

Jaswant Sagar Dam Collapse: A Wake up call

The Collapse of the 118 year old Jaswant Sagar Dam in Luni River basin in Jodhpur district in Rajasthan on July 8 and the wide spread destruction caused in the downstream area should serve as a wake up call for all concerned. India's aging dam population, absence of proper maintenance of the dams and absence of accountability mechanisms is going to increase the frequency of dam disasters in years to come. When the increased frequency of high intensity rainfall events due to global warming is added to this already heady mix, the consequences could be grave. Here we must note at the outset that Rajasthan was one of the few states where the World Bank funded Dams Safety Projects was implemented. And we may have got away without death of people this time, but we may not be that lucky next time.

The 43.38 m high Jaswant Sagar Dam is only one of the 100 large dams (of the total population of over 4600 large dams in India) that are already more than 100 years old. The largest number from this stock is in Rajasthan, at 27 large dams that are over 100 years old. In addition, there are 381 large dams in India that are between 50 and 100 years old. And just to add a warning sign, not all dams built

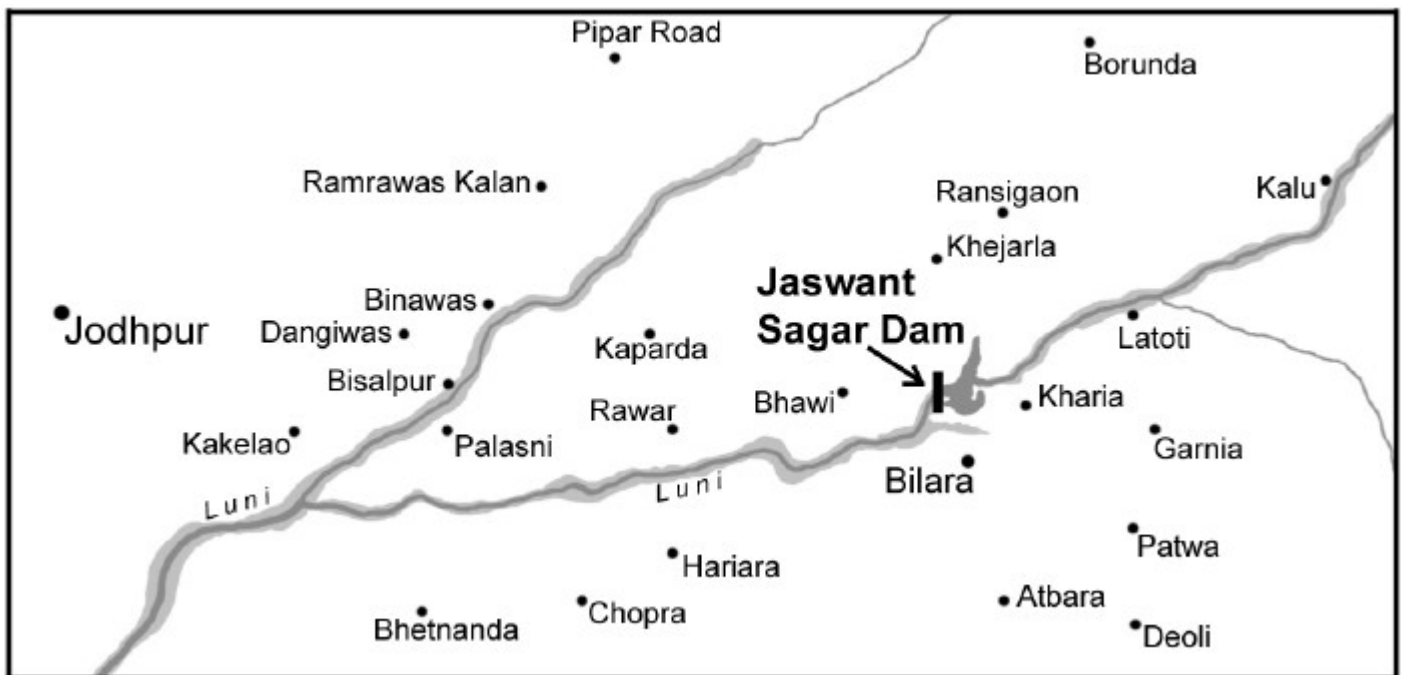
called distressed dams, out of which, 63 dams are less than 50 years old.

Moreover wrong operation of even younger or "modern" dams can lead to disaster. As we saw in the monsoon of 2006 when the sudden release of high quantum release of water from Ukai dam on Tapi river in South Gujarat lead to unprecedented flood disaster in Surat city and surrounding areas. This disaster was completely avoidable, had the dam authority taken timely action based on available information.

The Rajasthan Dam Safety Committee suggested (in November 1996 when the World Bank funded project was still on) removal of defects in the Jaswant Sagar Dam, viz. erosion of down stream area, signs of abrasion and cavitations etc. developed in the dam. The Comptroller and Auditor General report for Rajasthan in 2001 noted that none of that was done and in stead money was spent on other nonessential works.

India is supposed to have an elaborate dam safety mechanism in place, starting from the Resolution adopted at the First Conference of State Ministers of Irrigation held at New Delhi as far back as on the July 17-18, 1975

which reads, "The Conference recommends that in view of the increasing number of large dams in India, the Government of India may constitute an Advisory Dams Safety Service to be operated by the Central Water Commission." The Government of India constituted Dam Safety Organization in the Central Water Commission in June, 1979 to assist the State Governments to locate



over last 50 years are safe. In fact, according to Madhya Pradesh Govt, the state has 168 dams which can be

causes of potential distress affecting safety of dams and allied structures and to advise the State Governments in providing suitable remedial measures.

In Rajasthan itself, to strengthen the dam safety activities, a project "Dam Safety Assurance and Rehabilitation" was commenced in 1991 with loan from World Bank. An expenditure of Rs 109.68 crore was incurred. Unfortunately, what the project has left behind is a legacy of debt, unused infrastructure and unsafe dams.

To illustrate, the State Dam Safety Committee suggested (in November 1996 when the World Bank funded project was still on) removal of defects in the Jaswant Sagar Dam, viz. erosion of down stream area, signs of abrasion and cavitations etc. developed in the dam. The Comptroller and Auditor General report for Rajasthan in 2001 noted, "Instead of removing these defects, department incurred expenditure of Rs 27.61 lakh on 6 works viz.; renovation of existing road in bituminous road (Rs 9.88 lakh), construction of foot bridge on overflow (Rs 7.19 lakh), providing sodium lights (Rs 4.06 lakh), purchase of generating set and diesel engine (Rs 1.25 lakh), purchase of wooden planks (Rs 4.50 lakh) and other petty items (Rs 0.73 lakh) under basic safety facilities component of Dam Safety Project. These works did not increase the utility of the dam and resulted in avoidable expenditure out of interest bearing loan assistance funds of World Bank." The results are in front of us.

Rajasthan govt also had the advantage of satellite based information system that showed that the catchment area of the 12 km long dam with storage capacity of 40.83 million cubic meters was getting heavy rains. The govt officials and ministers also knew that for many years the dam has not been filled to capacity, so when so much water would come to the dam, there was every possibility of dam giving way. Particularly when the govt had not implemented the measures required for safety of the dam. The dam has had history of cracking up in the past (for example, in 1979 and earlier) when it experienced heavy inflows. But neither the Rajasthan govt, nor the Central Water Commission (who also has the resources, mandate and duty for flood forecasting) do anything to avert this avoidable disaster.

This was the repeat of the last year's flood event in Rajasthan that lead to death of scores of people and

destruction of property and livelihoods. That disaster could also have been predicted with the use of advance information about the rainfall that is now available with the govts.

Government of India's apex organisation on water resources, namely Central Water Commission, is supposed to be responsible for, among other things, guiding states on safety of major and medium projects of the country. Its tasks include, "To conduct studies on dam safety aspects for the existing and future dams and standardize the instruments for dam safety measures". Govt of India constituted the National Committee on Dam Safety in Oct 1987. The report of the working group on water resources development for the 11th Five year Plan says, "Although dam safety procedures are more or

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less well defined, there is no dam safety legislation." What is one to understand from this? Is the dam safety procedure *more* defined or *less* defined? Is the *definition of the procedure* good enough for dam safety? The report proposes an allocation of whopping Rs 2010 crores for dam safety (though

allocation for Rajasthan is scandalously, nil), but will such funds be of any help for the unaccountable water resources establishment? The past performance of the CWC, if we look at the implementation of the World Bank funded project, is dismal.

The only way out, if we really want to avoid more of such disasters in future, is to have clearly defined, publicly known norms of institutional and individual accountability for such serious lapses.

When last heard, the Rajasthan govt had set up a committee to enquire into the reasons for the Jaswant Sagar Dam collapse, the report was supposed to be submitted in 15 days, but a month after, it is known as yet if the report has submitted. In any case the report is not in public domain. The dam authorities started repair work at the dam soon after the floods subsided.

Government of India's apex organisation on water resources, namely Central Water Commission, is supposed to be responsible for, among other things, guiding states on safety of major and medium projects of the country. However, its track record is dismal if we look at the past. It has been a brazen participant of the dam disasters unfolding in India.

When a Dam Collapses in US Let us compare what happened at Jaswant Sagar Dam collapse with the sequence of events

when a dam collapsed recently in the United States.

On Dec 14, 2005, the upper reservoir of the 470 MW Taum Sauk hydroelectric project (upper reservoir of the pump storage project) in Reynolds County, Missouri breached (the breach was about 600 feet wide), in somewhat similar fashion as did the Jaswant Sagar Dam, releasing 5.24 MCM of water in 20 minutes. The quantity of the water released at the US dam was less than a 13% of the water released at the Jaswant Sagar Dam (40.83 MCM), though the water release from the Taum Sauk dam was certainly faster.

On Dec 21, '05, the Federal Electricity Regulatory Commission of USA (www.ferc.gov) made a public statement through press release that FERC has launched an investigation into the

breach. The Commission dispatched a team of five engineers to the Taum Sauk facility immediately after the breach. Immediately following the Taum Sauk breach of the upper reservoir, the Commission initiated a review of all Commission-regulated pump storage projects to assure project safety and determine the need for, and development of guidelines for the safe operation of pump storage projects. "The Commission's hydropower safety program is a model for the world. To the extent this unfortunate event provides lessons we can apply to the program, we will make it even better," FERC Chairman said.

The responsible company AmerenUE was asked by the FERC to submit a report prepared by an independent consultant retained by the company. The company

submitted a report on April 7, '06, which was in public domain. The Commission's dam safety staff conducted an exhaustive forensic investigation of the breach, which is detailed in a report released on April 28, '06.

A report by a team of independent experts assembled by the Commission was released on May 25, '06. The report was open for public comment till June 26, '06. on July 20, '06, the FERC made public all the submissions received during the comment period.

The FERC held the company responsible for 15 violations of various Commission regulations and license conditions, including failure to notify the Commission of conditions affecting the safety of the project and failure to use sound and prudent engineering practices. The FERC imposed a civil penalty of \$10 million, the largest

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At a similar dam breach in US, three separate enquiry reports were made and put in public domain. The Company has held responsible for negligence on 15 counts and the company was asked to pay a fine of USD 10 million and spend USD 5 million on dam improvements, in addition to paying for the damages caused due to the breach. Before taking up the repair work, an EIA had to be done and put in public domain a month before the public hearing. Remember none of this happened at the Jaswant Sagar Dam break in Rajasthan.

the Commission has ever imposed in a hydroelectric matter. In addition, the responsible company AmerenUE was asked to spend \$5 million in improvements, over and above the costs AmerenUE will incur in remedying the environmental and property damage caused by the breach. On Oct 2, '06, the FERC announced that the company has agreed to pay the penalties mentioned above. On April 10, '07, the FERC approved the USD 5 million plan for dam safety enhancement and other improvements and the plan was also made public.

The company had to submit a draft Environment Impact Assessment before under taking the repair work, even though the new dam was to be of the same size and area as the old dam. The company made the

application to FERC for the new dam on Feb 5, '07 and filed a supplementary report in May '07, as demanded by FERC. Based on our review of the licensee's application FERC issued a public notice on Feb 13, '07 of intent to prepare an environmental document. On Feb 21, '07, the Commission issued a Scoping Document that advised all

participants as to the proposed scope of the environmental document and to seek additional information pertinent to the analysis of the rebuilding proposal. The Commission conducted two public scoping meetings on March 12, '07, to identify issues and concerns surrounding the rebuilding of the upper reservoir.

The FERC staff went through the draft EIA and made their own comments, and demanded additional steps

which were accompanied by the publication of draft EIA on July 9, '07 for public comment. American Rivers, in its submission in response, opposed rebuilding of the dam, saying that since the facility was to come up for relicensing in 2010, the decision should not be limited to only current rebuilding, but whether to rebuild at all, that is include the decision if the project should get the license in 2010. The FERC will take a final decision after the comment period is over.

It is worth noting here that none of this happened at the Jaswant Sagar Dam breach in Rajasthan. Is there something we in India can learn from this case study of the Taum Sauk Dam breach in US?

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