End to End Early Warning System for Ukai and Local Floods in Surat City

Lead Institutions

TARU Leading Edge Pvt. Ltd.,
Surat Municipal Corporation (SMC),
Surat Climate Change Trust (SCCT).

Partner Institutions

Southern Gujarat Chamber of Commerce & Industry (SGCCI), Narmada Water Resources, Water Supply & Kalpsar Department (NWRWS), Centre of Social Studies (CSS), Sardar Vallabhbhai National Institute of Technology, Surat (SVNIT), Gujarat State Disaster Management Authority (GSDMA) and Integrated Natural Resource Management (INRM), Indian Institute of Technology, Delhi (IIT Delhi).

Project Summary:

Surat, located at the mouth of Tapi River, has most of its catchment area lying in high variability rainfall zone. Post 1970, the city witnessed increased demand for water (e.g. industrial) and new developments along flood plain which in turn reduced the flow, leaving dam managers with no choice but to maximize reservoir storage during the monsoons. On the other hand, changes in river regime, siltation and development of other infrastructure along the river bank (e.g. embankments) reduced the carrying capacity of the river within the city. During the tail end of monsoon, when the reservoir is already filled to its maximum capacity, even a slight increase in the inflow due to severe rainfall within the catchment area forces dam managers to release high volume of water within short period of time. This leads to flooding in Surat.

Over the past two decades, flood frequency increased due to increased rainfall variability (extreme events), especially in the river's catchment area. Urban flooding was aggravated due to construction of embankments, bridges and land-fills in the flood plain resulting in increased afflux effects. Following map represents the ward level risk profile.

Objective:

The main objective of this project was to reduce the impacts of floods and resultant damage in Surat. This was achieved through setting up of an End-to-End Early Warning System to monitor and forecast extreme precipitation events in Upper and Middle Tapi basin as well as Khadi (tidal creeks) floods. The sub objectives of this project were to develop an institutional coordination mechanism for urban flood resilience and also develop new rules for improved reservoir operation and systems.

Project Components:

- Development of Management Framework:
  - Surat City Stakeholder Trust

  - Technical Committee (Committee of experts or subject matter specialist for advice and monitoring systems during & after project period)
- Climate change informed hydrological and hydraulic modelling
- Early warning and disaster management system
- Information and support for the poor
- Ensuring sustainability of the system beyond project period

Implementing Approach:

Stakeholders responsible for flood information generation, dissemination, preparedness, warning and management range from national to state to district to city institutions. Earlier there were limited platforms available for members of these institutions to interact before and after floods to share learnings and take integrated actions. In order to establish an end to end warning system covering three states (Tapi catchment extending from Madhya Pradesh and Maharashtra to Gujarat), a trust- Surat Climate Change Trust (SCCT) was established with representing members from key institutions. This trust helped provide a much required platform for joint deliberation and action for the concerned stakeholders.

Currently, SCCT under the aegis of Surat Municipal Corporation (SMC) is anchoring the establishment of end to end warning system in Surat. Flood warning system in the city includes installation of weather systems, data transfer mechanism from catchment to reservoir to city level, development of weather and flow prediction models, improvement of existing flood preparedness and formulation of action plans.

Key Achievements:

1) Establishment of Surat climate change trust, comprised of members from national, state and city level institutions
2) Development of reservoir inflow and outflow prediction models
3) Installation of ten automatic weather stations and two water level measurement units across the city, to provide detailed weather, tide and flow information
4) Development of city level spatial data (in GIS) for flood management
5) Flood preparedness, response and mitigation plans are under development

The developed Hydrological Model provides advance information (5 day inflow forecasts) to key decision makers. During 2013 monsoon, SCCT used this system for predicting floods caused by extreme precipitation in Middle and Lower Tapi basin as well as Khadi (tidal creeks) floods. Spatial maps to aid in Flood preparedness and management were developed. Capacity building on how to use this information is expected to begin shortly. Also, based on this year's test results, the flood prediction model and the inundation model are being improved.

Organization Details:

TARU Leading Edge Pvt. Ltd is a private research consultancy organization with an expertise is primarily in six core sectors: Disaster Risk Management & Climate Change, Governance & Institutions, Natural Resource Management, Social Development, Urban Development, and Water, Sanitation & Hygiene. Within these sectors we undertake policy analysis, strategy development, action research, programme design, project management support, assessments and evaluations.

ACCCRN was launched in 2008 and is funded by The Rockefeller Foundation as part of their 9-year initiative aimed at building Climate Change Resilience. Climate change resilience is the capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function at an acceptable level. Simply, it is the ability to survive, recover from, and even thrive in changing climatic conditions. ACCCRN works at the nexus of climate change, vulnerable and poor communities, and urbanization.

Surat Municipal Corporation is a local self-government which has come into being under the Bombay Provincial Municipal Act, 1949. It carries out all the obligatory functions and discretionary functions entrusted by the BPMC Act, 1949 with the mission to make Surat a dynamic, vibrant, beautiful, self-reliant and sustainable city with all basic amenities, to provide a better quality of life.

Surat Climate Change Trust (SCCT) is a city level public trust registered under Bombay Public Trust Act 1950 (Registration No. E-7266/Surat) having its office at City Engineer's Office, Surat Municipal Corporation, Main Office,Muglisara, Main Road, Surat, Gujarat – 395 003. Surat Climate Change Trust is promoted by Surat Municipal Corporation (SMC), which comprises of members from various institutions including Surat Municipal Corporation, South Gujarat Chamber of Commerce & Industries (SGCCI), Academic Instructions (SVNIT, CSS) and state level stakeholders such as NWRWS as well GSDMA etc. at Surat.