

## **Concept Note: 2-Day Residential Training on 'Cyclone Risk Mitigation and Management'**

**Dates:** 29-30 May, 2026

**Venue:** Gujarat Institute of Disaster Management (GIDM)

### **1. BACKGROUND**

Tropical cyclones are among the most destructive natural hazards, posing substantial threats to life, property, and livelihoods. These systems form over warm tropical oceans and are characterized by a low-pressure center surrounded by intense winds and spiralling clouds. Although typically spanning 200 to 500 kilometers in diameter, some cyclones can stretch up to 1000 kilometers.

Even in their formative stages, cyclones bring multiple hazards—storm surges, high-speed winds, torrential rain, inland flooding, tornadoes, and lightning—each of which can be individually catastrophic. When these hazards converge, the damage potential magnifies exponentially.

The Indian subcontinent, with its extensive 8,041-kilometer coastline, is highly vulnerable—accounting for nearly 10% of the world's tropical cyclones. While the Bay of Bengal has historically seen higher cyclone activity, recent patterns show a notable increase in high-intensity cyclones over the Arabian Sea. Between 1998 and 2018, five "extremely severe" cyclones were recorded. According to the IPCC's 2019 special report, climate change is accelerating this trend—tripling the frequency of severe cyclones over the Arabian Sea.

### **2. CYCLONE VULNERABILITY IN GUJARAT**

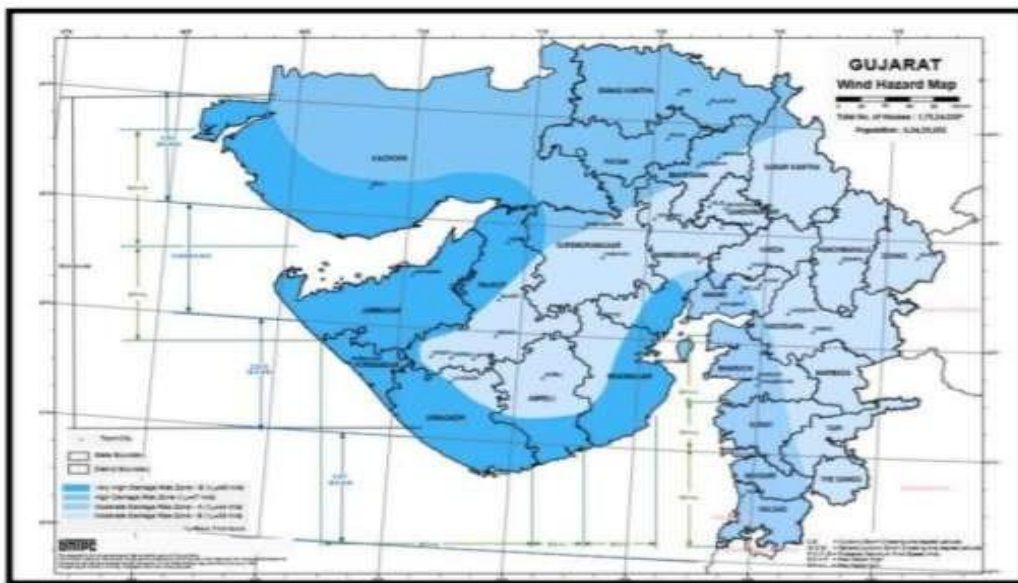
Over the years, Gujarat has experienced several significant cyclone events. The 1998 Gujarat cyclone stands out as one of the most catastrophic in Indian history, causing the deaths of at least 10,000 people, predominantly in Gujarat. In 2021, the extremely severe cyclonic storm Tauktae emerged as a tropical depression off the coast of Kerala and made landfall in the Saurashtra region, between Diu and Una. Tauktae was the strongest cyclone to hit Gujarat since the 1998 disaster.

Gujarat typically experiences cyclone season in the months of May and June, during the onset of the monsoon. A vulnerability profile report of Gujarat State has identified that specific areas are at high risk of cyclones. The coastal regions from Bhavnagar to Navsari are particularly susceptible. During the 2023 Cyclone Biparjoy, it significantly affected the coastal areas of Gujarat, particularly the regions already identified as high-risk zones.

The Arabian Sea is experiencing a significant and accelerated rate of warming compared to

the Bay of Bengal. This trend has been attributed to various factors, including global climate change and regional variations in sea surface temperatures. As the Arabian Sea warms, it provides more energy and moisture to the atmosphere, creating conditions that are increasingly favorable for the formation and intensification of tropical storms and cyclones. Historical data and recent climate models indicate that the region could see more frequent and powerful cyclones, similar to Cyclone Biparjoy, in the coming years. This increase poses significant risks to coastal and inland areas, which may experience more frequent and severe weather events.

**Figure 1: Image showing Wind/Cyclone Hazard Map of Gujarat**



Given its vulnerability to climate change and the increasing threat of extreme weather events, Gujarat must prioritize the climate-proofing of its critical infrastructure, industry, and communities. Key strategies should include conducting regular district-level climate risk assessments and establishing a unified emergency response framework to manage the compounded impacts of such events and support recovery and reconstruction efforts.

Cyclone Biparjoy serves as a recent reminder of the growing impact of the climate crisis, emphasizing the need for Gujarat to remain vigilant in building climate resilience, particularly at the local and regional levels. This includes:

- **Investing in Nature-Based Resilient Infrastructure:** Implementing cost-effective, nature-based solutions to enhance infrastructure resilience.
- **Building Decentralized Response Capacity:** Strengthening local capacities to respond to climate shocks effectively.
- **Designing Public Information Campaigns:** Developing effective public information campaigns to prepare vulnerable communities against climate risks.

By focusing on these strategies, Gujarat can better safeguard its population and economy from the adverse effects of climate change.

### 3. OBJECTIVES

The objectives of the proposed training programme are:

- To strengthen participants' understanding of cyclone hazard, risk assessment approaches, and evolving cyclone patterns, enabling informed and risk-sensitive decision-making.
- To develop capacity for planning and implementing cyclone risk mitigation and management strategies at the local level, with a focus on reducing vulnerability in coastal and high-risk regions.
- To enhance inter-departmental coordination and clarify the roles of key stakeholders in preparedness, mitigation, response, and recovery phases of cyclonic disasters.
- To critically examine existing cyclone risk management practices, identifying gaps, challenges, and opportunities for improvement across sectors.
- To build knowledge on structural and non-structural mitigation measures, including resilient infrastructure, ecosystem-based approaches, early warning systems, and community-based preparedness.

### 4. TARGET PARTICIPANTS

Sr. No.	Departments/Organizations
1.	<b>Agriculture and Co-operation Department</b>
2.	<b>Revenue Department</b> • GSDMA
3.	<b>Food and Civil Supplies Department</b>
4.	<b>Forest and Environment Department</b>
5.	<b>Home Department</b>
6.	<b>Narmada, Water Resources, Water Supply &amp; Kalpsar Department</b>
7.	<b>Port &amp; Transport Department</b>
8.	<b>Health &amp; Family Welfare Department</b>
9.	<b>Roads &amp; Building Department</b>
10.	<b>Education Department</b>

### 5. PEDAGOGY

The training adopts an interactive, participant-centered approach that blends theory with practice to ensure comprehensive learning. The pedagogical strategies include:

- **Expert-Led Lectures:** Delivered by senior experts and practitioners to provide foundational and advanced insights into cyclone science and management practices.
- **Case Study Discussions:** Real-life examples such as Cyclones Vayu, Tauktae, and Biparjoy will be examined to extract practical lessons and best practices.

- **Hands-On Activities:** Scenario-based exercises and simulations to strengthen decision-making, coordination, and evacuation planning.
- **Exposure Visit:** A site visit to the India Meteorological Department (IMD), Ahmedabad, to understand early warning systems and forecasting mechanisms in action.
- **Collaborative Group Work:** Group activities designed to foster peer learning, shared problem-solving, and cross-departmental collaboration.
- **Assessments & Reflection:** Pre- and post-tests to assess learning outcomes, and feedback sessions to encourage participant reflection and training improvement.

\*\*\*\*\*