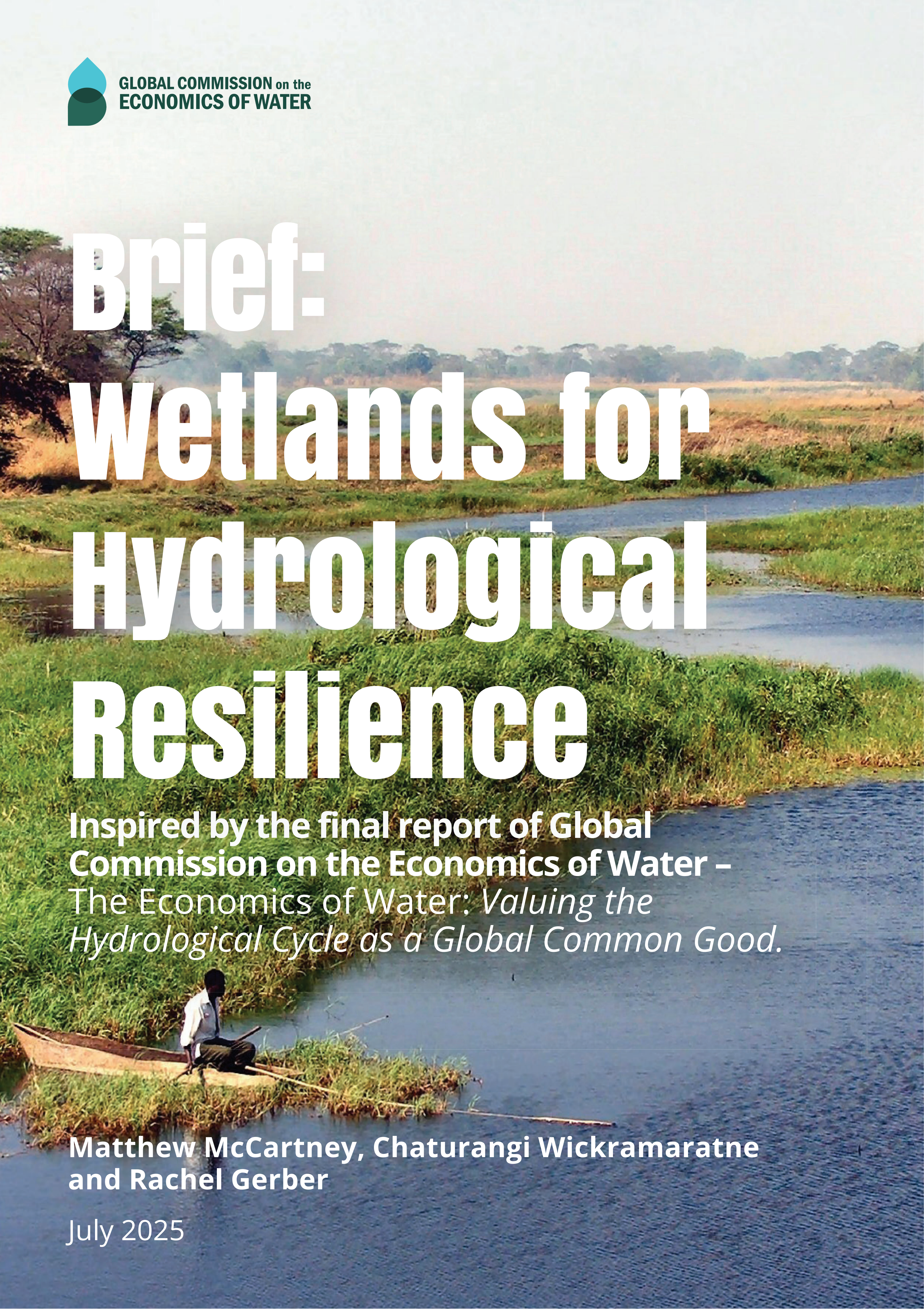

GLOBAL COMMISSION on the ECONOMICS OF WATER

Brief: Wetlands for Hydrological Resilience

Inspired by the final report of Global Commission on the Economics of Water – The Economics of Water: *Valuing the Hydrological Cycle as a Global Common Good.*

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The Global Commission's report sets out the shifts required to drive radical changes in how water is valued, managed, and used. The new economics of water begins by recognising that the water cycle must now be governed as a global common good, through collective and concerted action in every country, collaboration across boundaries and cultures, and for benefits that will be felt everywhere.

This policy brief examines the implications of the Global Commission's findings for young and future generations and identifies pathways for how youth-led intergenerational collaboration can enable just and truly sustainable water futures. It aims to guide policymakers on local to global actions, highlighting how an intergenerational approach to water is essential for delivering the five missions set out by the global Commission and stabilising the global hydrological cycle.

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Key messages

1. **The hydrological cycle is in crisis—restoring hydrological resilience is urgent.**

   Human-driven disruptions to blue and green water flows are amplifying systemic risks. Rebuilding hydrological resilience—the ability of water systems to withstand and adapt to stress—is central to achieving climate, biodiversity, and development goals.

2. **Water must be governed as a global common good—beyond sectoral boundaries.**

   Water underpins climate stability, biodiversity, food systems, and human health. Policy, governance, and finance must shift from fragmented, sectoral approaches to recognizing water as a unifying force for resilience.

3. **Wetlands are critical hydrological infrastructure—yet undervalued and vanishing.**

   Wetlands modify green and blue water fluxes across landscapes, connect surface water and groundwater, buffer extremes, and sustain water-dependent services. Recognizing wetlands as essential infrastructure is key to resilient, sustainable water systems.

4. **The Ramsar Convention can catalyze alignment across global environmental agreements.**

   Ramsar's mandate and mechanisms offer a unique platform to operationalize hydrological resilience through multilateral cooperation, integrate and synchronize efforts across the Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), and United Nations Convention to Combat Desertification (UNCCD).

5. **Cooperation among Multilateral Environmental Agreements (MEAs) enables policy coherence and joint investment.**

   Hydrological resilience offers a practical basis for coordinated planning—linking National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs), National Biodiversity Strategies and Action Plans (NBSAPs), and Land Degradation Neutrality (LDN) targets—and unlocking co-financing for nature-based solutions through shared data and monitoring.

6. **Systemic governance transformation is essential to overcome fragmentation.**

   Achieving hydrological resilience at basin, national, and transboundary scales requires breaking institutional silos, aligning incentives across sectors, and embedding water's ecological, social, and economic values into integrated decision-making. Governance reforms must enable coordination across jurisdictions and levels - local to global - to drive scalable, inclusive, and adaptive solutions.

Context

The Final Report of the Global Commission on the Economics of Water (GCEW) [1] presents a comprehensive, science-driven assessment of how the global hydrological cycle is being disrupted by unsustainable human activity. Disruptions to surface water and groundwater flows, evapotranspiration and precipitation patterns - increasing the frequency and intensity of droughts and floods - are undermining water security, accelerating biodiversity loss, and threatening the resilience of socio-ecological systems.

In response, the GCEW advocates for the recognition of the hydrological cycle as a global common good - shared across borders and generations, and foundational to climate, ecosystems, food systems, and public health. Water must no longer be treated as a discrete resource or sector, but as a connector and foundational element through which governance, finance, and development policies can be realigned.

Key challenges and implications

At the heart of the GCEW's recommendations is a call for systemic transformation in water governance - one that recognizes the central role of water in sustaining ecosystems, economies, and societies. Today's institutional frameworks remain fragmented and siloed, often overlooking the interdependencies between land, water, ecosystems, and climate. The Commission advocates for the reframing of Multilateral Environmental Agreements (MEAs) - including Ramsar - around the shared goal of hydrological resilience. Greater alignment across these frameworks could unlock synergies, reduce redundancy, and enable more integrated, nature-based solutions.

To enable this shift, we must reassess the value of water. As the GCEW report underscores, insufficient understanding, persistent undervaluation, perverse subsidies, and chronic underinvestment in water resilience have contributed to escalating risks - from inequality and biodiversity loss to climate instability. Water should be valued not only for its economic utility, but also for its ecological, social, and systemic significance, with financial and policy instruments realigned to reflect its full contribution to long-term resilience.

The critical role of wetlands

The GCEW's findings resonate strongly with the Ramsar Convention's evolving vision. Wetlands are not passive recipients of water; they are dynamic integrators of the hydrological cycle - integrating surface water, groundwater, soil moisture, and atmospheric moisture flows across local, river basin, and regional scales. As natural infrastructure, wetlands maintain hydrological integrity and support multiple ecosystem services that are foundational to human well-being and planetary health.

By linking blue water (surface water and groundwater) with green water (soil moisture and evapotranspiration), wetlands function as vital nodes in the water cycle (Figure 1). Their influence extends beyond water quantity to include timing, quality, and distribution—modifying flood peaks, sustaining baseflows, purifying water, and recycling moisture. These roles are highly context-specific, shaped by local climate, topography, vegetation, soil properties, and catchment connectivity.

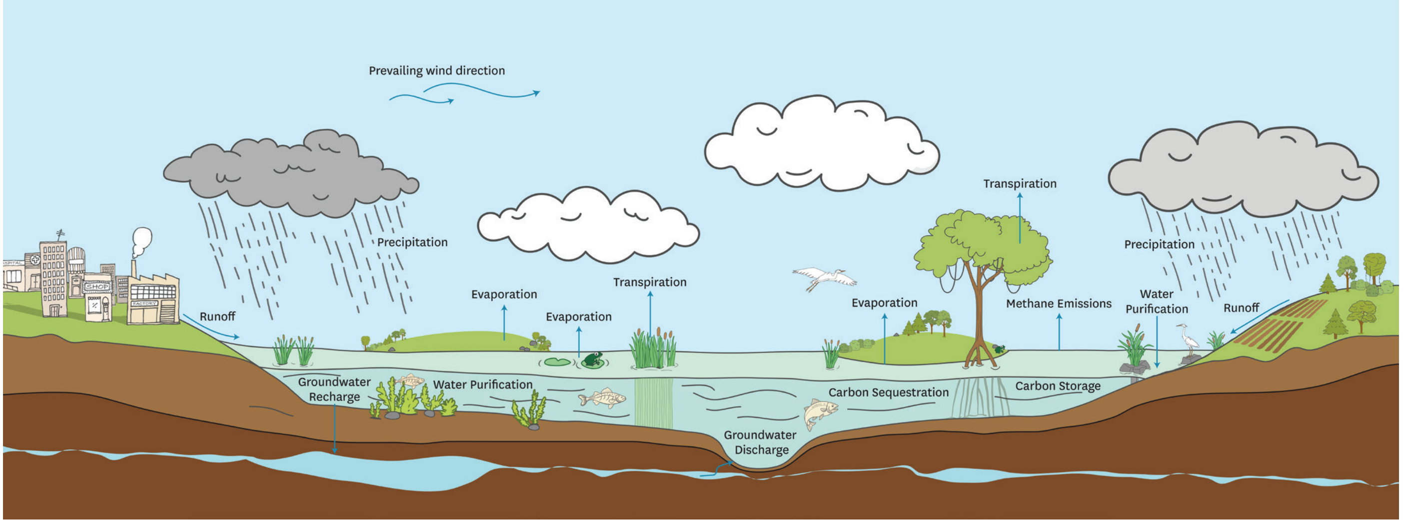

Figure 1: *Wetlands in the hydrological cycle*. Wetlands interact with all forms of water—surface, subsurface, and atmospheric—making them essential integrators of the hydrological cycle. Their ability to store, release, and transform water sustains both ecosystem functions and human systems.

Ecosystem services and societal benefits

Wetlands deliver a diverse array of provisioning, regulating, and cultural services that underpin water security, food systems, climate mitigation, and livelihoods. These services are deeply place-based and vary with ecological, hydrological, and socio-economic conditions (Box 1 and Box 2). Globally, wetlands are critical for the livelihoods and wellbeing of hundreds of millions of people. From flood storage and aquifer recharge to climate regulation and food production, wetlands are foundational to hydrological resilience.

Box 1: Wetland Ecosystem Services

Wetlands provide a diverse range of ecosystem services that are highly context-dependent—shaped by landscape position, climate, hydrological regime, and human management. These services are critical for both ecosystems and societies:

Water Storage & Flow Regulation
Many wetlands act as natural buffers against hydrological extremes, storing water during wet periods and releasing it during dry spells. In floodplains like the Sudd or Mekong Delta, this contributes to flood mitigation, dry season flow support, and local water availability—but outcomes vary with location within a catchment, connectivity and saturation.

Groundwater Recharge & Discharge
In some regions, wetlands enhance aquifer recharge (e.g., North American playas), while in others, they sustain baseflows through groundwater discharge (e.g., the Everglades). These functions are influenced by local geology, vegetation, and rainfall patterns.

Water Purification
Where positioned downstream of pollution sources, wetlands can filter sediments, nutrients, and contaminants through physical and biological processes. Examples like East Kolkata Wetlands show how treatment services can co-exist with productive uses—but effectiveness depends on scale, flow, and pollutant load.

Moisture Recycling & Climate Regulation
Wetlands influence local and regional climates through evapotranspiration and carbon storage. Tropical systems contribute to rainfall recycling, in places helping to sustain agricultural productivity and rural livelihoods in rainfed farming systems. Peatlands store vast carbon stocks. However, wetlands also emit methane, creating trade-offs that require context-specific management.

Provisioning Services & Food Security
Wetlands support agriculture, fisheries, and wild food collection—services that vary seasonally and spatially. For instance, seasonal wetlands in southern Africa enable dry-season farming, while rice paddies—human-made wetlands—provide the staple food for half the global population [2]. It is estimated that inland capture fisheries from inland wetlands sustain the nutrition and livelihoods of up to 820 million people globally [3].

Box 2: Economic Valuation of Wetland Ecosystem Services in the Kalu Oya and Mudun Ela Basins, Sri Lanka [4]

The wetlands of the Kalu Oya and Mudun Ela catchments in Sri Lanka illustrate the substantial economic and ecological value of peri-urban wetland ecosystems. A combined assessment of the direct and indirect use values using market price-based valuation and benefit transfer methods, estimated the total annual value of ecosystem services provided by these wetlands at between USD 13 million and 14.5 million (equivalent to USD 12,381–13,810 per hectare per year).

Key regulating services include water storage and flow regulation, which help buffer flood risks, and groundwater recharge, essential for maintaining local water availability. Water purification naturally enhances water quality, reducing treatment costs, while local microclimate regulation is believed to lower surrounding urban air temperatures - providing relief in the face of rising heat stress.

Although provisioning services such as food and fodder supply contribute a smaller share to total economic value, they remain critical for local livelihoods, especially through rice farming and livestock production. Beyond annual flows of ecosystem services, the wetlands are estimated to store approximately 500,000 tonnes of carbon. This carbon stock is valued between USD 12.1 and 13.1 million in terms of avoided emissions, underscoring the wetlands' role as natural carbon sinks and contributors to global climate mitigation.

The valuation clearly highlights that climate regulation, disaster risk reduction, and biodiversity protection represent the most significant ecological contributions. These findings provide a strong economic rationale for prioritizing wetland conservation and restoration within broader climate adaptation and resilience-building strategies.

While provisioning benefits may appear modest in monetary terms, their livelihood significance is profound—particularly for vulnerable communities. The Kalu Oya case makes a compelling case for integrating ecosystem service valuation into water and land-use planning, recognizing wetlands as critical infrastructure for hydrological and climate resilience, both locally and globally.

Yet, despite their considerable value - amongst the most valuable ecosystems per unit area on Earth, estimated at USD 25,682 per hectare, in total USD 11–12 trillion per year [5] - wetlands remain vastly undervalued and are routinely marginalized in economic planning and policy. As the GCEW report emphasizes, water is the global economy's "silent currency" [6] - essential to all life and prosperity, yet largely invisible in the governance of economies, infrastructure, and ecosystems (Box 3). This invisibility has fueled degradation and loss at an alarming pace:

- 35% of natural wetlands lost since the 1970s - three times faster than forest loss [7]
- 40% reduction in wetland water storage capacity - weakening natural buffers to floods and droughts [8]
- 85% decline in freshwater vertebrate populations - fish, amphibians, reptiles, birds - signaling ecosystem collapse in many places [9]

These are not just critical environmental losses—they also represent systemic risks to water, food, climate, and socio-economic resilience.

Box 3: Why Water Remains Invisible in Socio-Economic Development

Despite its critical importance, water remains largely invisible in mainstream economic and development planning. This invisibility arises from:

- *Inadequate economic and social valuation:* The full economic and social value of blue and green water is poorly understood and insufficiently integrated into economic decision-making.
- *Fragmented governance:* Water is managed in isolated sectors—agriculture, energy, health, environment—without recognizing its systemic interlinkages.
- *Inefficient resource allocation and market failure:* Many of water's most critical functions (e.g., flood buffering, groundwater recharge, rainfall generation) are public goods. Those externalities go unpriced and unaccounted for in national accounts or investment decisions.
- *Data gaps:* Green water (soil moisture) and atmospheric water flows are poorly measured and understood, leading to underrepresentation in economic and policy decisions supporting models.
- *Social inequities:* Marginalized communities, disproportionally dependent on ecosystems (e.g., wetlands, rainfed agriculture), often lack political voice, making their water realities invisible in policy.

The result is a high cost of inaction: chronic underinvestment in natural infrastructure, degradation of water systems - including wetlands - and a failure to anticipate escalating water-related risks. To reverse this trajectory, we must make water's full value visible—across hydrology, ecosystems, and societies. This requires robust data systems, integrated cross-sector planning, inclusive valuation frameworks, and incentive reforms that position water as the foundation of resilient development and ecological integrity.

Policy recommendations – hydrological resilience as an organizing principle

Positioning hydrological resilience as an organizing principle is more than a technical refinement - it is a strategic imperative. It brings clarity to the systemic disruptions undermining water security, ecosystem health, and climate stability, while underscoring the urgency for coordinated action across sectors, institutions, and scales. For the Ramsar Convention, this shift represents both an opportunity and a responsibility: to move from protecting individual wetland sites toward safeguarding the hydrological cycle - the foundation upon which ecological integrity, biodiversity, and socio-economic resilience all depend.

Conserving and restoring wetlands is not just about protecting habitat—it's about restoring the resilience of entire water systems. These actions buffer against shocks, stabilize water supplies, and provide nature-based solutions that are essential in the face of climate change, water scarcity, and land degradation.

With its long-standing focus on wetlands, strong normative grounding in the principle of wise use, and operational presence in over 170 countries, Ramsar offers a powerful platform for catalyzing systemic change. Below are six key pathways through which Ramsar can act as a catalyst for operationalizing hydrological resilience, leveraging its unique institutional architecture, global reach, and focus on wetlands to enable systemic transformations in water governance.

1. Framing Wetlands as Functional Nodes in the Hydrological Cycle

Ramsar can shift the policy narrative from wetlands as static habitats to dynamic components of the water cycle—regulating baseflows, recharging aquifers, buffering floods, and recycling atmospheric moisture. This system framing:

- Enables integration of wetlands into basin-scale water management, aligning conservation with Integrated Water Resources Management (IWRM) principles.
- Positions wetlands as infrastructure for resilience, particularly in the face of hydro-climatic variability and extremes.

2. Scaling Up from Site-Level Protection to Basin-Scale Governance

Ramsar can support the transition from site-based interventions to hydrologically coherent planning and management by:

- Encouraging designation of wetland complexes that span upstream–downstream gradients and hydrological corridors.
- Promoting integrated management plans that link Ramsar Sites to broader catchment dynamics, land-use regimes, and flow regulation systems.
- Supporting transboundary wetland cooperation, particularly where wetland systems are located along shared river basins (e.g., the Sudd in the Nile Basin, or the Ferghana Valley wetlands in Central Asia).

3. Mainstreaming Hydrological Resilience into Ramsar Tools and Guidelines

Ramsar can embed hydrological resilience across its operational toolkit by:

- Revising the Strategic Framework for the List of Wetlands of International Importance to prioritize hydrological functions (e.g., groundwater recharge, flow regulation, evapotranspiration corridors).
- Updating guidance on wise use to reflect resilience-based principles such as adaptive management, ecological thresholds, and moisture recycling.
- Integrating hydrological indicators into Ramsar Site Information Sheets, such as connectivity indices, baseflow contributions, soil moisture regimes, and—where feasible—monetary valuations of ecosystem services.

These tools can also serve as templates for enhancing collaboration between MEAs and platforms such as the UN Water Convention and the Sendai Framework for Disaster Risk Reduction.

4. Fostering MEA Synergies through the Water–Climate–Biodiversity Nexus

Ramsar can facilitate cross-MEA cooperation by anchoring collaboration in water-centric approaches, including:

- Aligning wetland-based actions with Nationally Determined Contributions (NDCs) (UNFCCC), National Biodiversity Strategies and Action Plans (NBSAPs) (CBD), and Land Degradation Neutrality (LDN) targets (UNCCD) by promoting co-benefit assessments tied to hydrological function.
- Supporting integrated monitoring systems with indicators like seasonal flow variability, wetland–aquifer interactions, and carbon–water linkages.
- Acting as a knowledge broker between climate, biodiversity, and water communities, helping translate hydrological resilience into measurable policy outcomes.

5. Mobilizing Co-Financing and Investment in Resilient Water Systems

Ramsar can catalyze investment by positioning wetland restoration and protection as climate adaptation and risk reduction strategies, helping to:

- Access climate finance (e.g., Green Climate Fund [GCF], Adaptation Fund [AF], Global Environment Facility [GEF]) for nature-based solutions that restore hydrological connectivity and buffer hydrological extremes.
- Demonstrate return on investment through cost–benefit analyses integrating the different functions of wetlands (flood protection, water retention, drought mitigation, filtration, etc.).
- Establish demonstration landscapes that blend ecological restoration with hydrological function, and socio-economic development serving as replicable models.

6. Strengthening Institutional Capacity for Adaptive, Participatory Water Governance

To embed hydrological resilience in practice, Ramsar can:

- Strengthen national wetland committees as platforms for cross-sectoral coordination on water issues.
- Support capacity development in hydrological monitoring, scenario analysis, valuation studies and resilience planning, particularly in vulnerable countries.
- Facilitate stakeholder participation, including indigenous and local communities, in decision-making about wetland and water system governance.

Conclusion

Hydrological resilience provides a compelling and actionable foundation for integrating Ramsar's wetland agenda with broader global environmental goals. By embedding this principle across its strategies, tools, and partnerships, the Ramsar Convention can evolve into a systemic enabler of resilient water governance. This pivot would not only elevate the visibility and value of wetlands in addressing climate, biodiversity, and land degradation—but also position Ramsar as a catalyst for policy coherence, financing, and integrated action. As pressures on global water systems intensify, the Convention's leadership in advancing hydrological resilience is critical for building a more adaptive, just, and sustainable future.

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Front cover photograph: Lukanga Wetland, Zambia (*photo*: Matthew McCartney, IWMI).

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