

# Cities of The Future – Climate Risk Management

The Griha Summit  
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# Cities and climate risk – Why does it matter?



Urban areas are concentration of large population, economies, infrastructure: central to growth of the nation or the region

Over 50% of India's GDP is derived from cities - Climate change impacts can wipe out development gains and significantly reduce quality of life

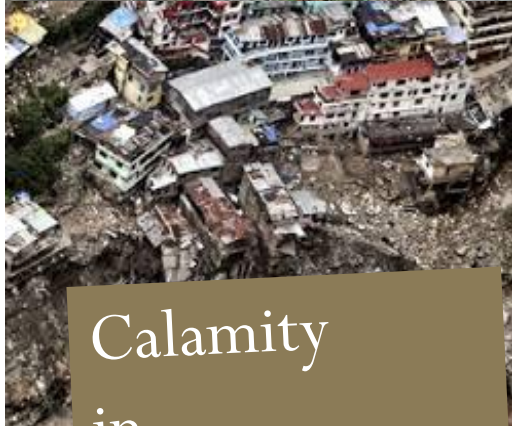
Climate related Disasters cost an estimated \$370 billion USD globally in 2011 (80 per cent of this was in Asia alone)

Associated social costs - Vulnerable groups are the most affected

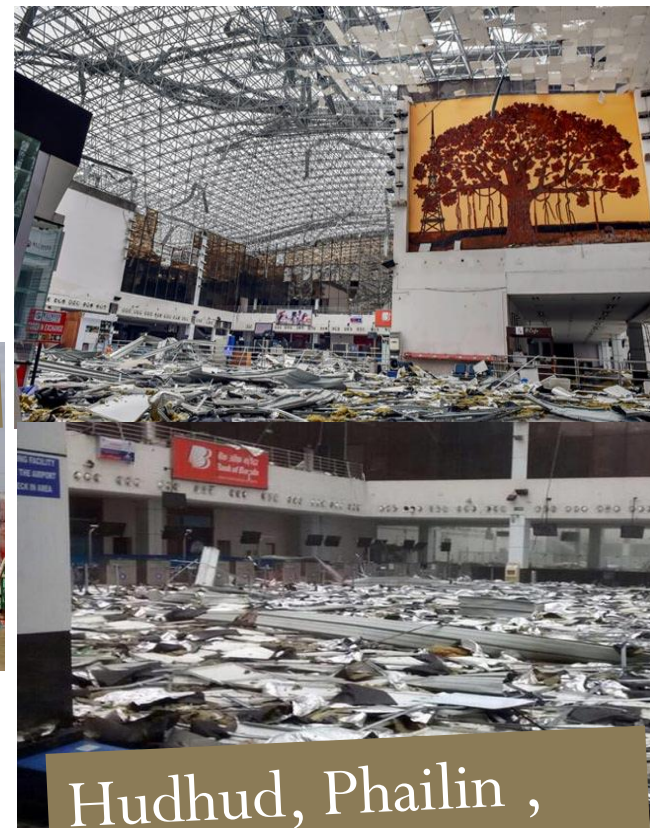
# Urban India – Confronting climate change and extreme events



Floods in Srinagar,  
Chennai



Calamity  
in  
Uttarakhand



Hudhud, Phailin ,  
Helen cyclones



# Urban India: Confronting development challenges

Increasing population, unplanned growth and urban sprawl

Pressures on and rising demands for housing, infrastructure and services

Environmental Degradation

Resource Depletion

Marginalization of vulnerable groups

Poor quality of life

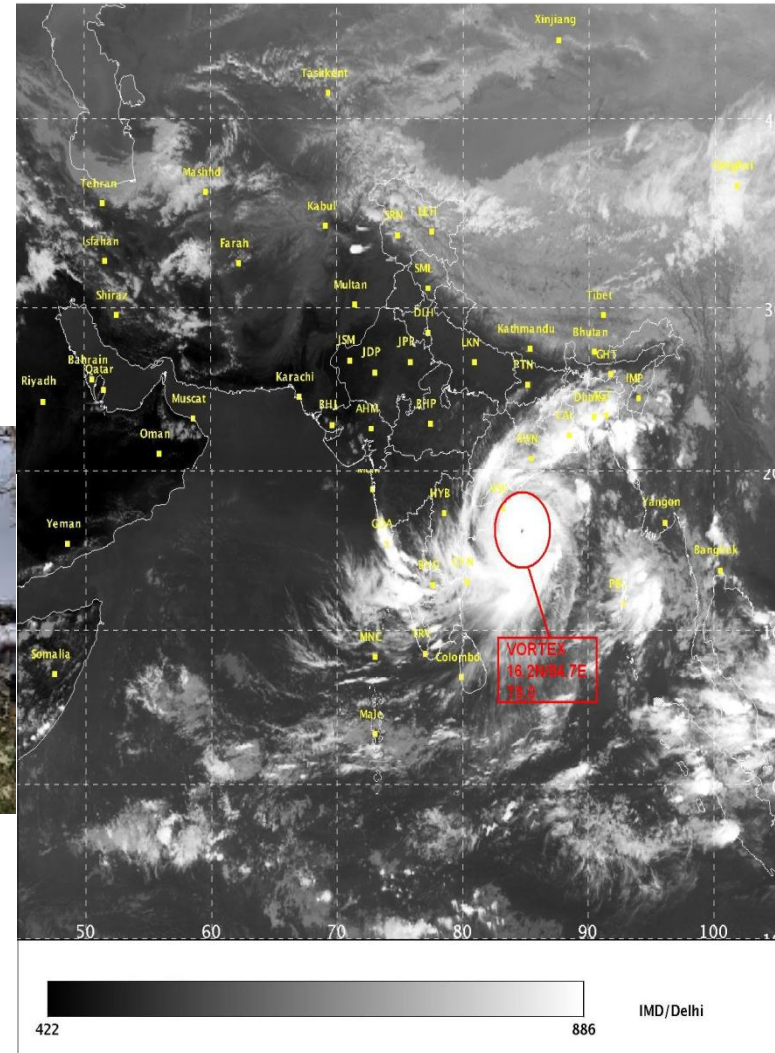
Limited resources and capacities of city governments



Source: Francesco Terzini Flickr Creative Commons

# Visakhapatnam – Cyclone Hudhud

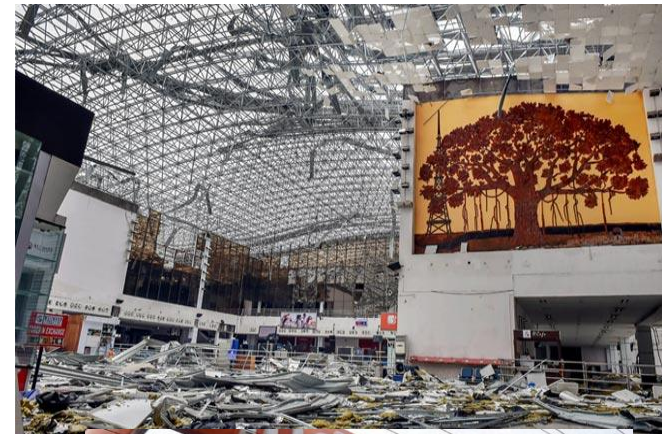
- People affected - 248,004 across 320 villages in Visakhapatnam, Vizianagaram, Srikakulam and East Godavari districts





# Hudhud - Estimate of Loss and Damage

- Fishing and related activities- 400 boats damaged and 72 sunk
- Eastern Power Distribution Company of Andhra Pradesh Limited- Rs 40,000 crore
- Navy- Rs 2000 crore
- Loss to airport infrastructure – Rs 500 crore
- Vizag Port- Rs.300 crore
- Road length- 2250km damaged
- Electricity poles, towers, communication network disrupted
- Industries- Rs 10,000 crore



# Visakhapatnam - Resilience building

USAID-Climate Change Resilient Development (CCRD) program

Inventorizing and mapping of infrastructure assets

Database Management System (DBMS)

Vulnerability mapping w.r.t sea level rise

## Resilience Strategy

- Man-made and natural infrastructure resilience
- Sector specific recommendations
  - Structural interventions
  - Planning considerations
  - Regulatory requirements
  - Capacity needs

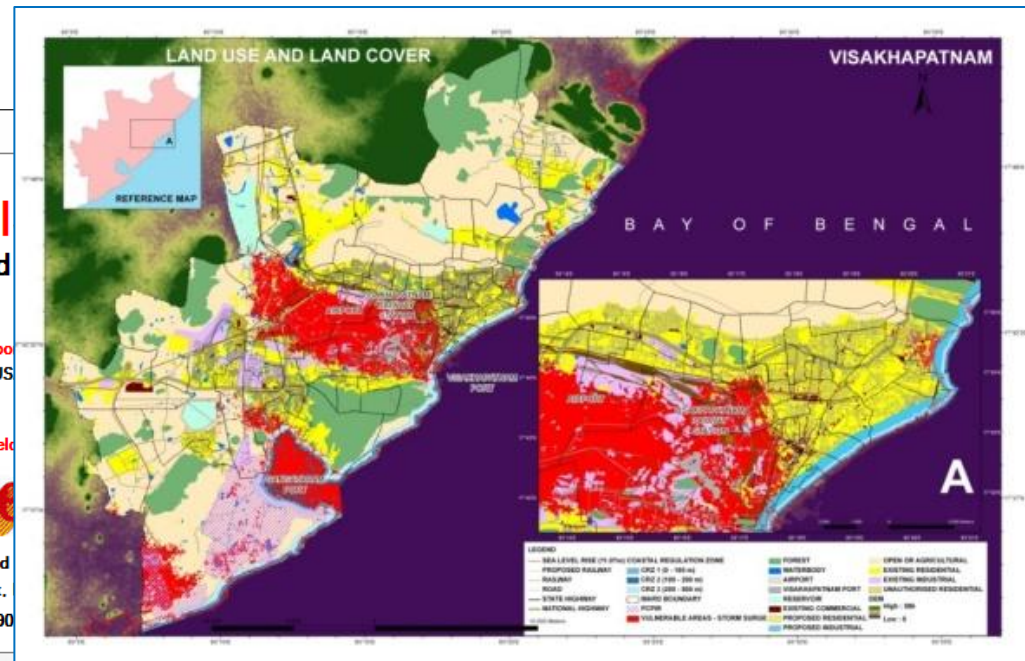


USAID CRIS

**CRI**  
Infrastructure and

Support  
US  
Develop

The Energy and  
Darbari Seth Block, IHC Complex,  
Tel. (+91 11) 2468 2100 and 4150490



# Database Management System for urban climate resilience planning

USAID CRIS

## CRIS DB Version 1.0

### Infrastructure and Services Database

Supported By  
USAID

Developed By  
**teri**

The Energy and Resources Institute  
Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA  
Tel. (+91 11) 2468 2100 and 41504900, Fax (+91 11) 2468 2144 and 2468 2145

Login Details

User name :

Password :

USAID CRIS

Climate Critical Infrastructure Disaster Management Energy Industry Social Infrastructure

This database demonstrates an urban infrastructure inventory where sector wise forms can be accessed to record and update information to support:

Urban development and climate resilience planning efforts

The system besides providing features like recording and updating information for various asset types also enables retrieving desired information by using the search filter option. Currently this is a standalone database system that runs on a personal computer which can be accessed by authorized users.

SWM Telecommunications Tourism Transport Water Waste Water

Sewerage Zone

Storm Water Sanitation Network Treatment Plants Discharge Community Toilet Quality Analysis SSLB Efficiency

Search Criteria:  Search Text:

Year	Zone	Areas Covered	Total GVMC Area	Area	Total Population	Population Covered
2013	I	Neugi Nagar, Portaise, Nine infantal n...				
2013	II	Mala, Mala Hillcock, Bhandari Hospital				
2013	III	Many immaculate school, Anita Tea ho...				
2013	IV	Bharat Lodge, Post office, Old Bus stand				
2013	V	Panaji core city area				
2013	VI	Campal, Dr.Jack Sequeira House				
2013	VII	St.Inez, Caulo Colony, Govt quarters				
2013	VIII	Part of Altno, Military camp, Mental Ho...				
2013	IX	Adarshana Colony Miramar to Solmar ...				
2013	X	Bhatlem and some parts of Altno Govt ...				
2013	XI	La campala and lake view colony				
2013	XII	Municipal Quarters, Tonca				

Storm Water

Storm Water

State \*  District \*

City \*

Zone \*

Areas Covered

Area (in hectare) \*

Paved Area (in hectare)

Unpaved Area (in hectare)

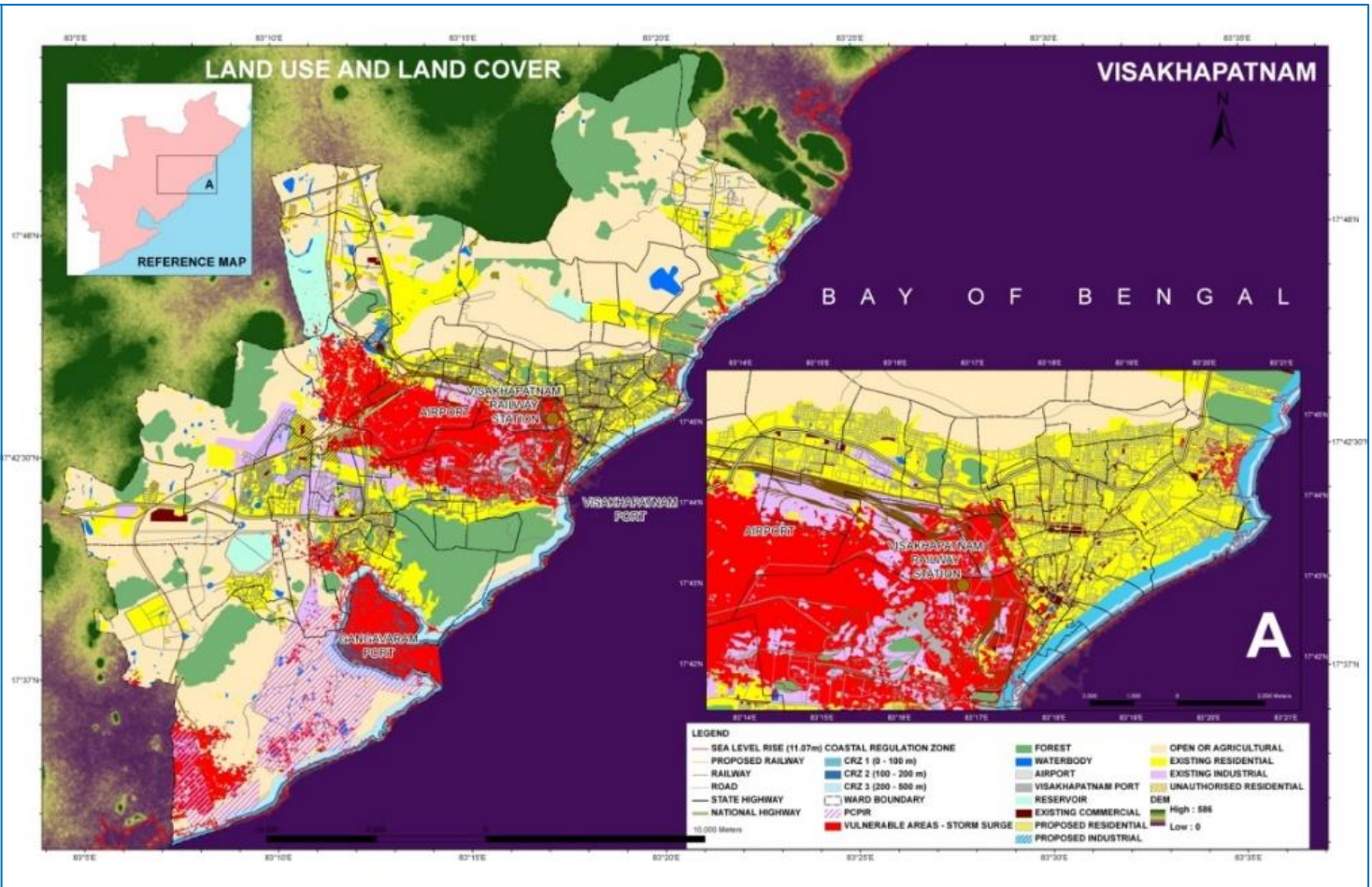
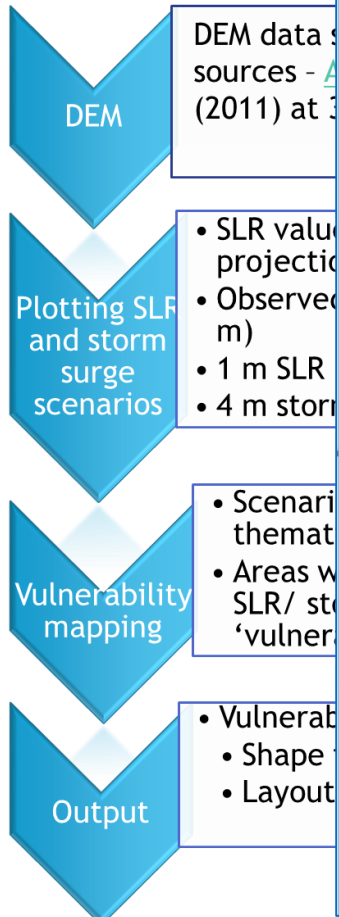
Length (in km.) \*

Major storm water drains

\* Required Fields



# Vulnerability Mapping



## Scenarios mapped

- Scenario 1: Based on TERI's SLR model projections
- Scenario 2: Based on observed SLR trend (with GIA corrections)
- Scenario 3: Based on 1 meter sea level rise assumption
- Scenario 4 (For Vizag only): In case of cyclonic events with surge height of 4m

# Visakhapatnam - Gearing up to be SMART



**Smart City**  
MISSION TRANSFORM-NATION

- **Vision** —

*A Healthy and Livable City, A Resilient City, A Vibrant City*

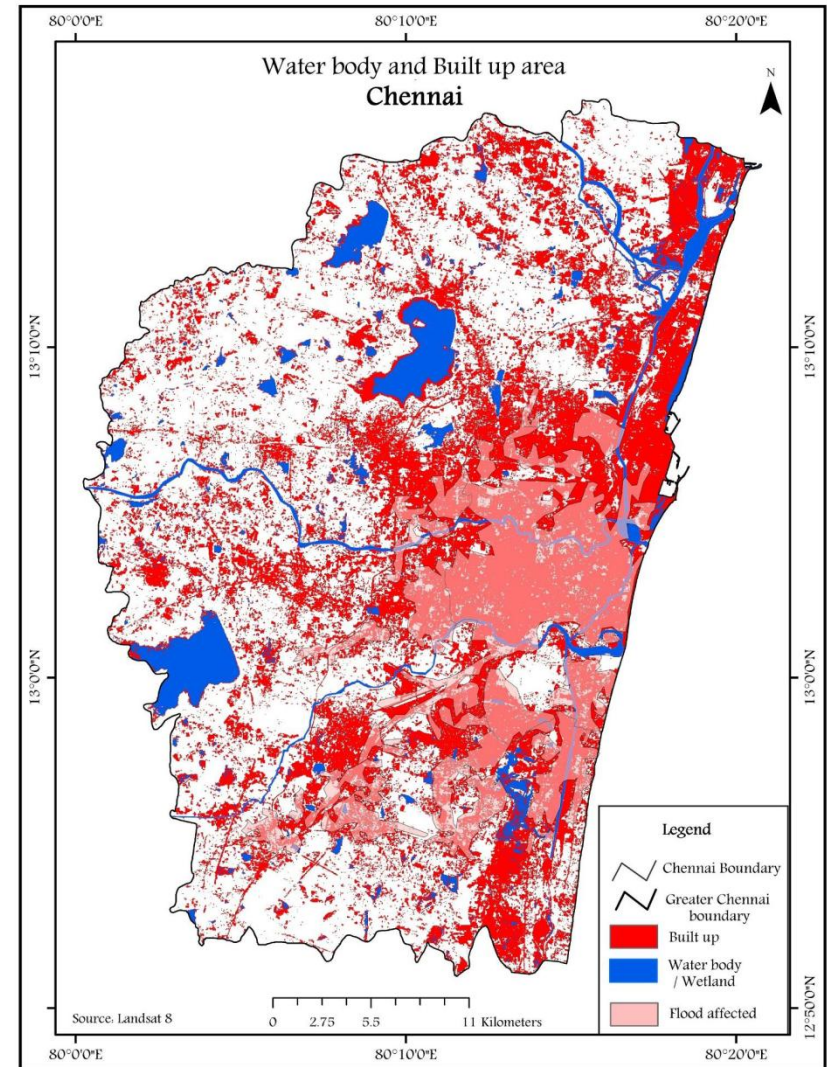
- **Strategies** —

- Building resilient infrastructure and ensuring sustainable energy availability
- Shore protection infrastructure
- Disaster management system based on ICT infrastructure - Early warning and evacuation systems
- Enhanced disaster management through improved urban governance



# Chennai Floods

- In November 2015, Chennai witnessed one of its worst rainfalls in history, with a record 1218.6 mm of rain in the month— three times its average monthly rainfall
- An estimated 1.4 million families have been affected by the floods, of which 50,000 families lived on the banks of the Adyar, Cooum and Buckingham canal.
- The floods have caused an estimated damage of INR 3,000 crore to public infrastructure alone.



# Chennai – 100 Resilient Cities

- Improved urban governance for resilience building- onus on Greater Chennai Municipal Corporation
- Chief Resilience Officer – coordinating multi-departmental dialogue and convergence
- Conserving urban ecology and watershed based drainage management – wetlands, marshes and lakes
- Use of ICT for disaster management systems

PIONEERED BY THE  
ROCKEFELLER FOUNDATION

100

RESILIENT

CITIES





# Chennai - Gearing up to be SMART



**Smart City**  
MISSION TRANSFORM-NATION

- Vision —

*A universal cultural hub for **safe and sustainable living** with enhanced mobility, smart urban infrastructure and **become more resilient** to the physical, social and economic challenges.*

- Strategies —

- Storm water management, water management, solid waste management
- Enhanced disaster management through use of ICT - Flood warning and monitoring system
- Disaster management system and SOPs for emergency situations

# Summing Up - Climate Risk Management in Urban Areas

- Prepare the cities to withstand climate change related gradual impacts like change in precipitation, temperature and sea level rise
- Equip the city equally to respond to disasters and extreme events
  - Disaster risk mitigation
  - Post-disaster management and resettlement
- Drive the city towards sustainable development encompassing environmental benefits



# Summing Up- Key Enablers

- **Policy and mandate** at national and state level
- **Integration of climate agenda** with city development agenda
- **Institutionalization** of urban climate resilience planning.
- Use and involvement of **local expertise** to generate context specific locally driven solutions
- **Capacity building** and awareness generation to generate momentum and facilitate action at all levels
- **Access to knowledge** on climate variability and change
- **Data management** and updating to facilitate decision making

**Thank you!**

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