



KAMARAJ IAS ACADEMY
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Dam Safety and Management

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Why is in news?

India has almost 6,000 large dams and about 80% of them are more than 25 years old and carry safety risks. A new Dam Safety Act (DSA) was passed in late 2021.

On October 4 this year, a glacial lake outburst flood (GLOF) in North Sikkim's South Lhonak Lake washed away one of the biggest hydropower projects in India, the Teesta III dam at Chungthang.

Reports have since revealed there were no early warning systems, no risk assessment or preventive measures in place as required under the Act.

Dam Safety bill, 2019:

The Dam Safety Act was tabled in the Rajya Sabha in December 2021, as a response to deficient surveillance and maintenance causing dam failure-related disasters.

Highlights of the Bill:

The Bill provides for the **surveillance, inspection, operation, and maintenance** of all specified dams across the country. These are dams with **height more than 15 metres, or height between 10 metres to 15 metres** with certain design and structural conditions.

It **constitutes two national bodies**: the **National Committee on Dam Safety**, whose functions include evolving policies and recommending regulations regarding dam safety standards; and the **National Dam Safety Authority**, whose functions include implementing policies of the National Committee, providing technical assistance to State Dam Safety Organisations (SDSOs), and resolving matters between SDSOs of states or between a SDSO and any dam owner in that state.

It also **constitutes two state bodies**: **State Committee on Dam Safety, and State Dam Safety Organisation**. These bodies will be responsible for the surveillance, inspection, and monitoring the operation and maintenance of dams within their jurisdiction.

Functions of the national bodies and the State Committees on Dam Safety have been provided in Schedules to the Bill. These Schedules can be amended by a government notification.

An **offence** under the Bill can lead to **imprisonment of up to two years, or a fine, or both**.

Key Issues and Analysis:

The Bill **applies to all specified dams** in the country. This includes dams built on both inter and intra state rivers. As per the Constitution, states can make laws on water including water storage and water power.

However, Parliament **may regulate and develop inter-state river valleys** if it deems it necessary in public interest. The question is **whether Parliament has the jurisdiction to regulate dams on rivers flowing entirely**

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within a state.

The functions of the National Committee on Dam Safety, the National Dam Safety Authority, and the State Committee on Dam Safety are listed in Schedules to the Bill. These Schedules can be **amended by the government through a notification**

The question is **whether core functions of authorities should be amended through a notification or whether such amendments should be passed by Parliament.**

Dam safety and management in India:

As per the **International Commission on Large Dams (ICOLD)**, dam failure is the collapse or movement of part of a dam or its foundation so that the dam cannot retain water.

The significant threats like unhealthy dams pose significant threats to human life, crops, houses, buildings, roads, the environment and the economy.

Ninety-two percent of India's large dams have been built on inter-state rivers.

State of Indian Dams:

India has 5745 numbers of dams (5334 are completed and 411 are under construction).

India is **ranked third in the world in terms of building large dams.**

Tehri Dam in Uttarakhand is the **highest dam in India** built on the Bhagirathi River.

Hirakud Dam in Odisha built on river Mahanadi is the **longest dam in India.**

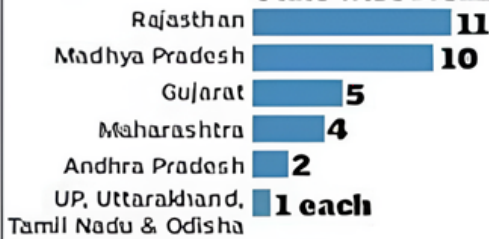
Kallanai Dam in Tamil Nadu is the **oldest dam in India.** It is built on the Kaveri river and is about 2000 years old.

MAKING DAMS SAFE

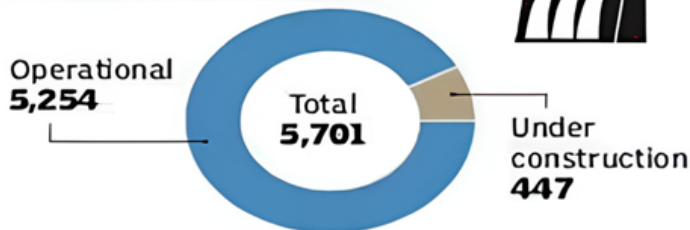
DAM DISASTER IN INDIA

Total number of dam disaster | **36**

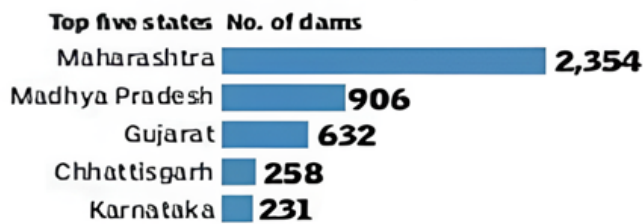
State-wise break-up



LARGE DAMS IN INDIA

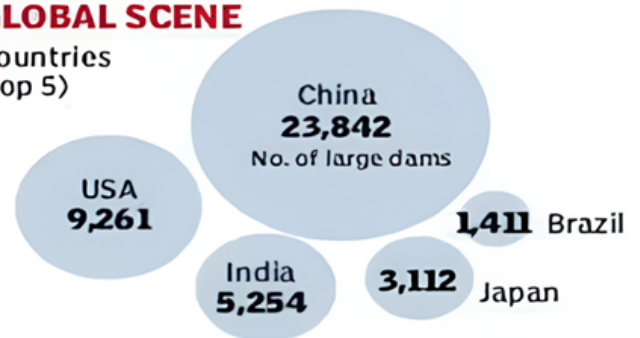


State-wise break-up



GLOBAL SCENE

Countries (top 5)



- > A large dam is classified as one with a maximum height of more than 15 metre from its deepest foundation to the crest
- > A dam between 10 and 15 metre in height is also included in this category with certain conditions

(Source: International Commission on Large Dams, 2016 and Ministry of water resources)

Statutory and institutional arrangements:

Under the **7th Schedule** of the Constitution of India, **water and water storage is a state subject**.

However, the **Central Government can enact legislation in 3 scenarios** – If a project affects multiple states or international treaties; If two or more states pass a resolution requiring such a law. This is what led to the Dam Safety Bill 2019; On matters related to the protection of the environment under the Environment Protection Act (EPA), 1986. The existing dam safety regulations are part of the Environmental Impact Assessment (EIA) under the EPA.

At the national level, the **Central Water Commission (CWC) issued guidelines** for: Dam Safety Procedures; Safety Inspection of Dams; Development and Implementation of Emergency Action Plan (EAP) for Dams; etc.

Dams under the **World Bank Dams Rehabilitation and Improvement Project (DRIP)** are governed by the aforementioned guidelines.

Challenges Associated with Dam Safety and Water Resource Management:

Many regions in India are **seismically active**, which poses a risk of earthquakes that could impact dam stability.

Poor soil quality and unstable geological conditions in certain areas also contribute to challenges in ensuring dam safety.

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Several dams in India are aging and may not meet modern safety standards. Maintenance and rehabilitation of these older structures are essential to prevent potential failures.

Changing climate patterns and increasing instances of extreme weather events, such as heavy rainfall and floods, can strain dams and their reservoirs, potentially leading to overtopping or dam failure.

Many rivers in India are **shared with neighbouring states or countries**, requiring coordinated efforts for dam safety and water management. **Disputes and lack of cooperation** can impact effective dam management.

Developing and maintaining effective communication networks, evacuation plans, and emergency shelters in the vicinity of dams is essential to manage potential disasters.

In cases where dam construction or operation requires the displacement of local communities, ensuring their proper resettlement and rehabilitation presents challenges.

Way Forward:

Develop a dynamic and adaptable project plan that incorporates real-time monitoring, eco-friendly technologies, disaster preparedness, and ecosystem restoration, ensuring long-term environmental and social sustainability.

Integrate climate change considerations into dam design and management, anticipating shifts in weather patterns and implementing adaptive measures to withstand extreme events.

Continue organizing training programs to equip dam safety professionals with skills and knowledge.

Strengthen cooperation with neighbouring countries/states to ensure effective management of shared river systems, and resolve conflicts.

Prioritize meaningful engagement with local ethnic communities, valuing their input, cultural heritage, and concerns to foster a harmonious project coexistence and ensure their well-being.