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Impact of Natural Disasters on Fisheries in India: A Growing Threat

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India, with its diverse geography and varied climate, is highly prone to natural disasters. From the towering Himalayas in the north to the vast coastline in the south, the country regularly experiences a wide range of catastrophic events such as floods, earthquakes, cyclones, landslides, and droughts. In recent years, climate change has intensified the frequency and severity of these disasters, leading to greater loss of life, property, and ecological balance. India, with its vast coastline of 11098.81 km, extensive inland and marine water resources, and millions dependent on fishing for livelihood, has one of the largest and most diverse fisheries sectors in the world.

However, the increasing frequency and severity of natural disasters driven largely by climate change are posing significant threats to this vital sector. Floods, cyclones, landslides, and glacial lake outburst floods are not just destroying infrastructure but are severely disrupting fish production, aquaculture systems, livelihoods, and food security. India is among the most disaster-prone countries globally. About 12% of its land is flood-prone, and 76% of its coastline is vulnerable to cyclones and tsunamis. The fisheries sector, being closely linked with water bodies and coastal zones, is directly exposed to these threats. India's fisheries can be broadly categorized into: Marine fisheries (both capture and culture), Inland capture fisheries and Aquaculture (freshwater, brackish water, and mariculture) Natural disasters affect all these sub-sectors in different ways ranging from direct destruction of habitats and infrastructure to long-term ecological and economic impacts.

1. Types of Natural Disasters in India

India is vulnerable to multiple natural hazards, mainly due to its unique topography and climatic conditions. The major types include:

Floods: Common during the monsoon season across the Gangetic plains, Northeast, and South India.

Landslides: Frequently occur in the Himalayan and Western Ghats regions.

Cyclones: Affect the eastern coast, particularly Odisha, Andhra Pradesh, and West Bengal.

Droughts: Impact arid and semi-arid regions like Rajasthan, Maharashtra, and Karnataka.

Earthquakes: The Himalayan belt is especially seismically active.

Glacial Lake Outburst Floods (GLOFs): Common in the upper reaches of Uttarakhand and Sikkim.

2. Causes of Increasing Disasters in India

1. Climate Change: The biggest factor behind the increasing intensity and frequency of disasters is climate change. Rising global temperatures have led to erratic monsoons, glacier melting, rising sea levels, and extreme weather events like cyclones and cloudbursts.

2. Unregulated Development: Infrastructure development in ecologically fragile regions like roads, hydropower projects, and hotels in the Himalayas has increased the vulnerability of these regions to disasters.

3. Urbanization and Poor Planning: Rapid urban growth without proper drainage systems, floodplains being encroached upon, and lack of green spaces have made cities like Mumbai, Chennai, and Bengaluru prone to flooding.

4. Deforestation and Land Use Change: Tree cover helps hold soil and regulate water flow. Rampant deforestation, especially in the Western Ghats and Himalayas, has made these areas prone to landslides and floods.

3. Recent Natural Disasters and Their Impact on Fisheries

1. Cloudburst and Flash Flood in Uttarkashi, Uttarakhand (2025)

On 5 August 2025, a devastating cloudburst struck Dharali in Uttarkashi district, triggering flash floods that washed away roads, homes, and infrastructure. Flash floods damaged several small-scale trout farms situated along mountain streams. These farms, a vital part of the local hill economy, lost entire stocks of rainbow trout as floodwaters washed away tanks and disrupted water flow systems. Its impact on Fisheries: Loss of infrastructure (ponds, raceways, pipelines), Mortality of stocked fish, Siltation of water sources affecting future stocking, Economic loss to marginal fish farmers

2. Landslide in Wayanad, Kerala (2024)

The Wayanad landslide in 30 July 2024 a massive landslide hit Mundakai, Chooral, and Mala in Wayanad district of Kerala following days of incessant rainfall. Entire hill slopes collapsed, burying homes and cutting off remote areas. The landslide caused widespread destruction and loss of life. Affected hilly areas where small-scale integrated farming, including aquaculture, is practiced. The destruction of land and water sources disrupted pond ecosystems and water supply for fish culture. Its impact on Fisheries: Destruction of integrated farms (rice-fish systems), Water contamination and reduced oxygen levels in ponds, Loss of fish stock and fingerlings, Setback to

eco-fisheries and community-based aquaculture in tribal areas

3. Glacier Floods in Chamoli, Uttarakhand (2021)

One of the most tragic disasters in recent times was the glacial lake outburst flood (GLOF) that occurred on 7 February 2021 in Chamoli district. A portion of a glacier broke off near Raini village, releasing a massive amount of water and debris into the Dhauliganga river. The resulting flash flood swept away two under-construction hydropower plants and caused the death of over 200 people. The glacial outburst flood in Chamoli not only caused widespread destruction but also impacted cold-water fisheries in the upper reaches of Uttarakhand. The Dhauliganga and Rishiganga rivers experienced heavy sedimentation and altered flow regimes, severely affecting native fish biodiversity like snow trout. Its impact on Fisheries: Loss of native fish habitat, Disruption of spawning cycles, Heavy sediment load reducing water quality and Long-term impact on riverine fisheries and biodiversity

4. Assam Floods (2020)

Assam's annual monsoon floods are infamous, but the 2020 floods were especially harsh. Torrential rains led to rivers like the Brahmaputra breaching their banks, submerging villages, displacing thousands, and destroying crops. Over 5 million people were affected, including thousands of fishers and fish farmers. Fish ponds were overtopped, and escape of cultured species like rohu, catla, and mrigal caused both economic losses and biodiversity imbalances. Its impact on Fisheries: Escape of cultured fish and seed, Damage to pond dykes and cages, Spread of diseases due to contaminated water, Disruption in fish seed supply chain, Livelihood loss to over 100,000 fish farmers

5. Cyclone Fani: Odisha & Bengal (2019)

Cyclone Fani, which made landfall in May 2019, was one of the most powerful storms to hit the eastern coast since the 1999 super cyclone. With wind speeds reaching over 200 km/h, it caused massive damage in Odisha, especially in Puri and Bhubaneswar, and later affected West Bengal. This caused extensive damage to coastal fisheries infrastructure. Traditional fishers lost boats, nets, and houses, while aquaculture farms—especially shrimp farms were inundated with saline water. Its impact on Fisheries: Loss of boats, gears, and ice plants, Destruction of hatcheries and shrimp ponds, Salinization of freshwater aquaculture areas, Unemployment among coastal fishers, Reduced fish landing and exports for months

6. Kerala Floods (2018)

The August 2018 floods in Kerala were the worst in nearly a century. Unprecedented monsoon rainfall led to the opening of multiple dams, including the Idukki and Mullaperiyar, causing widespread flooding across the state. It disrupted both inland aquaculture and coastal fisheries. Flooding of hatcheries and seed farms affected fish seed availability across South India. Fish ponds were destroyed, leading to the release of invasive species like tilapia into natural water bodies. Its impact on Fisheries: Spread of invasive species into rivers and lakes, Infrastructure loss in brackish water and freshwater aquaculture, Post-flood water quality deterioration, Reduced fish production and increased prices, Psychological impact on fishers due to asset loss

7. Jammu & Kashmir Floods (2014)

In September 2014, intense rainfall triggered flooding in Srinagar and other parts of the Kashmir Valley. The Jhelum river overflowed, submerging entire towns. It was Kashmir's worst flood in 50 years, with around 200 deaths in India and 264 in Pakistan-administered Kashmir. It affected cold-water aquaculture, especially carp farms in Anantnag and Pulwama. Thousands of fish farmers lost stocked fish due to the submersion of farms for over 10 days. Its impact on Fisheries: Loss of broodstock and seed, Damage to hatchery infrastructure, Delayed stocking cycles, Livelihood impact in a region already facing economic stress

8. Kedarnath Flash Flood & Cloudburst (2013)

The June 2013 cloudburst and subsequent flash floods in Kedarnath, Uttarakhand, remain etched in national memory. This known for its massive human toll, also devastated cold-water fish habitats in the Mandakini river. Changes in river morphology and pollution from debris hampered fish breeding grounds. Its impact on Fisheries: Displacement of aquatic fauna, Long-term loss of biodiversity in affected rivers, Disruption of eco-tourism related to angling

4. Broader Impacts of Natural Disasters on Fisheries

Beyond individual case studies, natural disasters have cumulative and system-wide impacts on India's fisheries:

1. Economic Losses: According to government estimates, India loses hundreds of crores of rupees annually due to damage to fishery infrastructure. Cyclones and floods lead to heavy losses in coastal states like Andhra Pradesh, Tamil Nadu, and Odisha.

2. Disruption of Fish Supply Chains: Disasters interrupt fish landings, cold chain operations, transportation, and export schedules, especially in marine sectors.

3. Ecological Imbalances: Floods and storms often lead to, invasion of non-native species, loss of native biodiversity and spread of fish diseases.

4. Food and Nutritional Security: Fish is a vital source of affordable protein. Loss of fish production due to disasters affects both food availability and nutritional outcomes, especially for low-income populations.

5. Mental Health and Livelihood Crisis: Fishers often live on the margins of poverty. Disasters push them further into debt traps, especially when they lose their boats, gear, or ponds. Many are forced to migrate or seek non-fishing work.

5. India's Disaster Management Efforts

India has significantly improved its disaster preparedness, especially after the 2004 Indian Ocean tsunami. Key institutions include:

- **National Disaster Management Authority (NDMA)**: Coordinates response and mitigation strategies.
- **State Disaster Response Forces (SDRFs) and National Disaster Response Force (NDRF)**: Specialized forces for rescue and relief.
- **IMD (India Meteorological Department) and INCOIS:** Provide early warnings for cyclones, tsunamis, and extreme rainfall.
- **Dam Rehabilitation and Improvement Project (DRIP):** Aims to improve dam safety.

- **Climate Resilient Cities Mission:** Supports cities in adapting to climate risks.

Despite these, there is still a long way to go in integrating climate resilience, sustainable development, and community-based disaster preparedness into mainstream planning.

6. Conclusion

India's fisheries sector is under growing threat from the increasing intensity of natural disasters. The recent events from Uttarkashi (2025) to Chamoli (2021) and Odisha (2019) show that no part of the country is immune. As climate change continues to disrupt weather patterns and ecosystems, fishers already among the most vulnerable—will bear the brunt unless immediate and long-term adaptive strategies are adopted. Protecting the livelihoods of millions of fishers, ensuring food security, and preserving aquatic biodiversity now depend on how effectively India integrates disaster risk reduction, sustainable fisheries management, and climate resilience into its policy and practice.

Kerala flood

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