

URBAN FLOOD RISK MANAGEMENT AND RESILIENCE IN GUJARAT

Organized by: Gujarat Institute of Disaster Management

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1. Background and Rationale

Urban flooding is emerging as one of the most significant and complex disaster risks confronting Gujarat's rapidly growing cities. The issue is no longer limited to occasional waterlogging following exceptionally heavy rainfall. Urban flood risk is increasingly shaped by the interaction of short-duration intense rainfall, rapid urbanisation, expansion of impervious surfaces, inadequate or ageing drainage infrastructure, obstruction or alteration of natural drainage channels, loss of water-retention areas, solid-waste accumulation and the location of people and critical infrastructure in low-lying and flood-prone areas. In riverine and coastal cities, these pressures are further influenced by river flows, reservoir operations, creeks, tides and coastal processes.

Gujarat's geographical and urban characteristics make this challenge particularly important. Major urban centres such as Ahmedabad, Surat, Vadodara and Bharuch along with several rapidly growing municipalities, have experienced recurrent flooding and waterlogging. However, the nature of the hazard varies between cities. Ahmedabad faces predominantly pluvial and drainage-related flooding; Vadodara is exposed to the interaction of intense rainfall, the Vishwamitri river system and upstream reservoirs; while Surat faces a more complex combination of pluvial, riverine, creek and tidal influences, with the Tapi basin and upstream Ukai reservoir adding an important catchment-scale dimension. GSDMA's flood vulnerability assessment of Ahmedabad, Vadodara and Surat has highlighted the need for city-level structural and non-structural measures, improved stormwater drainage, flood-risk reduction and integration of flood-risk information with urban planning.

The experience of Surat in July 2026 provides a recent illustration of the scale and complexity of the challenge. On 7–8 July 2026, Surat experienced exceptionally intense rainfall, with 358 mm recorded in 24 hours, according to the State Emergency Operations Centre. The rainfall resulted in widespread waterlogging and flooding in several low-lying and creek-connected areas. Thousands of people had to be evacuated or rescued, while roads, mobility, schools and normal economic activity were significantly disrupted. The event highlighted how extreme rainfall, urban drainage capacity, creek levels, low-lying settlements and emergency access can interact within a short period and create widespread disruption.

The Surat experience also shows why urban flooding cannot be addressed through drainage augmentation or emergency response alone. Flood risk is generated across the wider urban catchment. Rainfall falling upstream, changes in land use, reduction in natural storage, constriction of drainage corridors, inadequate maintenance of stormwater infrastructure, development in low-lying areas and the capacity of downstream receiving systems can all influence the depth, duration and extent of flooding. Effective urban flood management therefore requires coordination among urban planning, stormwater engineering, water resources,

disaster management, sanitation, road infrastructure, environment and public health authorities.

The challenge is further complicated by climate change and increasing climate variability, which add uncertainty to urban flood management. Changes in the intensity, timing and spatial distribution of rainfall can make flood events more difficult to predict and manage, particularly in rapidly urbanising areas where drainage capacity, land-use patterns and natural water-retention systems are already under pressure. Urban flood planning and infrastructure therefore need to account for changing climate conditions rather than relying solely on historical rainfall and flood patterns.

Climate change does not mean that every flood event can be directly attributed to climate change. Rather, it introduces additional uncertainty into the rainfall and hydrological conditions for which urban infrastructure was historically designed. For cities, this creates an important planning challenge: drainage systems, culverts, pumping stations, roads, underpasses, development controls and emergency plans based mainly on historical conditions may not adequately reflect future risk. Urban flood management therefore needs to move from a predominantly reactive approach towards risk-informed, climate-resilient and anticipatory planning.

Gujarat already has important institutional and technical experience on which to build. Surat has developed an integrated flood early-warning approach involving upstream hydrological information, reservoir operations, flood modelling, monitoring and dissemination. This provides an important example of how scientific information can support timely warnings and decisions. Similarly, recurrent flooding of Vadodara associated with the Vishwamitri system demonstrates the importance of considering the river, upstream reservoirs, urban drainage, bridges, floodplains and settlements as one interconnected system rather than treating individual drainage components in isolation.

At the city level, there is also a need to strengthen the ability of municipal and planning authorities to interpret and use flood-risk information. Flood hazard maps, drainage master plans, rainfall analyses, digital elevation models, flood forecasts, GIS layers and engineering reports are increasingly available. Their value, however, depends on whether decision-makers can understand their assumptions and limitations and translate the information into appropriate planning, infrastructure and emergency-management decisions.

The need, therefore, is not simply for another awareness programme on urban flooding. There is a need to strengthen the practical capacity of institutions responsible for planning and managing Gujarat's cities to understand how urban flood risk is generated, assess where risk is concentrated, interpret available scientific and technical information, identify appropriate structural and non-structural interventions, and integrate climate-risk considerations into routine urban planning and municipal operations.

The programme is intended to address this capacity gap. It will bring together urban planners, municipal engineers, disaster-management officials, water-resource authorities, GIS and technical personnel and other relevant stakeholders to examine urban flooding through Gujarat-specific cases and practical exercises.

2. Aim

To strengthen the practical capacity of key officials and professionals to understand, assess and manage urban flood risk in Gujarat.

3. Objectives

- Build a basic understanding of urban flood hazards and risks.
- Understand the causes and different types of urban flooding in Gujarat.
- Learn how rainfall, drainage, land use and natural drainage systems affect flooding.
- Understand the use of GIS, flood maps and other technical information for flood-risk assessment.
- Discuss structural and non-structural measures for reducing flood risk.
- Understand the role of climate change in future urban flood planning.
- Strengthen early warning, preparedness and coordination among key agencies.
- Develop practical actions for improving urban flood management in participants' respective areas.

4. Target Audience

- Urban planners and town-planning officials
- Municipal engineers and officers
- Disaster management officials
- Water Resources Department officials
- Drainage and infrastructure engineers
- GIS and technical professionals
- Officials from Urban Local Bodies and development authorities
- Other government officials and professionals involved in urban flood management

5. Tentative Program Details

Particular	Details
Programme	Two-Day Capacity Building Programme on Urban Flood Risk Management and Resilience in Gujarat
Dates	29–30 October 2026
Venue	GIDM, Raysan, Gandhinagar
Duration	2 Days
Participants	35–40
Focus	Urban flood hazard, risk, drainage, planning, early warning and preparedness
Approach	Presentations, case studies, practical exercises and group discussions