Dam Collapse in Bihar: Three Approaches for Action

By AIDMI Teams in Delhi, Assam, Andhra Pradesh, Gujarat and Uttar Pradesh.

Water Sector Approach

An important policy debate that discusses the relative merits of dams versus those of local and decentralized local harvesting structures continues.

Meanwhile, on September 20, 2017, a Rs. 389 crores dam near Bhagalpur in Bihar collapsed 24 hours before its inauguration by the Chief Minister Shri Nitish Kumar. This incident has raised grave concerns on the feasibility of dams and what can be done to make them safe in India?

The most common cause of dam failures in India is breaching—accounting for about 44% of cases[1]—followed by overtopping that accounts for about 25% failures. Therefore, **one, short list of overtopped dams** can be quarterly reviewed to enlist risk reduction measures to be taken.

Majority of Indian dams have failed immediately after construction or at the time of first full-load, which can be attributed to either inadequate design or poor quality of construction. **Two, a time bound review of ongoing design and quality of ongoing construction** of all dams by Government of India and states is the next step to dam safety.

Further, an increasing number of ageing dams is yet another red flag. **Three, a review of age—wise dam safety—**oldest dams first—will help mitigate future dam collapse in India.

Realizing the importance of dam safety, Government of India (GOI) has taken a number of steps. The Central Dam Safety Organization (CDSO)[2] was created in Central Water Commission (CWC) in 1979 with an advisory role to assist states in evaluating safety-related hazards in dam structures. **Four, CDSO scope of work, role, powers and available resources can be updated and upgraded** to match the demand for greater dam safety. In addition, uncertainty of changing climate can be included in the safety considerations.

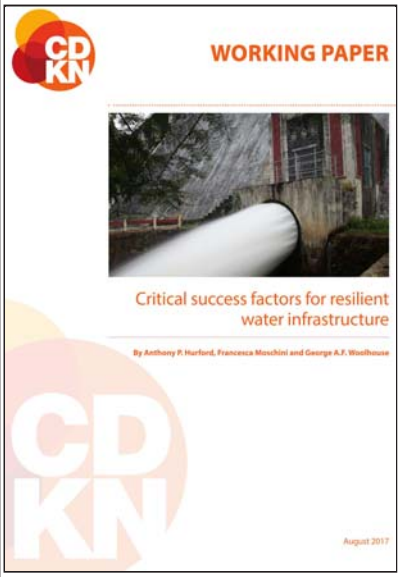
The National Committee on Dam Safety (NCDS) was constituted by Government of India in 1987, represented by all the States. NCDS suggests ways to bring dam safety activities in line with latest state-of-art expertise and technology consistent with the Indian conditions. **Five, a rapid compliance of the follow up on the NCDS suggestions** by each of the dams can be done.

Subsequently to the formation of NCDS, over 18 States having significant numbers of dams have also established their own State Dam Safety Organizations (SDSOs) and have taken up measures for ensuring dam safety in their respective jurisdictions. **Six, a review of results achieved by SDSOs** can add to dam safety.

As a major initiative, Dam Rehabilitation and Improvement Project (DRIP) was initiated in 2012 by the Government of India with the objective to improve safety and operational performance of selected existing dams (242) in seven states[3]. **Seven, the progress of DRIP and revision of its scope of work** can be done to underline existing and new hazards and vulnerability around dams. In addition dam-to-dam direct and joint safety learning mechanism will accelerate the pace of improvements.

The Dam Safety Review Panel (DSRP) constituted by each State of India to get the dam safety

Changing Climate Approach



Time has come to move on from safer dams to resilient dams. In fact all water infrastructure in India, in South Asia, needs a fresh look to make it survive the increasing risks of disasters and changing climate. A timely working paper by CDKN which suggest a way ahead: communication of risk and uncertainty; long-term partnership with strategic stakeholders; making the most of entry points; broadbasing of projects; and building institutional capabilities for climate compatible development. ■

https://cdkn.org/wp-content/uploads/2017/08/Working-Paper_Critical-success-factors-resilient-water-infrastructure_CDKN.pdf

inspections done. The Emergency Action Plans (EAP) are being prepared for each of the DRIP Dams. **Eight, third party review and updating of EAP of dams in each state** must be carried out in collaboration with State Disaster Management Authority (SDMA) before the next monsoon. The focus can move on from present to a "transformative" EAPs that fundamentally reduce the conditions of risks faced by dams.

Further review is in progress on development of Dam Asset Management Tool titled "Dam Health and Rehabilitation Monitoring Application' (DHARMA) which includes the dam safety related guidelines. **Nine, DHARMA process can be made more broad based** and include additional experts-climate change as well as risk mitigation-to update the list of dams facing loss and damage risk and develop a Road Map with National Disaster Management Authority (NDMA) for making dams safer.

The above nine actions can rapidly put dams in India on their way to greater safety. India's water and disaster risk management sector has the required expertise and capacities to mitigate loss and damage to ensure ongoing economic benefits of dams to India. ■

Disaster Risk Reduction Approach

India is ranked third after China and the United States of America in terms of number of large dams. But India's 80% of large dams have surpassed the age of twenty-five years and about 170 of them exceed the age of 100 years and are built in an era whose design practices and safety considerations do not match with the current design standards and the prevailing safety norms.[4] Their failure could be disastrous to India's economy. While, the Government of India is contemplating an institutional mechanism to improve safety in India for over 5000 dams, what measures can be undertaken until the Dam Safety Bill of 2010 is passed in the parliament?

First, a national level consultative process is required to support and **inform contents of the Bill** with inputs from a wide range of stakeholders across India.

Second, the National Disaster Management Authority (NDMA) should commission making of a **national guidelines for dam safety in India for risk-informed decision making.** The existing Guidelines for Safety Inspection of Dams[5] (June 1987) and Guidelines for Development and Implementation of Emergency Action Plan (EAP) for Dams[6] by Central Water Commission, Ministry of Water Resources can be made coherent. The Federal Emergency Management Agency in USA has such guidelines[7]. Directives from such guidelines should be made applicable to both, state-owned and privately-owned dam structures in India.

Third, once prepared, such guidelines can be of great relevance and use for implementing India's National Disaster Management Plan (NDMP), which emphasize on capacity building across all levels. The NDMP has made the Government of India responsible for developing forecasting models for discharge from dams and enhancing the safety of dams and reservoirs. Similarly, the NDMP has made the State responsible to carry out measures to increase safety, reduce risks from flooding; undertake pre- and post-monsoon inspections of dams and reservoirs and monitor the implementation of safety enhancements in accordance with norms[8].

Fourth, the Dam Safety Bill, 2010 has proposed that every owner of specified dams to establish a disaster management plan and an emergency action plan[9]. Such exercise of dam safety needs to be linked and integrated with district disaster management plans, which are mandatory by the Disaster Management Act, 2005. This is hardly ever followed.

Fifth, India needs a **comprehensive review of its dams and safety from the view point of natural disasters and extreme events.** Such review can help India contribute towards the goals of the Sendai Framework for Disaster Risk Reduction as well as India's commitments in Paris Agreement on climate change. ■

1 Dam Safety in India, DRIP Snapshot, CWC
2 DRIP India Dams to be Rehabilitated, Author Director CWC
3 Press Information Bureau, Ministry of Water Resources, February 2016
4 Ministry of Water Resources. 2017. Third National Dam Safety Conference Held. http://pib.nic.in/newsite/PrintRelease.aspx?relid=158555
5 CWC. 1987. Guidelines for Safety Inspection of Dams (June 1987). Ministry of Water Resources. http://www.cwc.gov.in/main/downloads/Safety%20inspection%20of%20dams.pdf
6 CWC. 2006. Guidelines for Development and Implementation of Emergency Action Plan (EAP) for Dams. http://www.cwc.gov.in/main/downloads/EAPChapters.pdf
7 FEMA. 2015. Federal Guidelines for Dam Safety Risk Management https://www.fema.gov/media-library/assets/documents/101958
8 NDMA. 2016. National Disaster Management Plan (NDMP), http://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf
9 PRS. Nd. The Dam Safety Bill 2010. http://www.prsindia.org/billtrack/dam-safety-bill-2010-1269/