



## EDITORIAL ANALYSIS

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### Does India need to relook the Dam Safety Act?

Syllabus: GS3/ Disaster Management

#### In News

- Sikkim's recent dam collapse exemplifies blind spots in Dam Safety Act's legislation and implementation.

#### Dams in India

- **About:** India has 4,407 large dams, the third highest number in the world after China (23,841) and the USA (9,263).
- **Major threats to dams in India**
  - **Ageing:** With over 6,000 dams in India, ranked third globally in terms of large dams and approximately 80% of these dams exceeding 25 years of age while 234 surpassing the century mark, ensuring their safety is of paramount importance.
    - For India, **2025 is set to be a big year as more than 1,000 dams would turn roughly 50 years or older.**
  - **Accumulation of sediments & siltation:** Accumulation of **sediments decreases a reservoir's capacity** over the years and determines a reservoir's life expectancy.
    - Siltation, which is the accumulation of silt and debris behind the reservoir, also leads to a **reduction in the storage capacity of the dams.**
  - **Structural issues:** India's dams are more vulnerable to deterioration because a large proportion of them are **earthen**--built by compacting successive layers of earth, and **not concrete**--and are hence **more prone to ageing.**
  - **Flooding:** The country gets **concentrated rainfall every year for a designated time period as opposed to distributed rainfall**, which contributes to the dams' vulnerability.
    - In India, the downstream areas are often exposed to flood disasters & flooding has caused 44% of dam failures in India.
  - **Seismic threat:** Some of the Himalayan dam systems, including the Tehri Dam, are in an active seismic area given that the Himalayan mountain system is constantly changing and growing giving rise to several tectonic movements.

#### Dam Safety Act (DSA), 2021

- **About:** It is an Act to provide for the surveillance, inspection, operation, and maintenance of the specified dam for prevention of dam failure related disasters and to provide for an institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto.
  - These are dams with height of more than 15 metres, or height between 10 metres to 15 metres with certain design and structural conditions.
- **Significance:** With provisions for two types of offenses related to dam safety and the emphasis on regular risk assessments, the Act is a testament to India's forward-thinking approach, ensuring the safety of its vast array of dams, many of which have stood for decades, if not centuries.
- **2 national Bodies:**
  - **The National Committee on Dam Safety (NCDS):**
    - Its functions include **evolving policies** and **recommending regulations** regarding dam safety standards;
    - It will be chaired by the National Water Commissioner.
  - **The National Dam Safety Authority:** Its 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.
- **Dam Safety Unit:**
  - Dam owners are now required to have a dedicated Dam Safety Unit, prepare Emergency Action Plans, and conduct Comprehensive Safety Evaluations at regular intervals.
  - **Head of dam safety:** Chairman of the Central Water Commission (CWC) would head dam safety protocols at the national level.
- **Role of states:**
  - **2 state bodies:**
    - State Committee on Dam Safety,
    - State Dam Safety Organisation.
    - These bodies will be responsible for the surveillance, inspection, and monitoring the operation and maintenance of dams within their jurisdiction.
  - **Provisions require States to:**
    - Classify dams based on hazard risk,
    - Conduct regular inspections,
    - Create emergency action plans,
    - Institute emergency flood warning systems,
    - Undertake safety reviews and period risk assessment studies,
    - Report and record incidents of dam failures.
- **Non-compliance:**
  - Failure to comply with any provision of the Act is punishable with **imprisonment** and/or **fin**es.
  - If such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, [entity] shall be punishable with imprisonment for a term which may extend to two years.

### **Sikkim's Dam collapse & challenges of DSA**

- In October of 2023, 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.
- **Challenges: Lacunae in the Legislation (DSA):**
  - The Sikkim incident **exemplifies blind spots in both legislation** and implementation.
  - The DSA does not promote **risk-based decision-making** and fails to incentivise **transparency**.
  - Reports have revealed there were **no early warning** systems, no risk assessment or **preventive measures** in place as required under the Act.
  - A robust DSA should **allow different stakeholders to access information** easily, but India's framework falls short.
    - Dam safety is a public purpose function.
    - Everything about dam safety, functions of all the institutions and committees and authorities, their reports, decisions, minutes and agendas, everything should be promptly available to the public.
    - But nothing is in the public domain.
  - **Transparency is further obstructed** when national and State bodies comprise government employees and engineers who worked on these projects.
    - This **compromises objective decision making**.
  - The frequency and scale of such disasters reveal a pattern of neglect.
- **Other Challenges:**
  - Dam safety is a function of many parts:
    - Designing and constructing dams that adhere to safety margins,
    - Maintaining and operating them per guidelines,
    - Recording data in real-time in an accessible format,
    - Forecasting hazardous events and
    - Instituting emergency plans, to name a few.
  - The Sikkim GLOF reveals poor compliance at all levels, from the dam's design to the spillway capacity (which controls the release of water from a reservoir).

### **Way ahead**

- Scientists who have been studying the glacier lakes in the Himalayas have warned of such events.
- **Periodic reviews are expected** to bring forth fresh inundation maps and new rule curves (which determine the capacity of dam reservoirs), all of which contribute towards the safety of the downstream areas.
  - Spillway capacity and other metrics should be reviewed every five years or so.

### **Daily Mains Question**

**[Q]** Examine the causes behind frequent incidents of dam collapse in India. Highlight the provisions of the Dam Safety Act of 2021 in this regard.

