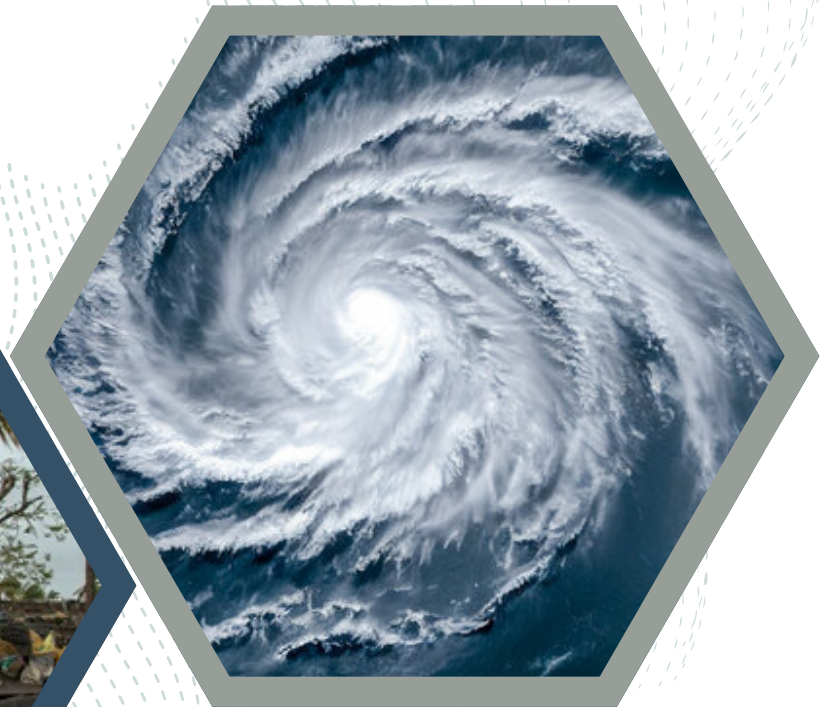


A 2-DAY RESIDENTIAL TRAINING PROGRAMME ON 'CYCLONE RISK MANAGEMENT'

Date:

12th to 13th June, 2024



Gujarat Institute of Disaster Management
Behind Pandit Deendayal Energy University, Raisan
Village, Gandhinagar, Gujarat, India - 382007

1. BACKGROUND

Tropical cyclones are extremely destructive natural events that pose significant threats to both life and property. These rapidly rotating storms form over tropical oceans, drawing energy from the warm waters. Each system features a low-pressure center surrounded by spiraling clouds, with the eye wall encircling the calm 'eye' at the center. Typically, tropical cyclones have diameters ranging from 200 to 500 kilometers, but they can extend up to 1000 kilometers.

Even in their early development stages, tropical cyclones can cause extensive damage. They bring multiple hazards, including storm surges, flooding, extreme winds, tornadoes, and lightning. Each of these hazards alone can be highly destructive, but when combined, they significantly increase the risk of loss of life and damage to infrastructure and property. The Indian subcontinent is one of the most cyclone-affected regions globally, with a coastline of 8,041 kilometers exposed to nearly 10% of the world's tropical cyclones. On average, five to six tropical cyclones form annually in this region, with two or three potentially being severe. While the Bay of Bengal has historically experienced more cyclones than the Arabian Sea, recent years have seen an increase in intense tropical cyclones over the Arabian Sea.

From 1998 to 2018, the region experienced five extremely severe cyclones. According to a 2019 special report by the UN Intergovernmental Panel on Climate Change (IPCC), the Arabian Sea is increasingly responding to climate change signals, with the frequency of severe cyclones tripling in recent years. The report also highlights that the intensity of tropical cyclones in the area is reaching unprecedented levels.

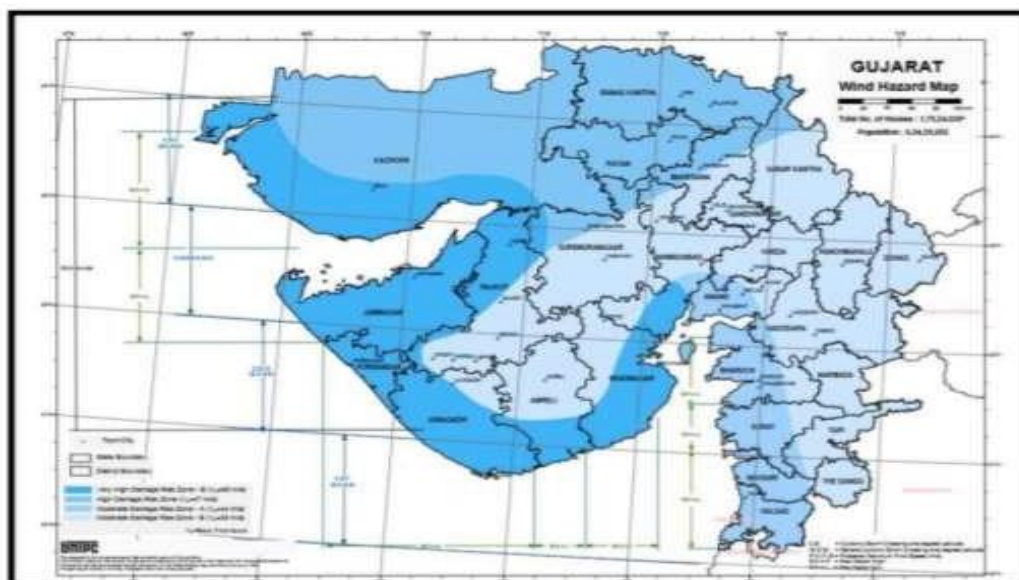
2. CYCLONE VULNERABILITY IN GUJARAT

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 as follows:

- To increase the participants' understanding and awareness of how to assess cyclone hazards effectively.
- To formulate strategies to manage cyclone risks at the local level, aiming to reduce the vulnerability of coastal communities.
- To highlight the vital role of diverse stakeholders across multiple departments in mitigating disaster risks during cyclonic events.
- To identify the existing gaps and challenges in current cyclone risk management practices.
- To gain insights into both structural and non-structural mitigation measures for cyclone-prone areas.

4. TARGET PARTICIPANTS

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