Participation should not be confined to awareness raising. It should be treated as an operational component of risk management, institutional learning and benefit sharing.

C. Public Health, Equity and Climate Resilience

Transboundary water decisions affect drinking-water safety, sanitation, food production, vector ecology, displacement and exposure to floods or droughts. Public-health institutions and affected communities should therefore be represented in basin governance, particularly where infrastructure or allocation decisions alter downstream water quality and access. Equity analysis should identify which populations receive benefits, which bear environmental or livelihood risks, and whether compensation, grievance and monitoring arrangements are accessible.

Climate change increases the importance of adaptive governance. Historical flow records alone are no longer sufficient for allocation and infrastructure planning. Basin organisations need shared scenarios, drought and flood triggers, ecosystem thresholds and review clauses. Recent global reporting demonstrates that climate-change adaptation remains unevenly integrated into operational arrangements, reinforcing the need for explicit adaptive provisions (UNECE & UNESCO, 2024).

D. Applied Governance Framework

The review proposes five mutually reinforcing pillars for authority-centred participation: representative inclusion; shared evidence; traceable influence; accountable implementation; and adaptive review. Representative inclusion ensures that affected groups are not reduced to symbolic attendance. Shared evidence establishes accessible and trusted information. Traceable influence connects stakeholder recommendations to formal decisions. Accountable implementation uses public action trackers, budgets and grievance systems. Adaptive review allows rules and priorities to change as hydrological, social and political conditions evolve.

Table 3. Priority reforms for resilient transboundary governance

Priority reform	Lead actors	Practical instrument	Expected outcome
Embed participation in legal rules	Riparian states and basin organisations	Revised treaty, charter or rules of procedure	Participation becomes a governance obligation rather than a discretionary activity.

Priority reform	Lead actors	Practical instrument	Expected outcome
Create transparent representation systems	Basin secretariats and civil society	Stakeholder register, selection criteria and rotation rules	Broader legitimacy and reduced elite capture.
Link evidence to decisions	Technical committees and stakeholder forums	Open data portal, joint fact-finding and written-response protocol	Greater trust, learning and traceability.
Finance meaningful engagement	Member states and development partners	Dedicated participation and capacity-building budget	More equitable participation by local and marginalised actors.
Strengthen accountability	Joint bodies, auditors and ombuds mechanisms	Public action tracker, grievance channel and compliance review	Improved implementation and early correction of failure.
Institutionalise climate adaptation	Basin organisations and national agencies	Scenario planning, trigger rules and scheduled agreement review	Higher adaptive capacity under hydrological uncertainty.

E. Limitations and Future Research

The review relies on published evidence and cannot directly observe confidential negotiations or informal influence. Comparative cases also differ in legal context, hydrology, conflict exposure and institutional maturity. Future research should test the proposed scorecard using interviews, document tracing and longitudinal observation of basin decisions. Particular attention is needed to women's leadership, youth participation, Indigenous and pastoralist knowledge, digital data governance, and the ways that funding arrangements shape institutional autonomy.

V. CONCLUSION AND RECOMMENDATIONS

Transboundary water governance succeeds when cooperation is operational, adaptive and politically credible. The existence of agreements and stakeholder forums is important, but neither guarantees equitable or resilient decisions. The evidence reviewed in this paper shows that participation produces stronger outcomes when it is backed by representation rules, accessible information, agenda-setting rights, documented responses, sustained financing and accountability mechanisms.

The most important reform is a shift from participation as presence to participation as authority. Basin organisations and riparian states should make stakeholder influence traceable throughout the decision cycle, from problem definition and investment appraisal to implementation, monitoring and dispute resolution. They should also integrate climate scenarios and scheduled review clauses, strengthen data exchange, protect local and marginalised representation, and establish public mechanisms for tracking commitments.

For vulnerable states, these reforms are not optional additions to technical water management. They are central to public health, livelihood security, ecosystem protection and regional stability. Shared waters can support peace and prosperity, but only when governance institutions are capable of distributing both benefits and decision-making power fairly.

Recommendations

1. Revise basin agreements and rules of procedure to define minimum standards for stakeholder representation, information access and decision influence.
2. Establish open, interoperable basin data systems with local-language summaries, documented uncertainty and independent quality assurance.
3. Create formal agenda-submission, written-response and grievance mechanisms so that stakeholder input is traceable.
4. Provide dedicated budgets for participation, capacity building, women's leadership, youth engagement and inclusion of livelihood groups.
5. Use joint climate scenarios, early-warning thresholds and scheduled institutional reviews to support adaptive governance.
6. Strengthen third-party facilitation where useful, while retaining basin ownership and preventing donor-driven substitution for public authority.
7. Evaluate governance performance using authority, equity, implementation and resilience indicators rather than counting meetings alone.

VI. DECLARATIONS

Ethics Approval and Consent to Participate

This article is based on analysis of published literature and publicly available institutional documents. It did not involve direct participation by human subjects and therefore did not require individual informed consent.

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Conflict of Interest

The author declares no conflict of interest.

Data Availability

All evidence used in the review is available from the cited publications and institutional reports.

Author Contribution

Dr. Daniel A. Otwori conceptualised the paper, conducted the evidence synthesis, developed the analytical framework and prepared the manuscript.

AI and Digital Tool Disclosure

Digital tools were used for language refinement, document formatting and reference organisation. The author reviewed and takes responsibility for the accuracy, interpretation and originality of the final manuscript.

VII. REFERENCES

- Barrett, C. B., & Constan, M. A. (2014). Toward a theory of resilience for international development applications. *Proceedings of the National Academy of Sciences*, 111(40), 14625–14630. <https://doi.org/10.1073/pnas.1320880111>
- Cascão, A. E., & Nicol, A. (2016). GERD: New norms of cooperation in the Nile Basin? *Water International*, 41(4), 550–573. <https://doi.org/10.1080/02508060.2016.1180763>
- Conca, K. (2006). *Governing water: Contentious transnational politics and global institution building*. MIT Press.
- Deribe, M. M., Melesse, A. M., Kidanewold, B. B., Dinar, S., & Anderson, E. P. (2024). Assessing international transboundary water management practices to extract contextual lessons for the Nile River Basin. *Water*, 16(14), 1960. <https://doi.org/10.3390/w16141960>
- Dinar, S. (2008). *International water treaties: Negotiation and cooperation along transboundary rivers*. Routledge.
- Gerlak, A. K., et al. (2025). Exploring engagement practicalities and motivations in transboundary rivers. *Environmental Research: Water*. <https://doi.org/10.1088/3033-4942/adf3db>
- International Union for Conservation of Nature. (2024). *Supporting effective transboundary water governance: The BRIDGE approach*. IUCN.
- Mozumder, M. M. H., et al. (2025). A comprehensive review of transboundary mega-basin management: Governance, participation and sustainability. *Water International*. <https://doi.org/10.1080/02508060.2025.2535928>
- Pahl-Wostl, C. (2019). Governance of the water-energy-food security nexus: A multi-level coordination challenge. *Environmental Science & Policy*, 92, 356–367.
- Reed, M. S. (2008). Stakeholder participation for environmental management: A literature review. *Biological Conservation*, 141(10), 2417–2431. <https://doi.org/10.1016/j.biocon.2008.07.014>
- United Nations Economic Commission for Europe. (2024). *Progress on transboundary water cooperation under the Water Convention: Third report on implementation of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (2020–2023)*. United Nations.
- United Nations Economic Commission for Europe, & United Nations Educational, Scientific and Cultural Organization. (2024). *Progress on transboundary water cooperation: Mid-term status of SDG indicator 6.5.2, with a special focus on climate change*. UN-Water.
- United Nations Educational, Scientific and Cultural Organization. (2024). *The United Nations world water development report 2024: Water for prosperity and peace*. UNESCO.
- Vij, S., Warner, J. F., Mehta, A. S., & Barua, A. (2024). Status quo in transboundary waters: Unpacking non-decision making and non-action. *Global Environmental Change*, 85, 102821. <https://doi.org/10.1016/j.gloenvcha.2024.102821>
- Zeitoun, M., & Warner, J. (2006). Hydro-hegemony: A framework for analysis of trans-boundary water conflicts. *Water Policy*, 8(5), 435–460. <https://doi.org/10.2166/wp.2006.054>
- Zikhali-Nyoni, T., et al. (2025). Assessing the value of third parties in transboundary water governance: Evidence from the Incomati River Basin. *Water International*. <https://doi.org/10.1080/02508060.2025.2451015>

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