

1st International Environment Forum for Basin Organizations

Issue Paper No. 1

Theme 1: Ecosystem and Biodiversity Conservation¹

Background:

Freshwater basins, including aquifers, provide ecosystem services and biodiversity resources which are vital for the survival and wellbeing of human populations. These services and resources are deteriorating rapidly, leading to negative impacts on human health and welfare. Water resource management approaches do not adequately take ecosystem services and resources into account.

Freshwater basins provide valuable ecosystem services, globally worth an estimated 2 to 5 trillion US dollars per year.² They provide water for consumption, irrigation and hygiene, as well as fish and other plant and animal resources used for food, fuel, medicine, genetic and biochemical material, and ornamentation. Basin ecosystems regulate pollution, disease spread, air quality, climate, groundwater supply, erosion, soil quality, floods and storms. Basin systems perform necessary nutrient cycling and soil formation functions. Finally, basins fulfill spiritual, recreational, aesthetic, and educational needs. A study of ecosystem services provided by 10 water systems in the Zambezi estimated their value at \$123 million per year, taking into account the value of the fish production, agriculture, and livestock farming supported by the ecosystem.³ Natural pollution filtration in the Nakivubo papyrus swamp in Uganda is worth an estimated \$2,220-3,800 per hectare per year.⁴ Groundwater recharge in the Hadejia-Nguru wetlands in Nigeria is worth an estimated \$4.8 million per year.⁵

Freshwater basins support some of the richest ecosystems on the planet. Freshwater ecosystems occupy less than 1% of the planet's surface but contain 12% of described species, and support 25% of described vertebrates.⁶ These biodiversity resources translate into direct human benefits. Inland fisheries alone can be worth billions, and can be essential to local economies and health. The Mekong, for example, produces an estimated 2.1 million tons of wild fish each year, worth between 4.2 and 7.6 billion US dollars on retail markets.⁷ Such fisheries

¹ This Issue Paper was developed by UNEP in cooperation with... [insert Partners].

² Millennium Ecosystem Assessment, Ecosystems and Human Well-Being: Current State and Trends – Inland Water Systems 554-555 (World Resources Institute 2005).

³ *Id.* at 555

⁴ *Id.* at 557

⁵ *Id.*

⁶ UNEP, Clearing the Waters, p. 26 (2010)

⁷ UNEP, Blue Harvest: Inland Fisheries as an Ecosystem Service, p. 16 (2010)

employ 60 million people across the globe, and provide the main source of protein and essential nutrients for hundreds of millions more.⁸

Yet, aquatic ecosystems are deteriorating rapidly. Up to 50% of inland water habitats may have been lost during the twentieth century.⁹ Populations of freshwater species are falling at a rate two-thirds higher than that of terrestrial and marine species.¹⁰ This deterioration has largely been caused by human mismanagement and pollution of freshwater ecosystems, driven by population growth and development, in addition to climate change and related problems of desertification, land degradation and drought. *[Specific examples of basin deterioration]*

This deterioration leads to negative impacts on human wellbeing. Over-abstraction, pollution, change in water flow, reduction in biodiversity, and reduction in capacity to perform regulatory and support functions such as detoxification of wastes, soil formation, and regulation of climate leads to serious negative impacts on human wellbeing. Lack of clean fresh water is a key factor limiting development, causing health problems, limiting water-intensive economic growth, and contributing to political and civil instability and international disputes. Currently, 1.1 billion people lack access to clean water, while 2.6 billion lack access to basic sanitation.¹¹ Water related diseases such as cholera, typhoid, amoebic and bacillary dysentery, dengue, malaria, yellow fever, scabies, trachoma and typhus are made more serious by degradation of water quality and changes in water flow. Loss of biodiversity threatens the livelihoods of millions of fishers. Change in flood patterns affects agricultural productivity and puts human communities at risk. Land degradation from salinization causes a loss of US\$11 billion each year.¹² *[Specific examples of harm/economic loss from ecosystem deterioration]*

Investing in water and ecosystems could lead to increased employment, reduction in disease and mortality, economic savings, and achievement of the Millennium Development Goals (MDGs).¹³

Main Issues:

- **Considering Ecosystem Services in Transboundary Water Resource Management:**

Existing water management systems do not include sufficient consideration of the variety and importance of ecosystem services, and the effect on these services of management decisions. In water management decisions, the focus is usually on one or two services, such as the use of freshwater resources for human consumption, or the generation of energy through hydrological systems. Projects aimed to optimize these services often degrade or destroy other valuable services, such as soil formation, water purification, flood control, and fish production services. *[Basin level example: e.g. consequences of dam construction]*

⁸ United Nations Environment Program, Blue Harvest: Inland Fisheries as an Ecosystem Service 5 (2010).

⁹ Millennium Ecosystem Assessment, Ecosystems and Human Well-Being: Current State and Trends – Inland Water Systems, p. 553 (World Resources Institute 2005).

¹⁰ United Nations Environment Program, Clearing the Waters 26 (2010).

¹¹ Millennium Ecosystem Assessment, Ecosystems and Human Well-Being: Current State and Trends – Freshwater, p. 175 (World Resources Institute 2005).

¹² *Id.* at 34

¹³ See UNEP's Green Economy Report, p. 135-137

The decision to choose certain services over others is usually unarticulated, often unrecognized by the decision-makers themselves. This sort of unarticulated trade-off is often detrimental to human welfare. Moreover, different ecosystem services may benefit different countries, leading to conflict when upstream users take action to exploit one service which results in reduction or destruction of services enjoyed by downstream users. [Example]

In order to optimize benefits from freshwater basins, it is necessary to articulate and consider the different ecosystem services to make conscious and intentional decisions to optimally balance them to optimize benefits throughout the basin.

- **Allocating Water to the Environment:**

Allocation of water in transboundary situations can be contentious and difficult, particularly where there is insufficient water to fully meet the needs of all users, as is usually the case. Often in these cases the water needs of the environment are not taken into account. However, without sufficient water allocation, the basin ecosystem will deteriorate, resulting in a loss of vital services. [Example]

Allocating water to the environment can even increase the amount of usable freshwater available, through groundwater recharge and water purification services provided by a healthy ecosystem. [Example]

Where users and ecosystem beneficiaries are separated by national borders, dialogue and cooperation is necessary to ensure that use of water by one country does not result in loss of ecosystem services in another country. Countries must cooperate in ensuring that sufficient water is allocated to the environment to meet its minimum needs.

- **Avoiding and Mitigating Transboundary Freshwater Pollution:**

Freshwater basins are both victims and carriers of pollution. Pollution has devastating effects on freshwater ecosystems, translating into negative impacts on human communities. The rivers carry these pollutants, sometimes across great distances, spreading the problem across communities and borders.

Agriculture, industrial, and human pollution impacts water quality, causing health problems and shortage of usable water. Land use change leads to pollution in the form of nutrients, sedimentation, or salinity, degrading ecosystems and affecting their ability to provide essential services. Discharge of water used for industrial cooling can cause temperature change downstream, affecting downstream plant and animal life which humans rely on for food and medicine. [Example]

The effects of pollution on ecosystem services are not sufficiently taken into account in planning and development decisions, due in part to lack of knowledge about the value and state of ecosystem services and the relationship between maintenance of ecosystem services and human activity, but also due to the lack of importance attached to ecosystem services in the political sphere. The result is a consistent devaluation of ecosystem services leading to large scale environmental degradation and ultimately total loss of these services. In order for these services to be protected, they must be articulated and defended.

Pollution of any part of a basin can affect the entire basin system. Rivers carry pollutants downstream, spreading the problem across boundaries. Ecosystem degradation caused by pollution affects the health of linked ecosystems throughout the basin. Often, the site of the environmentally destructive activity is in a different country than that which bears the cost. In these cases, it is important to find ways to articulate the value of ecosystem services within and between countries in order to ensure their protection.

Possible Responses:¹⁴

- Articulate and communicate the value of river basin ecosystem services. In order to gain the political and community support to protect ecosystem services it is necessary to find ways to assess and communicate their value. Basin organizations can and should play a central role in this process by collecting and disseminating information on ecosystem services to engage communities and bring the value of services to the attention of decision-makers. The value of ecosystem services must be communicated across borders, as well as within countries, in order to promote informed negotiation and transboundary decision-making. Transboundary Environmental Impact Assessments could contribute to facilitating dialogue across borders.
- Advocate consideration of ecosystem services in decision-making. River basins need advocates, or they will be compromised, and their vital services lost. River basin organizations are most suited for such advocacy because of their position of expertise and responsibility in relation to the basin and their stake in its preservation.
- Encourage a focus on resilience and sustainability in freshwater basin management. Healthy ecosystems are more able to cope with changing stresses and demands, and can continue to provide services such as groundwater recharge and water purification which helps maintaining their own health. Ecosystem deterioration affects the resilience and value of the entire basin. Basin organizations should highlight the importance of maintaining resilient ecosystems through monitoring of ecosystem health and disseminating the results.
- Provide a forum for transboundary dialogue and cooperation. Transboundary communication is necessary to address sharing and preserving of transboundary resources. Basin organizations are well situated to provide forums for the negotiation and renegotiation of water use arrangements as conflicts arise between uses and activities affecting ecosystem services. Such forums can provide the flexibility necessary for adaptive management of ecosystem services, and provide opportunities for all stakeholders, including sub-basin interests, to participate.
- Engage in international sharing of experiences and strategies. At the international level, international forums such as this one can provide opportunities for basin organizations to share examples of best practices, and their experiences in optimizing and valuing ecosystem services.

¹⁴ This list is not exhaustive. It is merely intended to guide the discussions and point towards possible avenues for action which, if implemented, could assist and benefit basin organizations in their work around the world and strengthen freshwater governance overall.
