THE SUSTAINABLE FRESHWATER TRANSITION

Summary of the transition

An integrated approach guaranteeing the water flows required by nature and people, improving water quality, protecting critical habitats, controlling invasive species and safeguarding connectivity to allow the recovery of freshwater systems from mountains to coasts. This transition recognizes the importance of biodiversity in maintaining the multiple roles of freshwater ecosystems to support human societies and natural processes, including linkages with terrestrial, coastal and marine environments.

Rationale and Benefits

Freshwater ecosystems host a significant diversity of life. Covering less than 1% of Earth's surface, these habitats are home to approximately one third of vertebrate species and 10% of all species[1], and provide ecosystem services to billions of people. Moreover, freshwater systems integrate terrestrial ecosystems, and their river basins or catchments, with coastal, and ultimately marine ecosystems. For example, coral reefs are impacted by activities on land, mediated by freshwater and groundwater systems.[2] The exploitation of freshwater resources for agricultural, industrial and domestic consumption has taken place with little regard to freshwater ecosystems and the services they provide.[3] Coastal areas, wetlands and other areas near river courses, have been particularly subject to conversion or development. As a result, the current rate of wetland loss is three times that of forest loss[4] with an estimated 30% of natural freshwater ecosystems disappearing since 1970, and 87% of inland wetlands since 1700 (see Aichi Biodiversity Target 5).[5] Populations of freshwater vertebrate species have declined at more than twice the rate of land or ocean vertebrates[6] (see Aichi Biodiversity Target 12). An estimated 1.8 billion people are likely to live under conditions of regional water stress by 2050.[7] Many inland water and coastal ecosystems are threatened by eutrophication due to excess run-off of soil and nutrients from terrestrial areas, especially from agricultural areas and degraded ecosystems (see Aichi Biodiversity Target 8). Safeguarding freshwater ecosystems and the services they provide for nature and humanity is therefore an urgent challenge.[8]

Key components of the transition[9]

INTEGRATE ENVIRONMENTAL FLOWS[10] INTO WATER MANAGEMENT POLICY AND PRACTICE. This requires communication, stakeholder participation, awareness-raising, adaptive management and demonstration of the benefits of flows for people and nature.[11] The flows of water and nutrients are important in maintaining the overall health of the ecosystem, and many species depend on connectivity for their migration and reproduction.[12] Environmental flows provide tools to coordinate upstream-downstream water allocations to maintain healthy ecosystems, while taking socio-economic and cultural objectives into consideration. Applying environmental flows in practice, policy and law allows a society to build the knowledge, capacities and institutions needed to implement integrated water resource management, and to adapt to climate change.

COMBAT POLLUTION AND IMPROVE WATER QUALITY. This needs to be done at the source to protect public health and the environment, and to increase water availability[13], including through wastewater treatment and re-use, regulation of polluting industries, market-based solutions,


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improved agricultural practices especially with regard to fertilizer use, manure management and erosion control, integrated river-basin management and nature-based solutions such as floodplain and coastal wetland restoration and riparian buffer zones.[14]

PREVENT OVEREXPLOITATION OF FRESHWATER SPECIES, through improved biological assessments, science-based management and development of freshwater fisheries action plans as described in the 2016 Rome Declaration;[15] and by preventing bycatch through identifying and using the temporal and spatial differences between target species and bycatch, and by mandating reporting on bycatch.[16]

PREVENT AND CONTROL INVASIVE ALIEN SPECIES IN FRESHWATER ECOSYSTEMS to eliminate their impacts on native populations. This can be done by identifying and regulating major introduction pathways such as trade and ballast water transfers, as well as through the removal of existing invasive alien species.

PROTECT AND RESTORE CRITICAL HABITATS. This can be done through the establishment of protected areas, land-use planning and habitat restoration programs,[17] all requiring stakeholder engagement to identify synergies and resolve trade-offs between biodiversity goals and other priorities, thereby improving the outcomes for biodiversity and ecosystem services, and making them more resilient to future conditions;[18] and by addressing threats from riverine sand and gravel mining, including through lifting demand-side pressures by using recycled materials for construction, avoiding over-design and improving the supply chain process (see Land and Forests and Cities and Infrastructure transitions).

Progress towards the transition

While overall progress on more sustainable policies and practices relating to freshwater ecosystems has remained low, innovative approaches in this direction have been successfully implemented in different contexts and regions across the world,

demonstrating the feasibility of such actions and providing guidance on scalability and replicability. For example, in South Africa environmental flows have been incorporated into water-related legislation, implemented through legally-mandated catchment management agencies.[19] A similar policy is followed in Mexico, where a water reserves programme aims to preserve sufficient water supplies for millions of people taking environmental flows into account, resulting in sustainable water allocation limits for 189 rivers.[20] Bulgaria has adopted a National Action Plan for Conservation of Wetlands of High Significance comprised of cross-cutting and specific measures including the restoration of water regimes and wetlands, provisions to control poaching and invasive alien species, improvements in data and monitoring and education, and support for climate change adaptation and to limit pollution, nutrient runoff and eutrophication.[21] In Germany, through the federal Blue Belt Programme, federal waters and riparian zones are being re-naturalized, and a greater emphasis is being placed on nature conservation, water protection, flood prevention and tourism, recreational sport and leisure activities.[22] In Kenya, a Presidential Task force was created to oversee interventions to achieve Blue Economy objectives, including the development and implementation of sub-catchment management plans to assist local communities in protecting wetlands, lakes, and other water catchment areas.[23]

Some linkages with other transitions

LAND AND FORESTS: *depends on* well-preserved terrestrial ecosystems to regulate water purification and supply; *contributes to* reducing land pressure from large hydropower schemes and water infrastructure development

AGRICULTURE: *depends on* more sustainable agricultural practices to reduce water abstraction and pollution

FOOD: *contributes to* nutritious and lower-impact diets through provision of sustainably-harvested freshwater fish and other biodiversity

FISHERIES AND OCEANS: *contributes to* healthy coastal and marine ecosystems through transport of nutrients and sediments, reduced pollution and conservation of migratory fish species; *depends on* sustainable marine harvest of fish that spawn in freshwater environments.

CITIES AND INFRASTRUCTURE: *depends on* reduced water consumption in urban areas, controlled urban expansion and use of green infrastructure; *contributes to* supply and quality of water for urban populations

CLIMATE ACTION: *depends on* sustainable climate change mitigation to maintain freshwater ecosystems including through snow and ice melt, and avoiding further fragmentation of rivers from large dams; *contributes to* climate change mitigation through carbon storage in wetlands, and to adaptation through ecosystem resilience

ONE HEALTH: *contributes to* physical and mental health by safeguarding clean water supplies and maintaining freshwater environments important for leisure, cultural and spiritual activities.

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