

**Report of the
Comptroller and Auditor General of India
on
Performance Audit of
Implementation of Flood Control Measures in
West Bengal
(Economic Sector)**

Government of West Bengal

Report No. 2 of the year 2019

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PREFACE

Floods have been a recurrent phenomenon, causing loss of lives, public property and bringing untold misery to the people, especially those in rural areas. There is also a larger economic impact, as they derail economic activities, thus affecting growth. Indian sub-continent has peculiar climatic conditions, which cause floods in some parts whereas drought in other parts. West Bengal is one of the prime flood prone States in the country with 42 per cent (37660 sq. km.) of its total geographical area (88752 sq. km.) being susceptible to floods.

During the period from 2013 to 2017, there was loss of 1012 human lives and properties worth ₹ 43997.27 crore (that included cost of crops, houses, cattle and public utilities lost) due to floods, as reported by the West Bengal Government to Central Water Commission.

The Performance Audit on “Implementation of Flood Control Measures in West Bengal” was conducted to assess the implementation and effectiveness of the flood control measures. The Performance Audit covers the period from 2013-14 to 2017-18 and examines various aspects of the Programme such as Planning, Implementation, Financial Management, Quality Control and Monitoring.

This Report for the year ended March 2018 has been prepared for submission to the Governor of West Bengal under Article 151 of the Constitution of India for being laid before the Legislature of the State.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Executive Summary

Flood damages - how bad is the situation?

A national perspective

The Indian sub-continent has peculiar climatic conditions, which cause floods in some parts whereas drought in other parts. Based upon the statistics provided by the States and compiled by Central Water Commission for the period 1953-2017, it has been reported that damages by floods in the country are more than ₹ 5800 crore per annum besides the loss of precious human lives and cattle.

In West Bengal

West Bengal is one of the prime flood prone States in the country with 42 per cent of its total geographical area (88752 sq. km.) being susceptible to floods. The State has three distinct drainage basins namely Brahmaputra, Ganga and Subarnarekha having 37660 sq. km. flood prone area.

During the period 2013-17, value of the flood damages to crops, houses and public utilities was ₹43997.27 crore. As such the average annual damages during these five years was ₹8799.45 crore, which was much higher than the all India average of last 60 years.

Who is responsible to take action?

Flood control programme/schemes are planned, funded and implemented by the West Bengal Government through the Irrigation and Waterways Department (I&WD). Besides, Government of India (GoI) also renders technical, advisory and financial assistance to the State Government. Central Assistance is provided to flood prone States to take up flood control and river management works in critical areas under Flood Management Programme (FMP). GoI set up Central Water Commission (CWC), Ganga Flood Control Commission (GFCC), Brahmaputra Board (BB) and National Disaster Management Authority (NDMA) to enable State Governments to address flood problems in a comprehensive manner. Apart from these, the Working Group for 12th Five Year Plan of the Planning Commission (PC) of India made (October 2011) various recommendations and suggestions for the management of flood. CWC plays a direct role in collection of flood data, flood forecasting and dissemination of flood forecasts to the local administration for planning suitable administrative measures.

What did we expect from this Performance Audit?

The Performance Audit was undertaken to get a reasonable assurance that:

- The Department had prepared a comprehensive long-term plan, prioritising flood control measures necessary to combat recurrent floods in the State.*
- Schemes/projects related to flood control measures were implemented as planned and were effective in minimising damage of life and property.*
- Necessary funds were made available and were utilised judiciously.*
- An effective system for ensuring quality control in construction and monitoring was in place.*

- Flood Forecasting was used as a tool to predict, warn and minimise damage from floods.

How did we do it?

Selection for detailed examination was done as follows: Out of 45 Divisions engaged in flood control measures during the years 2013-18, six Divisions executing two ongoing projects under Flood Management Programme (FMP)¹, and eight other Divisions on the basis of volume of expenditure and ensuring that these were located in different flood prone zones of the State.

The methodology adopted for achieving audit objectives with reference to audit criteria consisted of scrutiny of records, analysis of data, issue of audit queries, joint site visits etc.

How is this Performance Audit Report organised?

The report consists of six chapters, starting with introduction to the flood conditions in India and in West Bengal, extent of damages caused due to floods, statutory provisions to deal with the floods etc. Other chapters cover the planning, implementation, financial management and quality control and monitoring.

What did we observe in Audit?

As per the Annual Flood Report - 2017 of Irrigation and Waterways Department, all the blocks under KMP and KKB were inundated by flood waters in July 2017. The flood damage reports of the Department of Disaster Management and Civil Defence, GoWB reflected loss of life, devastating damage to property and its adverse economic and environmental impacts.

Flood damage data of 2017

Population affected (Million)	Cropped area affected (M ha)	Damage to crops (₹ in cr.)	Houses damaged (No.)	Damage to houses (₹ in cr.)	Human lives lost (No.)	Cattle lost (No.)	Damage to public utilities (₹ in cr.)	Total damages (₹ in cr.)
8.723	1.033	6914.50	8,26,982	9158.28	217	2,857	1655.16	17727.94

Chapter 2: Planning

In the absence of holistic basin-wise/river-wise Master Plan, flood management projects were taken up at different locations depending on priority and availability of funds without being linked to a comprehensive plan.

(Paragraph 2.1)

Irrigation and Waterways Department (I&WD) failed to adopt appropriate combination of structural and non-structural measures for effective management of floods. I&WD adopted only some of the structural measures. Non-structural /administrative measures like Flood Plain Zoning and Flood Proofing were not adopted.

(Paragraph 2.2)

¹ Kandi Master Plan and Kaliaghai-Kapaleswari-Baghai Basin Drainage Project.

Chapter 3: Implementation

Kandi Master Plan² was taken up in June 2012 to ameliorate the critical and perpetual flood situation in an area of about 510 sq. km. in Murshidabad district. Against the approved project cost of ₹ 438.94 crore, an amount of ₹ 209.32 crore was released and spent during the years 2013-18. Out of the total amount spent on this project so far, GoI has contributed only ₹ 24.98 crore (12 per cent) instead of ₹ 157 crore (75 per cent), mainly due to delay in submission of UCs by the State Government.

The project was still ongoing as only six out of 12 phases were completed as on March 2018 against the stipulated date of completion by March 2017.

Defects in Detailed Project Reports and various deviations from the Detailed Project Report like non-execution of embankment protection work in vulnerable stretches, less country side slope, less height of the embankment than the actual requirement, non-creation of additional waterway, less thickness of boulder pitching work *etc.* were noticed in execution of embankment protection work. Due to these deviations, risk of the infirmities of embankments cannot be ruled out, which could adversely impact the flood control arrangements.

Cases of non-compliance to the relevant Indian Standards Codes and recommendations of GFCC on providing sand cushion layer and sausage crate³ were also noticed which impacted stability of the embankments.

Further, Annual Flood Report of 2017 of I&WD reflected that all the blocks under KMP were inundated by flood water in July 2017, a clear indication of lack of effectiveness of flood protection measures taken by I&WD until now. The inundation maps from ISRO Bhuvan portal also clearly demonstrated the lack of efficacy of the flood control plan of the KMP project.

(Paragraph 3.2.1)

With a view to provide relief to the flood prone low lying terrain of seven blocks in Paschim and Purba Midnapore districts, which historically suffer from flood and tidal inundation, the KKB Drainage Scheme was initiated in March 2010. Investment clearance of ₹ 650.38 crore for KKB project was accorded by the Planning Commission, GoI in March 2010 with target date of completion by March 2015.

The project was commenced in March 2011 and ₹ 347.78 crore was released against which expenditure of ₹ 340.24 crore was incurred upto March 2018. The project was still (December 2018) ongoing. The project could not be completed within stipulated period mainly due to delay in land acquisition. Only 35 per cent of the estimated land was acquired up to March 2018.

Commencement of the project without ensuring acquisition of land grossly hampered execution of works leading to delay in completion of the project. Rivers/khals were not widened/excavated up to design bed width, which implied that with the limited carrying capacity, they would not be able to control frequent flooding in the areas. Inclusion of non-feasible items, non-construction of regulator at the confluence of river Kapaleswari and Kaliaghai and non-maintenance of already resuscitated rivers/khals caused heavy siltation

² Consisting of entire Bharatpur-I, parts of Khargram, Burwan and Kandi blocks.

³ Wire net filled with boulders, used for embankment protection.

affecting the overall drainage system of the project. It was observed in the Annual Flood Report of I&WD for 2017 that all the seven blocks⁴ included under KKB were inundated in 2017, which was indicative of the lack of effectiveness of flood protection measures taken by I&WD.

(Paragraph 3.2.2)

Apart from the two FMP projects, I&WD executed embankment protection as well as anti-erosion of river bank works under State Plan, Rural Infrastructure Development Fund (RIDF), Common Border Rivers Fund, One Time Additional Central Assistance (OTACA) etc. A sample of 145 such works having estimated cost more than ₹ one crore each were selected for detailed examination. It was seen that in flood protection measures taken up by the Divisions, the standards prescribed in CWC guidelines, Indian Standard Code and I&WD Code (Vol.I) were not complied with. Further, few financial deficiencies in implementation of the flood protection works were also noticed.

Required thickness of graded filter layer as per the Indian Standards Code was not provided in total 28 cases valuing ₹ 61.83 crore resulting in exposure of those embankments to force of water making them vulnerable to erosion.

In nine embankment protection and anti-erosion works valuing ₹ 58.36 crore, laying of sand cushion was not envisaged in the estimates and works were executed without providing any cushion of sand layer.

Extra expenditure of ₹ 10.44 crore was incurred in 10 embankment protection/anti-river erosion works where the thickness of stone boulder in launching apron was provided 33 to 56 per cent more than the actual requirement.

It was also observed that, in 2017, the area under flood inundation of the State was more than that in the last four years.

(Paragraph 3.2.3)

Chapter 4: Financial Management

During 2013-14 to 2017-18, Budget Estimates of ₹ 7309.59 crore were provided for Flood Control, which was subsequently reduced to ₹ 4520.53 crore in Revised Estimates. The actual expenditure was even less than the Revised Estimates of each year. Savings with respect to Budget Estimates as well as Revised Estimates ranged from 26 to 68 per cent and 14 to 34 per cent, respectively.

Yearly budgets were prepared by I&WD without taking any inputs from the Divisional level, which resulted in such savings. As per the Budget Publications, I&WD could not spend ₹ 1099.45 crore during 2013-14 to 2017-18, though provision of the fund was made through REs by the State Government.

Despite availability of funds, 2162 sq. km. of the total flood prone area of the State remained unprotected as per the Annual Flood Report 2017 of I&WD.

(Paragraph 4.1)

Some financial irregularities like executing maintenance work from FMP fund, non-deduction of Royalty and early refund of Security Deposit of contractors were also noticed and have been commented upon.

(Paragraph 4.2)

⁴ Narayangar, Datan-I, Sabong, Pingla, Bhagabanpur-I, Patashpur-I and Moyna.

Chapter 5: Quality Control and Monitoring

Three test checked Divisions⁵ did not ensure the quality of cement used in works valuing ₹ 13.52 crore, putting the strength of embankment protection works at stake.

I&WD failed to check the quality of materials used in the construction of the flood control works. This could impact the structural design causing defects leading to failure of the works impacting flood control measures.

(Paragraph 5.1)

Progress of the work was not monitored effectively. It was observed that both the projects (KMP and KKB) were delayed and vulnerable areas remained prone to floods.

Monitoring mechanism through remote sensing techniques was not adopted for any schemes of Flood Control.

None of the test checked Divisions maintained any inventory of assets. Land register was maintained only by KKB project division. As a result, I&WD had no database containing details of the assets created under FMP.

Inadequate monitoring system impacted field performance, also leading to failure to take corrective action while work was in progress.

(Paragraph 5.2)

There is no system of real time compilation and dissemination of flood data in I&WD. Though the river water level is collected on hourly basis in monsoon period by the river gauge stations, the data is uploaded only once during the day on the web-site of I&WD. As such, if there is a sudden surge of flood waters, it remains unreported.

There are only two river gauge station over River Bhagirathi-Hooghly though it passes through seven districts⁶ in the State. Further, there is only one gauge station for the entire 129 km length of the Mahananda river within Malda district. There is also no river gauge station for Tangon, Kalindri, Punarbhaba and Pagla river in Malda district. Thus, water level recording mechanism in these sub-basins is weak which would affect rescue measures, leaving people at the mercy of the flood waters.

(Paragraph 5.3)

What do we recommend?

Department may consider to :

- i. Prepare state-centric comprehensive plan taking into account all existing developments with latest updated data, including the strategies recommended by various technical bodies such as scientific assessment of flood prone areas, integrated basin management approach etc.
- ii. Adopt Engineering/Structural measures like detention basins, diversion of flood water, etc. which will not only reduce spilling but also bring relief to the flood prone areas by reducing flood flows and thereby the flood levels.

⁵ Malda Irrigation Division, Mahananda Embankment Division and Howrah Irrigation Division.

⁶ Murshidabad, Burdwan, Nadia, Hooghly, Howrah, Kolkata and South 24 Parganas.

- iii. *Adopt Administrative/Non-structural measures like enactment of Model Flood Plain Zoning Bill which aim at demarcating zones or areas likely to be affected by floods of different magnitudes, frequencies, probability levels and specify the types of permissible developments in these zones, so that whenever floods actually occur, the damage can be minimized.*
- iv. *Prepare defect-free DPRs and adhere strictly to the approved DPR and recommendations of GFCC while implementing the flood control measures without delay and avoiding wasteful expenditure.*
- v. *Take inputs from individual Divisions with respect to annual requirement of funds for flood control measures to ensure optimum utilisation of funds.*
- vi. *Introduction of Remote Sensing techniques for monitoring of physical progress of the schemes in Flood Management Works.*
- vii. *To ensure real time compilation and dissemination of flood data, provide more river gauge stations to measure the level of water at different locations and warning mechanism which will provide timely flood warnings with adequate lead time for the public to minimise the flood damages.*