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## Scenario And Management Of Aquatic Ecosystem

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Aquatic ecosystems contribute to a large proportion of the planet's biotic productivity as about 30% of the world's primary productivity comes from plants living in the, ocean. These ecosystems also include wetlands located at lakeshores, riverbanks, the ocean shoreline, and any habitat where the soil or vegetation is submerged for some duration. When compared to terrestrial communities, aquatic communities are limited abiotically in several different ways.

### Global Scenario

The earth, two-thirds of which is covered by water, looks like a blue planet-the planet of water-from space. The world's lakes and rivers are probably the planet's most important freshwater resources. But the amount of fresh water constitutes only 2.53% of the earth's water. On the earth's surface, fresh water is the habitat of a large number of species. These aquatic organisms and the ecosystem in which they live represent a substantial sector of the earth's biological diversity. The association of man and aquatic ecosystem is ancient. It is not surprising that the first sign of civilization is traced to wetland areas. The flood plains of the Indus, the Nile delta, and the Fertile Crescent of the Tigris and Euphrates rivers provided man with all his basic necessities. Water may be required for various purposes like drinking and personal hygiene, fisheries, agriculture, navigation, industrial production, hydropower generation, and recreational activities. The wide variety of wetlands, like marshes, swamps, bogs, peat land, open water bodies like lakes and rivers, mangroves, tidal marshes, and so forth, can be profitably used by humans for various needs and for environmental amelioration. Ever-increasing population and

the consequent urbanization and industrialization have mounted serious environmental pressures on these ecosystems and have affected them to such an extent that their benefits have declined significantly.

It is interesting to know that there are nearly  $14 \times 10^8$  cubic km of water on the planet, of which more than 97.5% is in the oceans, which covers 71% of the earth's surface. Wetlands are estimated to occupy nearly 6.4% of the earth's surface. Of those wetlands, nearly 30% is made up of bogs, 26% fens, 20% swamps, and 15% flood plains. Of the earth's fresh water, 69.6% is locked up in the continental ice, 30.1% in underground aquifers, and 0.26% in rivers and lakes. In particular, lakes are found to occupy less than 0.007% of world's fresh water. This amount of water is found in lakes, rivers, reservoirs, and those underground sources that are shallow enough to be tapped at an affordable cost. Only this amount is regularly renewed by rain and snowfall, and is therefore available on a sustainable basis.

### **Indian Scenario**

India by virtue of its geography, varied terrain, and climate is blessed with numerous rivers and streams that support a rich diversity of inland and coastal wetland habitats. Major river systems in the north are Ganga, Yamuna, and Brahmaputra (perennial rivers from the Himalayas) and in the south, Krishna, Godavari, and Cauvery (not perennial, as they are mainly rain-fed). The central part of India has the Narmada and the Tapti. The Indo-Gangetic floodplain is the largest wetland regime of India. Most of the natural wetlands of India are connected with the river systems. The lofty Himalayan mountain ranges in northern India accommodate several well-known lakes, especially the palaeartic lakes of Ladakh and the Vale of Kashmir, which are sources of major rivers. In the northeastern and eastern parts of the country are located the massive floodplains of Ganga and Brahmaputra along with the productive system of swamps, marshes, and oxbow lakes. Apart from this, there exists a number of man-made wetlands for various multipurpose projects. Examples are Harike Barrage at the confluence of the Beas and the Sutlej in Punjab, Bhakra Nangal Dam in Punjab and Himachal Pradesh, and the Cosi Barrage in Bihar-Nepal Border. India's climate ranges from the cold, arid Ladakh to the warm, arid Rajasthan, and India has over 8129 km of coastline, major river systems, and mountains.

Terrestrial ecosystems range from wet evergreen to deciduous forests in the Western ghats and north-east, scrub/plains in deccan plateau and gangetic plains amidst the mountain ranges.

There are 67,429 wetlands in India, covering about 4.1 million hectares. Out of these, 2,175 wetlands are natural, covering about 1.5 million hectares, and 65,254 wetlands are man-made, occupying about 2.6 million hectares.

According to Forest Survey of India, mangroves cover an additional 6,740 sq km. Their major concentrations are Sunderbans, and Andaman and Nicobar Islands, which hold 80% of the country's mangroves. The rest are in Orissa, Andhra Pradesh, Tamilnadu, Kamataka, Maharashtra, Gujarat, and Goa.

Wetlands have been drained and transformed due to anthropogenic activities, like unplanned urban and agricultural development, industries, road construction, impoundments, resource extraction, and dredge disposal, causing substantial economic and ecological losses in the long term. They occupy about 58.2 million hectares, of which 40.9 million hectares are under paddy cultivation. About 3.6 million hectares are suitable for fish culture. Approximately 2.9 million hectares are under capture fisheries (brackish and freshwater). Mangroves, estuaries, and backwaters occupy 0.4, 3.9, and 3.5 million hectares respectively. Man-made impoundments constitute 3 million hectares. Nearly 28,000 km are under rivers, including main tributaries and canals. Canal and irrigation channels constitute another 113,000 km.

Though accurate results on wetland loss in India are not available, the Wildlife Institute of India's survey reveals that 70-80% of individual fresh water marshes and lakes in the Gangetic flood plains have been lost in the last five decades. Indian mangrove areas have decreased by half from 700,000 ha in 1987 to 453,000 ha in 1995.

India's biennial State of Forest Report is out and mangrove cover has increased overall. A summary of the 2021 State of Forest Report is available here. "Mangrove cover in the country has increased by 54 sq km (1.10%) as compared to the previous assessment."

“...West Bengal has 42.45% of India’s mangrove cover, followed by Gujarat 23.66% and A&N Islands 12.39%. Gujarat shows maximum increase of 37 sq km in mangrove cover [(over 9,000 acres)].”

**Management:**

- Restoring and conserving the actual source of water-the water cycle and the natural ecosystems that support it-is the basis for sustainable water management;
- Environmental degradation is preventing us from reaching goals of good public health, food security, and better livelihoods worldwide;
- Improving the human quality of life can be achieved in ways that also maintain and enhance environmental quality;
- Reducing greenhouse gases to avoid the dangerous effects of climate change is an integral part of protecting freshwater resources and ecosystems.