

Five-Day Faculty Development Programme (FDP)

on

“HYDROMETEOROLOGICAL DISASTER RISK REDUCTION”



Tentative Dates:
21–25 September, 2026



Duration:
5 Days



Venue: NIDM Vijayawada, Andhra Pradesh



NATIONAL INSTITUTE OF DISASTER MANAGEMENT

Ministry of Home Affairs, Government of India

1. Background and Rationale

India is among the countries most vulnerable to hydrometeorological hazards, including floods, flash floods, urban flooding, tropical cyclones, storm surges, cloudbursts, glacial lake outburst floods (GLOFs), heat waves, cold waves, droughts, lightning, and thunderstorms. The frequency, intensity, and complexity of these hazards have increased significantly in recent decades due to climate change, environmental degradation, rapid urbanization, and changing land-use patterns. With its monsoon-dependent economy, extensive coastline, fragile Himalayan ecosystem, and rapidly expanding urban centres, India continues to face substantial risks from hydrometeorological disasters that result in significant loss of life, livelihoods, infrastructure, and ecosystems.

The global policy landscape, including the **Sendai Framework for Disaster Risk Reduction (2015–2030)**, the **2030 Agenda for Sustainable Development**, the **Paris Agreement**, and the **Early Warnings for All (EW4All)** initiative, underscores the importance of understanding hydrometeorological risks, strengthening early warning systems, and integrating disaster risk reduction into development planning. These international commitments, together with India's Disaster Management Act, 2005, call for strengthening institutional capacities and promoting science-based approaches for disaster risk reduction and climate resilience.

Faculty members and academic institutions play a pivotal role in developing the next generation of disaster management professionals, planners, engineers, administrators, and researchers. However, despite significant advancements in hydrometeorological science, forecasting technologies, geospatial applications, and climate modelling, a considerable gap persists between scientific knowledge and its effective integration into higher education, research, and professional practice. Many faculty members have limited exposure to practical tools such as GIS-based hazard mapping, flood inundation modelling, vulnerability assessment, multi-hazard early warning systems, and simulation-based learning approaches.

Recognising these emerging challenges and the critical role of academia in building disaster-resilient communities, the National Institute of Disaster Management (NIDM) is organizing a **Five-Day Faculty Development Programme (FDP) on "Hydrometeorological Disaster Risk Reduction."** The programme is designed to strengthen the knowledge, technical competencies, and teaching capacities of faculty members through a combination of expert lectures, practical exercises, case studies, simulations, and interactive discussions. By bridging the gap between scientific advancements and classroom instruction, the programme aims to enable participants to effectively integrate hydrometeorological disaster risk reduction into teaching, research, and institutional practices, thereby contributing to a more resilient and climate-informed society.

2. Aim of the Programme

The programme aims to strengthen the knowledge, technical competencies, and pedagogical capacities of faculty members and researchers on hydrometeorological disaster risk reduction by enhancing their understanding of hazard science, climate change, risk assessment, early warning systems, geospatial technologies, and disaster resilience. The programme also seeks to promote the integration of disaster risk reduction principles into higher education, research, and institutional practices through practical, evidence-based learning approaches.

3. Objectives of the Programme

The specific objectives of the programme are to:

- Familiarize participants with the concepts of hydrometeorological hazards, vulnerability, exposure, risk, and resilience.

- Enhance understanding of the Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals (SDGs), Paris Agreement, and India's institutional and legal framework for disaster management.
- Develop practical competencies in hazard mapping, flood inundation modelling, vulnerability assessment, and multi-hazard early warning systems using geospatial technologies.
- Strengthen participants' capacity to integrate hydrometeorological disaster risk reduction concepts, case studies, and practical modules into teaching, research, and student mentoring.
- Promote the application of climate-resilient approaches, nature-based solutions, community-based disaster risk reduction, and inclusive risk governance.
- Facilitate networking among faculty members, researchers, and disaster management professionals for continued knowledge exchange through the NIDM and IUIN-DRR platform.

4. Target Participants

The programme is primarily intended for faculty members, researchers, and academicians from universities, colleges, engineering and planning institutions, Administrative Training Institutes (ATIs), and other training academies involved in teaching or research related to disaster management, environmental science, geography, civil and water resources engineering, urban planning, public administration, climate change, and allied disciplines. Mid-career government officials engaged in disaster management training may also participate, subject to the availability of seats.

Suggested batch size: 50–60 participants.

5. Programme Structure and Key Themes

The five-day Faculty Development Programme will be delivered through expert lectures, practical demonstrations, computer laboratory sessions, case studies, group discussions, simulation exercises, participant presentations, and experience-sharing sessions. The major thematic areas include:

- Concepts of hazard, vulnerability, exposure, risk and resilience specific to hydrometeorological hazards
- Global frameworks: Sendai Framework for DRR (2015–2030), 2030 Agenda for SDGs, Paris Agreement, Early Warnings for All
- Climate change science and the amplification of hydrometeorological extremes
- Floods, flash floods and urban flooding — hydrology, forecasting and management
- Tropical cyclones, storm surge and coastal risk management
- Himalayan hydromet hazards: cloudbursts, flash floods and Glacial Lake Outburst Floods (GLOFs)
- Droughts, heat waves and cold waves
- Multi-hazard early warning systems (MHEWS) — the four pillars and last-mile risk communication
- Geospatial technology (GIS/Remote Sensing) applications for hazard mapping — practical
- Flood forecasting and inundation modelling — practical
- Disaster management planning, climate-resilient infrastructure and nature-based solutions
- Simulation/tabletop exercise on emergency response and the Incident Response System (IRS)

- Community-based DRR, gender and social inclusion in hydromet risk management
- Disaster risk financing and insurance for hydrometeorological extremes
- Disaster–development nexus and mainstreaming DRR into curricula and institutional practice

6. Andragogy (Training Methodology)

In keeping with adult-learning principles, the programme will use a mix of methods that build on participants' prior professional experience, encourage active engagement, and balance conceptual learning with applied skill-building:

- Interactive lecture-cum-discussion sessions by domain experts
- Case-study analysis of recent hydrometeorological disaster events
- Hands-on computer-laboratory practicals (GIS/remote sensing hazard mapping; flood/inundation modelling)
- Structured group exercises and participatory risk-mapping
- Tabletop simulation / mock exercise on emergency response
- Panel discussions and open forums
- Participant group presentations with peer and expert feedback
- Daily reflection and a concluding “way-forward” session for curriculum integration planning

7. Expected Learning Outcomes

At the end of the programme, participants will be able to:

- Understand the scientific basis of hydrometeorological hazards and disaster risk.
- Apply concepts of vulnerability, exposure, hazard mapping, and risk assessment in academic and professional settings.
- Demonstrate familiarity with GIS applications, flood inundation modelling, and multi-hazard early warning systems.
- Integrate climate change adaptation and disaster risk reduction principles into teaching, research, and institutional practices.
- Develop curriculum components, practical exercises, and outreach activities related to hydrometeorological disaster risk reduction.
- Strengthen collaboration with NIDM and the IUIN-DRR network for continued academic engagement and knowledge sharing.

Language: English/Hindi (bilingual delivery as required).

8. Certification

Participants who attend at least **75% of the programme sessions** and successfully complete the prescribed practical exercise components will be awarded a **Certificate of Participation** by the **National Institute of Disaster Management (NIDM)**.

Organizing Institution



The National Institute of Disaster Management (NIDM), an institute under the Ministry of Home Affairs, Government of India, was constituted under the Disaster Management Act, 2005 as the apex institution for training, capacity building, research, documentation, and policy advocacy in disaster management. With a vision of building a Disaster Resilient India, NIDM works closely with Central and State Governments, academic institutions, technical organizations, and international agencies to strengthen disaster risk

reduction capacities across sectors. The Institute conducts face-to-face, online, and blended training programmes, supported by state-of-the-art training infrastructure, modern classrooms, video conferencing facilities, and a specialized disaster management library. Through its multidisciplinary expertise and strategic partnerships, NIDM plays a leading role in promoting a culture of prevention, preparedness, and resilience in India and the region.

Organizing Team

Patron		Shri Madhup Vyas, IAS, Executive Director, NIDM
Co-Patron		Col. P.S Reddy, Joint Director, NIDM-Vijayawada
Course Coordinator(s)		Dr. Navneet Kumar, Professor, NIDM (navneet.nidm@nic.in)
Co- Course Coordinator(s)		Dr. G. China Satyanarayana, Associate Professor, NIDM
Program Team	1. Dr. Gunda Goutham Krishna Teja, Consultant (Training), NIDM 2. Shri Pradeep Goud, Junior Consultant (Training), NIDM 3. Smt. Nazia Shaik - Junior Consultant (Training), NIDM 4. Shri Thakur Deobardhan Kinwar, Librarian, NIDM 5. Shri U Venkatesh, Training Assistant 6. Shri Sumon, D.E.O 7. Smt. Harika, D.E.O	

TENTATIVE PROGRAMME SCHEDULE

DAY 1 —Foundations of Hydrometeorological Risk Science, Climate Change and Policy				
Time	S No.	Session Name / Topic	Andragogy	Resource Person(s)
09:00 – 09:30	–	Registration & Reporting	Registration	Programme Coordination Team
09:30 – 10:00		Inaugural Session — Welcome Address, About the Programme, Inaugural Address, Vote of Thanks	Formal Address / Panel	Executive Director, NIDM Team
10:00 – 10:20	Group Photo and Tea Break			
10:00 – 10:45	S0	Ice-Breaking Exercise and Pre-Training Assessment	Interaction & Group Activity	Shri Manjeet Singh, Asst. Prof., NIDM
10:45 – 12:00	S1	Understanding Hydrometeorological Hazards and Disaster Risk, DM Cycle and Institutional Frameworks	Lecture-cum-Discussion	Dr Navneet Kumar, Professor, NIDM
12:00 – 13:30	S2	Climate Change and Hydro-Meteorological Risk: Changing climate, extreme weather events, cascading disasters and Climate data sources	Lecture-cum-Discussion	Dr Navneet Kumar, Professor, NIDM
13:30 – 14:30	Lunch Break			
14:30 – 15:30	S3	Hazard Risk Vulnerability Capacity (HRVC): Concepts	Lecture-cum-Discussion	Shri Amarjeet Kumar, Asst. Prof., NIDM
15:30 – 15:45	Tea Break			
15:45 – 17:30	S4	Hazard Risk Vulnerability Capacity (HRVC) Analysis: Tools & Techniques	Practical Exercise	Shri Manjeet Singh, Asst. Prof., NIDM
DAY 2 — Advances in Geospatial Technologies, Early Warning Systems, and Flood Risk Assessment				
09:30 – 11:00	S5	Geospatial technologies, machine learning and AI approaches in DRR and Multi-Hazard Early Warning Systems	Lecture-cum-Discussion	Dr Navneet Kumar, Prof., NIDM
11:00 – 11:15	Tea Break			
11:15 – 12:45	S6	Floods in a Changing World: Understanding Risk and Building Resilience	Lecture-cum-Discussion	Dr. Mohit Mohanty, Assoc. Prof., IIT Roorkee

12:30 – 13:30	Lunch Break			
13:30 – 15:15	S7	Flood Inundation Modelling: A Practical Approach to Understanding Flood Risk	Practical session	Dr. Mohit Mohanty, Assoc. Prof., IIT Roorkee
15:15 – 15:30	Tea Break			
15:30 – 16:30	S8	Flood Inundation Modelling: A Practical Approach to Understanding Flood Risk (continued)	Practical session	Dr. Mohit Mohanty, Assoc. Prof., IIT Roorkee
16:30 – 17:30	S9	Meteorological Observations and Hazard Monitoring and Weather Forecasting Systems and Numerical Weather Prediction	Lecture-cum-Discussion	Dr G. China Satyanarayana, Associate Professor, NIDM
DAY 3 — Drought and Cyclones				
09:30 – 11:00	S10	Drought: Identification, Analysis, Types, Risk Assessment, and Management	Lecture-cum-Discussion	Dr G. China Satyanarayana, Associate Professor, NIDM
11:00 – 11:15	Tea Break			
11:15 – 13:00	S11	Hands-on computation of Drought Indices	Practical session	Dr G. China Satyanarayana, Associate Professor, NIDM
13:00 – 14:00	Lunch Break			
14:00 – 15:00	S12	Tropical Cyclones and Storm Surge: Forecasting, Warning and Coastal Risk Management	Lecture-cum-discussion Exercise	Dr Komali Kantamaneni, University of Lancashire, United Kingdom (ONLINE)
15:00 – 15:15	Tea Break			
15:15 – 17:00	S13	Floods and Cyclone Emergency Response and Incident Response System (IRS)	Field Visit	NDRF
DAY 4 - Integrated Approaches to Disaster Risk Reduction and Environmental Resilience				
09:30 – 11:00	S14	Potential of Spaceborne Polarimetric and Interferometric SAR for Disaster Mapping Monitoring and Impact Assessment	Lecture-cum-discussion	Dr. Shashi Kumar, Scientist/Engineer-SF, IIRS, ISRO
11:00 – 11:15	Tea Break			

11:15 – 13:00	S15	Applications of SAR Data for Disaster Mapping, Monitoring and Impact Assessment Through Case Studies and Scientific Insights	Lecture-cum-Case Study	Dr. Shashi Kumar, Scientist/Engineer-SF, IIRS, ISRO
13:00 – 14:00	Lunch Break			
14:00 – 15:30	S16	Hands-on SAR Data Analysis for Disaster Mapping and Monitoring Using PolSAR and InSAR	Practical	Dr. Shashi Kumar, Scientist/Engineer-SF, IIRS, ISRO
15:30 – 15:45	Tea Break			
15:45 – 17:15	S17	Community-Based DRR, Gender and Social Inclusion – Case-study and problem-based teaching methods/design	Practical	Shri Amarjeet Kumar, Asst. Prof., NIDM
DAY 5 — Cross-Cutting Themes, Consolidation and Valedictory				
09:30 – 11:00	S18	Teaching Innovations for DRR: Problem-Based and Simulation-Based Learning, Gamification, digital classrooms and assessment design for DRR courses.	Lecture-cum-Discussion	Dr. Reshma Talari, Assistant Professor, NIT Andhra Pradesh
11:00 – 11:15	Tea Break			
11:15 – 12:45	S19	Disaster risk financing and insurance for hydrometeorological extremes	Case studies and panel discussion	Shri Amarjeet Kumar, Asst. Prof., NIDM
12:45 – 13:45	Lunch Break			
13:45 – 15:15	S20	Group Presentations: Practical Exercise Outcomes (Flood and Drought risk assessment, Gamification of DRR, DRR Research proposal development)	Participant Presentations & Peer Feedback	Dr Navneet Kumar, Professor, NIDM & Faculty Panel, NIDM
15:15 – 15:30	Tea Break			
15:30 – 16:30	S21	Way Forward: Integrating Hydromet DRR into Curricula and Institutional Practice; Academia–Government–Industry Collaboration; Participant Feedback	Open Forum / Facilitated Discussion	Dr Navneet Kumar, Professor, NIDM
16:30 – 17:30		Valedictory Session — Feedback, Certificate Distribution, Vote of Thanks	Formal Session	Joint Director / Designated Patron, NIDM team