

## Ignore biodiversity management at your own peril

PRAKASH NELLIYAT

The United Nations designated May 22 as the “International Day for Biological Diversity,” to increase understanding and awareness of biodiversity issues. “Water and Biodiversity” is this year’s theme. We cannot imagine one without the other. Water and biodiversity are sources of life and livelihood or options for reducing poverty and enhancing human welfare. Basic human needs such as air, water, food, clothing and medicines are the products of water/biodiversity. Seventy per cent of the world’s poor lives in rural areas and depends directly on biodiversity for its survival and well-being.

### STRESS FACTORS

However, when the population and its requirements start to increase, there is proportionate stress borne by water and biodiversity. This contributes to global challenges such as climate change, rising food and energy costs and global economic crises, along with exacerbating poverty, inequality and underdevelopment.

Lack of access to safe drinking water is an important issue, especially in developing countries. About 2.8 billion people (40 per cent of the world’s population), experience some form of water scarcity. Lack of basic services (water supply and sanitation) leads to insecurity, political instability and even armed conflict in developing countries.

There has been considerable structural transformation in developing countries during the post-globalisation era. A substantial reduction in agriculture along with a rapid increase in industrialisation and urbanisation has led to severe land use changes. Forests and wetlands (hot spots for water and biodiversity) have been reduced and degraded. In addition, the indiscriminate discharge of wastes into water bodies has damaged the environment, with enormous and sometimes irreversible impact. However, managing these resources is essential if the world is to achieve sustainable development.

### WATER SCIENCE

Understanding the role of biodiversity in the hydrological cycle enables better policymaking. The term “biodiversity” refers to the variety of plants, animals, microorganisms, and the ecosystems in which they occur. Water and biodiversity are interdependent. In reality, the hydrological cycle decides how biodiversity functions. In turn, vegetation and soil drive the movement of water.

Every glass of water we drink has, at least in part, passed through fish, trees, bacteria, soil and other organisms. Passing through these ecosystems, it is cleansed and made fit for consumption. The supply of water is a critical “service” (of benefit to humans) that the environment provides. Biodiversity is what underpins the ability of nature to recycle water throughout.

Forests, for example, influence the hydrological cycle by directly affecting the rates of transpiration and evaporation, and how water is routed and stored in a watershed. Forest soils readily absorb, capture and sustain certain quantities of water. Deforestation increases soil erosion which reduces land productivity and causes water scarcity in

downstream areas. One-third of the world's largest cities get a significant portion of their drinking water supply from forest areas. Forests are a part of biodiversity and cities depend on biodiversity for their water.

## CHALLENGES AND CONCERNS

Plants, soils and animals not only sustain the hydrological cycle, but also play a significant role in purifying water. Wetland plants remove high levels of nutrients, such as phosphorus and nitrogen, thus preventing them from reaching drinking water. Toxic substances such as heavy metals from water are also removed. Normally, when water flows downstream, its quality may improve drastically, as the biodiversity (mainly bacteria, animals and plants), breaks down impurities and makes it fit for drinking.

**Lack of recognition:** There has been a widespread failure to recognise water and biodiversity's vital role in providing food, energy, disaster relief and environmental sustainability. The main reason is that there are no proper markets or values for the goods and services (which lift millions of peoples suffering from poverty and diseases) derived from ecosystems.

**Common property resources:** Forests/mangroves, oceans, rivers, ponds, lakes, marshes, estuaries etc., are predominantly common property resources with state ownership. However, communities are historically enjoined in their rights in extracting the benefits — as fishing in the oceans, and timber and other product extraction from forests. The free rider problem leads to the over-extraction of resources and species extinction.

**Competition and conflict:** The competition and conflict for water by divergent users/groups (agriculture and industry, upstream and downstream users) is an emerging issue. Similarly, the many users of bio-resources, such as fishermen and forest dwellers, compete with one another.

**Degradation:** There is evidence of the degradation of water and biodiversity through (a) drying rivers, wetlands and aquifers (b) bio-accumulation of agrochemicals and heavy metals in fish and other edible species (c) algal blooms from high nutrient loads (c) silting of dams and nutrient loss due to the fragmentation of rivers, and (d) the disappearance of natural forests. Much of this is caused by short-sighted development.

**Lack of pollution mitigation:** Most countries have the legislation to protect their water resources (particularly from the point source of pollution), but the implementation of laws often lags behind because responsibilities are dispersed and costs are high. Unfortunately, non-point pollution from agriculture often constitutes a greater total pollutant load than the point-sources, and proper management options are not in place.

**Inadequate investments:** The investments for the conservation of water and biodiversity sources are not sufficient. For example, in the water sector, most investments are for water resource development like irrigation, hydropower and drinking water supply, but are limited in supporting the continuous availability of fresh water.

## WHAT IS NEEDED

The environment supplies our basic necessities and biodiversity and underpins the ability of the environment to continue these services. Our aim must be to see how biodiversity and water can be used wisely to help us achieve our development goals. Considering the dynamic nature and multiple uses of water and biodiversity, its management is a complex task. Although water and biodiversity is a global issue, the problems and solutions are often very localised. The following steps are proposed:

Governments and international communities must work together and make more and immediate investments in water and biodiversity management. In this regard, the various conventions (Ramsar Convention for Wetlands Protection, Convention on Biological Diversity, etc.) should fulfil their objectives.

Internalising the external costs of water and biodiversity by (a) providing incentives through payments for ecosystem services, which encourage local communities to maintain the integrity of forests and watersheds, and (b) applying the "polluter pays" principle.

Along with specific national planning on water and biodiversity such as “National Water Policy,” multi-sectoral plans on water management that consider biodiversity and ecosystems as an integral part are needed.

The economic values of different water and biodiversity spots should be estimated for effective policy decisions. For example, the water-related ecosystem services by forests (water provisioning, regulation of water flows, water purification and erosion prevention) collectively account for a value of \$7,236/hectare/year or more than 44 per cent of the total value of forests.

The need for a holistic and integrated approach to biodiversity and water management. The ecosystem approach (strategy for the integrated management of land, water, and living resources) and the integrated water resources management strategy (promotes the coordinated use of water, land and related resources, to maximise the resultant economic and social development without compromising the sustainability of aquatic ecosystems) should be benchmarks.

Since water and biodiversity are closely associated with the enhancement of life and welfare, people’s involvement is significant. In this regard, the media have a crucial role in awareness generation. Non-governmental and community organisations must help in coordinating conservation programmes.

Biodiversity/water benefits should be shared by the community. A large number of bio-resources (fish, seaweeds, corals, medicinal plants, etc.) serve as basic raw materials in the manufacture of different consumer products.

However, the benefits derived from the business are not shared equitably by local communities. Considering this, the Convention on Biological Diversity has proposed to its parties to implement the “access and benefit sharing” principles, and promote them as an incentive mechanism to preserve our natural biodiversity.

(Dr. Prakash Nelliya is an environmental economist with the National Biodiversity Authority, Chennai. The views expressed are personal. E-mail: nelliya@yaho.co.uk)

