F. No. Z-24011/43/2023-FM Section-MoWR
Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
(Flood Management Wing)
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8th Floor, Block-11, CGO Complex,
Lodhi road, New Delhi-110003.
Dated : 22nd November, 2024

OFFICE ORDER

Subject: Nomination of Department of Water Resources, RD &GR officials for the one-day National Workshop on Integrated Flood Risk Management to be held on 26.11.2024- reg.

Department of Water Resources, River Development and Ganga Rejuvenation along with CWC is organizing a **one-day national workshop on Integrated Flood Risk Management at the auditorium, MSDME, New Moti Bagh, New Delhi on 26.11.2024** with the concerned stakeholders from the Central Government, State/UT Government, National Institutions, Dam authorities etc. Following officers of Department of Water Resources, RD &GR are nominated to attend the said workshop:

1. Smt. Debashree Mukherjee, Secretary (WR,RD &GR)
2. Shri Rakesh Kumar Verma, Addl. Secretary and Chairman (CWC)
3. Shri Subodh Yadav, Addl. Secretary (Admin & GW), DoWR,RD &GR
4. Shri Rajeev Kumar Mittal, Director General, NMCG
5. Shri Anand Mohan, JS (RD&PP), DoWR,RD &GR
6. Shri Pradeep Kumar Agarwal, JS (NRCD), DoWR,RD &GR
7. Shri Sharad Chandra, Commissioner, FM, DoWR,RD &GR
8. Shri Praveen Kumar, Commissioner, SPR, DoWR,RD &GR
9. Shri S.K.Sinha, Commissioner, B&B, DoWR,RD &GR, DoWR,RD &GR
10. Shri Anuj Kanwal, Commissioner (CADWM & BWUE), DoWR,RD &GR
11. Shri Darpan Talwar, Commissioner (Indus), DoWR,RD &GR
12. Shri Rajesh Kumar, Sr. Joint Commissioner-II, FM, DoWR,RD &GR
13. Shri O.P. Gupta, Sr. Joint Commissioner, PP, DoWR,RD &GR
14. Shri Manoj Kumar, Sr. Joint Commissioner-IV, FM, DoWR,RD &GR
15. Shri Asish Banerjee, SJC-I, NHP, DoWR,RD &GR

2. Detailed Program of the Workshop is enclosed herewith.

3. This issues with the approval of Secretary (WR, RD &GR)

Encl : As above

(Shyam Sunder)
Under Secretary to the Government of India
Email: er-mowr@nic.in

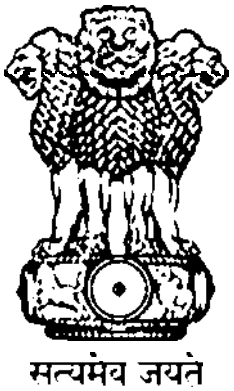
Copy to:

1.Officers concerned
2.Chief Engineer, P&D, CWC, R.K. Puram, New Delhi.
3.PPS to Secretary (WR, RD &GR)
4.PPS to Chairman, CWC, R.K.Puram, New Delhi.

National Workshop

on

Integrated Flood Risk Management



Kaushal Bhawan, New Moti Bagh

New Delhi

November 26, 2024

Department of WR, RD and GR

Ministry of Jal Shakti

National Workshop
on
Integrated Flood Risk Management

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National Workshop

on

Integrated Flood Risk Management

1. Introduction

1.1. Floods – a recurring natural calamity with huge losses

Floods are a natural calamity that India faces almost every year, in varying degrees of magnitude. India suffers huge economic losses annually, besides precious human lives due to floods. As per data compiled by Central Water Commission from 1953 to 2022, the average annual loss due to floods is given in the table below:

Average annual losses due to floods in the country	
Area affected	7.33 Mha
Population affected	32.35 million
Human lives lost	1,670 nos.
Cattle life lost	97568
Number of houses damaged	1.19 million
Economic losses in monetary terms	₹7267 Crore ₹18326 crore – cost indexed value
Area affected	7.33 Mha
Cropped area affected	4.27 Mha

1.2. Integrated Flood Risk Management

The Central Government has been supporting the States with policies, programs and schemes for flood control and management. Instead of fragmented and sporadic measures, flood risk management needs to be planned at the basin level.There is a need to follow a programmatic approach for Integrated Flood Risk Management with clearly defined goals, milestones and steps required, which should be tracked and monitored at the state and national level. The key measures include:

Key Measures for Integrated Flood Risk Management		
1	Master plans at basin and state level	Holistic plans for flood risk management at the State/ Basin level. Currently being done by GFCC and BB for Ganga and Brahmaputra Basin
2	Technology driven forecasting and decision support Systems	Non-structural measure, technology drivenEarly Flood Warning Systems, Flood Inundation Mapping and Integrated Reservoir Operations etc.

3	Flood Plain Zoning and Regulations	Non-structural measure,flood plain zoning is a method of flood management that regulates land use in flood plains to reduce flood damage
4	Sediment Management in Rivers and Reservoirs	Structural and non-structural measures for monitoring and managing sedimentation in rivers and reservoirs, catchment area treatment etc.
5	Flood Protection Works	Structural measures such as Dam, Barage, Weirs etc. to control the floods

1.3. National Workshop on Integrated Flood Risk Management

The Department of Water Resources, River Development and Ganga Rejuvenation along with CWC is organizing a one-day National Workshop on Integrated Flood Risk Management with relevant Stakeholders from the Central Government and all the States/ UTs. The national workshop will focus on:

(i) Implementation of Flood Plain Zoning and Regulations
(ii) Implementation of Sediment Management in reservoirs and river stretches
(iii) Implementation of Improved EFWS, Flood Inundation Mapping (FIP) and Real Time Integrated Reservoir Operations (IRO)

2. Flood Plain Zoning and Regulation (FPZR)

2.1. FPZR – A key tool for flood risk management

Flood plain zoning and regulation is a key tool for managing the flood risks. It has been advocated at the national level for few decades now. NGT has also passed certain directions towards implementation of Flood Plain Zoning. Central Water Commission has prepared draft technical guidelines for flood plain zoning, which have already been circulated to all the States/UTs for their suggestions. As a next step, the technical guidelines are to be finalized and a detailed plan of action for their implementation is to be prepared.

2.2. FPZR – Key Steps

There are several steps involved in flood plain zoning:

(i) To identify and prioritize the flood prone river stretches,
(ii) Take up flood frequency analysis of prioritized stretches, demarcation of flood zone for various period,

(iii) Mapping of infrastructure in the demarcated areas,
(iv) Draft regulations for the zone,
(v) Public notice and hearing the objections,
(vi) Finalization of flood plain zones and regulations,
(vii) Regulation and monitoring of the notified flood plain zones
(viii) Repeating the above steps for other priority stretches.

2.3. FPZR – Draft Model IWRM Bill

The Department of Water Resources has also circulated a draft Model Integrated Water Resources Management(IWRM) Bill, which provides for legal and institutional framework and process for flood plain zoning and regulation amongst other aspects of integrated water management.

3. Sediment Management in Rivers and Reservoirs (SMRR)

3.1. SMRR – A key challenge

Deposition and erosion of sediment along the length of river is a natural phenomenon. When underlying parameters of volume and velocities are disturbed, either due to lower gradient or encroachment in flood plain, widening of the channel, suspended silt particles in the river water settle down, this is called **siltation**. Sedimentation in reservoirs is the gradual buildup of sediment from a river into a reservoir. It is a natural geological process, but it can have negative environmental impacts, including increased flooding potential, and reduced reservoir storage space.

3.2. SMRR – National Framework

CWC has published a National Framework on Sediment Management in Nov 2022, which provides guidance on various aspects of sediment management. CWC has also carried out detailed survey and study of sedimentation in some of the important reservoirs. A study and modelling of sediment transport in seven river basin has been carried out under NHP apart from morphological studies of various rivers.

3.3. SMRR – Key Steps

There are several steps required for sediment management:

(i) Sediment analysis of various rivers and reservoirs,
(ii) Identify the priority reservoirs and river stretches,
(iii) Detailed study of prioritized reservoirs and river stretches to identify actionable reservoirs and river stretches including catchment areas;
(iv) Detailed project reports for the actionable projects
(v) Implementation of the projects

(vi) Monitoring of sediments post implementation

(vii) Repeating the above steps for next set of priority reservoirs and stretches

4. Technology driven EFWS, FIP andIRO

4.1. Early Flood Warning System (EFWS)

Central Water Commission carries out **Early Flood Warning System (EFWS)** through short range (upto 24 hors) flood forecasting and 7-day advisory flood forecasting. CWC is working to further strengthen, expand and modernize the Flood Forecastingbased on advancement in technology and support of the States/UTs. CWC is also working towards enhancing accuracy level of 7-day advisory through recalibration and revalidation and improved inputs from IMD weather forecasting and other national and international best practices. Early Flood Warning System (EFWS) have also been developed under NHP and the same are being rolled out across the States and Basins.

4.2. Flood Inundation Mapping

Central Government is also working towards**Flood Inundation Mapping (FIP),** which provides extent and depth of water in the surrounding areas in case of flooding. These 2D inundation maps are extremely useful both for public and disaster management authorities to take necessary steps for flood risk management. CWC is working with CDAC and NRSC for flood inundation mapping of Mahanadi basin, and Godavari & Tapi Basin respectively. EFWS with inundation forecast of Ganga Basin is also being developed by CWC. The developed solutions are being rolled out in the identified basins and further rolloutof flood inundation mapping in other basins of the country is being planned.

4.3. Near Real Time Integrated Reservoir Operations (IRO)

CWC is developing **nearReal Time Integrated Reservoir Operations (IRO)**, which can help in taking decisions to reduce downstream flood peak stage and store floodwaters for future use. It takes into account advance weather forecast, accurate flood forecasts, RTDAS, advanced computing tools including AI and ML and advance satellite communication. The model has been developed for 18 major reservoirs of Ganga Basin and is under final testing. IRO will thereafter be implemented in partnership with the States and National Dam Safety Authority. It is further proposed to undertake IRO study of another 7 river basins.

5. Detailed program

Detailed program of the workshop is as follows:

Session 1: Implementation of Flood Plain Zoning and Regulations 10 AM to 11:30 AM	
Effective flood plain zoning requires a holistic approach that harmonizes environmental considerations with urban development and community resilience. This session will provide an overview of the various facets of flood plain zoning including the draft technical guidelines by CWC, relevant provisions of draft Model IWRM Bill, the experience of demarcating flood plain zones in Ganga Basin.	
5 min	Welcome and Context Setting – AS/Chairman CWC
15 min	Overview of Flood Plain Zoning includingdraft guidelines for Flood Plain Zoning – Member (River Management), CWC
15 min	Key steps required for flood plain zoning including relevant provisions of Draft Integrated Water Resources Management Bill for flood plain zoning – Commissioner (FM), DoWR
15 min	Experience of Flood Plain Zoning from Haridwar to Unnao stretch of Ganga River – Government of UP/ UK
10 min	Overview of Master Plans for flood control and Flood Plain Zoning in Ganga Basin – GFCC
10 min	Overview of Master Plans for flood control and Flood Plain Zoning in Brahmaputra Basin – BB
10 min	Address by Secretary, WR, RD & GR
10 min	Open Discussion (Q&A)
Tea Break **11:30 AM – 12 Noon**	
Session 2: Deep Dive in Flood Plain Zoning **12 Noon – 1:30 PM**	
This session will deep dive in various aspects of flood plain zoning, detailed technical and regulatory aspects and experiences so far in this direction.The session will seek feedback from the state governments on the broader framework of implementation of flood plain zoning. Various challenges and constraints faced —spanning social, economic, political, and technical dimensions will be deliberated. The aspects of implementing FPZ in the river stretch with/without flood protection works will	

bediscussed. Additionally, we aim to identify potential action plans that can be adopted to address these challenges effectively.	
10 min	Technical Challenges in Flood Plain Zoning – CWC
10 min	Experience of Flood Plain Zoning in Urban Master Plan – CTP, DDA
10 min	Technical Support for Flood Plain Zoning demarcation – Director, NIH
10 min	Experience sharing by UP/ UKWater Resources Department
10 min	Experience Sharing by WB Water Resources Department
10 min	Experience Sharing by Bihar Water Resources Department
25 min	Open Discussion (Q&A) and interventions by the States
Lunch Break **1:30 PM – 2:30 PM**	
Session 3: Sediment Management in Rivers and Reservoirs **2:30 PM – 4:00 PM**	
This session will explore the causes and consequences of sedimentation in rivers and reservoirs, as well as strategies for effective sediment management. A National Framework for Sediment Management has been released by Ministry of Jal Shakti in October, 2022 to work as a broad framework for the States to make plans and policies for sediment management. The issues/ challenges faced by concerned States will be discussed.	
15 min	Framework for Sediment Management in Rivers and Reservoirs and Key Steps required by the States for Sediment Management – CE (P&D) CWC
15 min	Modelling of sediment transportation in seven basins under NHP
15 min	Presentation on preparing demonstrable projects in sediment management by International Centre of Excellence (IIT Roorkee)
15 min	Catchment Area Treatment – Experience of DVC
15 min	Experience of Sediment Management in Reservoirs – Rajasthan
15 min	Open Discussion (Q & A)
Tea Break	

4:00 PM – 4:15 PM	
Session 4: Technology for EFWS, FIP and IRO 4:15 PM to 5:15 PM	
Technology has revolutionized the way we approach early flood warning systems, flood inundation mapping, reservoir operations etc. Use of various tools and technologies like remote sensing, mathematical models etc. allow for the integration of diverse data sources—including topography, land use, and historical flood patterns—resulting in accurate flood risk assessments. Additionally, advanced modelling software can simulate flood scenarios, offering valuable insights for informed decision-making in flood management. The session will deliberate on technology and data driven flood forecasting systems, inundation mapping and integrated reservoir operations, which have been developed and are ready for implementation.	
15 min	Strengthening, Expanding and modernizing short range flood forecasting and improving the accuracy of 7- day advisory by CWC
15 min	Flood Inundation Mapping in Mahanadi Basin using Super Computer – CDAC
15 min	Near Real time Integrated Reservoir Operations (IRO) in Ganga Basin – CWC
15 min	Open Discussion (Q&A) followed by concluding remarks