



Environmental Impact of Dams

Why in news?

A 27-year-old hermit in Haridwar, Swami Atmabodhanand, has broken his 194-day fast in protest against sand mining and the upcoming dams on key rivers that feed the Ganga.

What is the environmental impact of Dams?

- **Habitat fragmentation:** Unless specifically engineered to allow fish to pass through them, **dams present a barrier** to fish that need to migrate to spawn and reproduce downstream and upstream along a river. This not only impacts the populations of the fish themselves, but it can negatively impact other species in the food chain that either eat that fish or are preyed upon by that fish.
- **Flooding and the destruction of surrounding habitat:** Dammed rivers **create a reservoir upstream** from the dam, which spills out into the surrounding environments and floods ecosystems and habitats that once existed there. Such flooding can kill or displace many different organisms, including plants, wildlife, and humans.
- **Greenhouse gases:** The flooding of surrounding habitat around dams kills trees and other plant life that then decomposes and releases large amounts of **carbon** into the atmosphere. Because the river is no longer flowing freely, the water becomes stagnant and the bottom of the reservoir becomes depleted of oxygen. This lack of oxygen creates a situation where **methane** (a very potent greenhouse gas) is produced from the decomposition of the plant materials at the bottom of the reservoir that eventually gets released into the atmosphere, contributing to global climate change.
- **Sediment builds up behind the dam:** Because a dammed river no longer flows freely, the sediment that would have otherwise been deposited naturally downstream begins to build up behind the dam, forming new riverbanks, river deltas, alluvial fans, braided rivers, oxbow lakes, levees and coastal shores. These changes in sedimentation can lead to dramatic alterations in plant life and animal life and how they are distributed.
- **Downstream sediment erosion:** Due to the restrictions in the sediment flow above a dam, the lack of sediment that would have once flowed downstream ultimately leads to a **deficiency in sediment load**, and therefore, leads to an **increase in downstream erosion**. This lack of sediment load causes the riverbed to deepen and narrow over time, a compromised water table, the homogenization of the river's flow, reduced wildlife support, and a reduction in sediment that reaches coasts and deltas.
- **Negative impacts on local fish populations:** Typically, local fish species **will not be adapted to the new environment** that is present after a dam is built and do not survive, leading to the extirpation of local populations. Many factors impact their survival, including the blockage of migration routes, a disconnection from the river's flood plain, changes in a river's flow, changes in temperature, turbidity, dissolved oxygen, and changes in local plant life.
 - Organic materials from within and outside the river that would normally wash downstream get built up behind dams and start to consume a large amount of oxygen as they decompose. In some cases this triggers algae blooms which, in turn, create oxygen-starved "**dead zones**" incapable of supporting river life of any kind.
 - Also, **water temperatures in dam reservoirs can differ** greatly between the surface

and depths, further complicating survival for marine life evolved to handle natural temperature cycling. And when dam operators release oxygen-deprived water with unnatural temperatures into the river below, they harm downstream environments as well.

- **Production of methyl-mercury:** The stagnant water in reservoirs creates a situation where the decomposition of organic matter from decaying plants can transform inorganic mercury into methyl-mercury. Unfortunately, methyl-mercury tends to bio-accumulate and cause toxic effects in humans and wildlife that eat the fish in reservoirs.

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