



सत्यमेव जयते

**Report of the  
Comptroller and Auditor General of India  
on  
Schemes for Flood Control and  
Flood Forecasting**



**Union Government  
Ministry of Water Resources, River Development  
& Ganga Rejuvenation  
Report No. 10 of 2017  
(Performance Audit)**



Leakage of water from the flushing conduit gates at Ichari Dam was noticed in Uttarakhand

# Background

- The subject of flood control is not included in any of the three legislative lists under the Constitution of India. However, Drainage and Embankments are two of the measures specifically mentioned in the State List. As such, Flood control and management schemes are planned, investigated and implemented by the State Governments with their own resources, according to the priority within the States. The Union Government renders assistance to States, which is technical, advisory, catalytic and promotional in nature.
- The Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR,RD&GR) is responsible for laying down policy guidelines and programmes for the development and regulation of the country's water resources. The Ministry provides technical guidance and conducts scrutiny, clearance and monitoring of the irrigation, flood control and multi-purpose projects (major/medium). The Ministry is also responsible for operation of the central network for flood forecasting and warning on inter-state rivers, the provision of central assistance for some State Schemes in special cases and preparation of flood control master plans for the Ganga and the Brahmaputra.
- The Performance Audit on 'Schemes for Flood Control and Flood Forecasting', for the year ended March 2016 has been prepared for submission to the President of India under Article 151 of the Constitution of India.
- The booklet abstracts the salient audit findings and related recommendations contained in the Audit Report.
- The CD contains the complete Report of the Comptroller and Auditor General of India in English and Hindi



Vulnerable condition of Sanyalchar embankment in Project WB-14 in West Bengal

# Schemes for Flood Control and Flood Forecasting

- During XI (2007-2012) and XII (2012-2017) Five Year Plans (FYPs), Government of India (GoI) implemented two major schemes viz. Flood Management Programme (FMP) and Flood Forecasting (FF) Scheme towards Flood Control and Management. GoI implemented other smaller schemes towards flood control viz. Dam Safety Studies and Planning (DSSP) and River Management Activities and Works related to Border Areas (RMABA).
- FMP was started in November 2007 with Central Assistance of ₹ 8,000 crore in XI FYP and ₹ 10,000 crore in XII FYP for undertaking works related to (i) river management, (ii) flood control, (iii) anti-erosion, (iv) drainage development, etc.
- Flood Forecasting is a non-structural measure and has been recognised as an effective tool for flood management by providing advance warning to the flood prone areas.
- As per Crisis Management Plan (CMP) for Dam failures (March 2011), MoWR, RD&GR through National Committee on Dam Safety (NCDS) impressed upon each State to come out with Emergency Action Plan (EAP) for each of its large dams.
- RMABA is an on-going central sector scheme during XI and XII FYP for undertaking long term projects in Nepal and Regular maintenance of flood protection works in Nepal, Bangladesh and Pakistan.


The Revetment damaged and washed away on most stretches of Project ArP-6 of the bank of the Lohit river in Arunachal Pradesh



## What were our Audit Objectives?

Performance audit on Schemes for Flood Control and Flood Forecasting in India were to examine whether:

1. Management, execution, monitoring and evaluation of Flood Management Programme was efficient and effective in controlling floods;
2. Establishment of Flood Forecasting network for dissemination of real time data was adequate;
3. Management and planning for execution of other schemes namely 'River Management Activities and works related to Border Areas' and 'Dam Safety Studies and Planning' was efficient and effective; and
4. Review and Oversight mechanisms for flood control measures were effective in management of flood.



Tree and bushes growing on embankment under HP-2 at km 42.900 in Himachal Pradesh

# Audit Scope and Methodology

The scope of our audit was as follows:

- i. With reference to Audit Objective 1, we covered 206 FMP projects that were sanctioned by MoWR, RD&GR between November 2007- March 2016 in 17 selected States to examine :
  - (a) Whether the funds released were timely, adequate, utilised for the prescribed purpose and released as per FMP guidelines.
  - (b) Whether the projects were taken up in an integrated manner covering entire river/tributary and Detailed Poroproject Reports were prepared and examined/ appraised as per guidelines in this regard.
  - (c) Whether the projects were executed as per CPWD/PWD Manuals.
- ii. With reference to Audit Objective 2, we examined whether the flood forecasting stations (level and inflow) were functioning properly and whether telemetry stations installed for real time data dissemination were functional.
- iii. With reference to Audit Objective 3, we examined whether the long term projects under RMABA were implemented and whether Emergency Action Plans for large Dams have been prepared and implemented.
- iv. With reference to Audit Objective 4, we examined whether the monitoring mechanism prescribed for FMP projects was implemented as per FMP guidelines.

Joint site visits were carried out along with officials of CWC/GFCC/BB and executing agencies. During the site visit, we test checked the execution of physical parameters of the projects as per approved Detailed Project Reports.

## Audit Sampling

During the XI and XII FYP, 517 projects were approved and funds were released to 25 States under FMP. We selected 17 States/UT for audit having 480 approved projects, in which total projects of more than ₹ 50 crore were approved by Empowered Committee/Inter-Ministerial Committee (EC/IMC). These 17 states are Arunachal Pradesh, Assam, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Manipur, Odisha, Puducherry, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal.

The sampling methodology used in respect of various flood control schemes was as under:

- a. We examined 50 *per cent* of the projects approved by the EC/IMC under FMP upto 31 March 2016 subject to maximum of 30 projects. In the States having five or less sanctioned projects, all the projects selected for audit scrutiny. We selected 47 projects for joint site visits.
- b. We selected 25 *per cent* of Level Flood Forecasting Stations and 50 *per cent* (maximum of two) of Inflow Flood Forecasting Stations under the selected Divisions for file examination. We selected 17 Flood Forecasting Stations for joint site visits.
- c. The sample size for examination of files of Emergency Action Plan (EAP) of Large Dams in the States during 2007-08 to 2015-16 was 10 *per cent* and 54 Dams for joint site visits.

In portion II of Project MAN-11, the bracing structure was found broken and separated in Manipur



# **Performance Audit Findings**

# Financial Management of Flood Management Programme

- During the nine years of the XI and XII Plan periods, only 57 *per cent* of approved works were completed.
- There were shortfalls in releases of Central assistance, deviations from FMP guidelines in phasing of expenditure and delays in completion of the projects.
- We noticed delays in 48 projects of four States ranging between two to 21 months in releasing first instalment of Central assistance to State Governments after approval of EC.
- An amount of ₹ 600.92 crore along with interest of ₹ 18.30 crore recoverable as loan from the State Governments for not releasing the Central assistance within 15 days to the executing agencies was not recovered by the Central Government.
- Funds amounting to ₹ 171.28 crore in six projects of five States (Bihar, Himachal Pradesh, Jharkhand, Uttar Pradesh and West Bengal) were not utilised and remained parked for the period ranging between 15 months to more than 60 months. Funds amounting to ₹ 36.57 crore in three States (Assam, Himachal Pradesh and Tamil Nadu) were diverted by the implementing agencies for works not approved in the Detailed Project Reports.
- An expenditure amounting to ₹ 18.12 crore incurred in the previous financial year before its approval by EC was included in the cost of project in contravention of clause 4.10.3 of FMP guidelines. Further, an amount of ₹ 19.99 crore was released in excess in two projects in Bihar and Uttarakhand.

- MoWR, RD&GR and State Governments did not ensure submission of audited statements of expenditure and Utilisation Certificates within stipulated time before releasing of Central assistance. In six States (Assam, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Uttar Pradesh and Uttarakhand) an amount of ₹ 2,161.79 crore was released by the Ministry without receipt of audited statement of expenditure.




Big gap in embankment of project UP-1 in Uttar Pradesh

## Execution of Flood Management Programme

- In eight (Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Uttar Pradesh and West Bengal) out of 17 States/UT, the flood management works were not taken up in an integrated manner covering entire river/tributary or a major segment of rivers/tributaries and the Preliminary Project Reports/Detailed Project Reports were not prepared in accordance with the scheme guidelines.
- There were huge delays in completion of FMP works ranged from 10 months to 13 years due to delay in approval of DPRs by Empowered Committee/Inter-Ministerial Committee, leading to technical designs becoming irrelevant at the time of actual funding. Instances of incorrect calculation of Benefit Cost Ratios were also noticed.
- There were delays in completion of FMP projects due to non-release/timely release of funds (Central share/State share) and due to non-acquisition of required land.
- Deficiencies in contract management viz. execution of work without call of tender, award of contract to large number of contractors, splitting of works, etc. were noticed. In three projects at Arunachal Pradesh and Uttar Pradesh, the actual quantity of work executed was below the approved scope of work. In four projects, an expenditure of ₹ 9.78 crore was incurred without the approval of the Competent Authority. GI wires valuing ₹ 25.40 crore remained utilised in one project of Himachal Pradesh. Irregular grant of mobilization advance amounting to ₹ 80.36 crore in three States resulted in loss of interest of ₹ 15.84 crore. An expenditure of ₹ 34.51 crore was incurred on jeep track/inspection roads

with Water Bound Macadam (WBM)/Bitumen (BT) surface over the flood embankment which was ineligible under FMP.

- Cases of award of work without collecting Performance Guarantee Bond, deviations from the approved scope of work, reduction in physical parameters, execution of work without authorisation of Competent Authority, execution of sub-standard work, delays due to non-settlement of claims were also noticed.
- Central Water Commission did not identify any drainage system, which needed immediate rehabilitation and adopt measures for its repair and restoration.



Showing plantation deep inside marginal bund in project UK-1 in Uttarakhand



## Flood Forecasting

- Against a target for the XII Plan for installation of 219 telemetry stations, 310 base stations and 100 flood forecasting stations, only 56 telemetry stations had been installed as of August 2016.
- Most of the telemetry stations installed during XI plan were non-functional due to which real time data was not available at these stations. Therefore, CWC did not depend on telemetry data even after investing in modernisation of telemetry station network for nearly 20 years which defeated the purpose of establishment of telemetry stations.
- There were insufficient number of flood forecasting stations in some of the States. There were deficiencies in installation and maintenance of flood forecasting stations. No flood forecasting stations have been established in Tamil Nadu. In XII Plan, action plan for installation of 41 telemetry stations in Tamil Nadu was prepared (July 2016) but tenders remained to be finalised.
- In Odisha, non-maintenance of water level in Hirakud dam as per the rule curve, and simultaneous opening later on of 50 flood gates caused heavy discharge of water resulting in flooding in downstream areas. In Uttarakhand, the flood forecasting could not be issued in time due to incorrect fixation of warning and danger level.

## Other Schemes for Flood Control

- We noticed delays in completion of RMABA projects which were long term solutions for the flood problems of Assam, North Bihar and Eastern Uttar Pradesh. There were discrepancies in execution of works like irregular award of work, splitting of tenders, payment of allowance at higher rates, etc.
- Out of 4,862 Large Dams, Emergency Action Plan/Disaster Management Plans of only 349 (7 per cent) large dams had been prepared (February 2016). Further, only 231 (5 per cent) large dams evolved operating procedure/manuals.
- Only two States (Himachal Pradesh and Tamil Nadu) had fully carried out the pre and post monsoon inspection of the dams, three States had carried out the inspections partially and remaining 12 States had not carried out these inspections.
- Dam Safety Legislation initiated in 2010 has not been enacted till August 2016.
- A time bound initiative for preparation and implementation of Emergency Action Plans including preparation of inundation maps and hydrological studies for all the large dams, was not observed.
- Programme for maintenance of dams were not prepared and adequate funds were not provided to carry out structural/repair works.

## Implementation of the recommendations of Review and Oversight Committees for Flood Control measures

- Recommendations of Rashtriya Barh Ayog with regard to identification of area affected by flood in the country remained unfulfilled.
- In most of the States the scientific assessment of flood prone areas was not carried out.
- Non-preparation of Digital Elevation Models led to non-demarkation of various flood zones in the Country digitally and absence of scientific images of the food affected areas.
- Morphological studies with a view to achieve better results in building, renovating and maintaining revetments, spurs and embankments to control and mitigate disasters caused by floods were not completed by any of the 17 States/UT.
- None of the States/UT sampled in audit had prepared Comprehensive Master Plans (CMP) for flood management.
- Six severely flood affected Ganga basin States did not constitute Implementation Committees for time bound implementation of the recommendations of the CMP for management of floods.
- None of the sampled States except Jammu & Kashmir, Manipur and Uttarakhand had enacted Flood Plain Zoning Acts. As such, enforcement of the measures to minimize/avoid damages due to floods could not be ensured.

Several seepage points were noticed at Lower Khajuriweir at Mirzapur in Uttar Pradesh

## Monitoring and Evaluation

- In five States (Bihar, Haryana, Himachal Pradesh, Jharkhand and Odisha) performance evaluation of the projects was not done by the monitoring agencies.
- Three State Governments (Manipur, Sikkim and West Bengal) did not take any action for rectification of the deficiencies pointed out during the performance evaluation of 26 completed projects under FMP.
- Concurrent evaluation of projects under FMP was not conducted in accordance with schemes guidelines in nine projects under FMP in three States (Assam, Himachal Pradesh and West Bengal).
- Remote Sensing was not used in the monitoring of FMP projects. Monitoring agencies (CWC/GFCC/BB) failed to conduct quality tests on the quality of construction materials and works during field visits.
- Site verification of FMP projects revealed that in 11 selected States the structures viz. embankment/earthen-embankment, revetment, launching apron, retaining wall, Gabion guide wall, stone protection work, Reinforced Cement Concrete (RCC) piles were found damaged and gaps in construction of embankments, structures washed away, less physical quantity executed, work not visible/submerged, cut in marginal bund, etc. were noticed.

## Recommendations


Based on the audit findings, following recommendations are made:

1. Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&GR) may release adequate funds/reimburse funds in timely manner as per FMP guidelines and may impress upon State Governments to release funds to executing agencies in time bound manner.
2. MoWR, RD&GR may keep strict vigilance on utilisation of funds by State Government and executing agencies so as to avoid parking and diversion of funds.
3. MoWR, RD&GR may release/reimburse the funds to the State Governments only after ensuring receipt of audited statements of expenditure, Utilization Certificates and other requisite documents.
4. MoWR, RD&GR may approve the projects under FMP after ensuring that the projects are formulated in an integrated manner covering entire river/tributary or a major segment of rivers/tributaries.
5. MoWR, RD&GR may approve the projects under FMP after ensuring that the Benefit Cost Ratio is worked out correctly as per guidelines in this regard.
6. MoWR, RD&GR may advise the State Governments to make efforts for early completion of delayed projects and completion of new projects in stipulated time.
7. MoWR, RD&GR may take adequate steps to release the funds after ensuring acquisition of required land.



8. CWC may devise a time bound action plan to speed up the formulation of flood forecast on real time data communication network by making all the telemetry stations operational and take suitable steps to install all the targeted telemetry stations.
9. CWC may ensure that the warning and danger levels have been fixed at appropriate level so that flood forecasting could be made correctly and timely.
10. MoWR, RD&GR may prepare a time bound action plan to accelerate the completion of all the long term River Management Activities and Works Border Areas (RMABA) projects to facilitate the long term solution to the flood problem of Assam, North Bihar and Eastern Uttar Pradesh from annual floods.
11. MoWR, RD&GR may, in consultation with State Governments, devise a time bound action plan for preparation and implementation of Emergency Action Plans including preparation of inundation maps and hydrological studies for all the large dams in the country.
12. MoWR, RD&GR may advise the State Governments to prepare Standard Operating Procedures for dams and carry out the prescribed pre and post monsoon inspection of the dams.
13. MoWR, RD&GR may persuade the State Governments to prepare a time bound action plan to comply with the recommendations made by Rashtriya Barh Ayog, Task Force 2004, Parliamentary Standing Committee on Water Resources and National Water Policy 2002 and 2012, and factor these recommendations in the release of funds in the various schemes of Central Government.

14. MoWR, RD&GR may take up with the States to enact the Flood Plain Zoning Bill and implement it in a time bound manner.
15. MoWR, RD&GR may conduct performance evaluation and concurrent evaluation of all FMP projects as per FMP guidelines.
16. MoWR, RD&GR may consider increasing the use of Remote Sensing Technology in the monitoring of FMP.
17. Central Water Commission/Ganga Flood Control Commission may ensure quality tests on the quality of construction materials and works during field visits.
18. MoWR, RD&GR may persuade the State Governments to immediately review the issues relating to damages/washing out of already constructed structures and take appropriate action for construction works not taken up.



Leakage of water from the flushing conduit gates at Ichari Dam was noticed in Uttarakhand

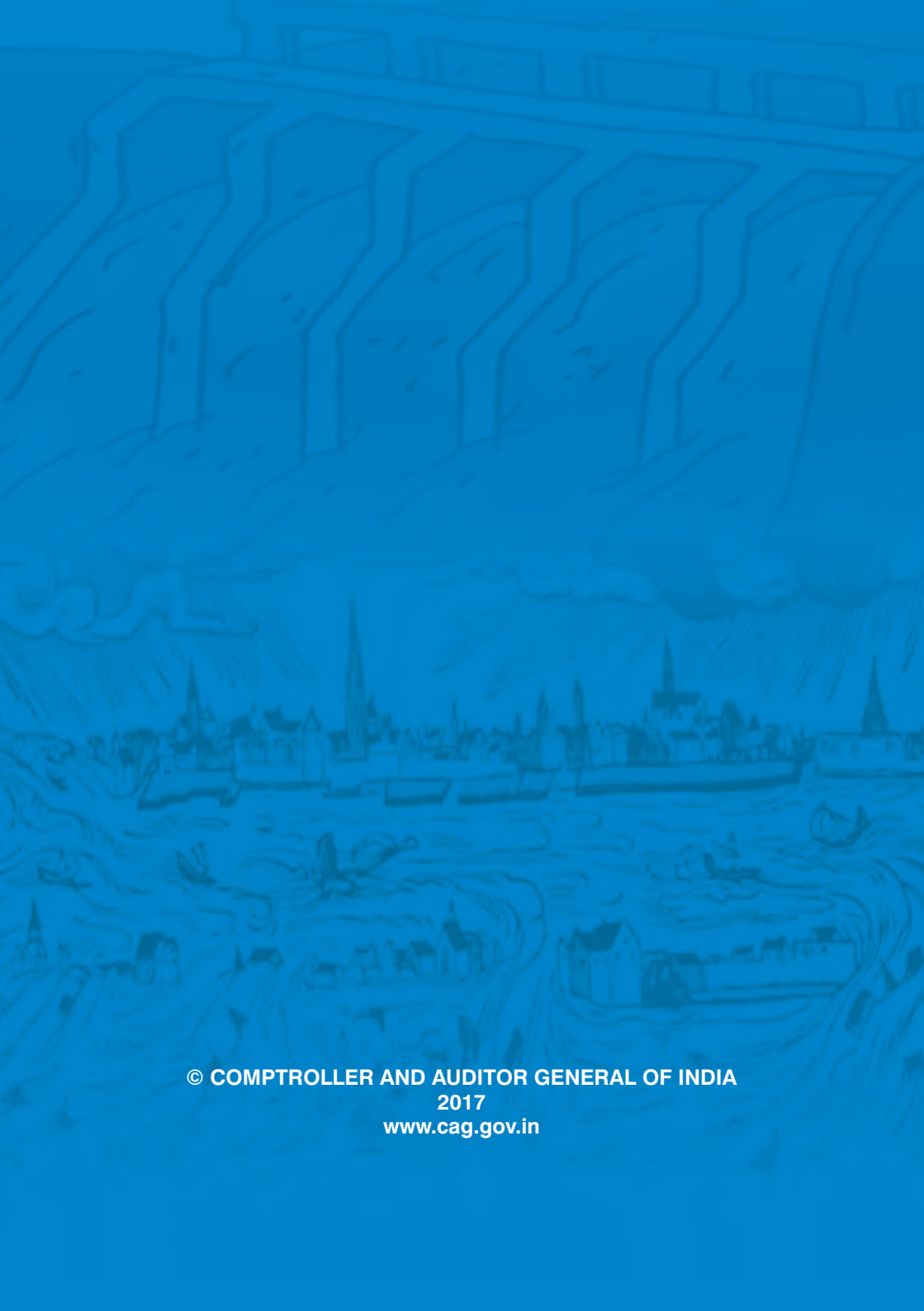


Tree and bushes growing on embankment under HP-2 at km 42.900 in Himachal Pradesh









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