

September 01, 2018  
Alappuzha District



## CHAPTER VI CONCLUSION AND RECOMMENDATIONS



### 6.1. Conclusion

Kerala State Disaster Management Plan 2016 records that the State has a higher degree of disaster risks as compared to the rest of the country. As noted in the Rebuild Kerala Development Programme, floods are the most common of natural hazards that affect the people, infrastructure and natural environment in Kerala, and incidence of floods in the State is becoming more frequent and severe. Audit observed that in the context of management of floods, better planning, implementation and integration of efforts of different authorities/ bodies are among the measures urgently required to enable the State to be better prepared to face any eventuality of extreme rainfall and severe flooding in the future.

The preparation of a State Level Master Plan for water resources development, formulation of Master Plans for the major rivers of the State and constitution of a State Level Authority for coordinating all water related activities at the river basin level need to be prioritised. Flood plains of the State are yet to be demarcated and flood plain zoning legislation remains to be enacted. The State needs to explore options for having in place a reliable large-scale flood hazard map. Infrastructure needs to be strengthened and shortages of equipment met for effective functioning of Fire and Rescue personnel. Flood forecasting stations need to be set up on priority and real time data be made available at the earliest for optimal results through systems such as the DSS. Vendor selection should be such as would ensure projects deliver expected outputs and within the prescribed time frame. Effective functioning of communication infrastructure at all times requires to be ensured, particularly in flood prone locations across the State.

Even after a considered decision by KSEBL in consultation with KSDMA in August 2018 to introduce a dynamic flood cushion of four feet below FRL (68.87 MCM), spills of 467 MCM could not be avoided in respect of Idukki reservoir. Extreme care needs to be taken to ensure that outflow does not exceed inflow except under emergencies in respect of operations of major reservoirs to avoid potential flooding disasters. Integrated reservoir operations in multi-dam basins needs to be ensured.

Land Use and Land Cover change analysis of the Periyar basin revealed significant increase in built-up area and notable decrease in water bodies in recent years, rendering the basin vulnerable to floods. Continuous monitoring and timely action is essential for eviction of encroachers obstructing free flow of the river waters and to ensure removal of operational bottlenecks hindering smooth spillway operations.

Works of immediate repair and restoration approved for execution under SDRF in the wake of the 2018 floods remained to be completed even after a

lapse of two years and eight months. Strict monitoring by Revenue and Disaster Management/ Local Self-Government/ Water Resources Departments of the progress of works meant to lower the potential risk of riverine flooding and of dredging works in channels etc. is a must to ensure that optimal results accrue without delay.

## **6.2. Recommendations**

Government of Kerala may consider revision of the State Water Policy to include aspects relating to flood management, in line with the National Water Policy and after considering the specific requirements of the State. Feasibility of bringing a legislation for flood plain zoning, and an Authority to identify and demarcate flood plain zones of the State and to prohibit or restrict the use of these lands is to be considered. The State may initiate action to operationalise the Civil Defence Training Institute in Thrissur for the fulfilment of the intended objective of training and equipping sufficient number of Civil Defence volunteers to respond to emergency/ disaster situations. Priority needs to be given to review the adequacy of equipment, vehicles and infrastructural facilities in the Fire and Rescue Services Academy as well as in Fire and Rescue stations so that the GoK's dedicated force for rescue services may be adequately equipped to handle any flood or other disaster situation.

Government may ensure adequacy of the number of rain gauges capable of generating real time data in order to ensure accuracy of rainfall estimation. Projects for procurement/ installation of systems meant for flood management such as decision support system etc., may be entered into only after ensuring timely availability of input data from all sources including external sources. Kerala State Disaster Management Authority may ensure that fail-safe communication infrastructure is available in vital installations such as at dam sites and that a built-in redundancy of different layers of communication capable of functioning during the most adverse circumstances exists in flood-prone locations across the State.

Kerala State Electricity Board may ensure flood release operations for reservoirs are based on approved rule curves and that the approved rule curves of 2020 for Idukki and Idamalayar would be adequate to handle situations similar to the extreme rainfall event of 2018, without consequential flooding. In view of the drastic change in land use over the past few decades with its impact on the recent floods, Government may initiate urgent steps to review the adequacy of the measures initiated to reduce the risk of vulnerability to floods, attributable to changes in land use. Government may also initiate steps for an integrated and comprehensive legislation and a land use policy.

The Government needs to prioritise speedy resolution of the issues relating to removal of unauthorised constructions from the construction free zone in Cheruthoni as also to ensure no new construction is allowed to come up in future within the demarcated zone. Adequacy of planned/ ongoing works under the comprehensive flood mitigation plan for safeguarding Cochin

International Airport Ltd. and its surrounding areas may be ensured and the pace of implementation is to be reviewed so that risk of loss to life and property in case of extreme rainfall/ flooding is minimised. Government may also prioritise works such as deepening of the leading channel upstream of Thottappally Spillway and timely breaking of developing sand bar, if any, at the sea mouth so as to ensure unhindered flow of flood waters to the sea, even while ensuring compliance with extant environment related instructions. A system of periodic monitoring of status of works of immediate nature funded by State Disaster Response Fund may be followed to ensure that works sanctioned are completed on priority basis.



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**Thiruvananthapuram,**  
**The 05 October 2021**

**Countersigned**



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**New Delhi,**  
**The 12 October 2021**