



Mains Practice Question

Q. Dam failures are always catastrophic, especially on the downstream side, resulting in a colossal loss of life and property. Analyze the various causes of dam failures. Give two examples of large dam failures. (Answer in 150 words, UPSC Mains 2023)

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Approach:

- Begin by defining dam failure and its repercussions.
- Discuss the causes of dam failures and a few examples of dam failures.
- Conclude with a positive note.

Introduction:

A dam failure is simply an uncontrolled release of water from a reservoir through a dam because of structural failures or deficiencies in the dam. Ranked third in terms of building large dams, dam failure in India can potentially result in a release of large quantities of water imposing risks on the people or property downstream.

Body:

Causes of dam failures

- **Overtopping:** It is caused due to poor spillway design, leading to a reservoir filling too high, especially in times of heavy rainfall.
- **Foundational Defects:** Instability of slopes can lead to seepage of water beneath the dam.
- **Operational Failures:** Valves and conduit failures often cause improper functioning which can lead to inadequate water discharge.
- **Geological Instability:** Tectonic induced calamities like landslides, earthquakes can pose a threat to dam structures.
- **Ageing Dams:** Rising frequency of flooding and other environmental changes can accelerate the dam's ageing process.
- **Structural Failure:** Inadequate design, construction materials, or maintenance can lead to dam collapse.

Examples of large dam failures

- **Machchu II Dam Failure (1979):** Due to heavy rainfall and improper design, the Machchu II Dam in Gujarat burst, resulting in a catastrophic flood. The torrential flow destroyed villages, claiming the lives of over 2,000 people.
- **Tiware Dam Failure (2019):** Situated in Ratnagiri, Maharashtra, the Tiware dam breached due to excessive rainfall, flooding seven villages and killing several people.

Conclusion:

Efforts like the Dam Safety Act 2021 and Dam Rehabilitation and Improvement Project (DRIP) are the steps in right direction to prevent catastrophic events of dam failure in India.

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