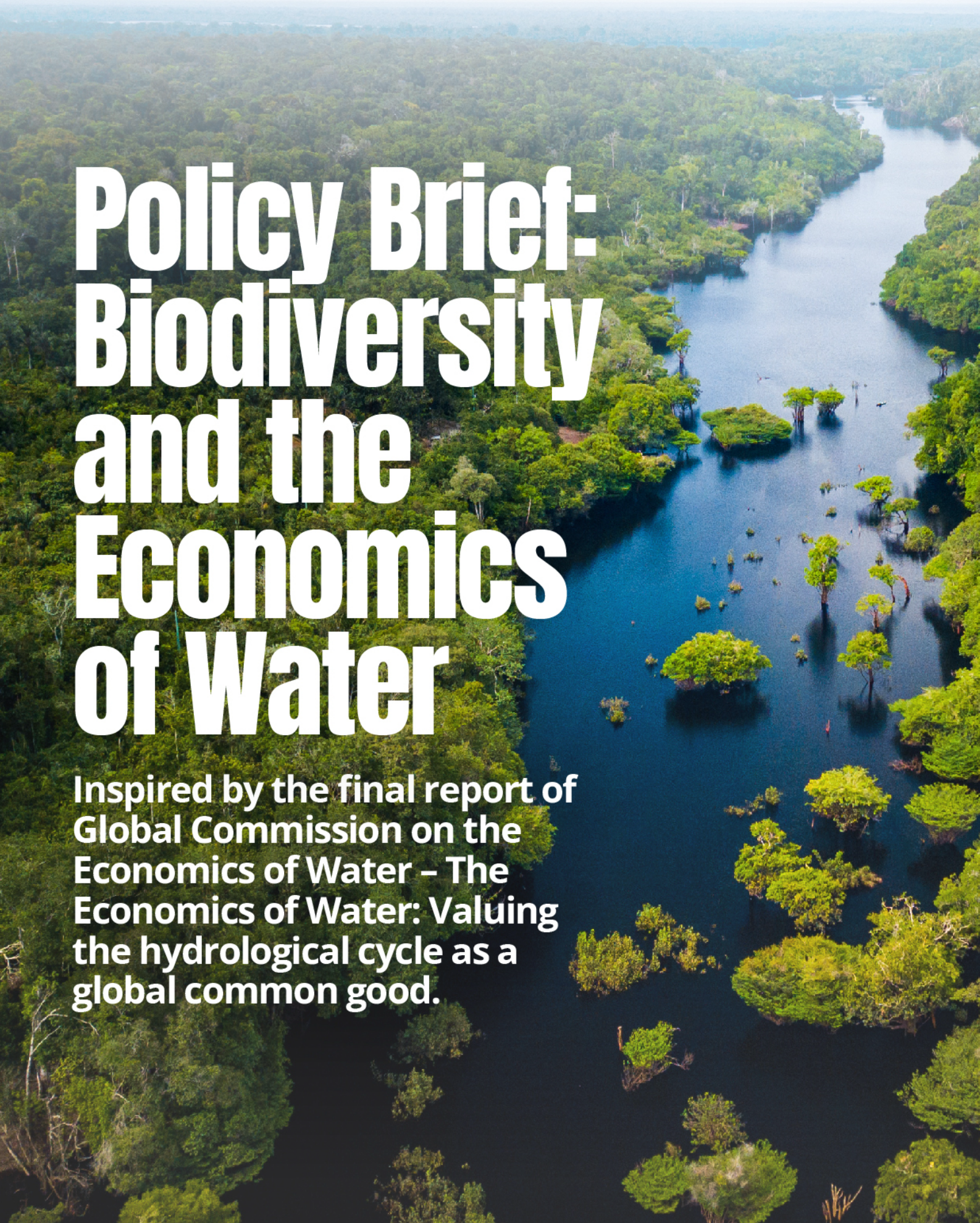
GLOBAL COMMISSION on the ECONOMICS OF WATER



Policy Brief: Biodiversity and the Economics of Water

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.

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, that can only be fixed collectively, through concerted action in every country, collaboration across boundaries and cultures, and for benefits that will be felt everywhere.

This policy brief looks at the implications of the Global Commission's findings for the success and implementation of the Global Biodiversity Framework (GBF), and how consideration of the hydrological cycle can accelerate progress towards the GBF targets.

Key Messages

- A holistic appreciation of the hydrological cycle that recognises its blue and green components is key to understanding the links between water, biodiversity and climate.
- Disruptions to the ecosystems that underpin the water cycle are deeply intertwined with depletion of the world's biodiversity and climate change, with each reinforcing the other.
- "Green water" is often overlooked, yet must be taken into account if we are to address the water, biodiversity and climate crises.
- The feedback between land cover and rainfall generation is a critical yet under-appreciated component of the global hydrological cycle. Forests and natural lands are the source of 45% of rainfall on land.
- The feedback between soils and rainfall storage is another critical yet under-appreciated component of the global hydrological cycle.
- Water should play a much more prominent role in national strategies to mitigate climate change and biodiversity loss.
- Taking action to protect and stabilise green water flows can accelerate progress towards the GBF targets. NBSAPs can be strengthened by embedding the role of green water.
- Green water should become a key element of Nature-based Solutions (NbS), especially in terrestrial and freshwater ecosystems. Green water considerations should be part of adaptation policies considering its key role in limiting the water dimensions of climate extremes.
- Contributions of green water to the Global Biodiversity Framework exemplify where these could prevent further destabilisation of the hydrological cycle and protect the related ecosystem functions and Nature's Contributions to People (NCPs). Redirecting subsidies from blue to green water would be a powerful action to support these.

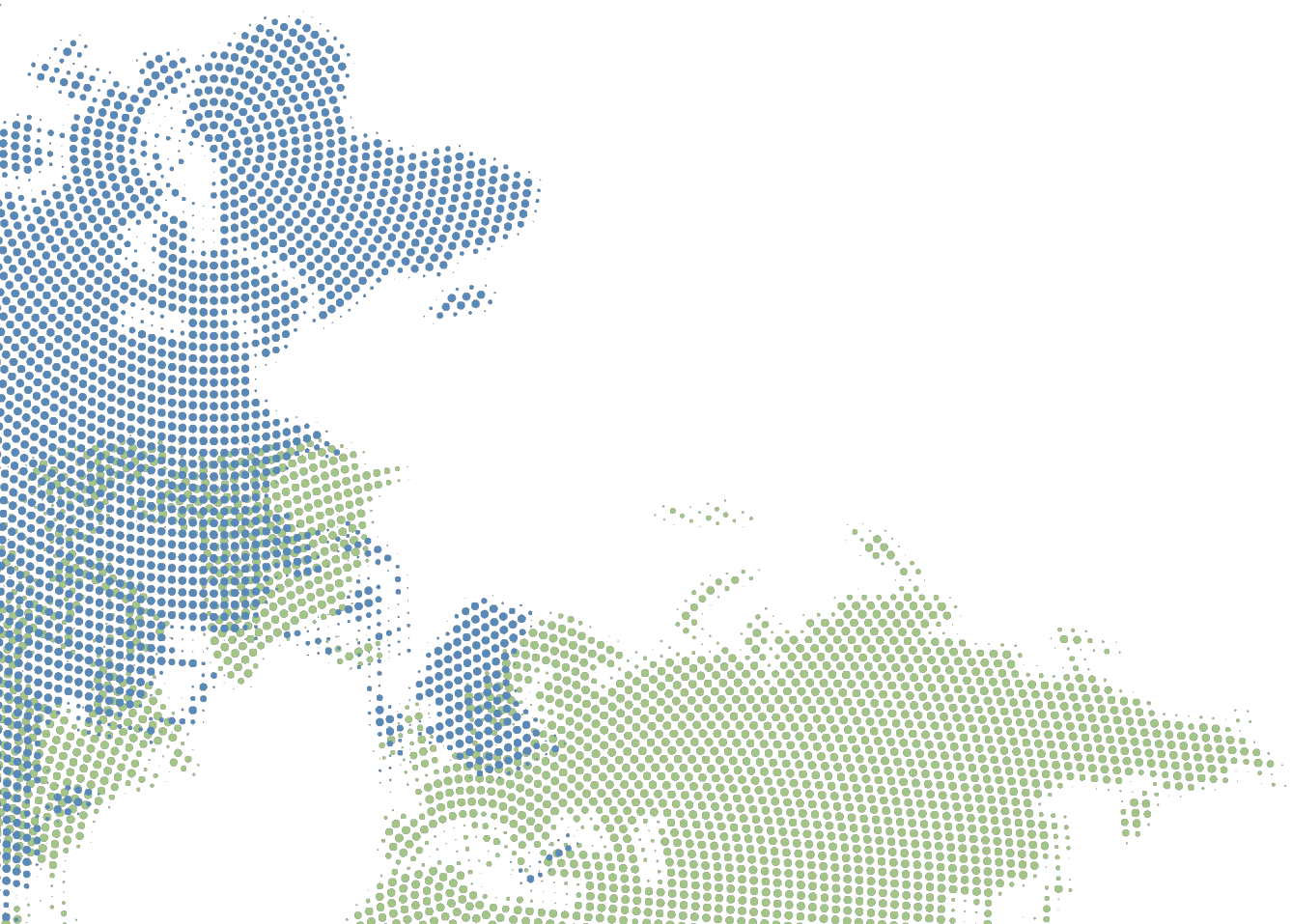
Understanding blue and green water in the hydrological cycle

Water is the "bloodstream" of the biosphere. The global hydrological cycle provides the basis for all life, enabling carbon cycling through the production of biomass, regulating the climate, and carrying nutrients, chemicals and pollutants.

This cycle comprises "blue" water – in rivers, lakes, and aquifers – but also "green" water – the moisture held in soil and plants, which evaporates and transpires into the air, travels through the atmosphere, condenses to form clouds, and then falls as rain or snow (Figure 1). "Terrestrial moisture recycling" (TMR) describes moisture originating over land that contributes to precipitation also over land, i.e. land-to-land rainfall, generated on land, transported downwind, and falling on land. Though green water flows from land represent a local and immediate water loss to the air, much of it eventually returns to land somewhere as part of the terrestrial water cycle. New modelling from the Global Commission on the Economics of Water shows that about 45% of terrestrial precipitation is sourced from land, with the remainder coming from ocean sources. Green water flows are therefore just as critical as ocean evaporation for sustaining precipitation, the source of all freshwater.

Countries are strikingly interconnected via these atmospheric moisture flows. Latest modelling reveals land-to-land moisture connections that can be seen across oceans, connecting evaporation in west African countries to rainfall in South American countries, and evaporation in North American countries to precipitation in European countries. Atmospheric moisture extends the scope of our understanding of how water moves. Managing water as a resource is much more than a local matter.

Blue water is the basis for all aquatic ecosystems, including wetlands, and is available to humans as an extractable resource. Green water, which is available to plants, supports all terrestrial ecosystems and rainfed agriculture, as well as irrigated agriculture where irrigation complements rainfall. On global and annual scales, approximately 60% of the precipitation that falls on land goes to green water and 40% to blue water, meaning green water constitutes the majority of freshwater on land.



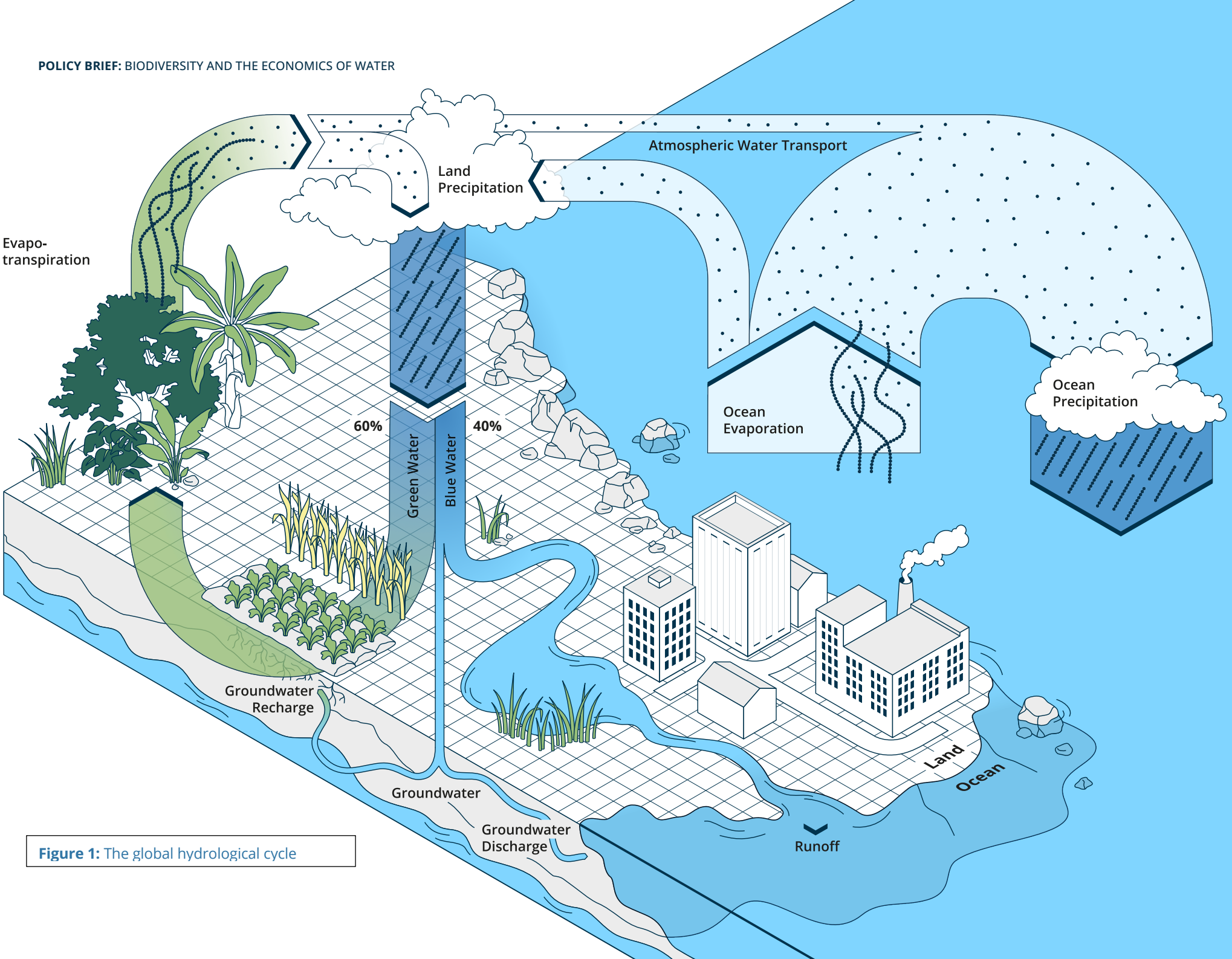


Figure 1: The global hydrological cycle

Human actions are destabilising the hydrological cycle

The stability of the water cycle is governed by Earth's energy balance and land use, determining the partitioning of precipitation between runoff and evapotranspiration, which in turn determines future rainfall.

Current thinking too often assumes stable patterns of water supply year after year, but this is no longer true: as global warming and land-use changes destabilise the water cycle, rainfall patterns are shifting.

Rising temperatures increase both the atmosphere's water demand and its capacity to hold water. Water supplies are thus connected to Earth's energy balance: land and oceans respond to global warming by evaporating more water. Moreover, as water traps heat, more atmospheric water vapour leads to more warming and more evaporation. Each 1°C increase in global temperature accelerates evapotranspiration and increases water vapour in the atmosphere by 7%. This adds power to the global hydrological cycle, leading to more extreme events, like intense rainfall, hurricanes and cyclonic storms, and associated storm surges and coastal flooding.

Land use changes – particularly deforestation and loss of wetlands – interrupt the process of terrestrial moisture recycling, thereby increasing uncertainty in the year-to-year supply of stable precipitation. The feedback between land cover and rainfall generation is a critical yet under-appreciated component of the global hydrological cycle.

Water, Biodiversity and Climate are intricately connected

Water and the process by which it moves through the hydrological cycle is necessary for all life on Earth. Yet this relationship runs two ways. Intact and biodiverse ecosystems and lands managed in ways which do not adversely impact their hydrological functioning (i.e. their capacity to supply green water flows) are critical to preserving terrestrial moisture recycling and with it nearly half of all precipitation on land.

Similarly, the overexploitation of agricultural soils by conventional agriculture – especially the non-renewal of soil organic matter – jeopardizes soils' capacity to retain green water between rainfalls and irrigations, hence accelerating the global hydrological cycle, while amplifying climatic drought and intense rainfall.Furthermore, a stable supply of green water in soils is crucial to sustaining the natural land-based ecosystems which in turn absorb 25-30% of the carbon dioxide emitted from fossil-fuel combustion. Keeping moisture in soils is therefore essential in the efforts to mitigate climate change.

However, the loss of forests, wetlands and soil moisture are depleting the planet's carbon stores. Rising temperatures trigger extreme heat waves and increase evaporative demand in the atmosphere, which dries landscapes and heightens the risk of wildfires.

Both droughts and floods exacerbate soil erosion and land degradation, which can create vicious cycles – ever-less-fertile soil that cannot support vegetation or absorb rainfall, more green water lost, and more land cleared to grow crops – inflicting damage on communities and all life. It follows that water should play a much more prominent role in national strategies to mitigate biodiversity loss and climate change.

Green water must be managed in a way that acknowledges the feedback between climate change, land-cover change, soil degradation, and precipitation. Ecosystems whose evapotranspiration is the source of rain at regional scales – especially rainforests and wetlands[i] – should be conserved, restored and sustainably used. In addition to the biodiversity and climate agenda, they contribute to the water agenda set by the Global Commission on the Economics of Water.

Green water flows are materially important to the economy

With the rapid changes and imbalances occurring in Earth's systems, economies must consider a new dimension of freshwater's impacts on economic development: namely, changes in precipitation.

A striking finding from the Global Commission's work is that the poorest decile of the global population receives nearly 70% of its annual precipitation from terrestrial moisture recycling. In contrast, the richest decile obtains only around 20% of rainfall from terrestrial sources. Further, regions that generate a substantial amount of terrestrial moisture recycling-driven rainfall in poorer areas coincide with deforestation hotspots, placing them at greater risk of precipitation declines. The findings imply that terrestrial moisture recycling is a materially important input to the economy. Estimates of the economic contribution of forests have neglected this important ecosystem service and thus severely underestimate the economic value of forests. These findings also indicate that measures to stabilise terrestrial moisture recycling are essentially pro-poor.

Completing the cycle

Current approaches to water tend to deal with one part of the hydrological cycle – namely the blue water we can see – and largely overlook the green water held as moisture in soil and plants and released as water vapour into the air. This failure is consequential. We cannot address the biodiversity and climate crises without addressing the water crisis and the role of the hydrological cycle. Nearly 3 billion people and more than half of the world's food production are now in areas where total water storage[ii] is projected to decline.

The economic consequences of water stress are exacerbated by policies that promote overuse and allocate water in ways that neither reflect the benefits water could bring nor consider equity and environmental sustainability. Neglecting the role of the hydrological cycle in the design of NBSAPs and across the GBF targets risks exacerbating areas of water stress, which in turns undermines the functioning of ecosystems.

Accelerating progress towards GBF Targets

A holistic understanding of the global hydrological cycle and its links to biodiversity and climate is vital if we are to achieve the ambitions of the three Rio conventions on biodiversity, climate and desertification.

While recognising the importance of concerted action to better govern and manage blue water, this policy brief focuses on the "missing green water", mapping where action to protect and stabilise green water stocks and flows can help accelerate progress towards GBF targets.

Several GBF targets would benefit from a "green water lens". The Annex table provides the full mapping. The targets where a consideration of green water would bring considerable benefits are:

- **Targets 2 and 3**: Most water-scarce basins and a significant share of evaporation-sheds contributing to green water transfers are in ecoregions where nature is already degraded [4] and should be prioritized when implementing targets 2 and 3. Regenerative agriculture – that promotes better soil health including an enhanced soil green water holding capacity – is critical to contribute to target 2. [5] Wetlands, particularly peatlands, are critical for green water conservation and also provide blue water services. In particular, they help reduce flood and drought risk given their high (up to 90%) water holding capacity.

- **Target 8**: Greenwater should become a key element of Nature-based solutions especially in terrestrial and freshwater ecosystems: preserving the greenwater cycle contributes to mitigate climate extremes [1], [2], and also supports climate adaptation by limiting the water dimensions of climate extremes [3]

- **Targets 10 and 11**: The sustainable management of ecosystem services and functions include soil and its capacity to store greenwater. Agroecological approaches, among others, include a better retention of green water through increasing soil organic matter and (semi-) natural habitats (hedges, riparian vegetation, wetlands, small woods, flower stripes, and other agroforestry practices) [5]. By representing close to half of the continental water cycle, green water, although often ignored as a key resource, is a key NCP with a central role in agriculture (consumptive use of water in agriculture is dominated by green water esp. in Europe, Africa and South America) [3], and key connection to forestry, that is a major contributor to the green water cycle.

- **Target 15:** It is key to make green water a more obvious element of the land-related risks, dependencies and impacts, including by ensuring it is made more explicit in related guidance (SBTN) and reporting (TNFD) mechanisms.

- **Target 20:** Knowledge and modelling of the green water cycle have recently progressed rapidly, and there is a needfor further science developments on regional mechanisms, evaporation and precipitation-sheds, and how technology can be used to address those, including developing countries and indigenous knowledge.

Green Water Pathways for GBF Progress

The Global Commission on the Economics of Water sets out five critical water missions[iii] to address the most important and interconnected challenges of the global water crisis. Two of these missions focus on ways to preserve and protect green water:

- **Mission 1: Launch a new revolution in food systems.** We need another major transformation in agriculture to reshape the reliance on large quantities of water and nitrogen-based fertilisers, to sustain the planet, while at the same time strengthening farmers' incomes and delivering nutrition equitably across populations. This will require making radical gains in water productivity. It also requires a major step-up in the adoption of regenerative agriculture systems to preserve soil health – including by storing organic carbon in the soil and improving soil water retention – with the aim of covering at least 50% of global cropland by 2050. Achieving these systems will require leveraging large agroindustry coalitions to transform supply chains, as well as creating farmer-centred solutions that enhance demand for regenerative agricultural products and restoring sustainable traditional techniques.

- **Mission 2: Conserve and restore natural habitats critical to protect green water.** It is critical to integrate the benefits of green water into how we manage land use and natural habitats and guide investments for their conservation. To safeguard this precious resource, we should aim to conserve 30% of the world's forest and inland water ecosystems and restore 30% of degraded ecosystems by 2030, in line with the Global Biodiversity Framework. Priority should be given to protecting and restoring those areas that can best contribute to a stable water cycle. Efforts must also be made to engage with and support Indigenous Peoples, who are stewards of a quarter of the planet's land and about 40% of remaining natural lands worldwide.

As concrete steps coming out of the CBD COP16, countries and parties could:

- **Embed consideration of the hydrological cycle across the Global Biodiversity Framework and NBSAPs.** To prevent further destabilisation of the hydrological cycle and acceleration of moisture in the atmosphere, and to protect related ecosystem functions and NCPs. This would in turn help countries facing critical water issues to improve their

NBSAPs and their financing from national budgets as it would give a higher national priority to biodiversity objectives.

- **Establish a Green Water taskforce:** Building on the findings of the Global Commission and assessment against the GBF, assess where evidence, knowledge and data and information systems can be strengthened ahead of the next COP to inform how GBF targets and NBSAPs can be strengthened by considering green water. The taskforce could report back at CBD COP17.

Governance and financing are critical enablers moving forward:

- **Governance and– IPLCs (indigenous people and local communities):** There is ample evidence that IPLC – including farmers, pastoralists, gatherers, hunters, fishers, etc. – contribute significantly to global biodiversity conservation and ecosystem services [6]. It is therefore necessary to involve them in all awareness-raising, communication and education actions to strengthen the understanding and the importance of green water in further steps towards better biodiversity and ecosystems governance. This should include the promotion of indigenous knowledge and practices that support maintaining the green water cycle.

- **Financing the conservation and restoration of the green water cycle:** Because of insufficient knowledge and awareness of the green water role, investments and financing have focused for decades on blue water, through water infrastructure (and pricing) for water transport, storage, flood protection and utilities, and water technologies for water application in agriculture (e.g. laser levelling for surface and basin irrigation, sprinklers, drip irrigation). Rebalancing financing towards green water would first require financing of forest conservation, as today's pressures are far too great to ensure zero-deforestation, and second to assess the role and economic value of green water, with three key dimensions:

    - The costs of specific actions for conservation of forests and natural lands, the transition towards regenerative agriculture, and other measures to protect or restore soil health.

    - The benefits provided by green water to various sectors. Considering the dynamics of terrestrial moisture recycling, some of these benefits materialise at multiple geographical scales.

    - The risks related to green water, namely droughts and extreme rainfall, which are probably the largest threats to agriculture and value chains supply resulting from climate change.

Annex Table: Mapping Greenwater onto the Global Biodiversity Framework (GBF) Targets

Targets	Target elements affected / enabled by green water	How to enable green water?
1. REDUCING THREATS TO BIODIVERSITY		
TARGET 1: Plan and Manage all Areas To Reduce Biodiversity Loss		
Ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes addressing land- and seause change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.	• **Areas of high biodiversity importance** – include areas with unique, important or threatened biomes and habitats, that are key sources and/or sinks of greenwater to/from the atmosphere [2] (evaporationsheds / precipitationsheds). • **High ecological integrity** – areas which dominant ecological characteristics (composition, structure, function) occur within their natural ranges of variation and can withstand and recover from most disturbances. Ensuring steady flows and stocks of greenwater is key to maintain such natural ranges	• Considering how areas of high biodiversity importance contribute and/or benefit from the greenwater cycle (in volume and time) is key to their inclusive spatial planning and/or effective management • Considering how areas of high ecological integrity contribute and/or benefit from the greenwater cycle (in volume and time) is key to their inclusive spatial planning and/or effective management
TARGET 2: Restore 30% of all Degraded Ecosystems		
Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.	• **Restoration of degraded ecosystems:** Degraded ecosystems include a loss of ecosystem functions and services (such as green water cycle). Assessing this loss is a necessary first step for monitoring the total percent of degraded ecosystems which are under restoration, and should include green water.	• Most water-scarce basins and a significant share of evaporationsheds contributing to green water transfers are in ecoregions where nature is already degraded, and should be prioritized when implementing this target [4] • Regenerative agriculture – that promotes better soil health including an enhanced soil greenwater holding capacity – is choice ensemble of actions to contribute to this target. [5]

	• **Regeneration of biodiversity and ecosystem functions and services:** Another dimension relates to transformed ecosystems (such as agricultural areas), where ecosystem function and services should be regenerated including to sustain agricultural production, and where greenwater storage in soils is a critical element	
TARGET 3: Conserve 30% of Land, Waters and Seas		
Ensure and enable that by 2030 at least 30 per cent of terrestrial and inland water areas, and of marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories.	• **Conservation of 30% forest ecosystems:** The global target of protecting 30% of terrestrial lands by 2030 will not bring more lands under conservation if the target is reached only on regions where forested ecosystems are still intact. • **Conservation of 30% of inland water ecosystems:** Inland water ecosystems such as lakes, rivers, swamps, peatlands and wetlands act as a source and purifier of water, providing resilience against flood and droughts, supporting biodiversity, and providing water for agriculture and other uses including carbon storage and sequestration. Yet they remain under threat, with natural wetlands declining by 35% between 1970 and 2015, three times the rate of forest loss. [7]	• Most water-scarce basins and a significant share of evaporationsheds contributing to green water transfers are in ecoregions where nature is already degraded, and should be prioritized when implementing this target [4] • Wetlands, particularly peatlands, are critical for green water conservation and also provide blue water services. In particular, they help reduce flood and drought risk given their high (up to 90%) water holding capacity • Forests, in particular tropical rainforests, play a critical role in rainfall generation given their moisture-generation and conveyance power.
TARGET 4: Halt Species Extinction, Protect Genetic Diversity, and Manage Human-Wildlife Conflicts		

Ensure urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential, including through in situ and ex situ conservation and sustainable management practices, and effectively manage human-wildlife interactions to minimize human-wildlife conflict for coexistence.	N/A[1]	N/A
TARGET 5: Ensure Sustainable, Safe and Legal Harvesting and Trade of Wild Species		
Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimizing impacts on non-target species and ecosystems, and reducing the risk of pathogen spillover, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities.	N/A	N/A
TARGET 6: Reduce the Introduction of Invasive Alien Species by 50% and Minimize Their Impact		

Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent by 2030, and eradicating or controlling invasive alien species, especially in priority sites, such as islands.	• **Invasive Alien Species' pathways are identified and managed:** with an increased management of invasive species, natural atmospheric transport is likely to become a preferred pathway, often associated with the greenwater cycle and rainfall (wet deposition) [8]	• With the (green) water cycle accelerating in most regions due to global warming[1], there is an increased risk of associated natural transport and deposition of alien invasive species, hence its necessary to better explore such pathways at regional level and quantify the associated risks
TARGET 7: Reduce Pollution to Levels That Are Not Harmful to Biodiversity		
Reduce pollution risks and the negative impact of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects, including: (a) by reducing excess nutrients lost to the environment by at least half, including through more efficient nutrient cycling and use; (b) by reducing the overall risk from pesticides and highly hazardous chemicals by at least half, including through integrated pest management, based on science, taking into account food security and livelihoods; and (c) by preventing, reducing, and working towards eliminating plastic pollution.	• **Reducing excess nutrients lost to the environment:** The major causes of excessive nutrients are agricultural runoff and leaching, including from the historic and ongoing application of fertilizers, and the target specifically calls for excess nutrients lost to the environment to be reduced by half. Degraded soils (notably with low organic matter) have a strongly reduced greenwater holding capacity that goes along with reduced retention of nutrients.	• Better valuing and managing greenwater in the agricultural soils compartment will be a strong enabler of nutrients retention hence of reducing excess nutrients lost to the environment.
TARGET 8: Minimize the Impacts of Climate Change on Biodiversity and Build Resilience		

Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions, including through nature-based solutions and/or ecosystem-based approaches, while minimizing negative and fostering positive impacts of climate action on biodiversity.	• **Nature-based solutions (NbS)** are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, where the greenwater cycle necessarily plays a regulation role. • **Ecosystem-based mitigation** refers to the use of ecosystems for their carbon storage and sequestration service to aid climate change mitigation: halting land conversion (esp. deforestation) preserves the greenwater cycle • **Ecosystem-based adaptation** aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of the adverse effects of climate change, which are strongly manifestated through greenwater-related extremes (more frequent and intense droughts and floods) [1].	• Greenwater should become a key element of NbS especially in terrestrial and freshwater ecosystems. • There is significant scientific evidence showing that forest ecosystems conservation mitigates climate change and also preserves the greenwater cycle that in turn contributes to mitigate climate extremes [1], [2] • Keeping moisture in soils is also critical to their ability to sequester carbon. • Greenwater considerations should be part of most adaptation policies considering its key role in limiting the water dimensions of climate extremes [3]
2. MEETING PEOPLE'S NEEDS THROUGH SUSTAINABLE USE AND BENEFIT-SHARING		
TARGET 9: Manage Wild Species Sustainably To Benefit People		
Ensure that the management and use of wild species are sustainable, thereby providing social, economic and environmental benefits for people, especially those in vulnerable situations and those most dependent on biodiversity, including through sustainable biodiversity-based activities, products and services that enhance biodiversity, and protecting and encouraging customary sustainable use by indigenous peoples and local communities.	N/A	N/A
TARGET 10: Enhance Biodiversity and Sustainability in Agriculture, Aquaculture, Fisheries, and Forestry		

Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agroecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems, and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.	• **Biodiversity-friendly practices** help to increase the positive effects and reduce the negative effects of production on nature. E.g., sustainable agricultural production may include increases in productivity based on the sustainable management of ecosystem services and functions, agroecological approaches Biodiversity-friendly practices are an important aspect of maintaining the resilience, or the ability of productive systems to recover from stress or disturbance, incl. those resulting from a disrupted greenwater cycle (more frequent floods and droughts) • **Nature's contributions to people (NCP)**: The sustainable management of agriculture, and forestry is an essential element in ensuring the continued availability of NCP and in particular food security.	• The sustainable management of ecosystem services and functions include soil and its capacity to store greenwater. Agroecological approaches, among others, include a better retention of greenwater through increasing soil organic matter and (semi-)natural habitats (hedges, riparian vegetation, wetlands, small woods, flower stripes, and other agroforestry practices)[5] • By representing close to half of the continental water cycle, greenwater, although often ignored as a key resource, is a key NCP with a central role in agriculture (consumptive use of water in agriculture is dominated by greenwater esp. in Europe, Africa and South America)[3], and key connection to forestry, that is a major contributor to the greenwater cycle.
TARGET 11: Restore, Maintain and Enhance Nature's Contributions to People		
Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as the regulation of air, water and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through nature-based solutions and/or ecosystem-based approaches for the benefit of all people and nature.	• See above on NbS (Target 8) and NCP (Target 10)	• See above on NbS (Target 8) and NCP (Target 10), and consider here the critical role played by the restoration of the greenwater cycle to protect people from natural hazards and disasters
TARGET 12: Enhance Green Spaces and Urban Planning for Human Well-Being and Biodiversity		

Significantly increase the area and quality, and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature, and contributing to inclusive and sustainable urbanization and to the provision of ecosystem functions and services.	• **Green and blue spaces:** those space are inextricably linked with green and blue water, respectively.	• Creating new green and blue spaces, better managing existing areas for biodiversity and health outcomes, and ensuring that such areas are accessible to people, will naturally improve the cycle of greenwater in urban and densely populated areas, incl. create an evaporation flow with a resulting cooling effect [9].
TARGET 13: Increase the Sharing of Benefits From Genetic Resources, Digital Sequence Information and Traditional Knowledge		
Take effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030, facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments.	N/A	N/A
3. TOOLS AND SOLUTIONS FOR IMPLEMENTATION AND MAINSTREAMING		
TARGET 14: Integrate Biodiversity in Decision-Making at Every Level		

Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, and fiscal and financial flows with the goals and targets of this framework.	• **Policies, regulations, processes, strategies, assessments and national accounting:** Various decision-making frameworks guide activities at global, national and local scales and in the private and public sector. However, these frameworks often do not appropriately account for biodiversity or its values, esp. greenwater	• Absence of greenwater mention in most environmental laws and governance remains a major concern. Even under the ambitious EU Green Deal [10], which endorses the vision of a regenerative and restorative economy, neither its associated directives (the Nature Restoration Law -unless for water in peatlands-, the Proposal for a EU Directive on Soil Monitoring and Resilience, nor the Farm to Fork Strategy [11] refer to green water in any place. This would among others imply assessing the role and economic value of not just blue water, but also green water that is held in the air, biomass and soils.

TARGET 15: Businesses Assess, Disclose and Reduce Biodiversity-Related Risks and Negative Impacts		
Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions: **(a) Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity, including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains, and portfolios;** **(b) Provide information needed to consumers to promote sustainable consumption patterns;**	• **Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts:** Companies are progressively engaging into reporting and disclosure of their risks, dependencies and impacts on nature, and many start with water. However their reporting (following guidances such as SBTN[2] and TNFD[3]) is merely limited to blue water. Engagement on land comes second if any, whereas it should include land conversion (incl. deforestation), land footprint, and landscape engagement (incl. regenerative agriculture), which all influence the greenwater cycle.	• It is important to make greenwater a more obvious element of the land-related risks, dependencies and impacts, including by ensuring it is made more explicit in related guidance (SBTN) and reporting (TNFD) mechanisms.

(c) Report on compliance with access and benefit-sharing regulations and measures, as applicable; **in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production.**		
TARGET 16: Enable Sustainable Consumption Choices To Reduce Waste and Overconsumption		
Ensure that people are encouraged and enabled to make sustainable consumption choices, including by establishing supportive policy, legislative or regulatory frameworks, improving education and access to relevant and accurate information and alternatives, and by 2030, reduce the global footprint of consumption in an equitable manner, including through halving global food waste, significantly reducing overconsumption and substantially reducing waste generation, in order for all people to live well in harmony with Mother Earth.	N/A	N/A
TARGET 17: Strengthen Biosafety and Distribute the Benefits of Biotechnology		
Establish, strengthen capacity for, and implement in all countries, biosafety measures as set out in Article 8(g) of the Convention on Biological Diversity and measures for the handling of biotechnology and distribution of its benefits as set out in Article 19 of the Convention.	N/A	N/A
TARGET 18: Reduce Harmful Incentives by at Least $500 Billion per Year, and Scale Up Positive Incentives for Biodiversity		

Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least $500 billion per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity.	• **Incentives, including subsidies, harmful for biodiversity** emanate from policies or programmes that induce unsustainable behaviour harmful to biodiversity, often as unanticipated and unintended side effects of policies or programmes designed to achieve other objectives. As for most countries irrigation is seen as the way to sustain and increase productivity, it is heavily subsidized, contributing to rainfed agriculture being neglected.	• Subsidies for (irrigated) crops that rely on bluewater (eg maize) are greater than those for (rainfed) crops relying upon greenwater: an incentive that tends to artificialize the water cycle (increasing the farmers' dependency on bluewater) and to neglect the increasing role of greenwater in enhancing crop resilience.
TARGET 19: Mobilize $200 Billion per Year for Biodiversity From all Sources, Including $30 Billion Through International Finance		
Substantially and progressively increase the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, mobilizing at least $200 billion per year by 2030, including by: **(a) Increasing total biodiversity related international financial resources from developed countries, including official development assistance, and from countries that voluntarily assume obligations of developed country Parties, to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, to at least $20 billion per year by 2025, and to at least $30 billion per year by 2030;**	• Green water provides benefits to various sectors that need to be taken into account by the financial sector. Considering the dynamics of terrestrial moisture recycling, some of these benefits materialise at multiple geographical scales.	• Assess the role and economic value of green water so that it can be considered within natural capital accounting, payments for ecosystem services and other financial instruments.

(b) Significantly increasing domestic resource mobilization, facilitated by the preparation and implementation of national biodiversity finance plans or similar instruments according to national needs, priorities and circumstances; **(c) Leveraging private finance, promoting blended finance, implementing strategies for raising new and additional resources, and encouraging the private sector to invest in biodiversity, including through impact funds and other instruments;** **(d) Stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, and benefit-sharing mechanisms, with environmental and social safeguards;** **(e) Optimizing co-benefits and synergies of finance targeting the biodiversity and climate crises;** **(f) Enhancing the role of collective actions, including by indigenous peoples and local communities, Mother Earth centric actions[1] and non-market-based approaches including community based natural resource management and civil society cooperation and solidarity aimed at the conservation of biodiversity;** **(g) Enhancing the effectiveness, efficiency and transparency of resource provision and use;**		
TARGET 20 : Strengthen Capacity-Building, Technology Transfer, and Scientific and Technical Cooperation for Biodiversity		

Strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through SouthSouth, North-South and triangular cooperation, to meet the needs for effective implementation, particularly in developing countries, fostering joint technology development and joint scientific research programmes for the conservation and sustainable use of biodiversity and strengthening scientific research and monitoring capacities, commensurate with the ambition of the goals and targets of the Framework.	• **Access to and transfer of technologies:** Numerous technologies have the potential to assist in addressing the ongoing degradation of the greenwater cycle. Examples of relevant technologies include, among others, (i) technologies for spatial planning and managing greenwater, including geospatial technology, remote sensing and geographic information systems; and (ii) indigenous and traditional technologies (eg rainwater harvesting practices such as zaï pits[12])	• Knowledge and modelling of the greenwater cycle have recently progressed rapidly, and there is a need for further science developments on regional mechanisms, evaporation- and precipitation-sheds, and how technology can be used to address those, including by developing countries.
TARGET 21: Ensure That Knowledge Is Available and Accessible To Guide Biodiversity Action		
Ensure that the best available data, information and knowledge are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management and, also in this context, traditional knowledge, innovations, practices and technologies of indigenous peoples and local communities should only be accessed with their free, prior and informed consent,[2] in accordance with national legislation.	• **Communication, awareness-raising, education:** The absence of greenwater mention in public policies and international agreements clearly demonstrate the need fo, awareness and education measures. • **Knowledge management:** Management of greenwater related knowledge, information and data will be a key element of awareness-raising and education • **Monitoring:** Effective monitoring, including the use of indicators, depends on the availability of good quality data, information and knowledge.	• Partners should rapidly develop material to support communication, awareness-raising, and education on the importance and key role of greenwater • There is a need to establish or strengthen information and knowledge management systems on greenwater that could support both national and international discussions and commitments.
TARGET 22: Ensure Participation in Decision-Making and Access to Justice and Information Related to Biodiversity for all		

Ensure the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.	N/A	N/A
TARGET 23: Ensure Gender Equality and a Gender-Responsive Approach for Biodiversity Action		
Ensure gender equality in the implementation of the Framework through a gender-responsive approach, where all women and girls have equal opportunity and capacity to contribute to the three objectives of the Convention, including by recognizing their equal rights and access to land and natural resources and their full, equitable, meaningful and informed participation and leadership at all levels of action, engagement, policy and decision-making related to biodiversity.	N/A	N/A

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