Student Seminar

Building climate resilient cities: Exploring theories, practices and prospects

16-17 Feb 2015

Database Management System for coastal cities

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TERI

INVENTORY

Objectives

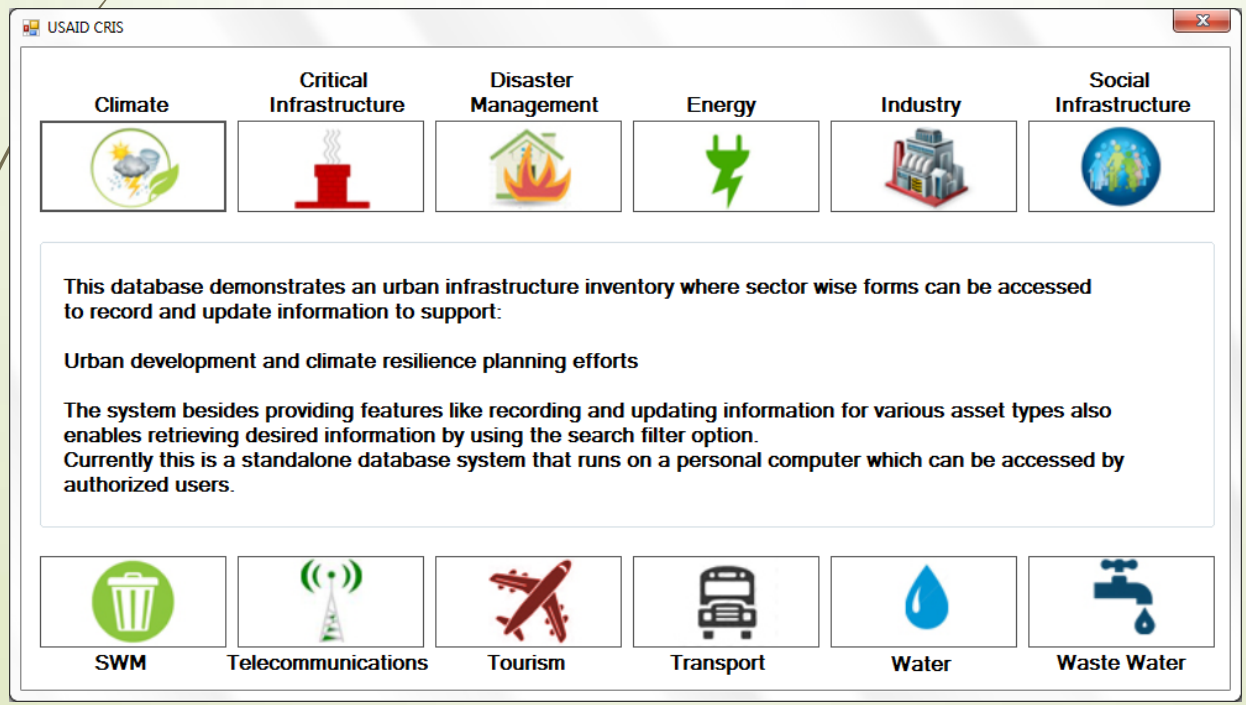
- To develop an inter-sectoral and inter-departmental urban infrastructure inventory to be housed at the municipal corporation level
- To capture sector wise locational and coverage details of basic infrastructure assets in the city
- To record the inventory information using a database management system (DBMS) software i.e. Microsoft Access
- To demonstrate the applicability of the DBMS to the city by enabling features of storing, retrieving and updating information in the database

Scope

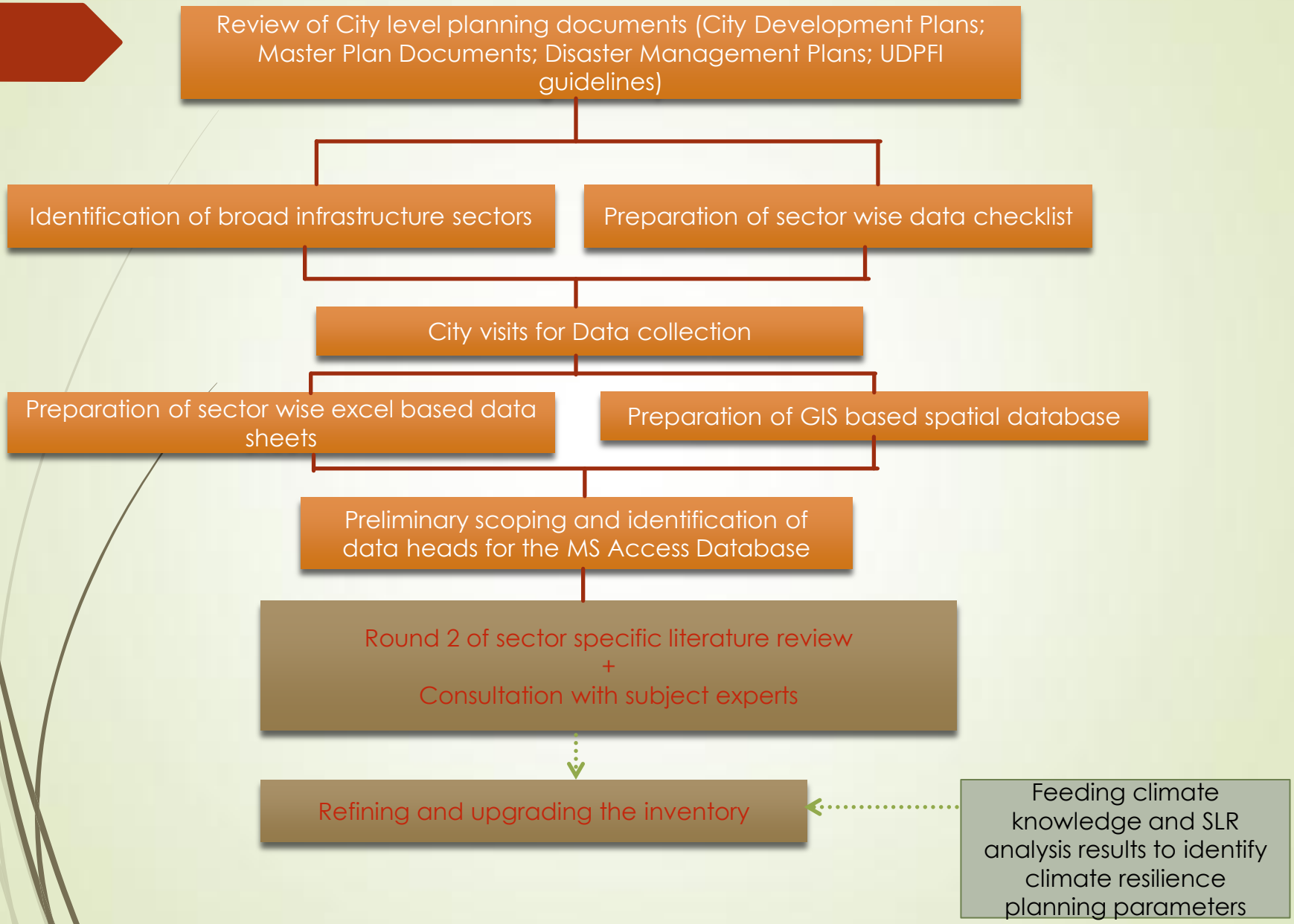
* The focus is on collecting baseline information on infrastructure assets and services at the city level and collating inter-departmental data in one place
* The infrastructure inventory does not look into design stage micro level details

Key sectors identified in the study

* Heritage and Tourism
* Water supply
* Sewerage and drainage
* Solid waste management
* Transport
* Social Infrastructure(Schools and Hospitals)
* Ecologically sensitive areas
* Energy and communications
* Disaster management

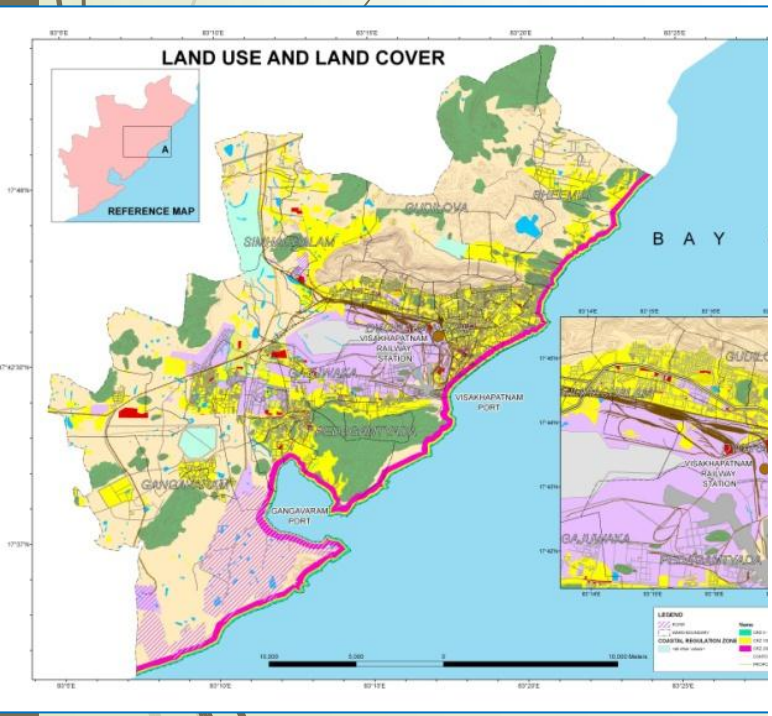


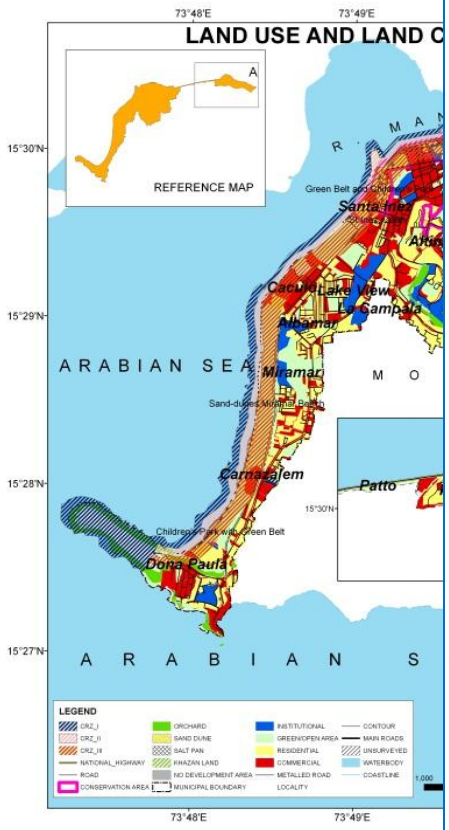
Approach for Inventorization

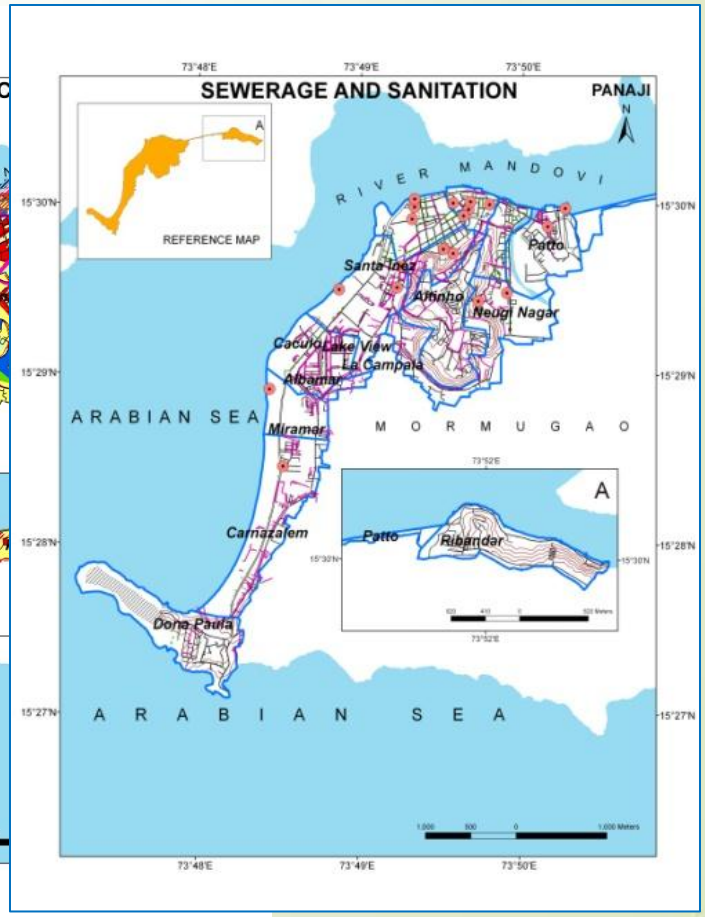


Inventorization of infrastructure assets

Literature review	• Identification of infrastructure sectors • Preparation of data checklists
Data collection	• Preparation of sector-wise data sheets • Preparation of GIS based spatial database
Scoping and identification of Data heads	• MS Access base system








TRANSPORT
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Santa Inez
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Caculo
Lake View
La Campala
Albamar
Miramar
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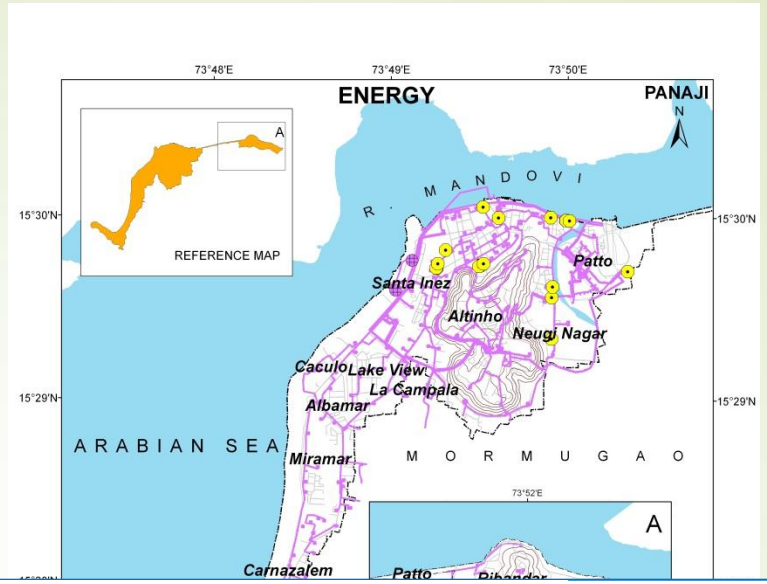
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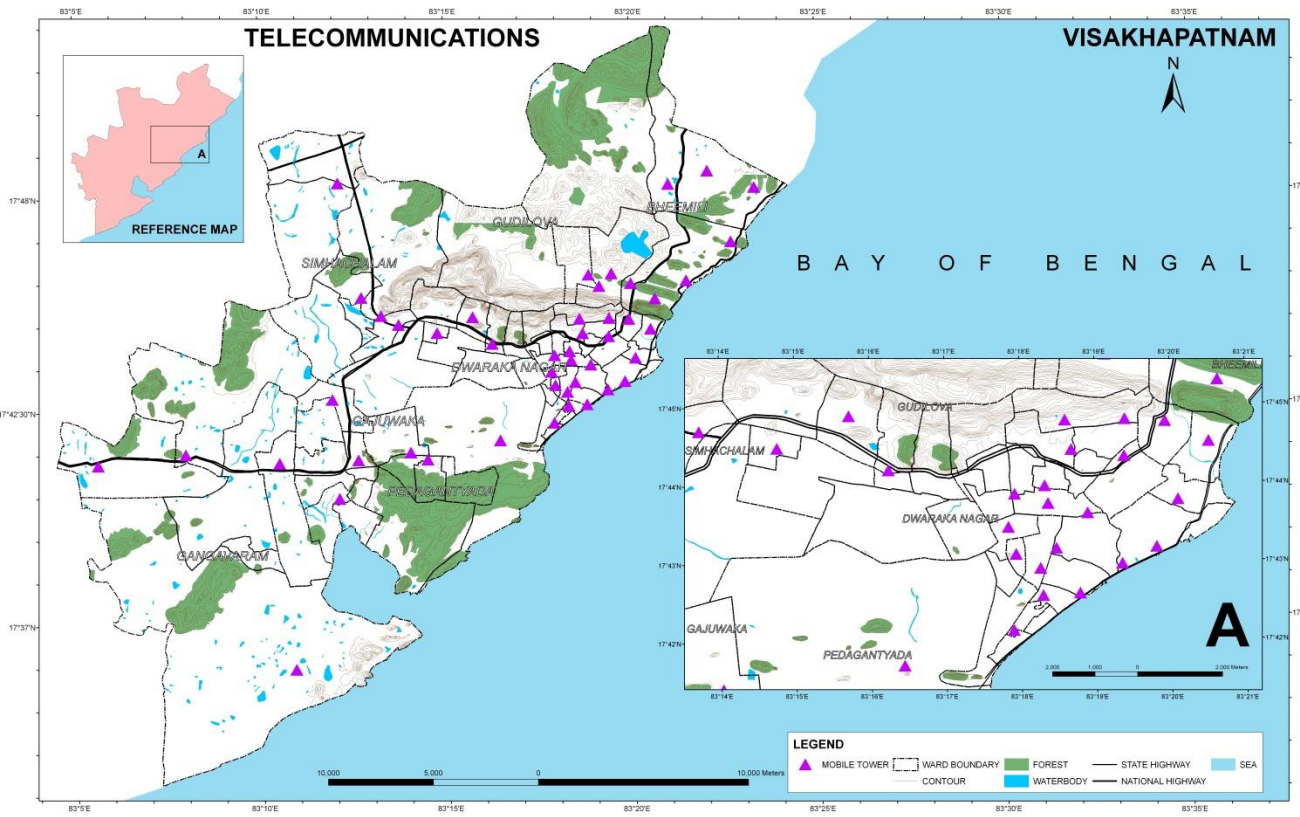
TELECOMMUNICATIONS
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VISAKHAPATNAM
BAY OF BENGAL
GUDILOVA
DWARAKA NAGAR
PEDAGANTYADA
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TOURIST ATTRACTIONS
HERITAGE PLACES
HOTEL
MOSQUE
TEMPLE
GURUDWARA
CHURCH
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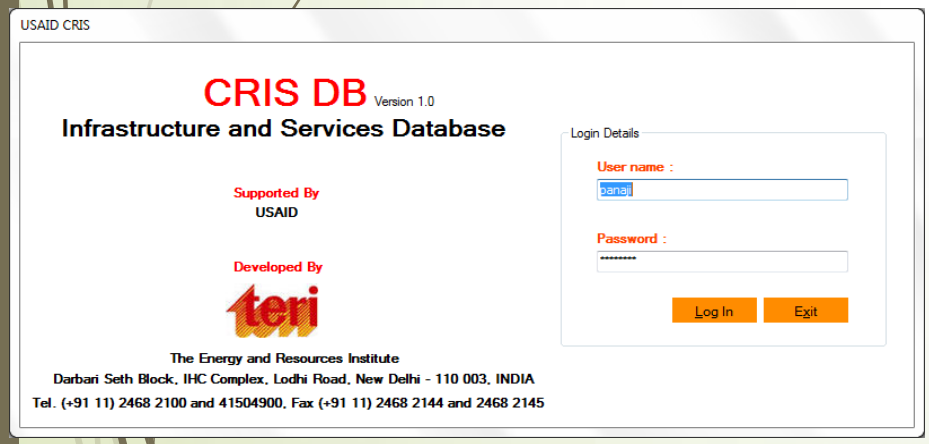
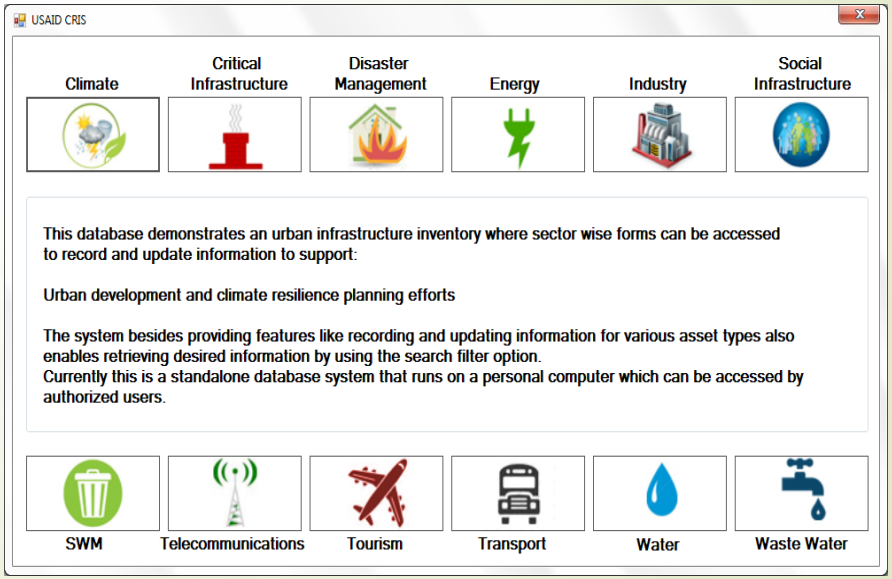
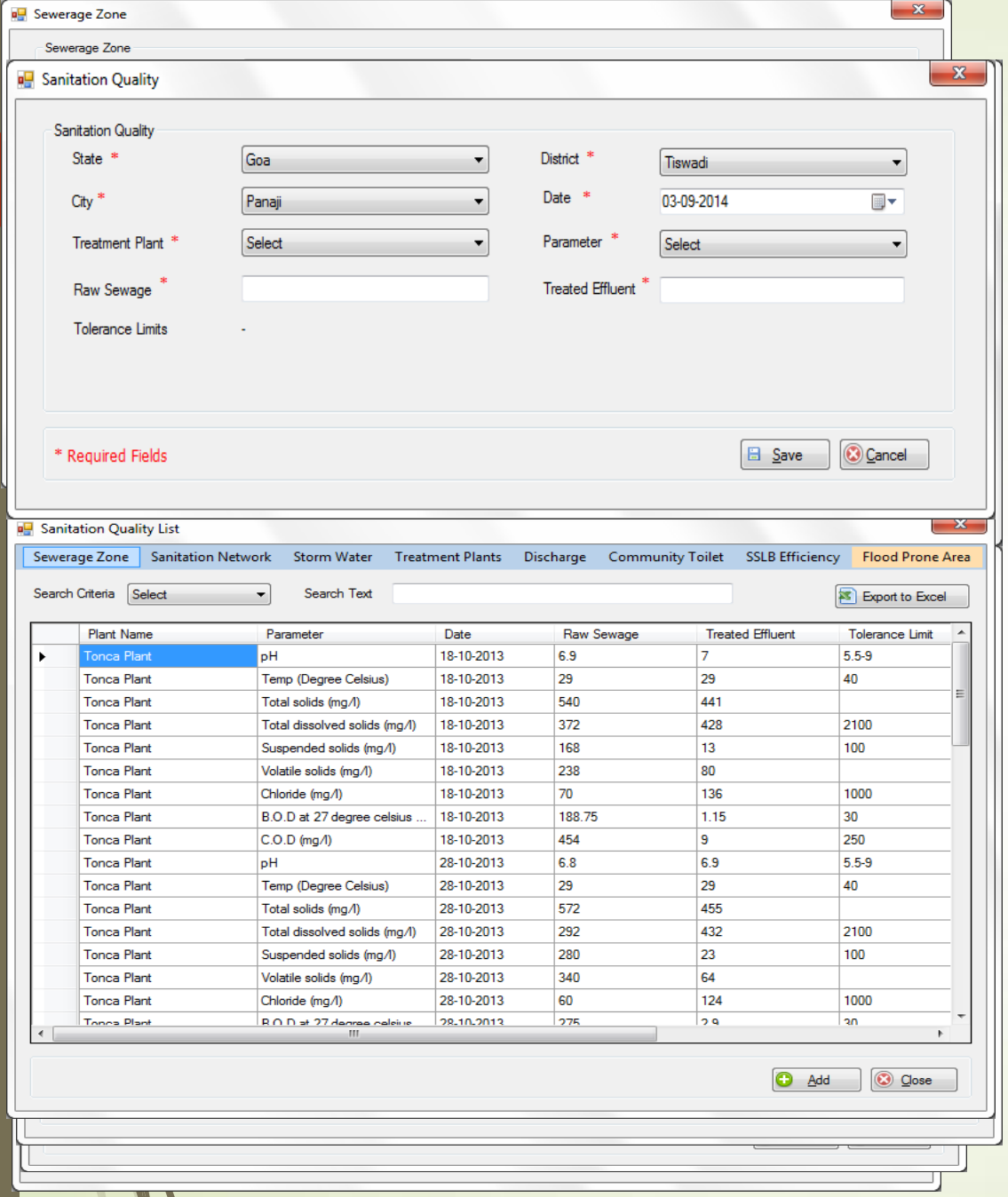
Inventorization of infrastructure assets

Literature review	• Identification of infrastructure sectors • Preparation of data checklists
Data collection	• Preparation of sector-wise data sheets • Preparation of GIS based spatial database
Scoping and identification of Data heads	• MS Access based Database Management system

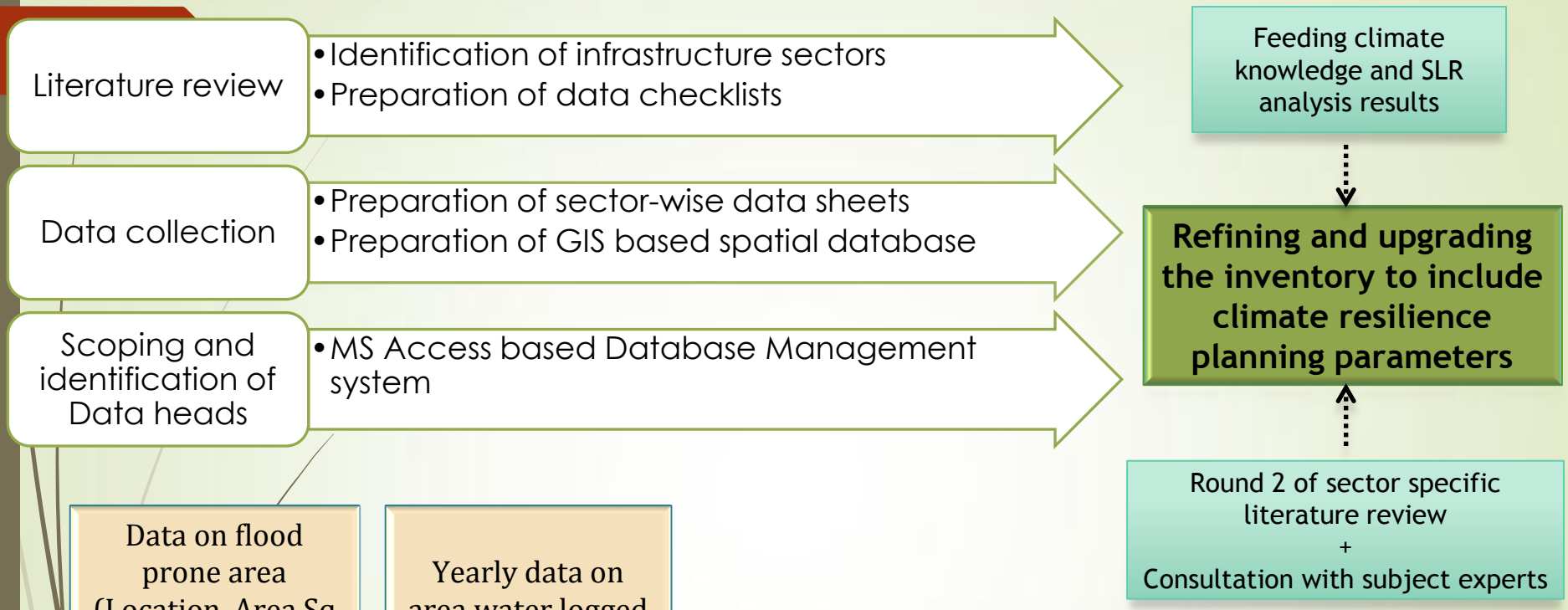




DBMS: Waste water sector



Inventorization of infrastructure assets



Data on flood prone area (Location, Area Sq Kms)

Yearly data on area water logged

Distance of waste water plant from sea

Width/section details of drainage in vulnerable areas

Network details (Maps, Area)

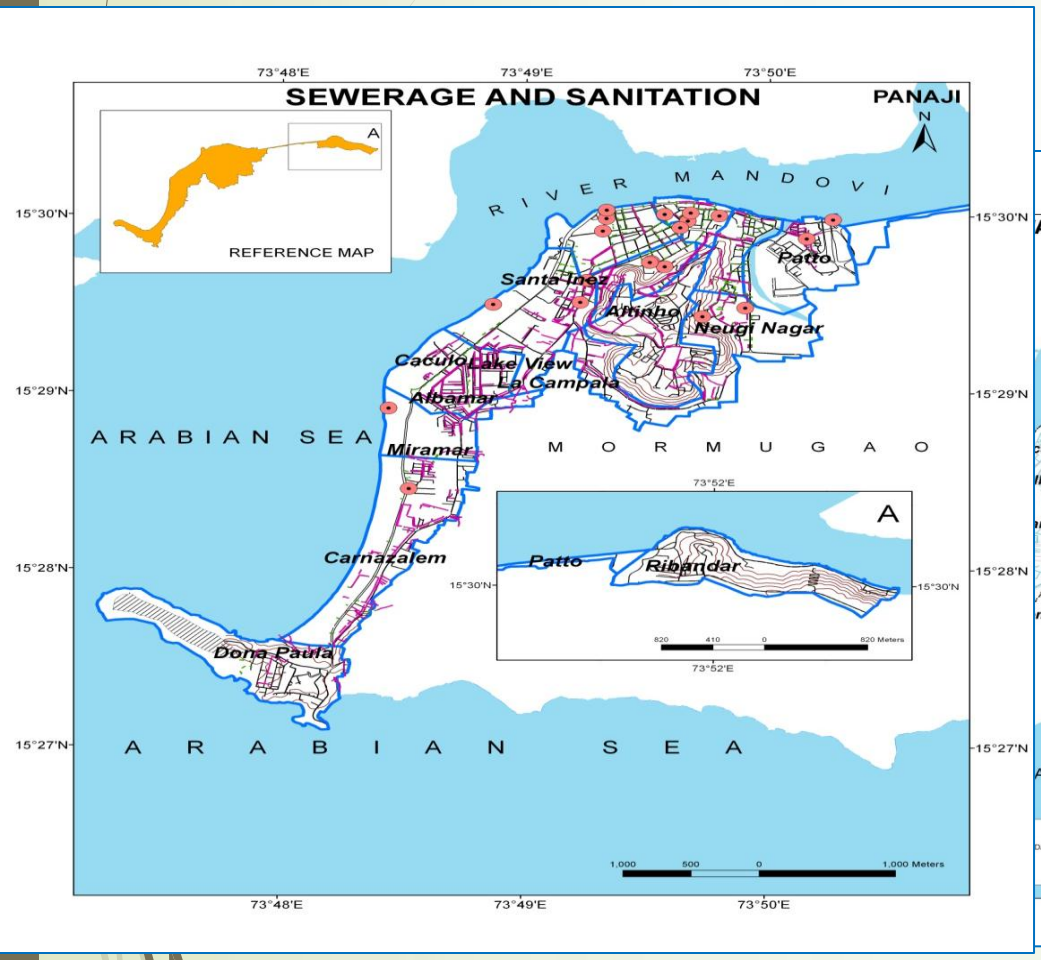
Maximum capacity of treatment plant

Maximum capacity of pumps

waste water treatment plant Geographic location, elevation, position of outlet pipes)

Height of outfall sewer at Sea(from MSL from HTL)

Spatial Inventory


SEWERAGE AND SANITATION
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REFERENCE MAP
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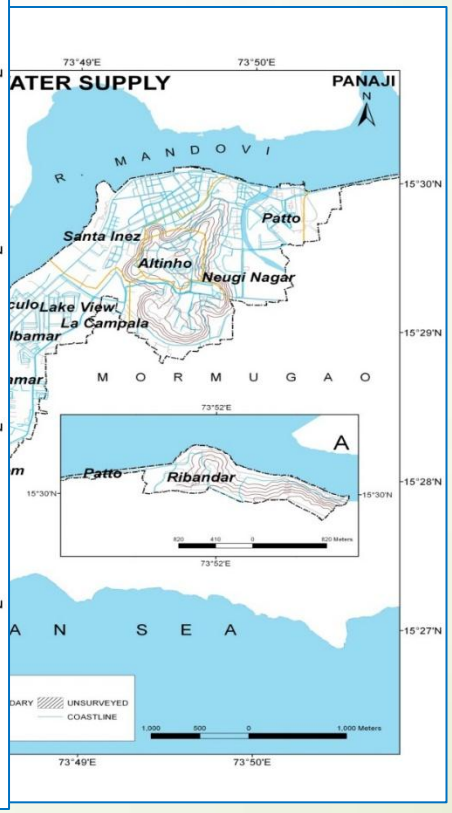
ATER SUPPLY
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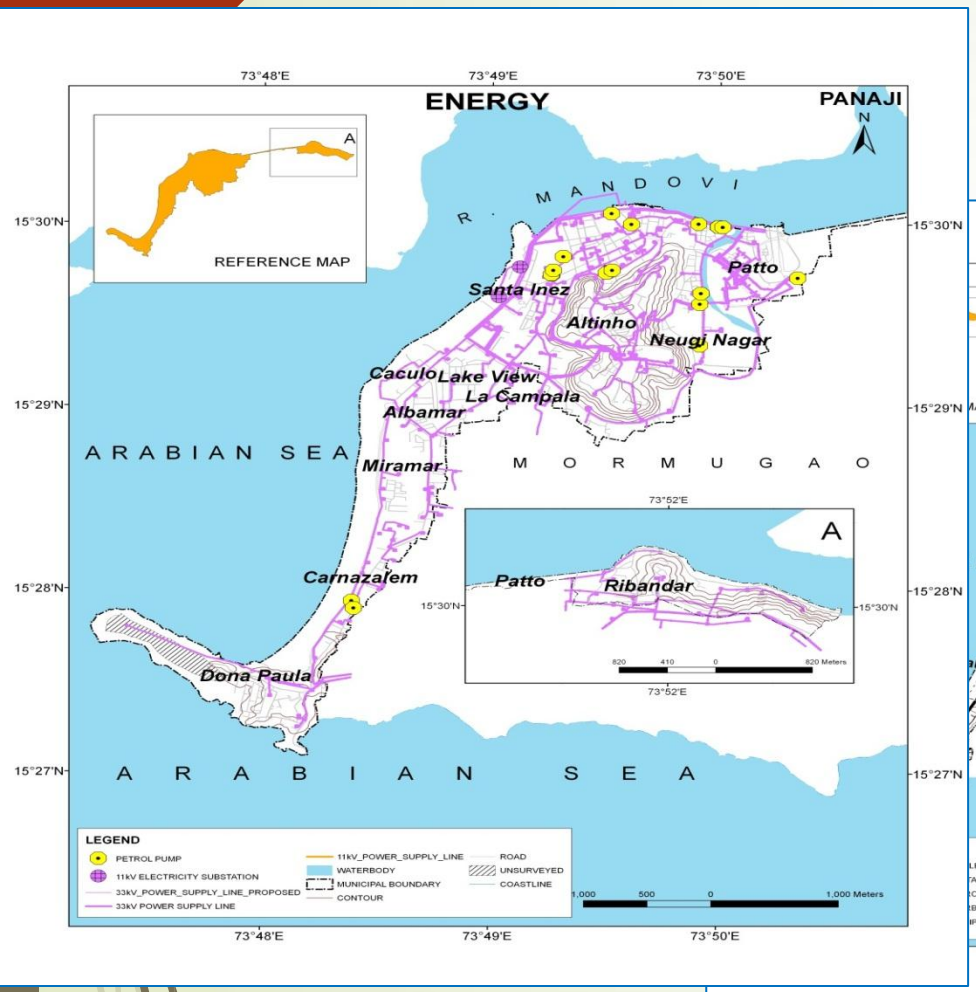
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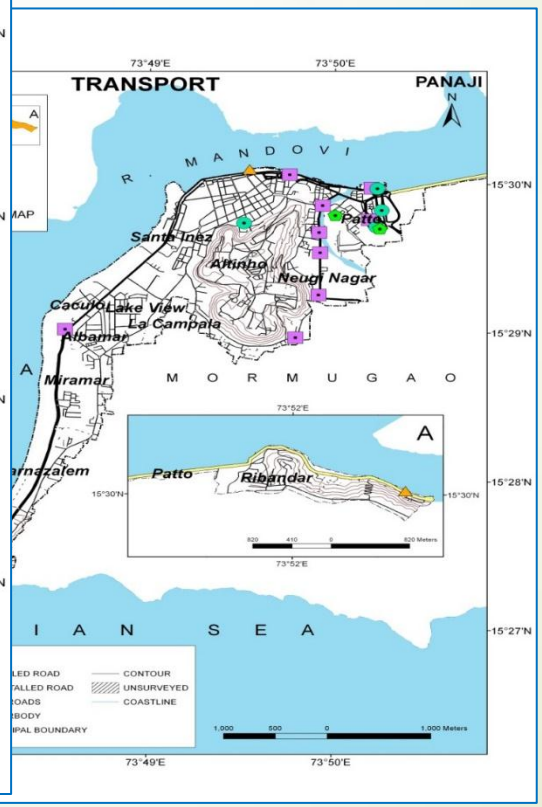
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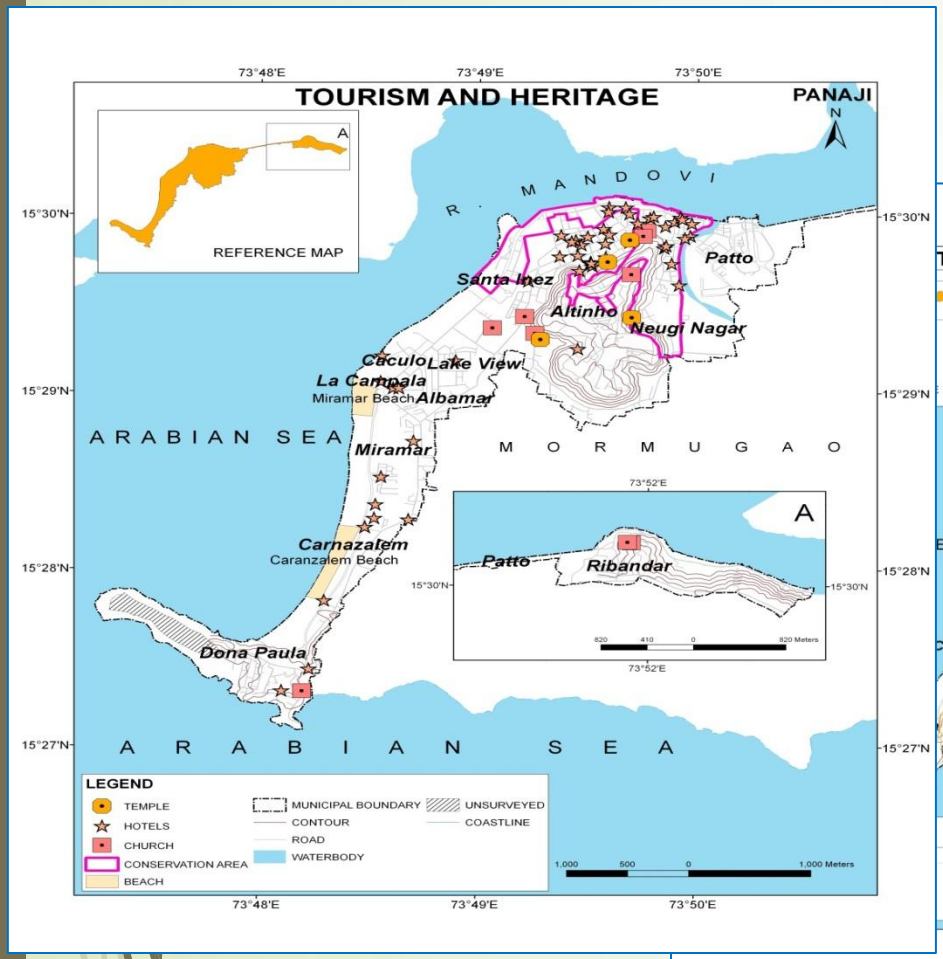
TOURISM AND HERITAGE
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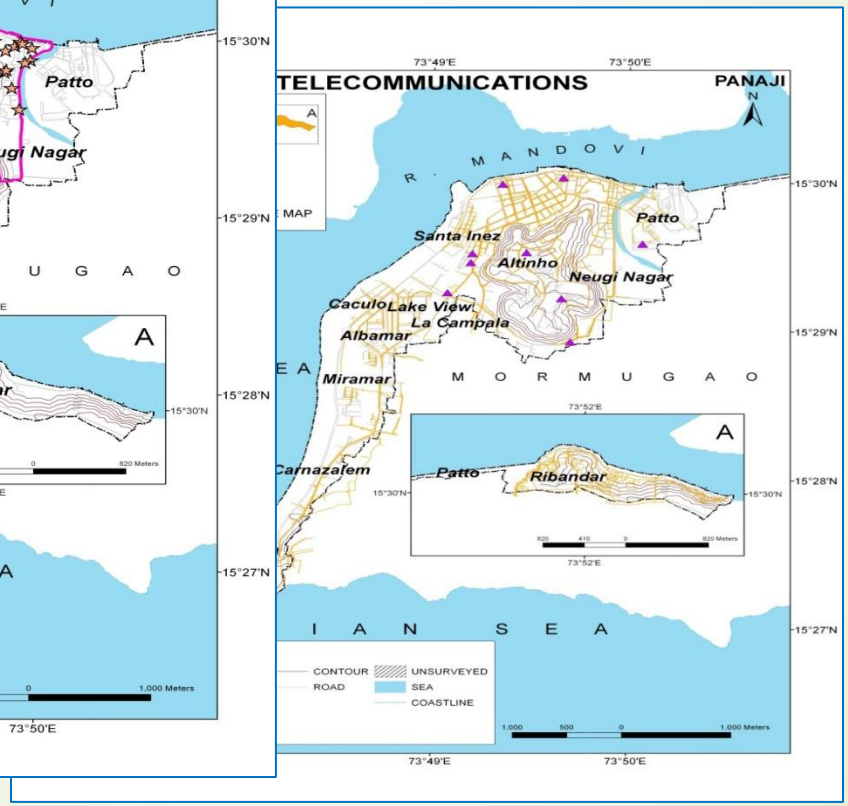
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Sector wise Data components

Sector wise Data components

Sectors	Data checklist
Water Supply	a) General info (Water Demand; Deficit) b) Sources of water and quantity supplied Storage i) Reservoirs – number, location ii) Pumping stations c) Water treatment plants- location; operating capacity d) Distribution categories and tariffs e) Water quality records
Waste Water System	a) Collection (or Capture) i) Sewerage zones and coverage ii) Storm water zones and coverage iii) Network details (diameter categories; length of network) iv) Location of community toilets b) Treatment i) Location and capacity of treatment plants ii) Type of treatment undertaken c) Location of discharge points d) Quality check records of treated waste water
Solid Waste Management	a) Generation: i) Source wise quantity of waste generation ii) Types of waste stream and corresponding quantity b) Collection: i) Frequency of collection ii) Location of bins/ community dumping sites c) Transportation & Transfer i) Type of vehicles and numbers ii) Location of transfer stations; segregation centres; sorting centres d) Treatment i) Treatment plants – location, numbers, capacity ii) Treatment methods e) Disposal i) Details of disposal techniques (location of landfills and their area)

Sector wise Data components

Sectors	Data checklist
Transport	a) Urban Public Transport systems – road and water based (urban buses, IPT and informal transport systems, boats and ferries, etc.) i) Location of bus terminals, parking areas b) Railways (Locations of railway stations and railway network in the city) c) Ports i) Ports/ harbors with boundaries ii) Connectivity to industrial zones and the city iii) Transport and other infrastructure at Port – Terminals, Container depots, etc. d) Airport (Location and capacity)
Electricity	a) Generation (Location listing of generation points) b) Transmission (Location of Grid stations/sub stations) c) Distribution Network- spatial data
Telecomm	Mobile Towers and Telephone exchanges – no. and location
Health	a) Location, type of management and number of beds–hospitals; urban health centres
Education	a) Location and intake capacity of schools – type wise
Industries/ SEZ	a) Number and locations of industries (Industrial estates) (Existing and proposed) – type wise b) SEZs with location (Existing and proposed)
Tourism information	a) Tourist visitation (month wise)- Domestic and Foreign categories b) Location of key tourist sites c) Locations of Hotels

Database Management System(DBMS)

Key Features

- Windows based system which can be installed in a standalone PC
- Central Repository of urban infrastructure
- Profile based access
- Easy updation of data using data entry forms
- Search on parameters
- Sorting on any Data field
- Date export to Excel for further analysis

S. No.	User Role	Access Rights
	Super Administrator	Super Administrator have the following rights for all the city/states: • View details of any asset • Add details of a new asset • Edit details of any asset
	Vizag System Administrator	Vizag System Admin have the following rights for Vizag city: • View details of any asset • Add details of a new asset • Edit details of any asset
	Panaji System Administrator	Panaji System Admin will have the following rights for Panaji city: • View details of any asset • Add details of a new asset • Edit details of any asset
	General User	General User of a city has rights to view details of any asset of his/her city.

Technology

- Development platform
  - .NET Framework 4.0
  - Coding in C# (C Sharp)
  - MS Access 2007
- Hardware
  - Standalone PC
- Software
  - Operating System: Windows
  - MS Access 2007
- Windows based application

Demonstration DBMS

Revisiting the inventory to add new data fields

Feeding climate knowledge and SLR analysis results

Refining and upgrading the inventory to include climate resilience planning parameters

Round 2 of sector specific literature review
+
Consultation with subject experts

Data on flood prone area (Location, Area Sq Kms)

Yearly data on area water logged

Network details (Maps, Area)

Distance of waste water plant from sea

Width/section details of drainage in vulnerable areas

Waste water treatment plant Geographic location, elevation, position of outlet pipes)

Maximum capacity of treatment plant

Maximum capacity of pumps

Height of outfall sewer at Sea(from MSL from HTL)

Future Scope of the DBMS

- Connect departments through network
- Development of a Web based system
- Providing anytime anywhere access to authorized users
- Capturing data from source (various authorities & departments) using online data entry
- Department based access rights to specific assets
- Workflow automation for verification and approvals
- Robust Search
  - Parameterised search
  - Free text search
- Email integration for Notifications, Alerts and Reminders
- Mobile based application
- Centralized easy manageability
- Security & scalability
- Enhancements based on users feedback

Way Forward

Implementing structural measures

- Retrofit and design adaptation of existing facilities in low lying areas- Airport
- In case of flooding, storm water drainage and adequate gradient /slope to the areas housing equipment, exit and entry should be ascertained

Resilience planning in infrastructure projects

- Most of the structural measures can be implemented as part of the infrastructure projects that are designed within the city development plans (CDPs)
- Considerations for infrastructure resilience can also be inbuilt into the DPR level
- Long term financial planning required for facilitating applications for external funds to assist with adaptation costs

Feasibility assessments

- Detailed cost benefit and feasibility studies required for undertaking engineering measures like raising the elevation of the outfall channel to sea; increasing and augmenting the capacity of the treatment facility etc.

Way Forward

Siting norms and SOPs

- Siting norms should be laid out for key infrastructure projects (like processing and industrial units) in and around vulnerable areas as per the CRZ Notification, 2011
- Preparation of the standard operational procedures (SOP) for emergency situations is required
- SOP can include alternate route planning measures- like an emergency supply plan with demarcated network routes as well as alternate modes of supply to restore water supply in the affected zones
- Alternative transport arrangements need to be planned for interstate / intercity commuting during floods, eg: alternative route planning for roads prone to blockage/flooding

Mainstreaming at policy level

- At a policy level, integrating vulnerability assessment and resilience planning in institutional and regulatory framework– Plans, Acts, Rules, Regulations, and enforcement of CRZ Notification, 2011