




# DAM REHABILITATION AND IMPROVEMENT PROJECT




*This Scheme addresses overarching pillars of dam safety like structural integrity, surveillance and maintenance, instrumentation and monitoring, design intrinsic risks, natural hazard risks, emergency planning with adequate provision of capacity building including physical rehabilitation*




**COMPONENT - I**  
REHABILITATION OF DAMS AND  
ASSOCIATED APPURTENANCES






**COMPONENT - II**  
DAM SAFETY INSTITUTIONAL  
STRENGTHENING



**COMPONENT - III**  
INCIDENTAL REVENUE  
GENERATION FOR  
SUSTAINABLE OPERATION  
AND MAINTENANCE OF  
DAMS



**COMPONENT - IV**  
PROJECT MANAGEMENT





## NEED FOR DAM REHABILITATION




- ❖ Dams are key to water, food, and energy security in India.
- ❖ India rank third globally with 5334 large dams in operation and 411 under construction.
- ❖ Storage capacity created approx. 250 BCM and 50 BCM is under creation.
- ❖ About 80% of the dams are over 25 years old, 227 dams are more than 100 years old.
- ❖ Safety of dams is of utmost importance on account of their strategic importance and risks of dam failure.




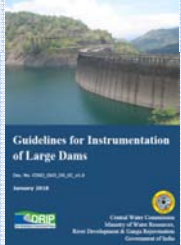






## DAM SAFETY INITIATIVES



The formulation of Dam Safety Act, unified dam safety procedures and dam rehabilitation programs were initiated simultaneously during late 1980s



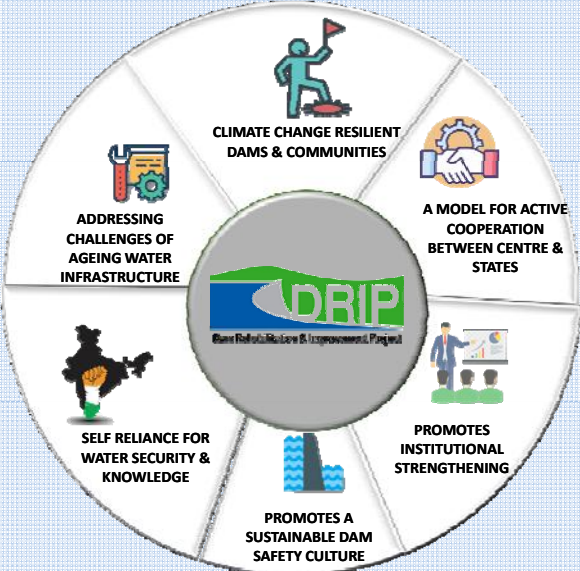
  
 सत्यमेव जयते  
**DAM SAFETY ACT**



## INDIA'S DAM SAFETY MANAGEMENT





**Dam Safety Assurance & Rehabilitation Project**  
[1991-99; 182 Dams; US\$ 86 M]

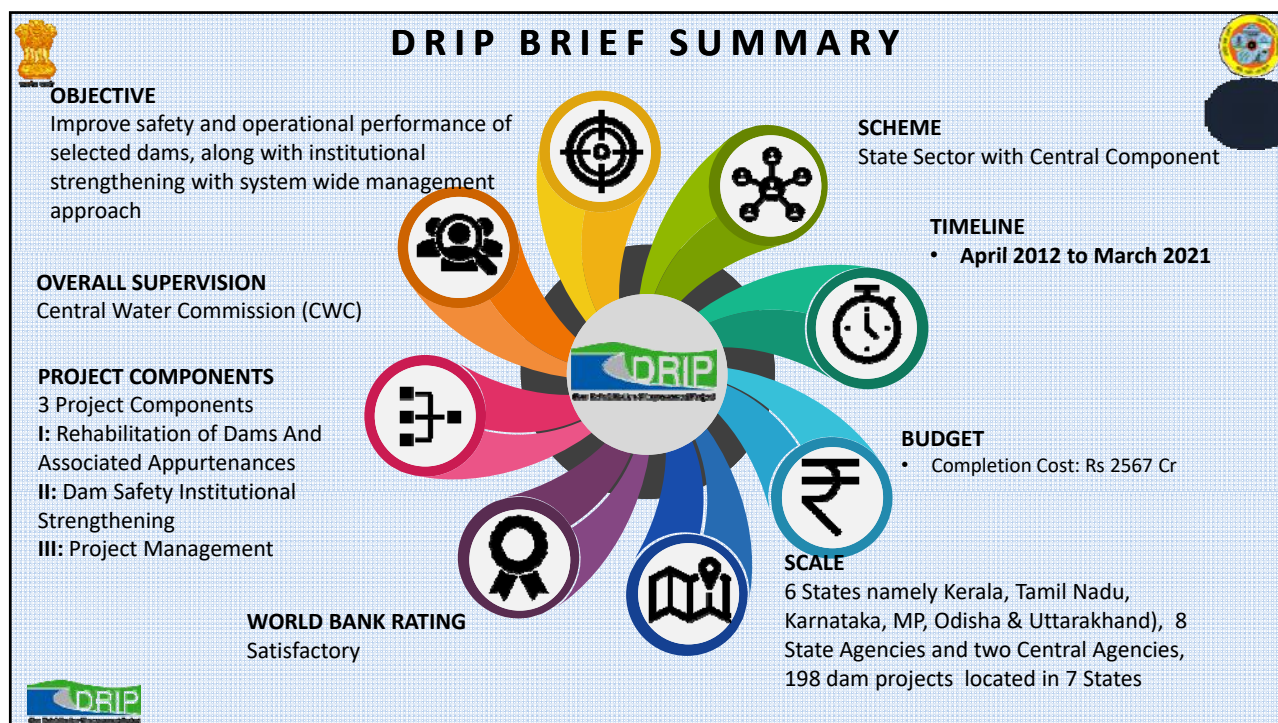
**Dam Rehabilitation & Improvement Project (DRIP)**  
[2012-21; 223 Dams; US\$ 533 M]

**DRIP PHASE-II & PHASE III** (Largest dam rehabilitation initiative in India)  
[2021-31; 736 Dams; US\$ 1418 M]

**Dam Safety Act 2021**  
A dedicated legislation with all modern elements of dam safety









## COMPONENT II

### DAM SAFETY INSTITUTIONAL STRENGTHENING



**7%**

**Component Cost**




- Customised Trainings
- Capacity Building of Academic Institutions
- Preparation of Guidelines/Manuals
- DHARMA
- SHAISYS
- Logistic Support to various DSO
- Dam Safety Conferences (national & international)







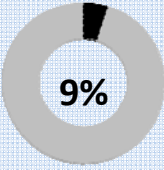


## COMPONENT III

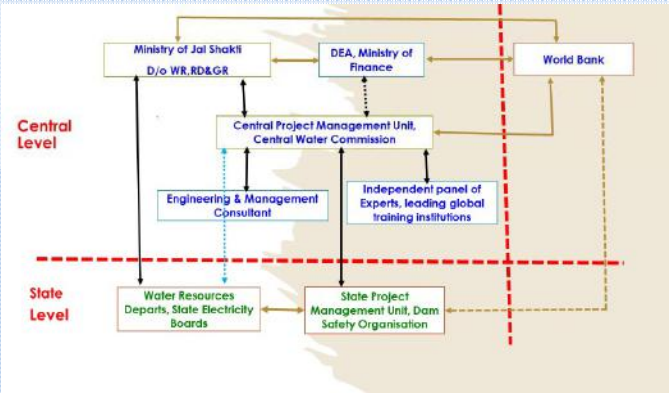
### PROJECT MANAGEMENT

- Supports SPMUs for activities related to procurement of goods and services
- Consultancy services
- Operating cost of CPMUs/SPMUs
- Outsourcing of support staff
- Payment of Audits fees etc.
- Expenses towards all Meetings
- Miscellaneous Expenses

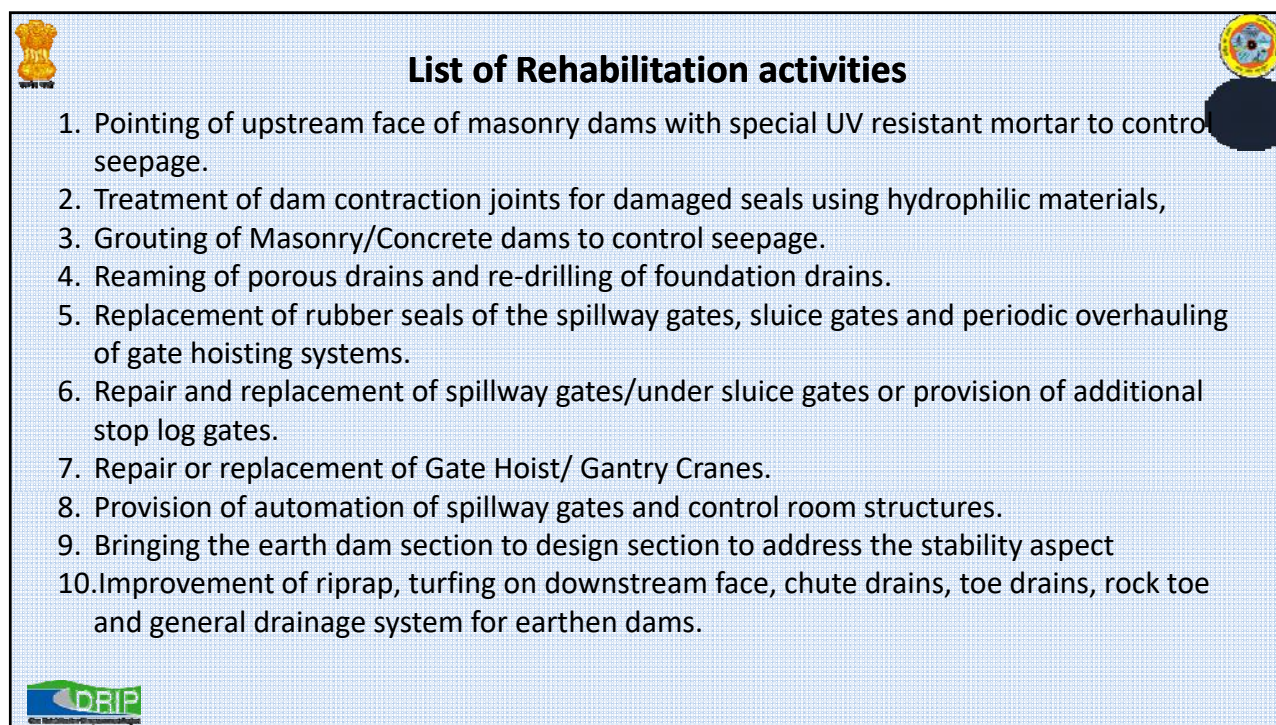
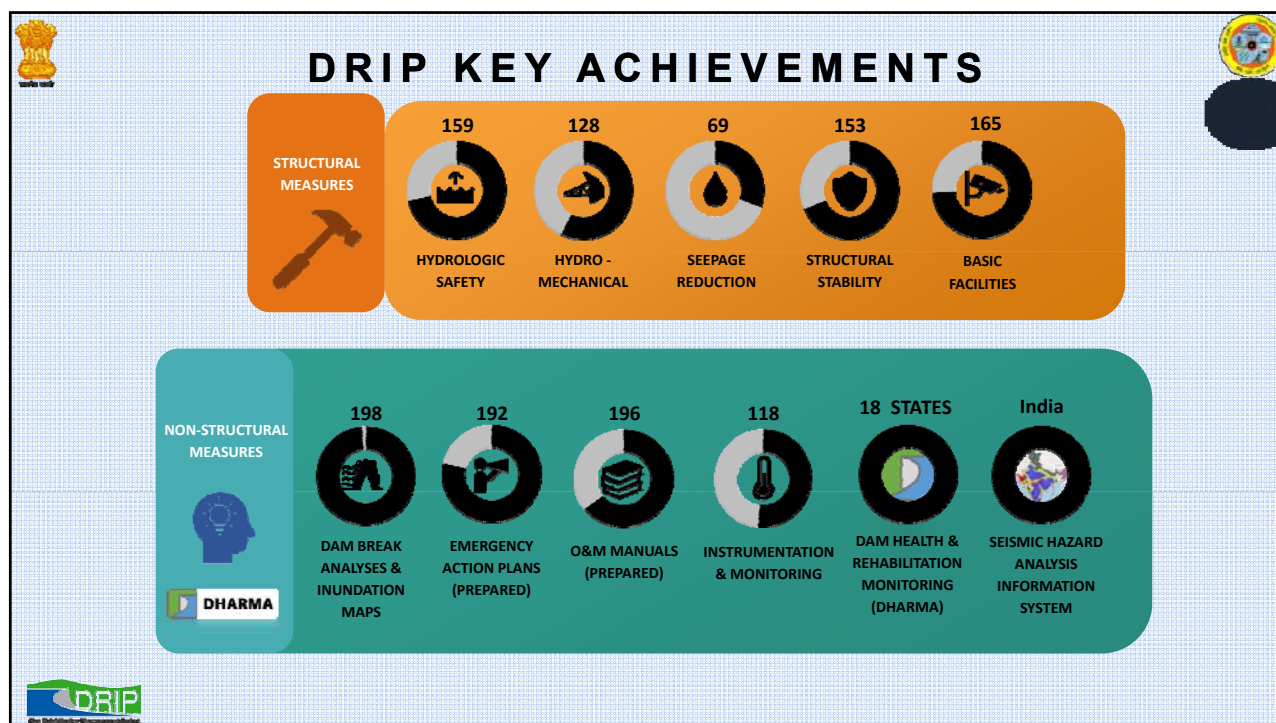


**9%**

**Component Cost**









## List of Rehabilitation activities Contd./...



11. Improving dam instrumentation and monitoring, SCADA and automation system of dams.
12. Providing additional spillway structures/fuse plugs/flush bars to take care of hydrological safety.
13. Raising height of dams to cater for increased design flood to address hydrological safety.
14. Repair of spillway glacis, discharge channel and energy dissipation arrangements etc.
15. Survey and mapping of cracks and its remedial measures.
16. Dredging/ Desiltation of dam reservoirs on selective basis.
17. Geo-membrane sealing system for upstream face treatment of dams.
18. Repair of sluice outlet structures.
19. Downstream face pointing with mortar.
20. Grouting of embankment dam (with low pressure slurry) & foundation curtain.



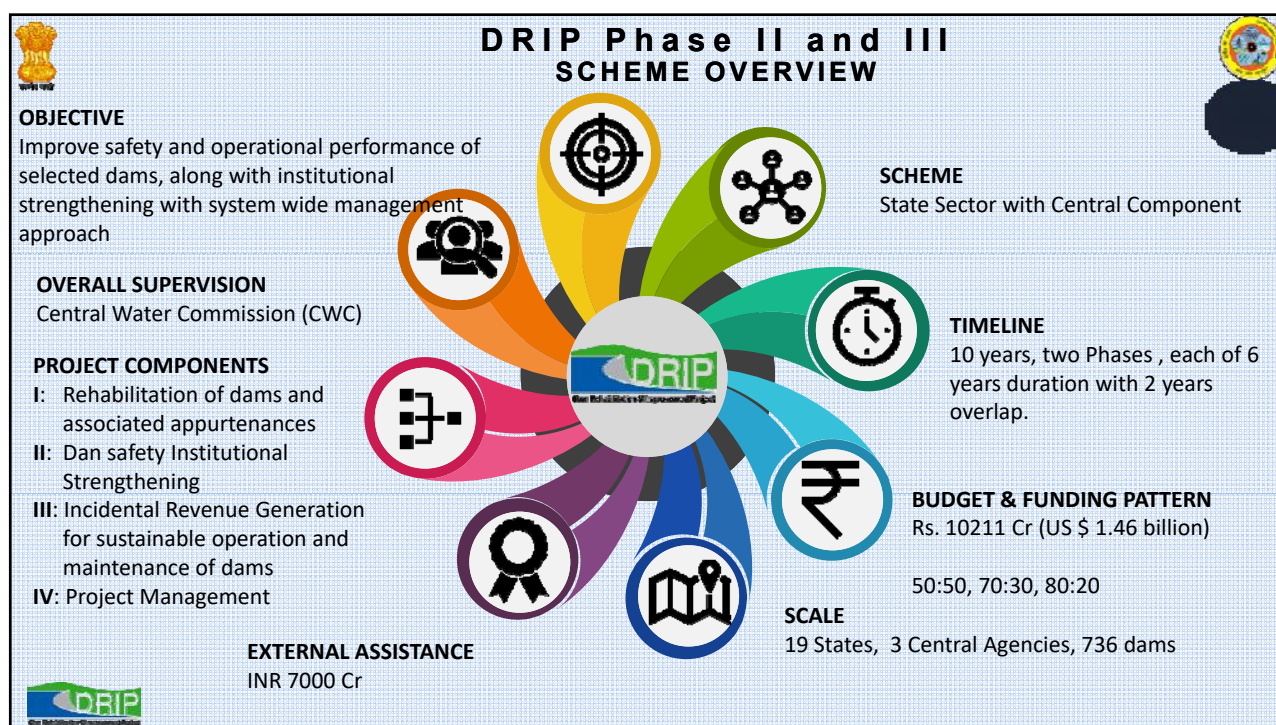
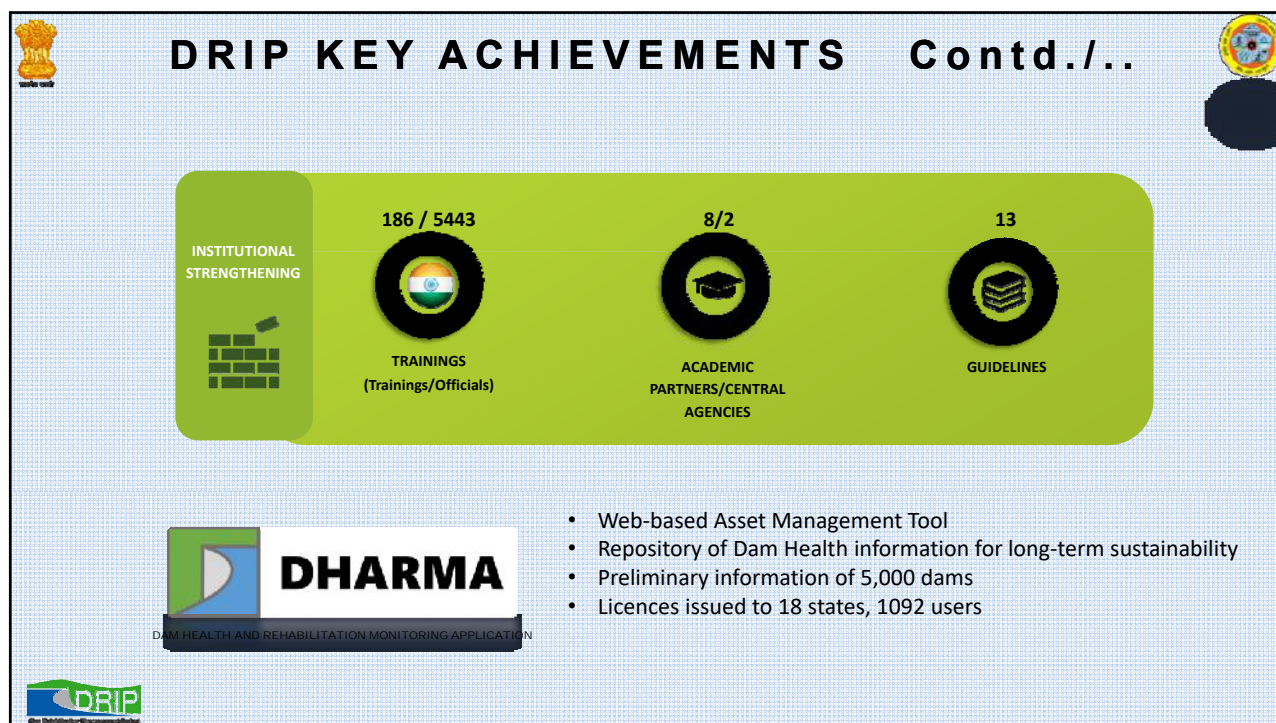
## List of Rehabilitation activities Contd./...

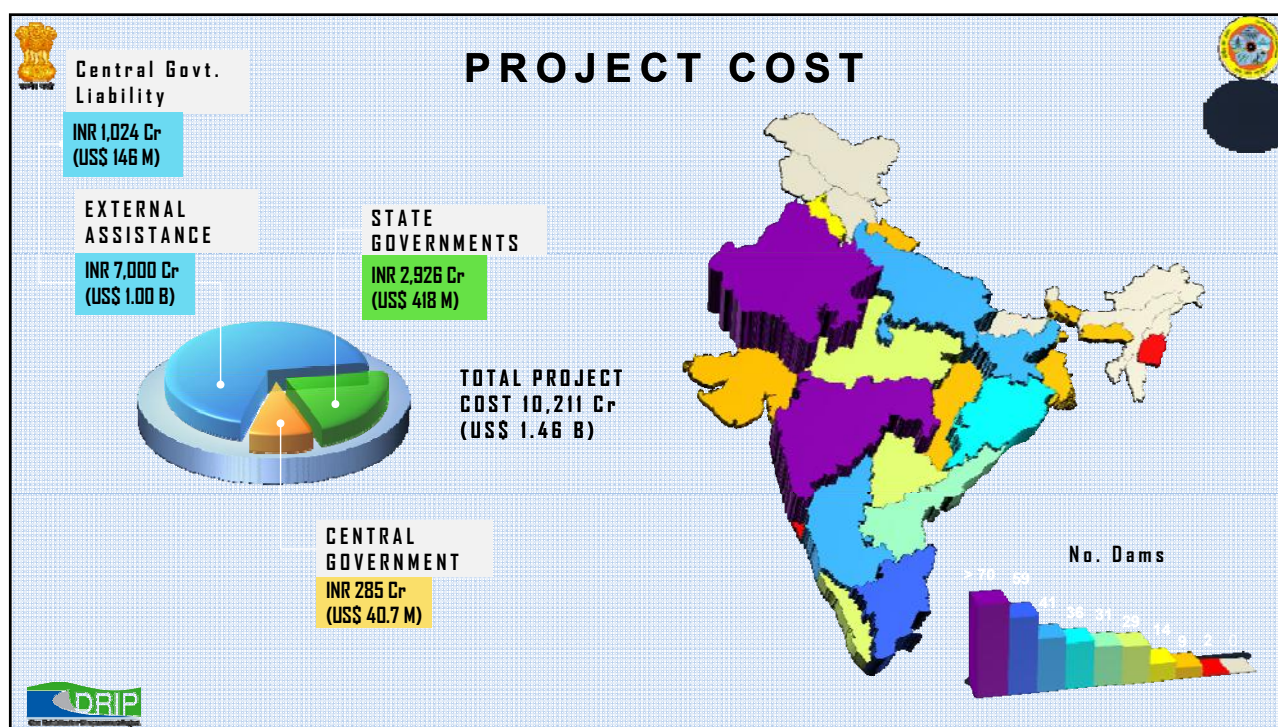
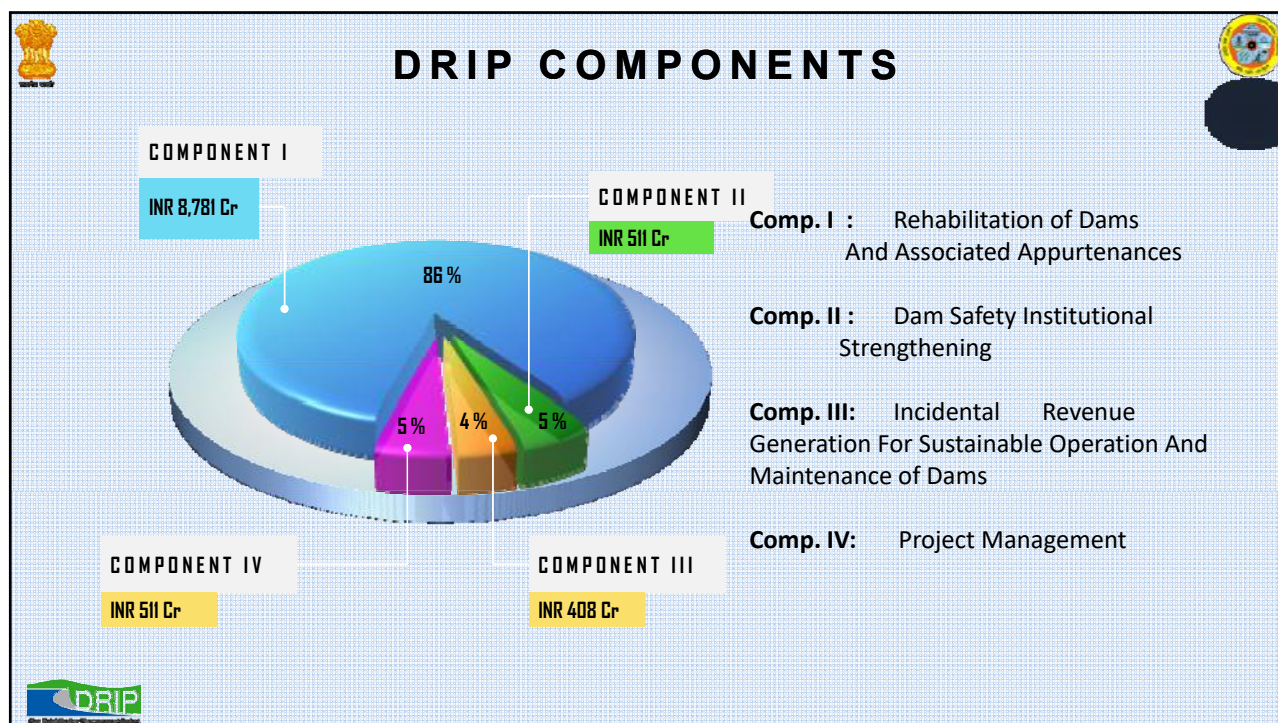


21. Provision or repair of parapet wall.
22. Providing backing concrete to dam for stability improvement.
23. Catchment Area Treatment (CAT) and Reservoir rim treatment.
24. Various kind of investigations i.e. geotechnical, underwater, survey, geo-physical/ sonic tomography etc.
25. Pre and post Bathymetry survey for de-siltation of dam or for physical modelling inputs.
26. Establishment of telemetric stations, automatic weather stations and other equipment for integrated flood forecasting and reservoir operation etc.

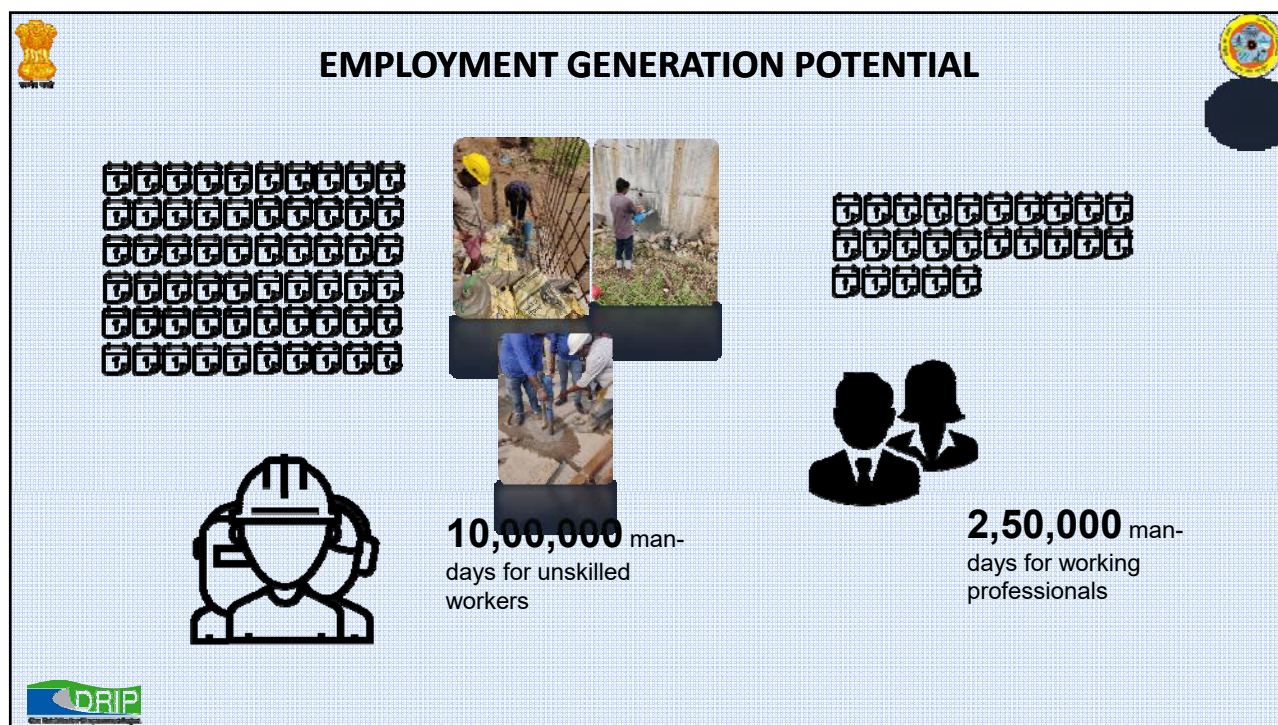














## DRIP VIS-À-VIS DAM SAFETY ACT 2021



- DRIP is implementation of the Majority of Dam Safety Act Provisions on Ground. The Act and DRIP has common objectives of surveillance, inspection, O&M for prevention of dam failure related disasters and institutional strengthening
- DRIP has all the provisions for Physical Rehabilitation of Dams in line with Provisions in the Act to address safety concerns
- DRIP focuses on Need for Disaster Management Plans, Early Warning System, Comprehensive Dam Safety Evaluation, Operation & Maintenance (O&M) Manuals, Risk Assessment, Instrumentation & Automation, Asset Management System, Documentation etc. which are mandatory in the Act.
- DRIP Phase II & Phase III has Incidental Revenue Generation for sustainable operation and maintenance of dams as one of the important component of the project. The proposals implemented under this component will help the dam owners to keep sufficient financial provisions for better maintenance of the dams. The Dam Safety Act 2021 also calls for sufficient financial provisions for maintenance of the dams.
- Implementation of this Component would need tweaking the policies by the state governments so as to utilize part of the revenue generated towards maintenance of the respective dam.



## CONTRIBUTION TO AATMA NIRBHAR BHARAT



- DRIP is one of the unique global program having rehabilitation provision of hundreds of large dams
- Scheme strengthen five pillars of Aatm Nirbhar Bharat Abhiyan (economy, infrastructure, 21<sup>st</sup> Century technology driven arrangement & system, demand and vibrant demography) through long term upkeep of these existing assets
- Institutional Strengthening is a step to ensure self-reliance in knowledge of Indian professionals and skill of dam's owners
- Scheme will generate an opportunities for Indian professionals to provide technical support to various African and South Asian Countries in the area of dam safety
- India is emerging as hub of knowledge in various aspects of dam safety
- India own global recognition through on-going DRIP







## Redressal of Inter-State Dam Safety Management concerns



- The provision of the scheme support to reduce the likelihood and consequences of dam failure through better dam safety management, monitoring and rehabilitation.
- The management and monitoring measures for flood mitigation include:
  1. Developing Emergency Action Plans (EAPs), Operation & Maintenance (O&M) Manual and an Instrumentation.
  2. O&M manual to include dam health monitoring and reporting protocols and updated operational protocols such as flood routing, as needed, to minimize the risk of downstream flooding.
  3. Development of systems for integrated reservoir operations for cascade of reservoirs.
  4. The scheme supports development of additional systems to detect and respond to risks promptly, such as early warning systems, data management and analysis software, Instrumentation (SCADA).



## Current Status of DRIP-2



- Union Cabinet Approved the Scheme in October 2020
- Co-financing by World Bank and AIIB (each for US\$ 250 million)
- Loan Agreement signed with World Bank(USD 250 M) in August 2021. 10 States participated (Gujarat, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Rajasthan, Odisha, Tamil Nadu, Chhattisgarh).
- **Project declared effective on October 12, 2021**
- Loan agreement with AIIB(US\$ 250 million) signed in May 2022.





## Current Status of DRIP-2

contd....



- Five additional States appraised in September 2021. Karnataka , Uttar Pradesh , West Bengal and Uttarakhand (through UJVNL) are the new states to be on board DRIP. Andhra Pradesh , Telangana , Goa and BBMB are in waiting to join DRIP subject to meeting Project Readiness Criterion(PRC) of the World Bank and DEA.
- The tenders amounting to approx. Rs.2200 Cr has been published. The civil works for approximately Rs. 1100 Cr has been awarded.
- The loan amounting US\$ 19 Million has been disbursed( for period up to March 2022).

