

# **Dam Rehabilitation & Improvement Project Introduction**

## **1.1 General**

The Central Water Commission (CWC) under Ministry of Water Resources (MoWR), Government of India, plans to implement, with assistance from the World Bank, the **DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP)**, which would be a six-year project starting from January, 2011. The project would be implemented in 4 States, namely Kerala, Madhya Pradesh, Orissa, and Tamil Nadu. About 223 large dams in the four participating states with substantial need for rehabilitation and improvements would be included in the project. Development of appropriate institutional mechanisms for the safe operation and maintenance of all large dams would also be taken up in these states. In addition, strengthening of the institutional setup for national level dam safety surveillance and guidance would be taken up in Central Water Commission (CWC) under Ministry of Water Resources (MoWR). The project implementation agencies for DRIP would be the owners of dam (i.e. Water Resources Departments (WRD) or State Electricity Boards (SEB)) in the four participating States. The overall implementation of the project would be coordinated by Central Water Commission with assistance of an engineering and management consulting firm.

## **1.2 Historical Background of Scheme**

1. Dams have played a key role in fostering rapid and sustained agricultural and rural growth and development, which have been key priorities for the Government of India since independence. Irrigated agriculture and hydropower development have been major pillars of the government's strategy to achieve these priority goals and to ensure food security. Rainfall, which occurs mainly in intense and unpredictable downpours within a four-month monsoon season, is of high temporal and spatial variability and does not meet year-round irrigation and other water demands. Except for the perennial Himalayan Rivers, almost all the river systems in India are seasonal. India ranks third in the world after China and the United States in terms of number of dams. Over the last fifty years, India has invested substantially in infrastructure necessary to store surface runoff in reservoirs formed by large, medium, and small dams with associated appurtenances. In India, there are 4711 large dams completed and another 390 dams are under construction (as per National Register of Large Dams, 2009 published by CWC). These dams have served the country well for the economic stability even in the worst years of drought, floods, cyclones, etc. Out of these, 3750 (79.6%) dams are more than 20 years old. Many large dams are ageing and have various structural deficiencies and shortcomings in operation and monitoring facilities. Few of them do not meet the present design standards – both structurally and hydrologically. Thus an increasing number of dams fall in the category where they need rehabilitation.

2. Water being a state subject, the state governments are the owners of the dams within their territories, and as such any dam safety related initiatives by the Central Government would

necessarily have to involve the state governments also. Keeping this in view, the matter was broached in the State Irrigation Ministers Conference held in 1975; and, as a follow up of its recommendation, a Dam Safety Organization (DSO) was created at the centre in Central Water Commission (CWC) in 1979. The objective of this DSO was to perform a coordinative and advisory role for the State Governments and to lay down guidelines, compile technical literature, organize trainings, etc. and in general to take steps to create awareness in the states about dam safety and thereafter assist in setting up infrastructure for the same

### **1.3 Reason and Justification for Proposal**

1. The risk of failure of a dam is one of the inevitable concerns of civilization. Dam failures are typically caused by factors of age, construction deficiencies, inadequate maintenance, extreme weather or seismic events, and wrong operation. There have been about 200 notable failures of large dams in the world (as per ICOLD figures of 1995) and more than 8000 people have died in these disasters. Since the dam owners in India – mostly state governments – have limited financial resources for rehabilitation of dams reported to be in distress, an urgent need has been felt for a centrally coordinated scheme to : (i) ensure rehabilitation and modernization of dams to bring them back to full standard of safety and operation; (ii) develop and implement adequate maintenance programs; (iii) ensure regular review of the status of the dams, both by the operator and by independent review panels, to examine problems relating to sustainable O&M of dams; (iv) formulate standards and guidelines and asset management systems to minimize future risks of dam failures; and (v) Strengthen institutional mechanism in states.

2. In addition to above, need also has been felt for modernizing and strengthening the central level dam safety organization (in CWC) for providing state-of-the-art technical and managerial assistance to the Dam Safety Organizations of states and other dam-owning organizations.

### **1.4 Earlier Initiative Leading to Formulation of Present Proposal**

1. Earlier, the Dam Safety Assurance & Rehabilitation Project (DSARP) assisted by the World Bank was implemented in 4 States of the Indian Union, namely Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu, under overall guidance of Central Water Commission during the period 1991 to 1999. The Project was completed in September 1999 at a cost of Rs.422.95 crore.

2. Under DSARP, the institutional set-up of ‘Dam Safety Organization’ at centre as well as in four participating states has been strengthened through training of officers, installation of modern equipments and creation of dedicated set –up. Formulation of a number of guidelines on Dam safety and Probable Maximum Precipitation (PMP) Atlases has been one of the most significant and unique achievements of the project. Basic Dam safety facilities like providing access roads, back-up power, instrumentation, installation of communication system, stockpiling of emergency materials etc. have also been provided at 182 dams in the 4 states. Thirty-three dams have come up to the desired safety level, reducing risk and adverse environmental impact on the property and people living downstream.

3. The DSARP Project, assisted by the World Bank, was a unique project and first of its kind anywhere in the world. After seeing the performance and benefits accrued from the project, an imperative need has been felt that another project covering some more States having significant number of large dams be implemented through the World Bank assistance on similar terms and conditions. Accordingly, eleven States, namely Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal were included in the initial proposal, and subsequently the States of Madhya Pradesh and Orissa were also included on specific requests from them.

4. The World Bank DRIP Preparation Mission visited India from 12 to 22 November, 2008 and held discussions with officials of CWC & participating States. Out of 13 identified States only 11 States participated in the discussions (Uttar Pradesh and Bihar did not attend the discussion). The Aide Memoire ( November, 2008) circulated by the World Bank indicated inclusion of 5 States viz. Chhattisgarh, Kerala, Madhya Pradesh, Orissa and Tamil Nadu as confirmed States for DRIP implementation on the basis of institutional readiness, government interest and commitment. Of the other states that had earlier shown interest in the project, Bihar, Gujarat, Maharashtra, and Uttar Pradesh indicated that they would be unlikely to join DRIP. The World Bank Mission considered that the proposals from Andhra Pradesh, Jharkhand, Uttarakhand, and West Bengal were not sufficient for inclusion for reasons of small number of dams proposed, or quality and readiness of documentation.

5. The finalized 5 states were requested to convey their government level willingness with concurrence of their finance department for participation in DRIP. The government of Chhattisgarh has indicated that they are not inclined for taking part in the Dam Rehabilitation and Improvement Project with World Bank assistance. However, willingness was indicated by 4 states namely **Kerala, Orissa, Madhya Pradesh and Tamil Nadu.**

6. As was the case with DSARP, the central component of DRIP will also be implemented in **Central Water Commission**, involving institutional strengthening measures for its Dam Safety Organization (DSO). The overall responsibility for project oversight and implementation would rest with the Dam Safety Rehabilitation Directorate in DSO of CWC.

## **1.5 Project Economics and Justification**

1. The proposed project includes: (i) rehabilitation and physical improvements of 223 dams in four states; (ii) strengthening of institutional capacity of participating states and centre for sustainable dam operation and maintenance and monitoring of dam safety. The project will be implemented in the four states of Kerala, Madhya Pradesh, Orissa, and Tamil Nadu, and in Central Water Commission under Ministry of Water Resources.

2. The project will target physical and technical dam improvements, and managerial upgrading of dam operations, management and maintenance, with accompanying institutional reforms and strengthening of regulatory measures pertaining to safe and financially-sustainable dam operations. Large dams with substantial need for rehabilitation and improvements have been included and appropriate institutional mechanisms for their safe operation will be developed. Many dams suffer from operational deficiencies, while some dams have structural and mechanical problems that could become a safety hazard. Some dams are prematurely

nearing the end of their economic life, while others have lost a proportion of their reservoir capacity.

3. The foremost justification of Dam Rehabilitation and Improvement Project is the protection of human lives. However, to quantify this protection in economic terms is not possible. Further benefits relate to: (i) avoidance of direct physical damage to private and public assets downstream of the dam at risk; (ii) avoidance of the very large indirect negative multiplier effects on the various sectors of the economies downstream of the reservoirs, irrigated agriculture being the main driver of those local economies; and (iii) avoidance of replacement of the dam and reservoir.

4. The primary beneficiaries, both urban and rural communities, are dependent on reservoirs for their water supply and livelihood, as well as all downstream communities of 223 dams who could be placed at physical and/or operational risk if dam safety is compromised.