# Student Seminar

## Building climate resilient cities: Exploring theories, practices and prospects

**16-17 Feb 2015**

## The building blocks for urban resilience: Introduction to the key theme for the seminar

**DR DIVYA SHARMA, FELLOW,**

**SUSTAINABLE HABITAT DIVISION,**

**TERI**

# VULNERABILITIES OF CITIES

•Cities house

- More than half of the world's population,
- Trade, businesses, economic activities
- Built assets

•By 2030 nearly 60 % of the global population is projected to be urban with the developing world housing nearly 80% of this population.

•Urbanization and economic growth go hand in hand.

•Cities are the centres of economic growth generating more than 80% of the global GDP

•Cities also responsible for a significant share of the GHG emissions and consequent climate change.

# Increasing urbanization leading to increased pressure on

**Resources**

**Infrastructure**

**Services**

**Experts are increasingly refuting the old school of thought which says urbanization should be contained**

**The new school of thought says urbanization should be promoted and should be planned to reap maximum Development Goals**

**Government of India has recently announced development of 100 SMART cities and allocated finances for the same under the union budget**

# Climate change impacts poses additional pressures on cities

## Floods

74 YEARS OF SERVICE TO THE NATION

SIMULTANEOUSLY FROM GUWAHATI & DIBRUGARH

GUWAHATI, WEDNESDAY, SEPTEMBER 12, 2012, Pages 16 Price Rs. 4.00

floods throw city life out of gear

A waterlogged street in Guwahati on Tuesday evening. – UB Photos

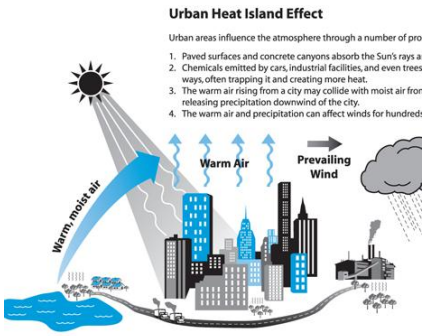
hours made the situation more chaotic. "For Guwahatians, it is an

be a folly to expect anything from the State Government or

floods waters from the flood affected areas to provide some

deep density at places. Parts of GS Road also witnessed waterlogging.

## Water shortage



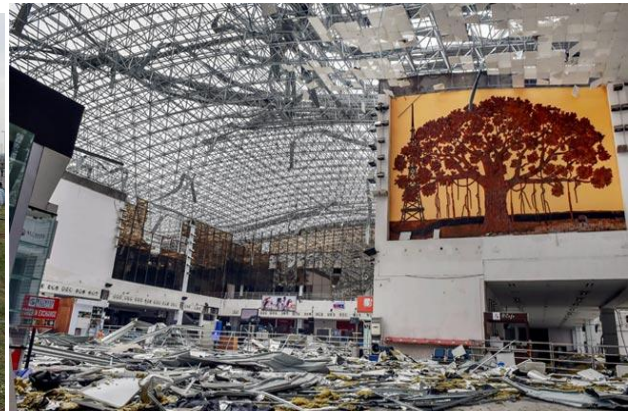

## Urban Heat Island Effect

## Storms

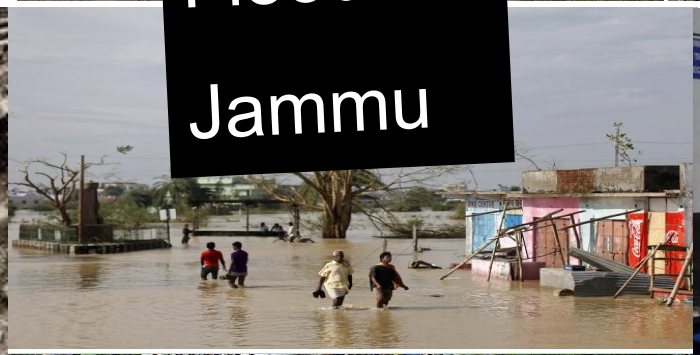
**Development goals of the cities are seriously undermined by climate change impacts.**

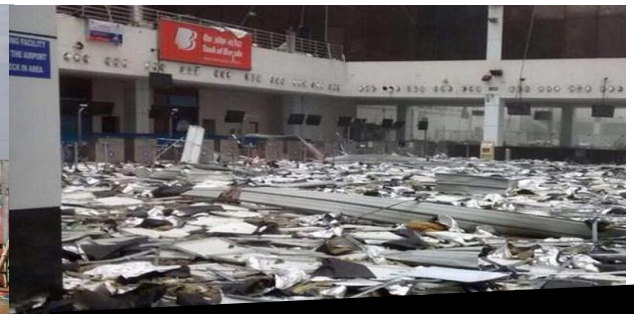
**Building Climate Resilience: Holistic mechanisms to address climate variability and change without compromising on present development challenges**


Floods in Jammu



Calamity in Uttarakhand



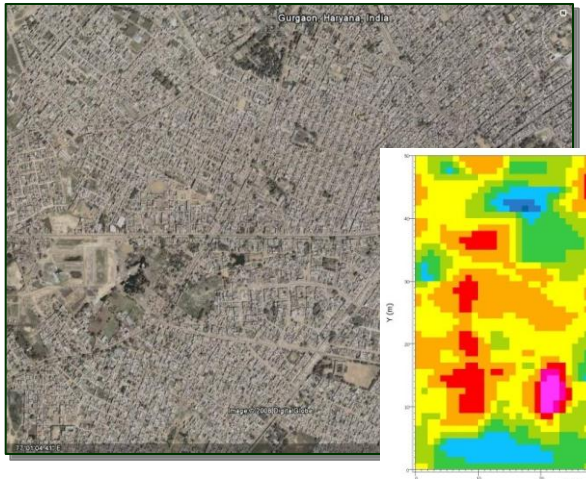


Hudhud, Phailin , Helen cyclones

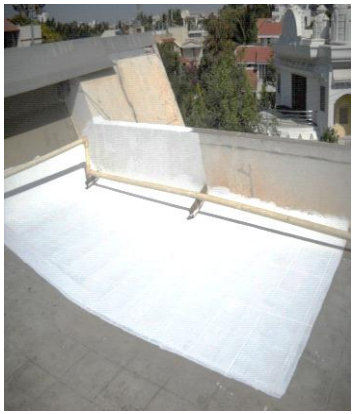
**Recent calamities in India have drawn attention not only towards the great damage climate events can instill on settlements but also towards the uncertain climate conditions that might await us in near future**

# Cities across the world are engaging in planning for climate resilience……

**…….transforming their systems to address climate variability and change without compromising on present development challenges.**





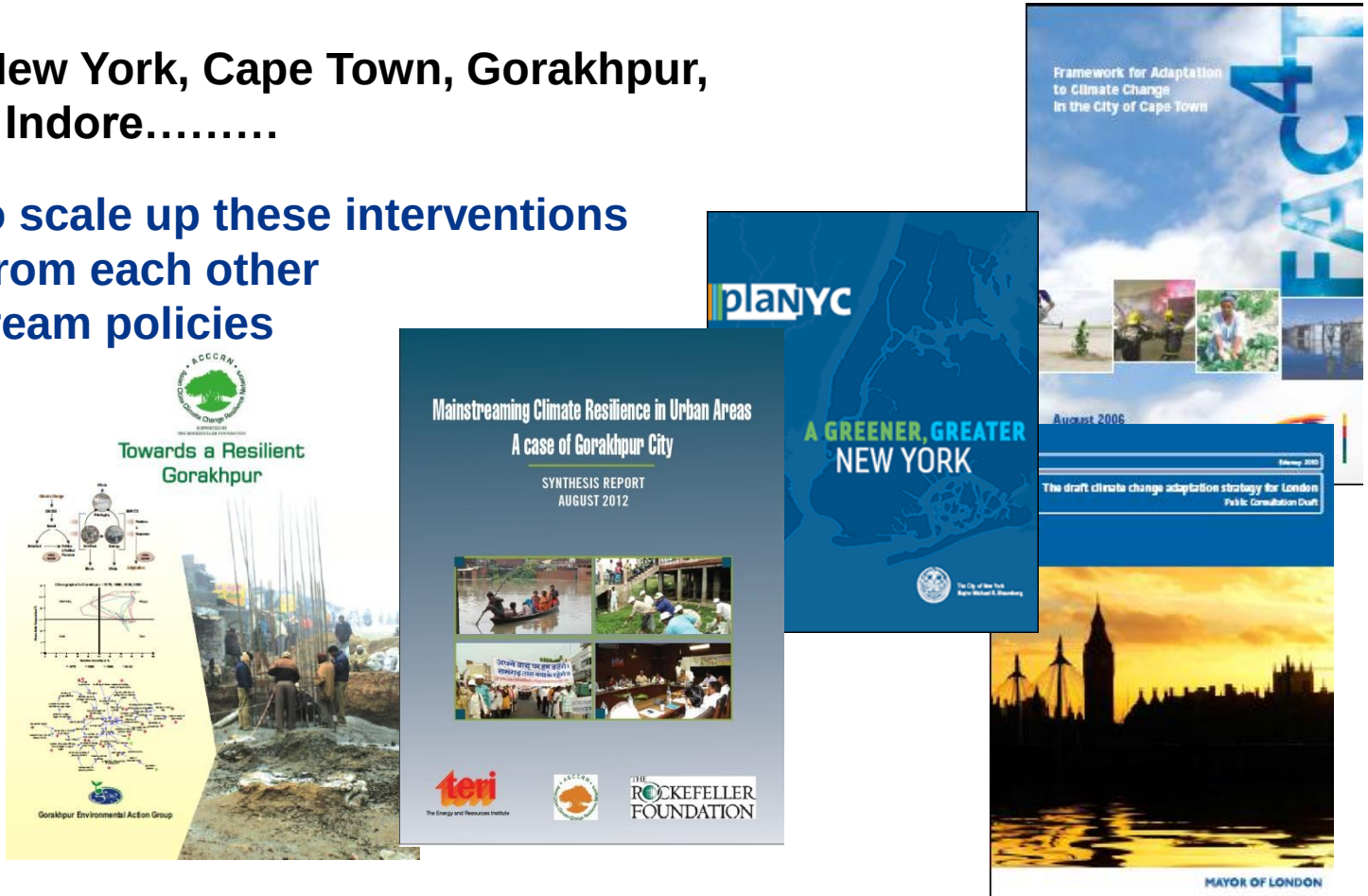



# Cities across the world are engaging in planning for climate resilience……

**…….transforming their systems to address climate variability and change without compromising on present development challenges.**

**London, New York, Cape Town, Gorakhpur, Surat and Indore……**

- **Need to scale up these interventions**
- **Learn from each other**
- **Mainstream policies**



# WHAT IS CLIMATE RESILIENCE IN THE CONTEXT OF CITIES?

**Resilient cities in the light of climate change should be able to develop plans for future development and growth bearing in mind the climate impacts that the urban systems are likely to face (Prasad et al, 2009).**

## Climate Resilience

**Not development in new way**

**Factoring climate variability and change considerations in the planning and development framework**

**Ensuring long term sustainability and preparedness to climate change**

# RESPONDING TO CLIMATE CHANGE : FROM REACTIVE TO PROACTIVE ACTION

Reactive (driven by actual perceived climate variability)

**Proactive (driven by climate forecasting / future scenarios)**

| | | | | |
|---|---|---|---|---|
| Disaster mitigation/ response (post extreme event) | Disaster preparedness measures (based on current variability) | "Climate proofing" at project level | Mainstreaming climate forecasts into sectoral policies and processes | Strategic multi-stakeholder adaptation and mitigation planning |

## Key actors:

| | | | |
|---|---|---|---|
| Households, CBOs, aid/relief organizations | Private developers, insurers, development NGOs | Sectoral agencies (environment, water, housing, etc.) | Centralized unit ("climate czar") with strategic planning authority |

# WHY CLIMATE RESILIENT CITIES?

**Climate change will have impacts on many sectors**

**Temperature and precipitation variability** will impact agriculture and subsequently food security and livelihoods, will increase the extent and severity of vector borne diseases as incidence of floods and water logging increase,

**Flooding** will cause loss and damage to infrastructure and property in affected areas

**Sea level rise** will cause damage to coastal ecosystems, increase damages from storm surges and will make coastal freshwater aquifers saline.

**Climate induced disasters** will have serious economic and social consequences like loss to property, infrastructure, health, forced migration to name a few

**Climate change impacts will exacerbate existing development challenges like health, education, livelihood, housing, infrastructure and services, and poverty. Climate change , if not accounted for will be an additional burden and greatly hamper development goals.**

# HOW ARE CLIMATE RESILIENT CITIES DIFFERENT OR BETTER?

**Climate resilient cities have the capability to reduce and manage the negative impacts of climate change because they have planned and factored these changes in their development goals and planning by:**

- Utilizing climate information (past and future) to identify climate stressors typical to their cities/region
- Preparing and implementing strategies to reduce vulnerability of population and city systems.
- Adapting to change, preparing and responding to disasters, mitigating GHG emissions

# WORLD INITIATIVES

### C40 Cities Climate Leadership

- A network of world's megacities
- An initiative to reduce carbon emissions and increase energy efficiency in large cities across the world.
- Implements sustainable climate actions locally to addresses Climate change globally

### ICLEI's Resilient Cities

- Urban resilience program consists of a range of tools, guidebooks, conferences, seminars, networks and access to financing opportunities.
- Connects local government leaders and climate change adaptation experts.
- Offers tailor-made climate resilience strategies to local, regional and national governments

### Global Resilience Partnership

- Global resilience agenda convened by USAID & Rockefeller.
- Through a network of regional hubs the Resilience Partnership will source, test and scale innovative solutions that are tailored to local needs.
- Strives to improve resilience at multiple scales; from families to communities, countries to region

# HOW TO PLAN FOR CLIMATE RESILIENT CITIES? ARE THERE GENERAL RULES TO FOLLOW?

## Key steps:

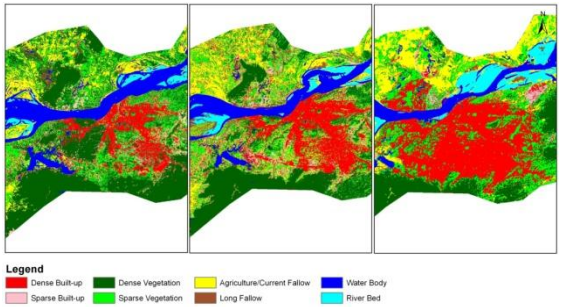
- Urban profiling
- Identification of current and future climate stressors
- Understanding risks and vulnerabilities
- Identification of strategies to reduce vulnerability and manage risks- develop resilience
- Steering governance processes, regulations and institutions for long term benefits
- Locating finance
- Involving community throughout

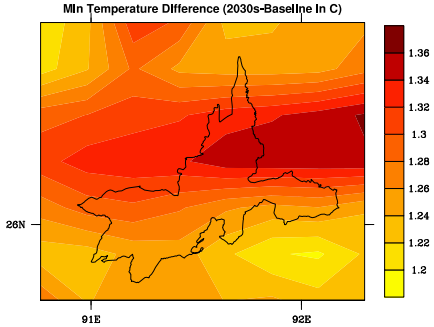
**Contextualization** is an important element of urban resilience process. It allows for identification of most appropriate process and means for resilience planning considering the geo-topographical, governance, socio-economic as well as climate elements unique to an urban space.

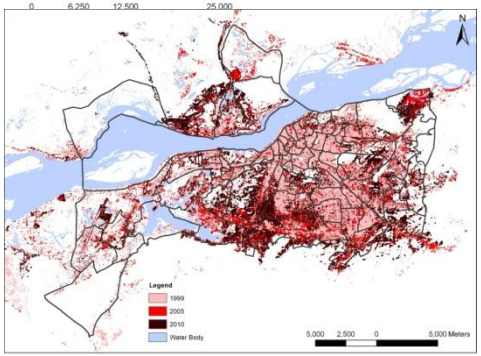
# OUR INTERVENTIONS

**Gorakhpur**
**Guwahati**

- **Risk and vulnerability assessments**
- **Climate resilience strategies**
- **Policy analysis and mainstreaming climate resilience**



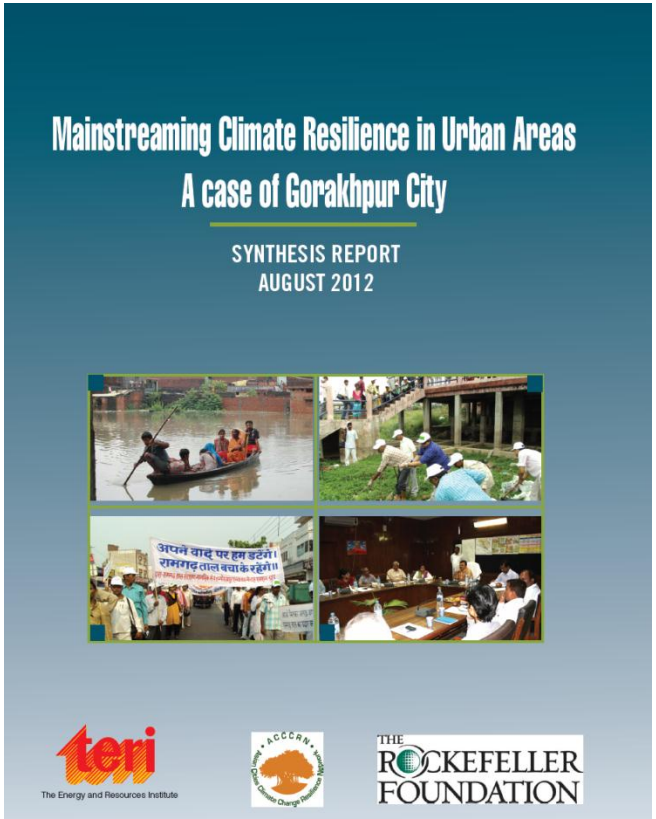




**Asian Cities Climate Change Resilience Network(ACCCRN)**

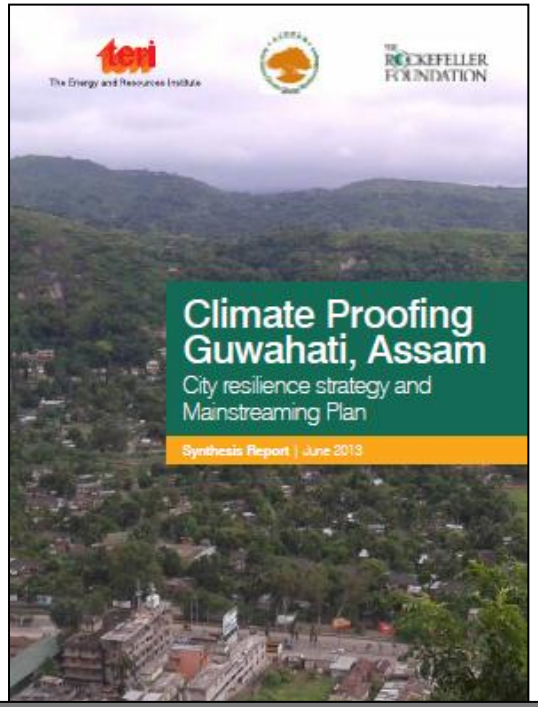
# OUTCOMES

2

## Mainstreaming climate resilience




A mainstreaming plan for climate resilience strategy for Gorakhpur city




A City Climate resilience strategy along with a detailed mainstreaming plan for the city of Guwahati

# OUR INTERVENTIONS

Surat
Indore
Gorakhpur
Guwahati
Shimla
Mysore
Bhubaneswar

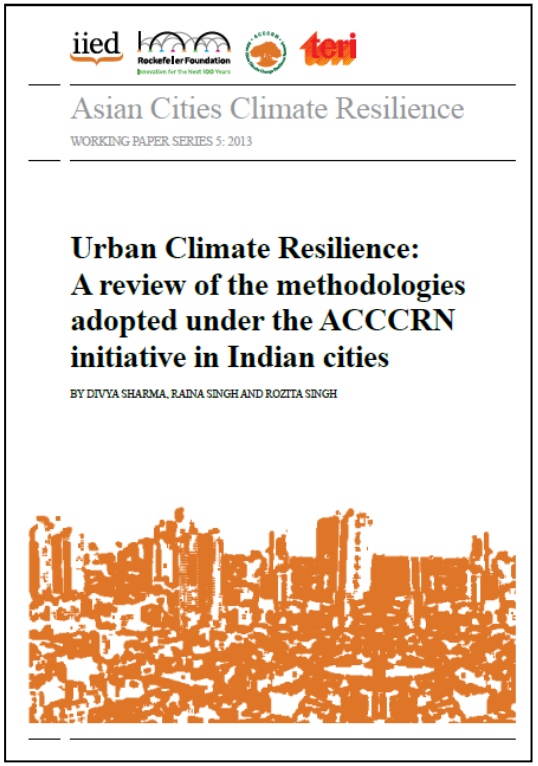
- **Scaling up of ongoing resilience building interventions**
- **Analyzing replication potential**


**International Institute of Environment and Development (IIED)**

# OUTCOMES

3

## Assessing replication potential of ACCCRN methodologies and processes

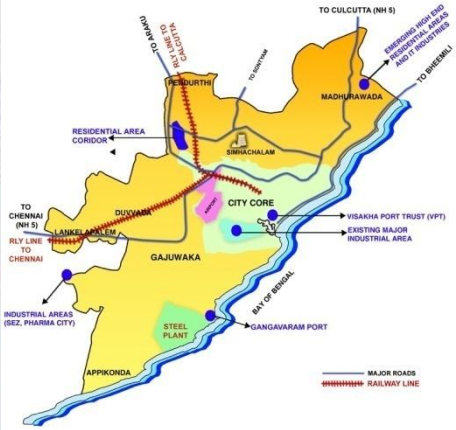



- A working paper assessing different methodologies used under the ACCCRN framework for its potential for replicability in other cities in India.
- A policy Brief
- A paper in International Peer Reviewed Journal
- The study commissioned under ACCCRN by the IIED, London

# OUR INTERVENTIONS

## Panaji
## Vishakhapatnam

- **Assessment of impact of SLR on infrastructure and services in the two coastal cities**
- **Infrastructure inventory to assist climate resilience planning**


**USAID-Climate Change Resilient Development (CCRD) program**

# OUR INTERVENTIONS

4

## Climate Resilient Infrastructure and Services

1. **Assessment of SLR and its impact on infrastructure and services of project cities**

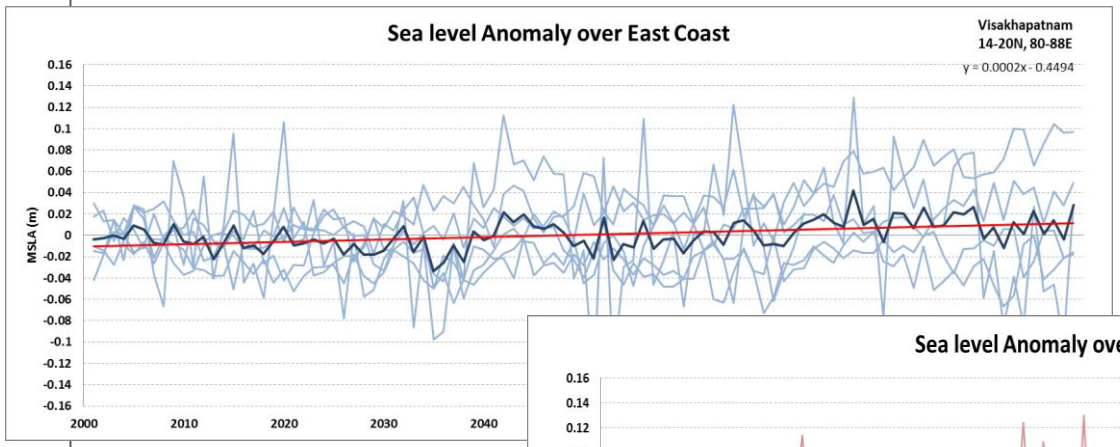
USAID
FROM THE AMERICAN PEOPLE

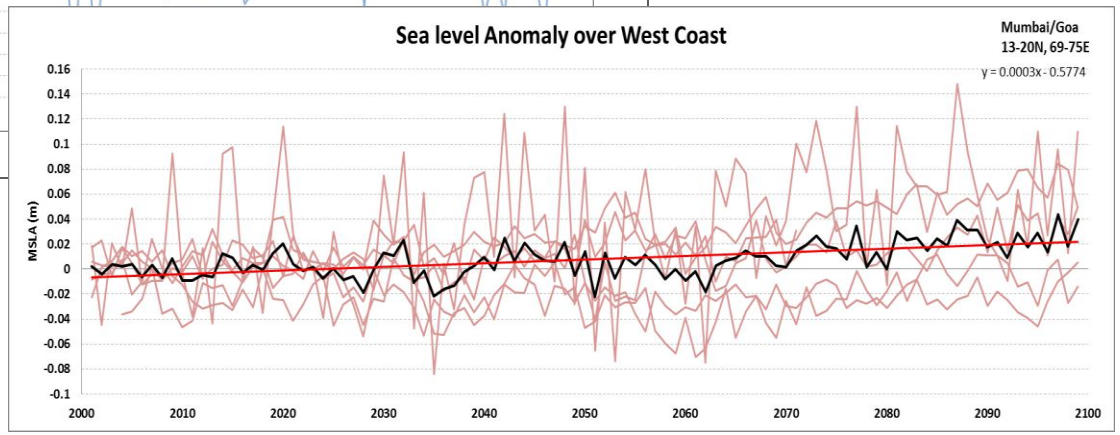
# OUR INTERVENTIONS

4

## Climate Resilient Infrastructure and Services

### 1. Assessment of SLR and its impact on infrastructure and services of project cities

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# OUR INTERVENTIONS

4

## Climate Resilient Infrastructure and Services

1. Assessment of SLR and its impact on infrastructure and services of project cities
2. Vulnerability mapping

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# OUR INTERVENTIONS

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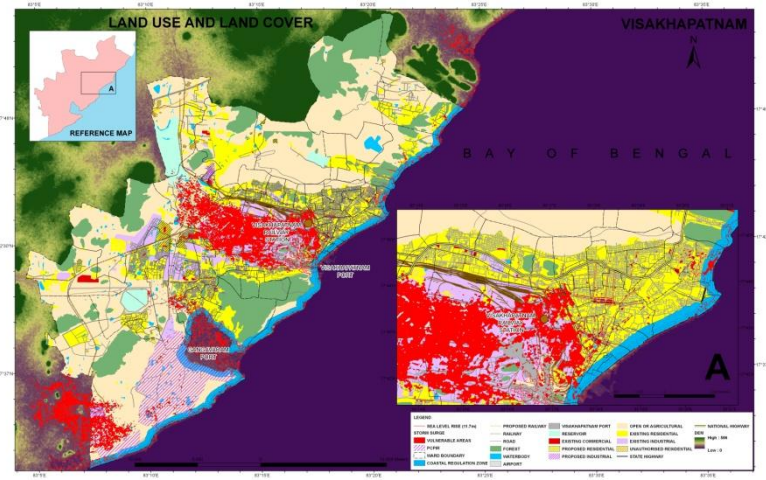


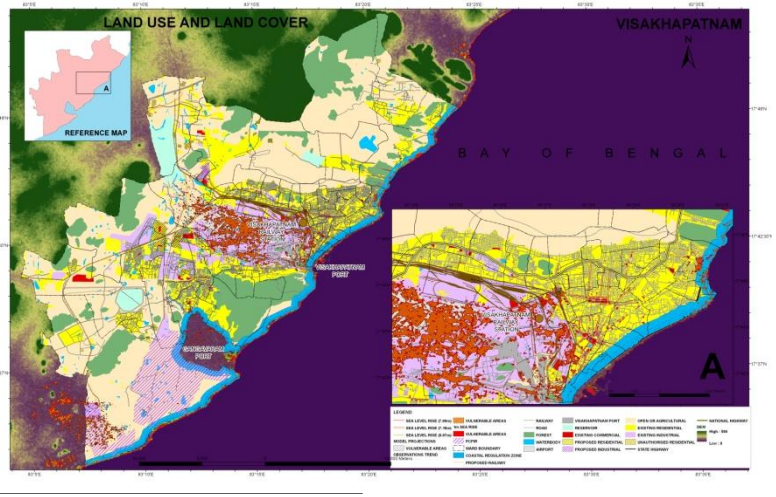


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# OUR INTERVENTIONS

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## Climate Resilient Infrastructure and Services

1. Assessment of SLR and its impact on infrastructure and services of project cities
2. Vulnerability mapping
3. Microsoft Access based DBMS to facilitate Inventorization of Infrastructure Assets

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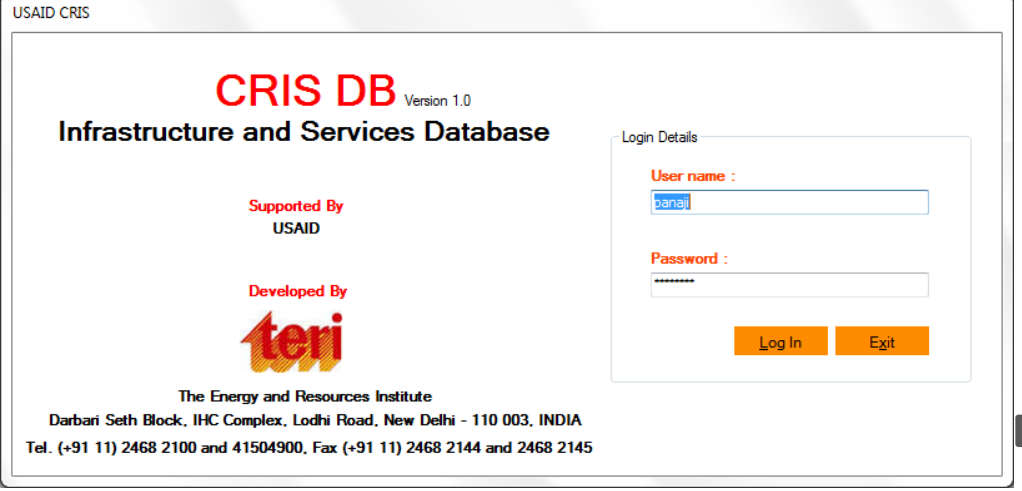
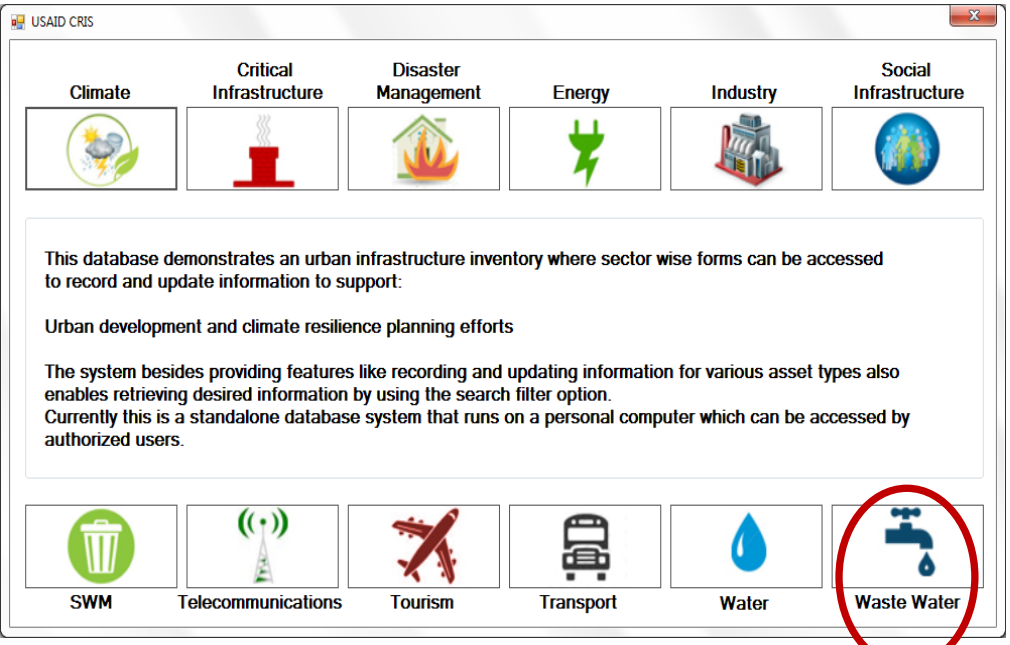
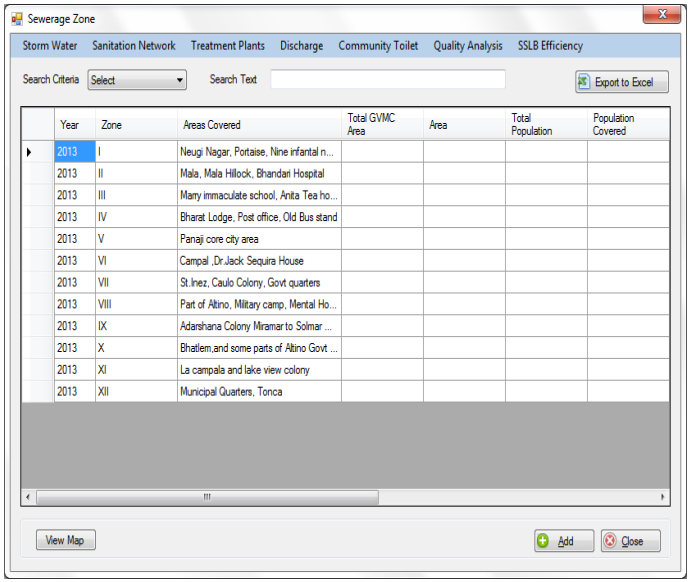

USAID CRIS
CRIS DB Version 1.0
Infrastructure and Services Database
Supported By
USAID
Developed By
teri
The Energy and Resources Institute
Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA
Tel. (+91 11) 2468 2100 and 41504900, Fax (+91 11) 2468 2144 and 2468 2145
Login Details
User name :
panaji
Password :
Log In
Exit


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
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Area
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Population Covered
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2013 II Mala, Mala Hillock, Bhandari Hospital
2013 III Marry 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 Sequira House
2013 VII St.Inez, Caulo Colony, Govt quarters
2013 VIII Part of Altino, Military camp, Mental Ho...
2013 IX Adarshana Colony Miramar to Solmar ...
2013 X Bhatlem,and some parts of Altino Govt ...
2013 XI La campala and lake view colony
2013 XII Municipal Quarters, Tonca
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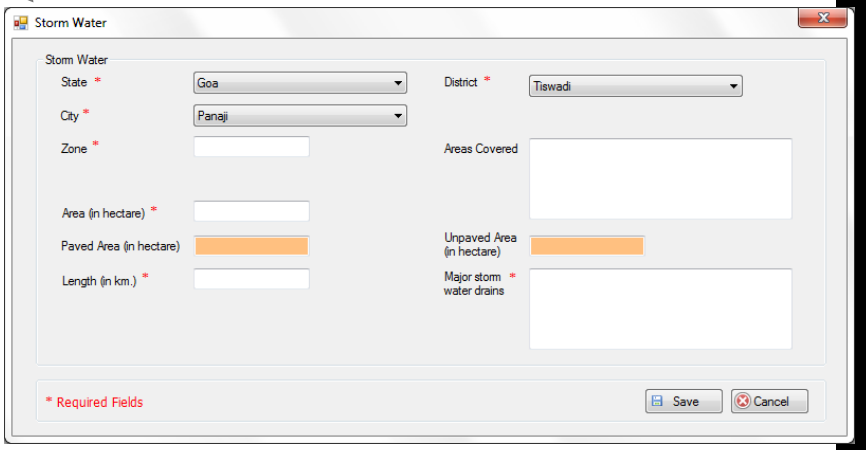
Storm Water
Storm Water
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Goa
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City *
Panaji
Zone *
Areas Covered
Area (in hectare) *
Paved Area (in hectare)
Unpaved Area (in hectare)
Length (in km.) *
Major storm water drains
* Required Fields
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# OUR INTERVENTIONS

4

## Climate Resilient Infrastructure and Services

1. Assessment of SLR and its impact on infrastructure and services of project cities
2. Vulnerability mapping
3. Microsoft Access based DBMS to facilitate Inventorization of Infrastructure Assets
4. A rapid vulnerability assessment methodology for coastal cities in India

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# OUR INTERVENTIONS

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4. A rapid vulnerability assessment methodology for coastal cities in India

1. Working paper
2. City case studies
3. Policy Brief
4. National Conference

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# OUR INTERVENTIONS

## Nepal

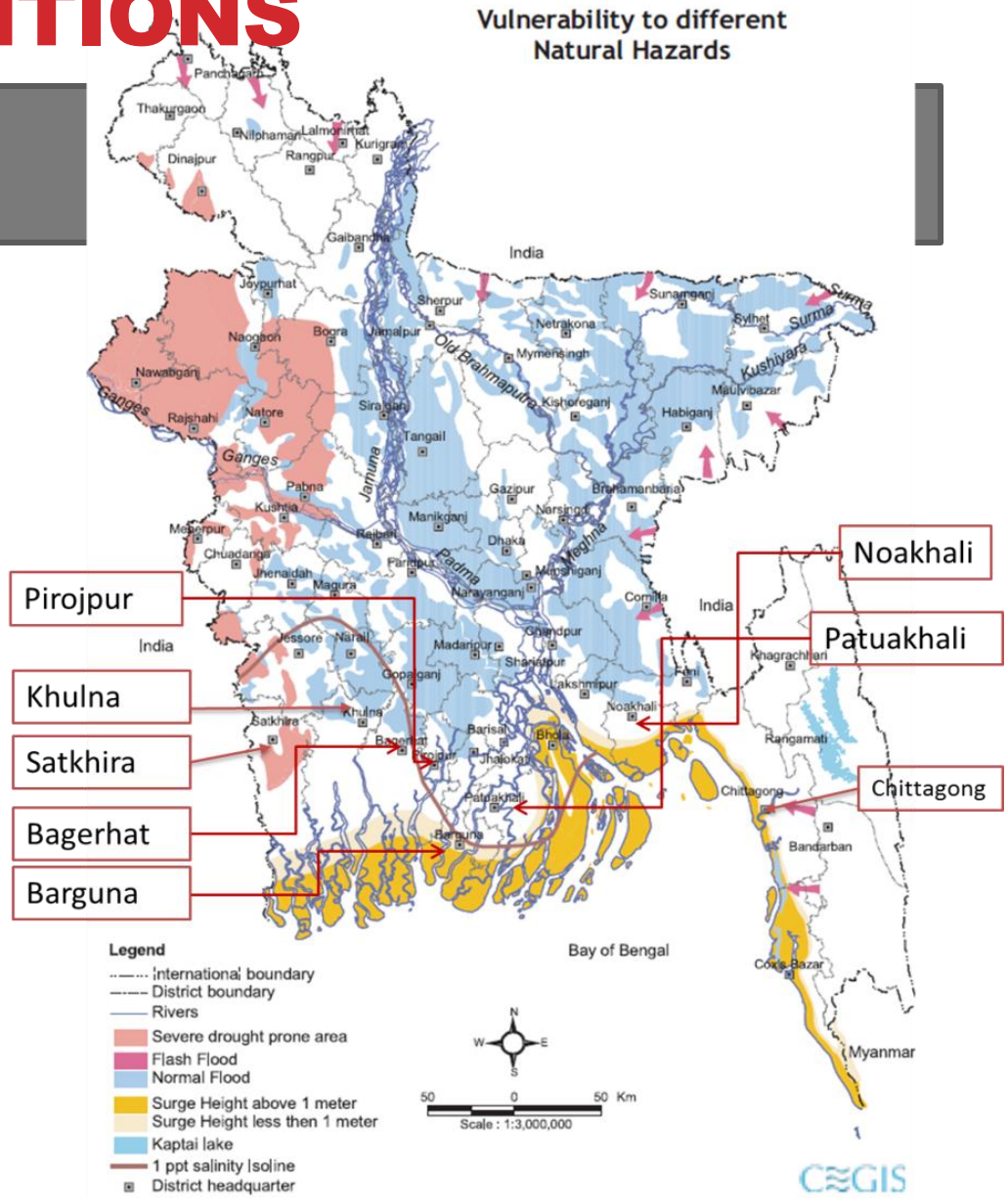
- **Climate Resilient Housing**
  - **Assess the market potential for climate resilient low cost housing in Nepal**
  - **Design a feasible business model**
    - **developing a low cost housing insurance framework**
    - **identification of potential implementing partners for pilot interventions**

**International Finance Corporation**

# OUR INTERVENTIONS

## Bangladesh

- **Climate Resilient Housing**
  - **Assess the market potential for climate resilient low cost housing in the Polders of coastal Bangladesh**
  - **Design a feasible business model**
    - **developing a low cost housing insurance framework**
    - **identification of potential implementing partners for pilot interventions**

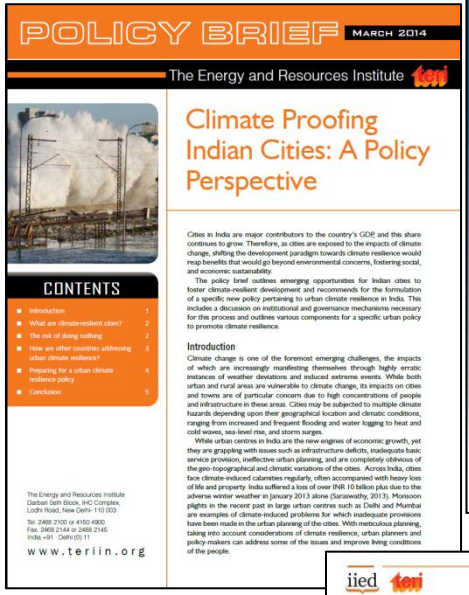



**International Finance Corporation**

# OUTCOMES

## 1 Policy Advisory

1. **Policy Synthesis review on mainstreaming climate resilience into urban development planning processes in India.**
2. **Policy Briefs on :**
   - i. **Urban Climate resilience Policy(TERI-DFID policy Brief series)**
   - ii. **Climate resilience and the built environment ( ACCCRN policy brief)**
   - i. **Replication and scaling up ACCCRN Experience (IIED- TERI Policy Brief)**


POLICY BRIEF MARCH 2014

The Energy and Resources Institute teri

Climate Proofing Indian Cities: A Policy Perspective

CONTENTS

Introduction 1
What are climate-resilient cities? 2
The risk of doing nothing 2
How are other countries addressing urban climate resilience? 3
Preparing for a urban climate resilience policy 4
Conclusion 5

Introduction

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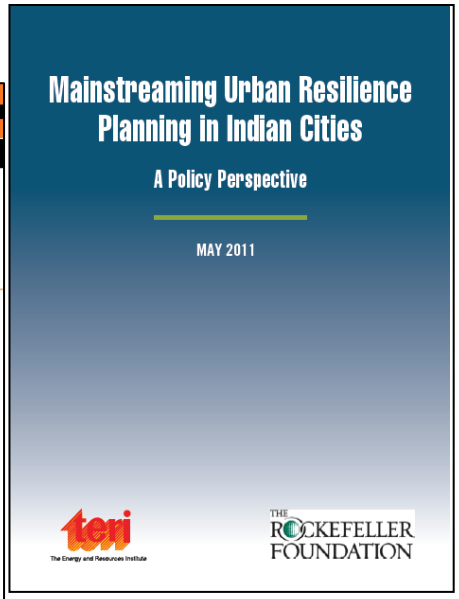
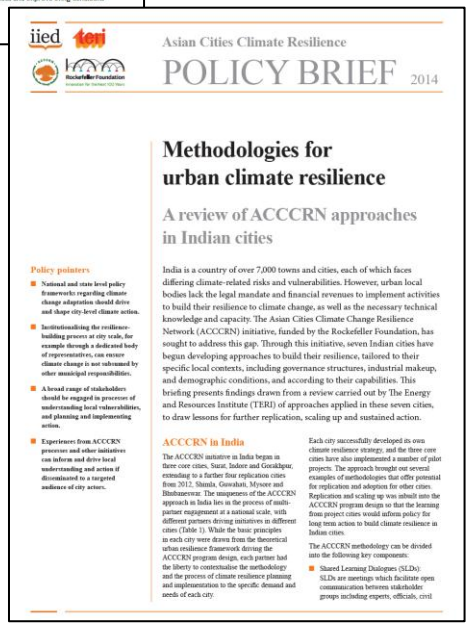

Mainstreaming Urban Resilience Planning in Indian Cities

A Policy Perspective

MAY 2011

teri The Energy and Resources Institute

THE ROCKEFELLER FOUNDATION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Asian Cities Climate Resilience

POLICY BRIEF 2014

Methodologies for urban climate resilience

A review of ACCCRN approaches in Indian cities

Policy pointers

ACCCRN in India

# ONGOING

5

**Engagement at State level for mainstreaming urban climate resilience(2 states)**

## OBJECTIVES

- ✓ Facilitating a dialogue on the need to bring forth urban climate change resilience agenda
- ✓ Supporting state governments in identifying entry points and preparing a framework and policy
- ✓ Support state government in identifying capacity needs and institutional support mechanisms to implement resilience projects in cities

1. Multi stakeholder engagements
2. State specific proposals
3. Working paper
4. State specific policy briefings
5. Stat level PDFs
6. National Policy Forum
7. Pilot Training at LBSNNA
8. Media outreach and engagement

# ONGOING

6

## Asia Pacific Network's CAPaBLE program

### Training programs

-**Total 4 in the selected 4 states (3 days duration each)**

-**Target audience: city practitioners, stakeholders in urban space, elected representatives**

### Policy Brief

- Outlining the need for capacity building, type of training required at various levels of government

### Seminar In TERI University

- Target audience: post graduate students and early career researchers

### National Conference

- Target audience: Policy makers at national and state level, elected representatives, city practitioners and other stakeholders

# THANK YOU FOR JOINING FOR THIS SEMINAR !

Contact : divyas@teri.res.in