EXECUTIVE SUMMARY

Inundation in suburban Perungalathur area

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The Purpose

Chennai city has a long history of facing the vagaries of nature in the form of cyclones and high intensity rainfall. Chennai had experienced catastrophic flooding in 1943, 1976, 1985, 1998, 2002, 2005 and 2015 due to heavy rains associated with cyclonic activity. The December 2015 floods in the city and its suburban areas claimed 289 lives, inundated 23.25 lakh houses, disrupted power and telecommunication services, halted air, rail and road transport, caused extensive damage to public and private property and brought the city to a standstill for several days.

The agonising impact of the floods brought to public domain the failure in the roles, which ought to have been played by various Government bodies in effectively managing the disaster. With a view to ascertain the preparedness of Government of Tamil Nadu (GoTN) in minimising the magnitude of loss due to floods and to assess whether the disaster was avoidable, a Performance Audit of 'Flood management and response in Chennai and its suburban areas', was conducted from June to November 2016, covering the period from April 2011 to March 2016.

The objectives of the Audit were to assess the (i) effectiveness in implementing the Master Plans for orderly development of the city with due regard to preservation of water bodies and structures, (ii) effectiveness in addressing the issue of encroachments, which hinder free flow of rain water, (iii) economy and effectiveness in carrying out flood management programmes, (iv) efficiency and effectiveness in disaster management, and (v) the effectiveness of internal control mechanism, including performance evaluation and monitoring.

Results in brief

Results of Audit scrutiny indicated that the laxities in urban planning and ineffective enforcement of statutes and Master Plans had impacted natural water bodies and thereby, paved the way for flooding. Several plans to restore and augment capacities of tanks and reservoirs, to reduce surface runoff and to meet the ever increasing drinking water demands of the water-starved city failed due to poor project management, ineffective handling of land acquisition process and lack of co-ordination among different departments and agencies of GoTN. Unrestrained encroachments blocked free flow of flood water and had inundated several parts of the city. Flood mitigation projects to revive the waterways suffered delays due to poor project management and unresolved encroachment issues. Even routine desilting and cleaning of macro and micro drains were not carried out as envisaged. The city and its suburban areas were way behind the target on putting in place storm water drainage networks due to lack of importance attached to this crucial infrastructure. Underground Sewage Schemes did not cover several areas and sewage entering and clogging storm water drainage network was not a rare sight.

Flood relief activities were hampered by absence of dedicated institutional mechanism to spearhead rescue and relief activities. Absence of a Disaster Management Plan impeded the efforts of extending rescue and relief in an organised manner.

Principal Findings

PLANNING

- The State lacked a law on Flood Plain Zone (FPZ) and an updated Water Policy to protect natural waterways. Frequency - based flood inundation maps, Emergency Action Plan for dams and Basin-wise comprehensive master plans were not prepared to respond to challenges posed by heavy rains.

(Paragraph 2.2)

- Though the Tamil Nadu District Municipalities Building Rules, 1972 had envisaged for maintaining a buffer zone of 15 metres from the margin of the waterways, the Second Master Plan, 2008 of Chennai Metropolitan Development Authority (CMDA) did not attempt to demarcate flood plain zones to regulate constructions along waterways, resulting in large buildings coming up on the banks of rivers, obstructing free flow of flood water.

(Paragraph 2.3)

- CMDA liberally allowed constructions through conversion of land use from Agriculture, Non-urban and Open Space & Recreation zones to other zones, resulting in steep increase in built up areas and consequent reduction of soil recharge of rain water. Such unauthorised constructions shrank the water bodies and had led to massive inundation during December 2015 floods.

(Paragraph 2.4)

MANAGEMENT OF WATER BODIES

- Failure of Water Resources Department (WRD) to create two new reservoirs in the upstream of Chembarambakkam Tank though recommended by Nucleus Cell for flood mitigation and improper planning/non-completion of augmentation work across Kosastahalayar River resulted in non-achievement of envisaged water storage and flood control.

(Paragraph 3.1)

- Tardy implementation of project for restoration and protection of water bodies resulted in abandoning of lakes and consequent reduction in the water storage capacity of the water bodies.

(Paragraph 3.2)

ENCROACHMENTS

- Encroachment of tanks, lakes and river beds played a major role in causing the massive floods in Chennai. Despite enactment of a law in 2007 to protect tanks from encroachment, the percentage of tanks encroached, kept increasing year after year.

(Paragraph 4.2)

DRAINAGE SYSTEM IN CHENNAI METROPOLITAN AREA

- Eight projects taken up under Jawaharlal Nehru National Urban Renewal Mission, to provide new channels and strengthen existing channels in Chennai Metropolitan Area (CMA) could not be completed due to encroachments and lack of co-ordination between different departments, contributing to flooding in many areas.

(Paragraphs 5.1.1 to 5.1.8)

- Inadequate coverage of storm water drains (SWD) due to poor outlay, coupled with improper design and missing links in the SWD networks, contributed to flooding. Furthermore, rainfall intensity adopted by Greater Chennai Corporation for designing SWDs was incorrect leading to construction of lower capacity SWDs which also contributed to the floods of 2015.

(Paragraph 5.2)

- In 2014 and 2015, the annual desilting works of waterways in CMA had not commenced before the onset of monsoon. GoTN had not attached due importance to the desiltation work and had not bothered to release funds well before the monsoon and as a result, none of the sanctioned works could be completed before the onset of the monsoon. The non-execution of works before monsoon hindered the free flow of flood water, thus contributing to floods in 2015.

(Paragraph 5.6.1)

- Chembarambakkam Tank, despite being a major tank, did not have any scientific inflow forecast system and lacked a mechanism for real time flood forecast, which was not in accordance with the Central Water Commission (CWC) norms for Dam Safety Procedures and Reservoir Regulation Schedules.

(Paragraph 5.8.5)

- In the absence of Emergency Action Plan for Chembarambakkam Tank, the outflow of water was much more than the inflow leading to unsustained release of water into Adyar River. The water at the tank was never maintained at the full tank level. On 01 December 2015, water was stored upto 3.481 TMC against the total capacity of 3.645 TMC, as WRD wanted to protect the private land, which were illegally allowed to remain in the foreshore area, from being submerged.

(Paragraph 5.8.5)

- Considering the opportunity to store an additional 0.268 TMC in Chembarambakkam Tank, 12,000 cusec of discharge could have been maintained for six hours during which period, water was actually released at 20,960 to 29,000 cusec. Hence, an additional quantity of 0.266 TMC could have been stored in the Chembarambakkam Tank and yet the storage level would not have reached the brim.

(Paragraph 5.8.5)

- Paragraph 8.1.2 of the Report on Dam Safety Procedures issued by CWC, GoI (July 1986) concludes that flood disaster can be logically classified as man-made if the quantum of outflow from the dam exceeds the inflow. The indiscriminate discharge of water at 29,000 cusec for 21 hours on 1 and 2 December 2015 had led to a man-made catastrophe.

(Paragraph 5.8.5)

DISASTER MANAGEMENT

- The Governing Body of Tamil Nadu State Disaster Management Authority (Authority) did not meet even once since its constitution in November 2013. The Tamil Nadu State Disaster Management Agency (TNSDMA) did not have the financial autonomy contemplated by GoI.

(Paragraph 6.1)

Principal Recommendations

- ***Action should be taken to enact a law on Flood Plain Zoning, on the lines suggested by GoI, to minimise the impact of construction on water bodies.***
- ***Chennai Metropolitan Development Authority should not allow development along water bodies without ensuring ameliorating measures taken by developers to prevent the impact of such developments. The system of conditional approvals should be stopped forthwith.***
- ***Government should ensure co-ordination with all line departments/ agencies in evicting encroachments along water ways and inside water bodies.***
- ***Thrust should be laid on expansion of Storm Water Drain networks with due importance to design of water carrying capacity of the drains and annual maintenance.***
- ***Preparation of Emergency Action Plan for dams should be completed on priority.***
- ***Government should put in place an operational institutional framework for disaster management with financial autonomy as contemplated by GoI.***