## TABLE OF CONTENTS

Para No.	Description	Page No.		
	Preface	v		
	Executive Summary	vii		
Chapter I - Introduction				
1.1	Organisational set-up for flood control	1		
1.2	Audit Objectives	3		
1.3	Audit Criteria	3		
1.4	Audit scope and methodology	4		
1.5	Acknowledgement	5		
Chapter II - Planning and Capacity Building				
Planning				
2.1	Inadequate provision for flood management in the State Water Policy	7		
2.2	Non-preparation of State level Master Plan for water resources development and management	8		
2.3	Non-enactment of legislation to identify and demarcate Flood Plains in the State	10		
2.4	Flood Hazard Map not conforming to criteria	12		
Capacity Building in Disaster Management				
2.5	Implementation of Civil Defence in the State	14		
2.6	Revamping of Kerala Fire and Rescue Services Academy	20		
2.7	Non-functioning of Virtual Cadre for Disaster Management	22		
Chapter III - Flood forecasting and reservoir operation				
3.1	Adequacy of rain gauges in Periyar basin	25		
3.2	Adequacy of flow gauge density in Periyar Basin	28		
3.3	Flood Forecasting Stations not set up in the State	28		

Para No.	Description	Page No.		
3.4	Non-completion of a project intended for obtaining data required for flood management	29		
3.5	Inadequacies of State Emergency Operations Centre	31		
Reservoir operation				
3.6	Assessment of impact of dam spillage on flooding in downstream areas	43		
3.7	Siltation of reservoirs and reduction in storage capacity	52		
Chapter IV - Impact of change in Land Use and Land Cover				
4.1	Result of LULC study in the Periyar basin	55		
4.2	Illegal constructions on Cheruthoni riverbed in Idukki district	58		
4.3	Diversion canal for Chengalthodu inadequate to prevent inundation	60		
4.4	Obstruction to flood discharge through Thottappally Spillway	63		
Chapter V - Financial management and survey				
Financial management				
1 111411				
5.1	Management of the State Disaster Mitigation Fund	67		
	Management of the State Disaster Mitigation Fund  Execution of immediate restoration activities in post flood scenario	67 73		
5.1				
5.1	Execution of immediate restoration activities in post flood scenario			
5.1 5.2 <b>Result</b>	Execution of immediate restoration activities in post flood scenario  s of survey	73		
5.1 5.2 <b>Result</b> 5.3	Execution of immediate restoration activities in post flood scenario  s of survey  Pre-flood preparedness	73		
5.1 5.2 <b>Result</b> 5.3 5.4	Execution of immediate restoration activities in post flood scenario  s of survey  Pre-flood preparedness  Flood Management - Operational phase	73 76 76		
5.1 5.2 <b>Result</b> 5.3 5.4	Execution of immediate restoration activities in post flood scenario  s of survey  Pre-flood preparedness  Flood Management - Operational phase  Post flood review	73 76 76		

	Appendices	
Appendix 1.1:	Statement showing list of institutions covered by Audit	87
Appendix 2.1:	Details of encroachment of water bodies noticed in the test-checked districts and status of action taken by Departments	88
Appendix 2.2:	Statement showing shortage of equipment, vehicles and infrastructural facilities in Kerala Fire and Rescue Services Academy	90
Appendix 3.1:	Salient features of Mullaperiyar, Idukki, Idamalayar, Lower Periyar dams and Bhoothathankettu barrage	92
Appendix 3.2:	Rule curve framed in 1983 for Idukki dam	93
Appendix 3.3:	Rule curve framed in 2020 for Idukki and Idamalayar dams	94
Appendix 3.4:	Procedure followed for conduct of simulations of reservoir operations using rule curves	95
Appendix 3.5:	Sample simulations of Idukki reservoir using 1983 rule curve	96
Appendix 3.6:	Sample simulations of Idukki reservoir using 2020 rule curve	100
Appendix 3.7:	Sample simulations of Idamalayar reservoir using 2020 rule curve	105
Appendix 4.1:	LULC analysis for Idukki district	110
Appendix 4.2:	LULC analysis for Ernakulam district	111
Appendix 4.3:	LULC analysis for flood prone region of Ernakulam district	112
Appendix 5.1:	Statement showing name of LSGI, Taluk and number of respondents covered by Audit in selected districts while conducting survey of affected persons	113