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Urbanisation, sewage, microplastics: Why many Indian wetlands are under threat

It will take innovative strategies, long-term planning, effective policies and strict laws to protect these key ecosystems.

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Chilika lake in Odisha. | [Aditya Bhattacharjee, CC BY 2.0 via Wikimedia Commons](#)

Approximately 4.86% of India's land area is covered by wetlands – ecosystems that are often referred to as the "Earth's kidneys" because they are crucial for maintaining an ecological

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However, many of India's wetlands are under threat due to urbanisation, domestic and industrial pollution, and unscientific land-use practices. Urban wetlands in major cities are particularly at a high risk due to rapid urbanisation and unchecked discharges from nearby dumpsites or sewage.



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Since 1997, World Wetlands Day has been celebrated on February 2 every year to highlight why these ecosystems are vital for people and the health of the planet. Given that wetlands are the Earth's most threatened ecosystem, this year's theme is "protecting wetlands for our common future".

Wetlands are natural sponges that prevent flooding and soil erosion by absorbing excess water runoff. They also trap a significant amount of carbon and are natural waste-water treatment systems. In addition, they are home to a wide range of life forms, including microbes, plants, insects, amphibians, reptiles, birds and mammals.

India has a substantial number of ecologically important wetlands, ranging from the high-altitude Himalayan wetlands to coastal marshes, inland lakes, and riverine wetlands plains.

But not all of them have been recognised and listed in the [Ramsar Convention](#) – an international treaty on the conservation and wise use of wetlands and their resources.

In 2024, India added five new wetlands to the Ramsar List of Wetlands of International Importance, bringing the country's total to an impressive 85 sites. And on January 31, four

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Prominent Ramsar sites in India include the Sundarbans in West Bengal, Chilika Lake in Odisha, Keoladeo National Park in Rajasthan, Vembanad-Kol Wetland in Kerala and the Renuka Wetland in Himachal Pradesh,.

Expanding land use

However, many Indian wetlands are under threat. The Chatra Wetland in eastern India, for instance, has reported approximately 60% degradation over the past 28 years, primarily due to suburban expansion. The [Harike wetland](#) in Punjab, meanwhile, serves as a stark example of wetland-area reduction caused by agricultural land expansion: it shrunk by 13% between 1989 and 2010.

Sewage effluents that contain fibres and microplastic fragments are increasingly entering the wetland environments. Kerala's [Vembanad-Kol Wetland](#) has revealed high levels of microplastic accumulation in water and sediments, often associated with organic matter.

Similarly, a study of mangrove sediments in Mumbai, published earlier this year in the *Journal of Hazardous Materials Advances*, documented an alarming average of 6,730 microplastic pieces per kilogram of dry sediment. This primarily consisted of fibres from synthetic clothing and polyethylene from [plastic](#) waste. Such pollution harms a wetland's physical environment as well as the organisms that depend on it.

Open defecation also intensifies pollution, and, combined with poor waste-management practices, has led to the proliferation of invasive plant species that displace the native vegetation and alter ecosystem functions.

Poor water-quality regulations exacerbate the effects of pollution, weakening the resilience of wetland ecosystems and impairing their ability to recover from disturbances.

In Assam's [Deepor Beel](#), wetlands are being filled for habitation, while pollution, fishing, and poaching of migratory birds further threaten this ecosystem.

In addition to these challenges, changes in precipitation patterns and the increase in drought frequency due to climate change are disrupting wetland ecosystems. Alterations in

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An IIT Indore study on Thane Creek, Kolleru Lake, Pallikaranai Marsh Reserve Forest, and Tampara Lake, published in 2024, indicates a high risk from extreme precipitation events. Wetlands in southern, central, and eastern India are particularly susceptible to recurring droughts, which historically occurred every four years to five years but may intensify and become more frequent due to climate change.

Rising sea levels

Accelerated sea-level rise is also expected to cause shifts in species composition, reduced wetland productivity, and loss of ecosystem functions.

A recent study by the Center for Study of Science, Technology and Policy also highlights the increase in inundation risk due to sea-level rise in coastal cities by the end of the century, which could cause saltwater intrusion (movement of saline water into freshwater habitats), leading to the degradation of urban wetlands.

Several initiatives in India, such as the National Wetlands Conservation Programme and the National Mission for Clean Ganga, aim to protect and restore wetlands, while also promoting sustainable management of these systems.

Most state wetland authorities have also introduced policies and programmes either as part of national frameworks or under state-level programmes. Tamil Nadu has brought in a dedicated wetlands [mission](#).

However, protecting and restoring wetlands remains a challenge, mainly due to a lack of awareness about the importance of wetlands, conflicting demands for land use, insufficient monitoring systems and weak legal frameworks.

Currently, two Ramsar wetlands: Loktak Lake and Keoladeo National Park are in the Montreux Record – a record of those Ramsar sites where unfavourable changes in ecological character have occurred, are occurring or are likely to occur.

This underscores the need for integrated approach, innovative strategies, long-term planning, effective policies and strict laws to protect these systems.

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A critical step forward would be a detailed study analysis of biodiversity and ecosystem services to highlight the unique values of lesser-known wetlands. This should be complemented with creating awareness about traditional wetland activity cycles.

Such efforts could lead to their being included in conservation lists, ensuring that they are protected and able to access resources for sustainable management.

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February 2 is World Wetlands Day.

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