

City Resilience Framework for small and medium towns of India - An user guide

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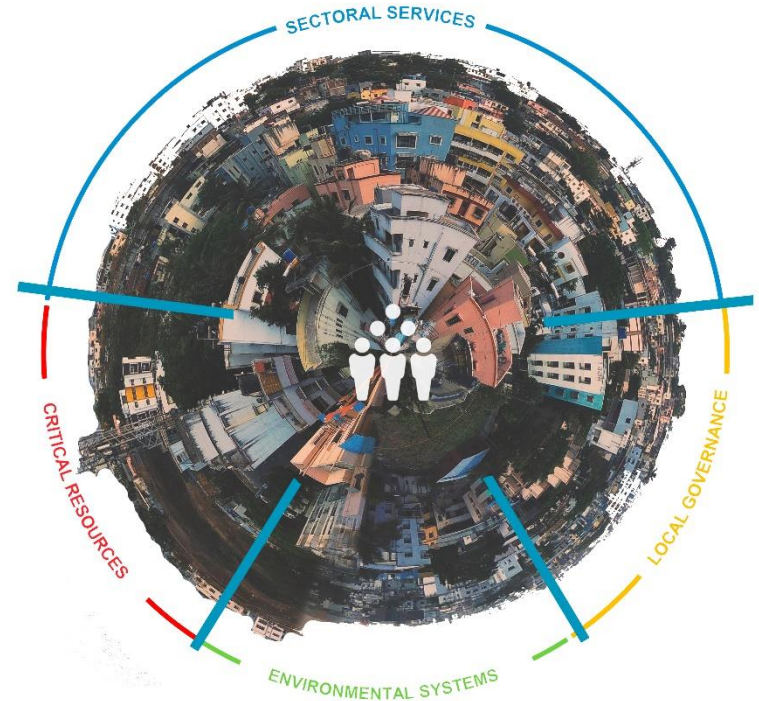
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City Resilience Framework for Small and Medium towns of India

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Aim and objective of the tool

Aim:

With a strong focus on small and medium cities of India, this framework and approach tool helps cities to self-assess themselves through a streamlined qualitative process with a series of steps and processes, identify their vulnerabilities across urban systems and people, prioritise them, enabling them to come up with resilience interventions adaptable to their respective cities.

Objectives :

- To focus on reducing vulnerabilities and increasing adaptive capacities of identified city service systems and vulnerable groups of people
- To understand the city ecosystems and integrate them into resilience city interventions
- To analyse and strengthen adaptive capacities of city service systems across various scales of the city. i.e. City ; Community ; Household/Individual
- To understand existing institutional frameworks, funding mechanisms, resources that can help implement the resilience interventions at the local level
- To integrate the resilience interventions with relevant existing or upcoming city plans and leverage them to achieve resource efficiency in terms of (capācity ; funds; technology ; manpower)

Disclaimer:

The tool identifies an approach with 3 phases ; The first two phases helps us to know the city, its challenges and helps us to prioritize the identified vulnerabilities. Then, potential interventions/proposals for the prioritized vulnerabilities are formulated by the core group as per the city context. The third phase is then used to analyze/screen those interventions for its resilience quotient, viability and mainstreaming it at various scales of the city through stakeholder involvement. The process includes refining interventions in phase three as per the resilience quotient and then a summary is prepared.

User groups of the tool

User group : Local governments

Purpose :

This process being open looped and reiterative is targeted at city's urban local bodies to strengthen their role in community and resilience building. It can be adopted by them to assess their city's risks and vulnerabilities, prioritize and implement corresponding resilience strategies.

User groups : Academia/Industry/Community groups/Planning agencies

Purpose :

This process is in a step by step format under three phases which is the ideal sequence to be followed. In case of cities, where certain parts of the analysis has already been done, this tool can be used for a inter-agency collaboration where in select parts of the process can be carried by any of the above mentioned user groups.

Aim of the resilience framework

MUNICIPAL URBAN SERVICES

VULNERABILITY REDUCTION and INCREASING ADAPTIVE CAPACITY



1. Resilient Built environment and Infrastructure



Inclusive and adequate access to safe water supply and sanitation



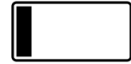
Adequate and Affordable energy supply



Strengthening of public health systems



Integrated planning – geography, ecosystem and urban systems by learning from the city's history.



2. Strengthening emergency response Capacity building - Technical aspects



Infrastructure in emergencies – Swift decision making (Network plans, specifications for consumption, SOPs, Disaster Management plans etc.)



Extreme events monitoring and data management at various scales.



Technology and Communication (Awareness and sensitization)



Collaboration, Community and Shared Learning (Government- Academia- Industry)



3. Legitimate Financial Investments and Regulatory Framework



New financial mechanisms at local level by collaborations – Resource efficiency



Infrastructure investments (implementation + O & M) and cost recovery

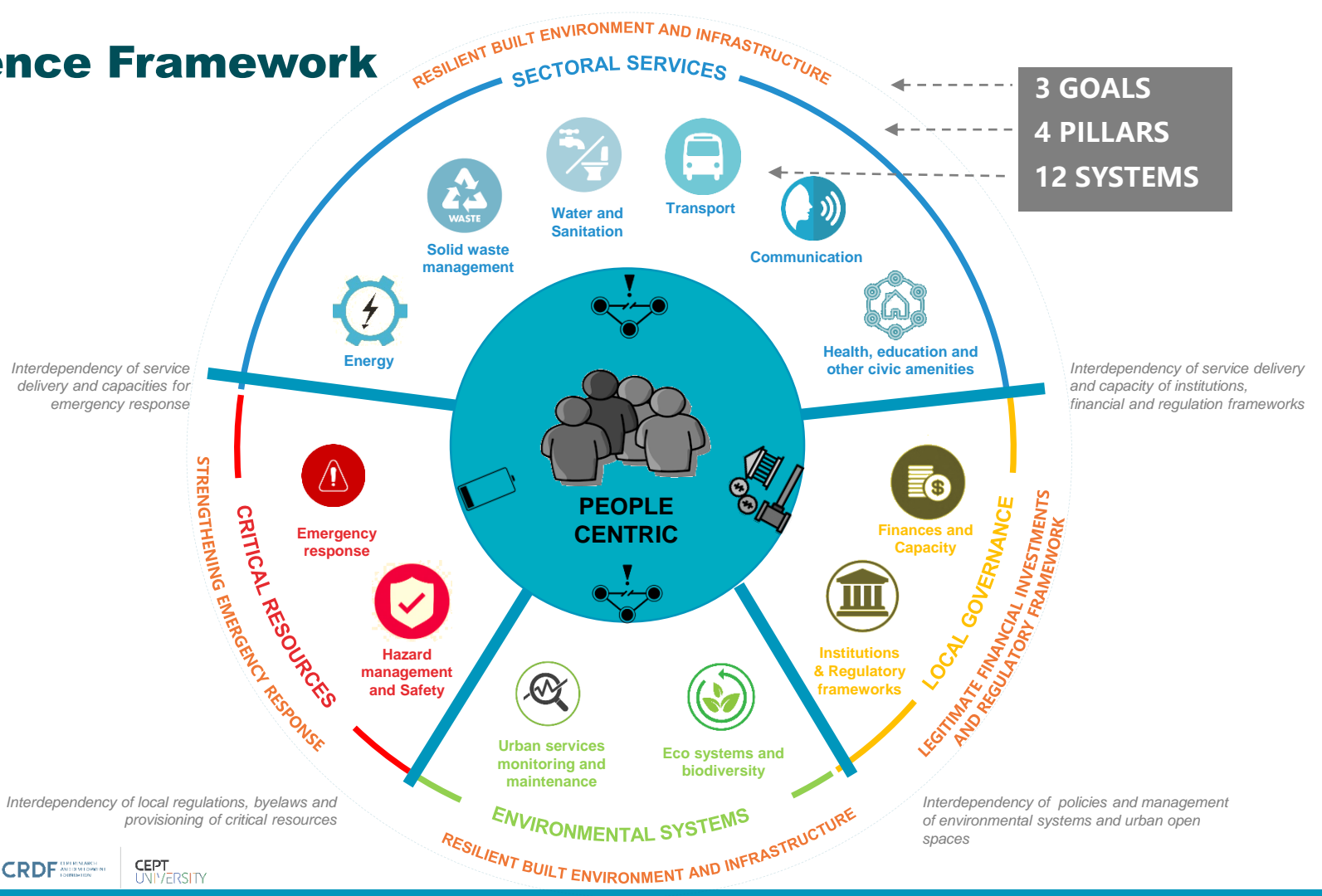


Incentivize disaster response measures

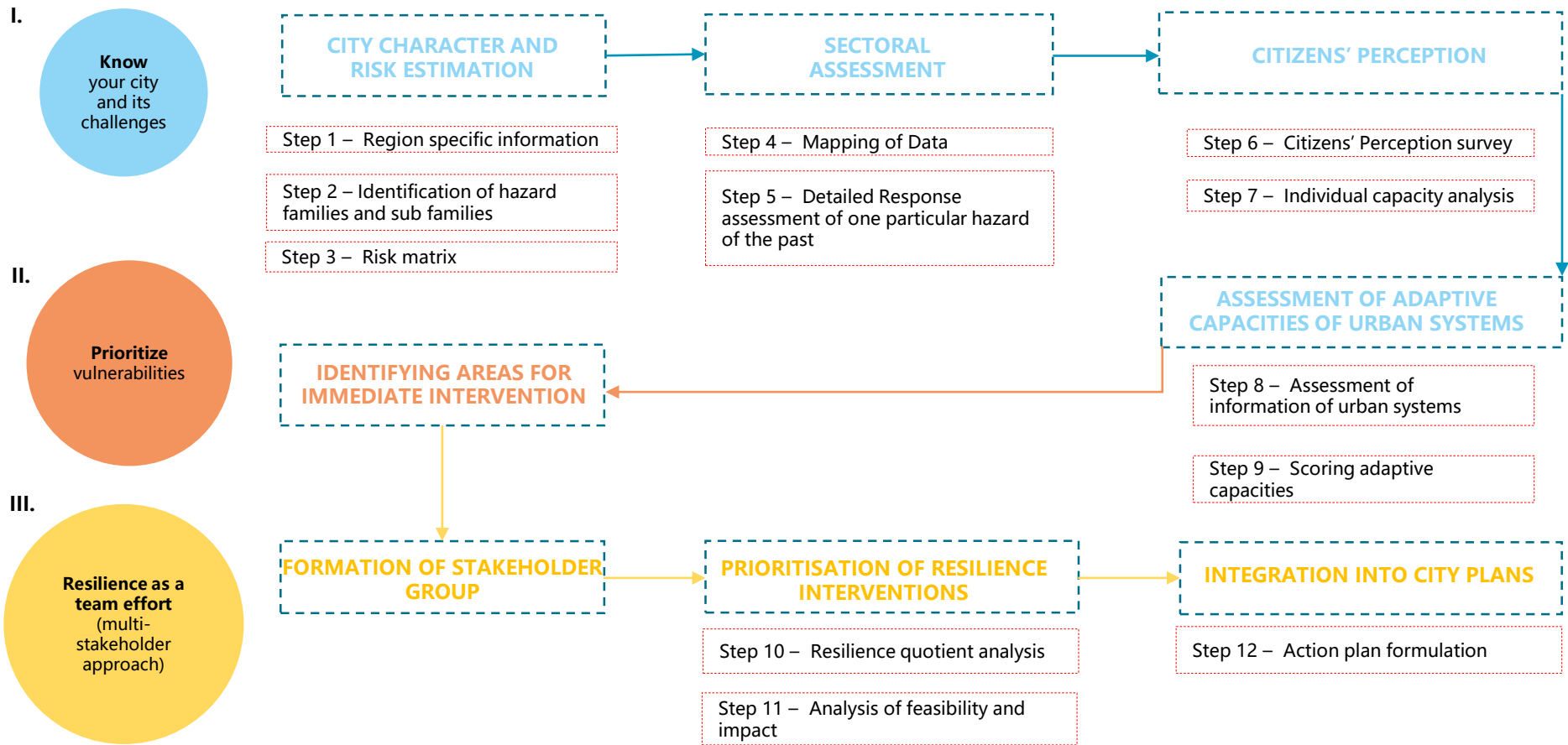


Invest in technological database support

Resilience Framework



The process – An overview



Phase I

I.

Know
your city
and its
challenges

CITY CHARACTER AND RISK ESTIMATION

Step 1 – Region specific information

Step 2 – Identification of hazard families and sub families

Step 3 – Risk matrix

Purpose :

To perform a quick risk estimation to get an idea of the potential disasters the city can face, based on,

- Frequency of occurrence
- Extent of their impacts on Infrastructure ; Basic services Social aspects ; Economy

Approach :

Qualitative and Quantitative

Output :

Identification of city type and a risk matrix with risk scores for identifying major hazards

Step 1 – Region specific information

Identification of the type of city with a brief description of the existing city systems across,

- I. HILLY
- II. RIVERINE
- III. COASTAL
- IV. MIXED – A combination of two or more ecosystems



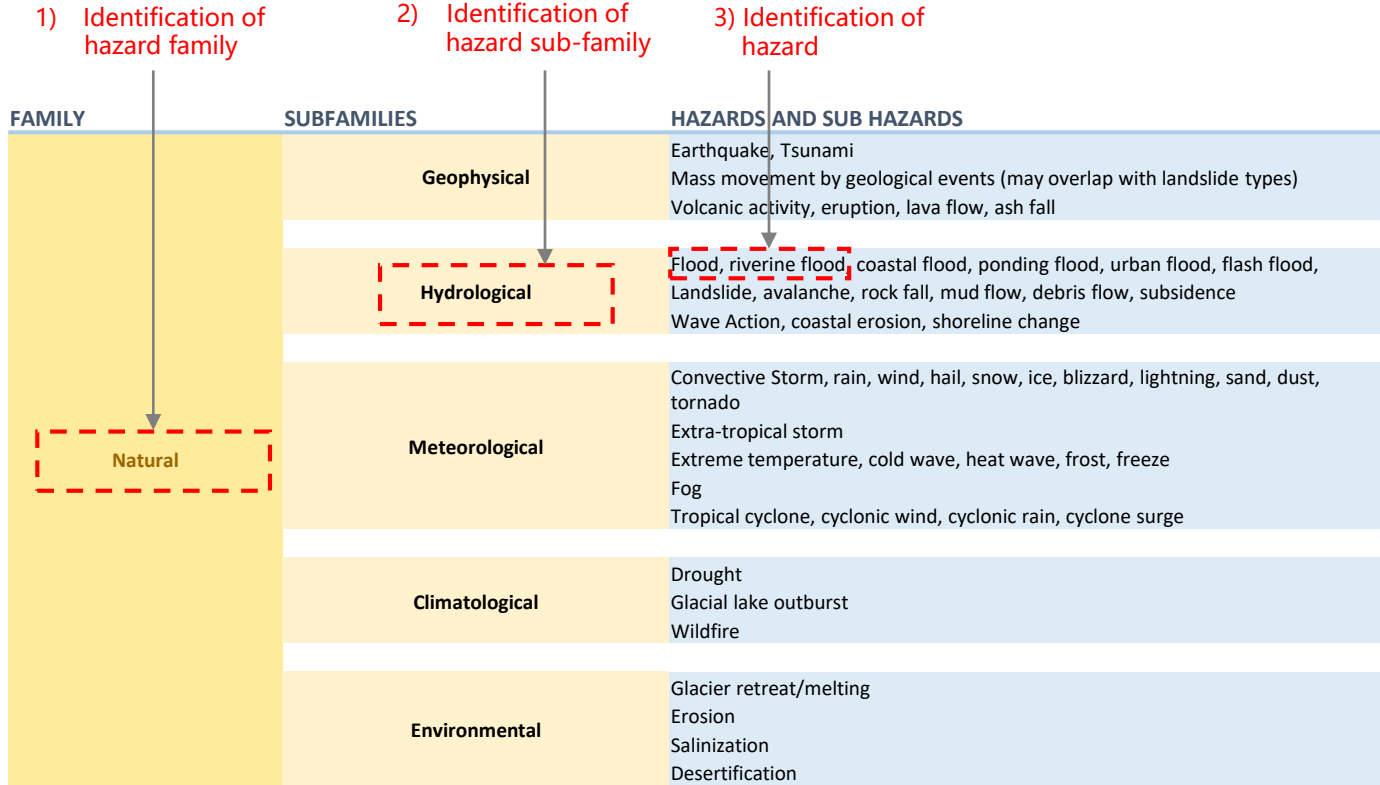
Phase I

I.

Know your city and its challenges

CITY CHARACTER AND RISK ESTIMATION

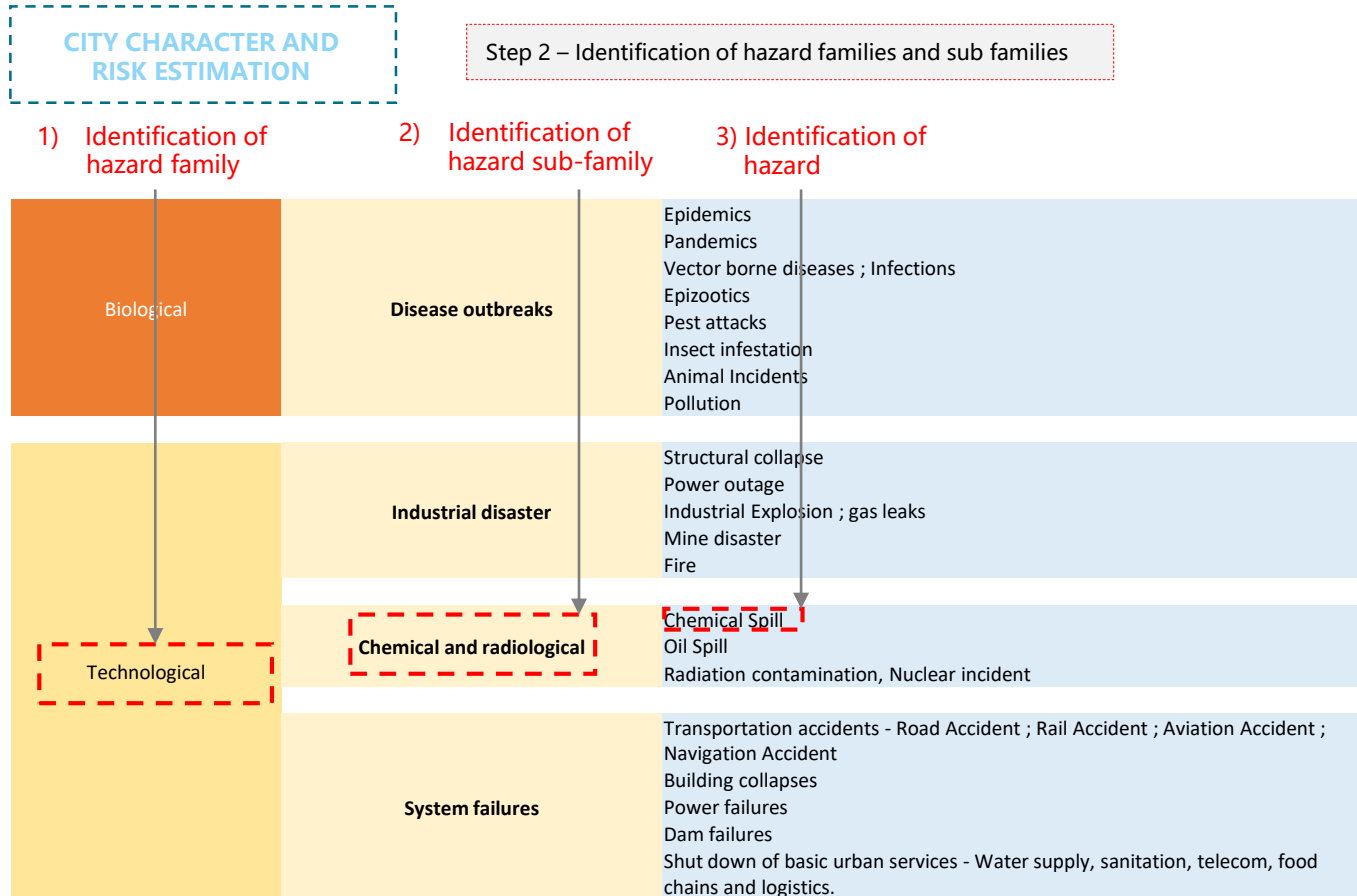
Step 2 – Identification of hazard families and sub families



Phase I

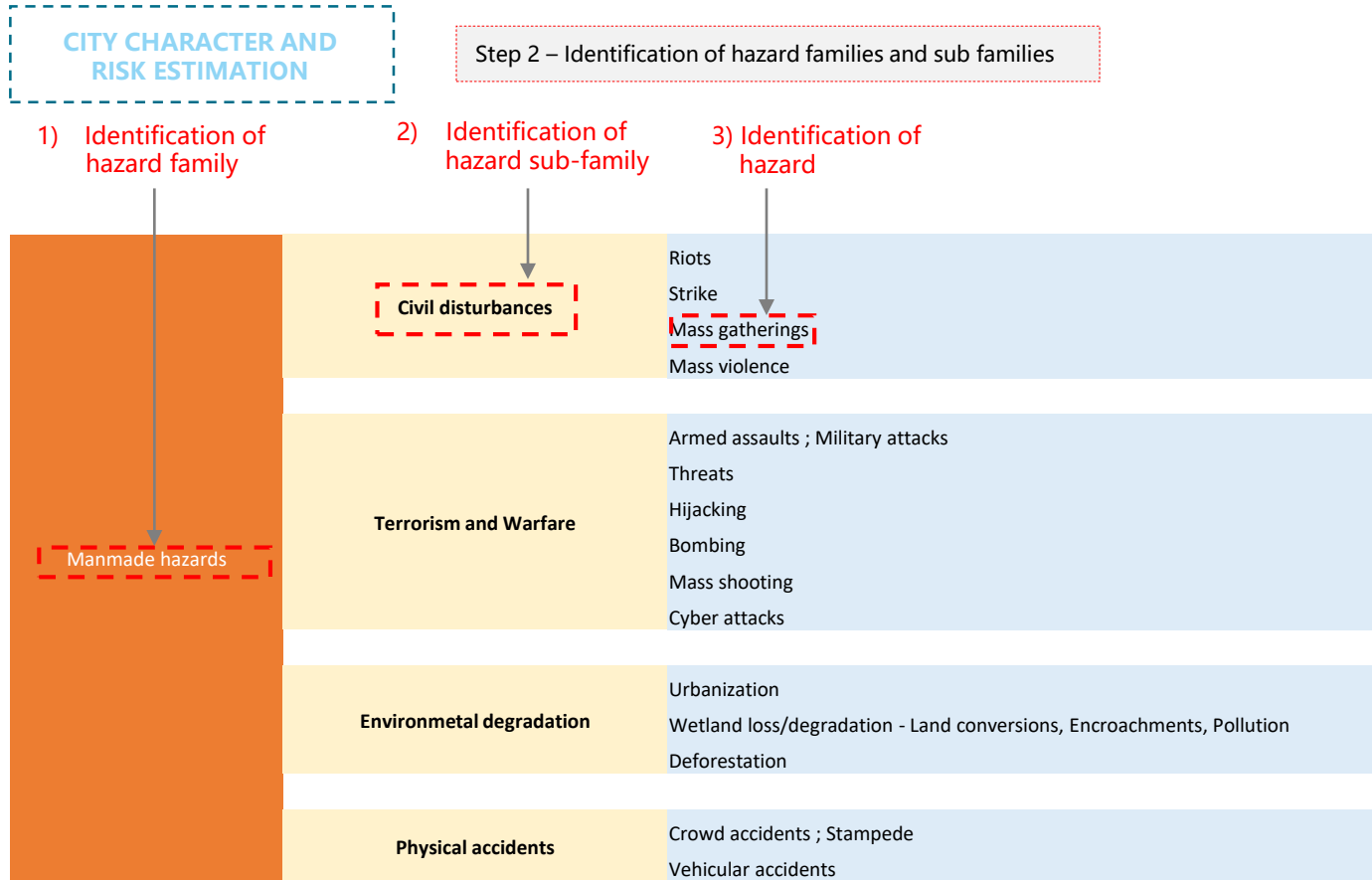
I.

Know your city and its challenges



Phase I

I.



Phase I

I.



Know
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and its
challenges

CITY CHARACTER AND RISK ESTIMATION

Step 3 – Risk matrix

To develop the risk matrix firstly, the identified hazards are analysed based on their frequency of occurrence. The following rationale is used for scoring:

- Likelihood analysis

Description	Scoring
Is highly likely to occur, could occur more than one time per year. Likelihood probably greater than 50%	5
Reasonable likelihood, may arise once per year. Likelihood 50/50 chance	4
May occur, perhaps once in 10 years. Likelihood less than 50% but still quite high	3
Unlikely but should still be considered, may arise once in 10 to 25 years	2
Likelihood probability significantly greater than zero. Unlikely in foreseeable future – negligible probability	1



Phase I

I.



CITY CHARACTER AND RISK ESTIMATION

Step 3 – Risk matrix

Secondly, the identified hazards are analysed based on their impact on vulnerable groups and urban systems. The following rationale is used for scoring:

- Impact analysis

Impact on system	Impact on the poor and vulnerable	Scoring
System fails completely and is unable to deliver critical services ; may lead to failure of other connected systems	Severe impacts on poor and vulnerable groups in the city leading to situations of extreme destitution	5
Serious impact on the system’s ability to deliver critical services, however not complete system failure.	Loss of confidence and criticism in city government; ability to achieve city vision and mission seriously affected; Significant impacts on poor and vulnerable groups in the city that seriously affects their lives and livelihoods	4
System experiences significant problems, but still able to deliver some degree of service	Moderate impacts on the lives and livelihoods of the poor and vulnerable groups in the city	3
Some minor problems experienced, reducing effective service delivery, possibly affecting certain other systems or groups	Minor impacts on the lives and livelihoods of the poor and vulnerable groups in the city	2
Minimal impact on system – may require some review or repair, but still able to function	Minimal impacts on the lives and livelihoods of the poor and vulnerable groups in the city	1



Phase I

I.



Know
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CITY CHARACTER AND RISK ESTIMATION

Step 3 – Risk matrix

The risk matrix is then formulated and major hazard are identified by the risk score.

Risk score – Likelihood x Impact

L I K E L I H O O D	Frequent / Very likely - 5					
	Moderate / Likely - 4					
	Occasional - 3					
	Unlikely / improbable - 2					
	Rare - 1					
		Insignificant - 1	Minor - 2	Moderate - 3	Major - 4	Catastrophic - 5
		I M P A C T				



Phase I

I.



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SECTORAL ASSESSMENT

Step 4 – Mapping of Data

Step 5 – Detailed Response assessment of one particular hazard of the past

Purpose :

To map data across the identified 12 systems under 4 pillars of,

- Sectoral services
- Environmental systems
- Critical resources
- Local governance

through assessment questionnaires focusing on vulnerable groups and interdependencies between various aspects.

Approach :

Qualitative and Quantitative

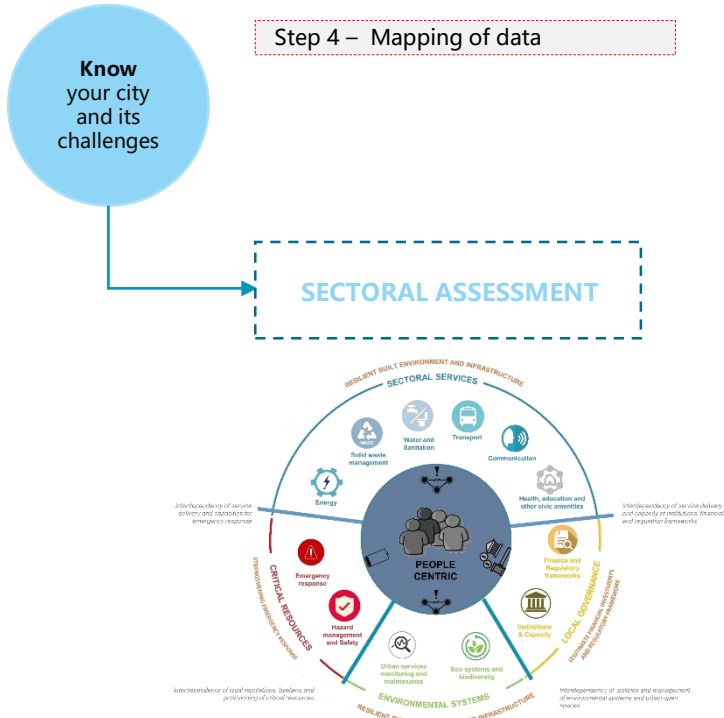
Output :

Qualitative and quantitative data / Maps gathered under all 12 systems identified



Phase 1

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Approach : **Qualitative and Quantitative**

In addition to a city's profile across,

POPULATION LITERACY EMPLOYMENT INDUSTRIAL PROFILE

since, **FRAMEWORK IS PEOPLE CENTRIC**

we focus on identifying, **VULNERABLE GROUPS**

Population considered vulnerable to identified major hazards

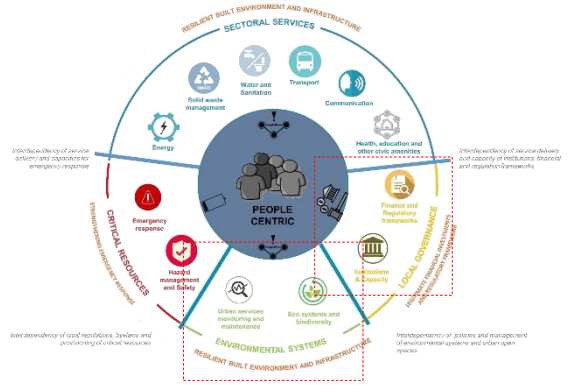
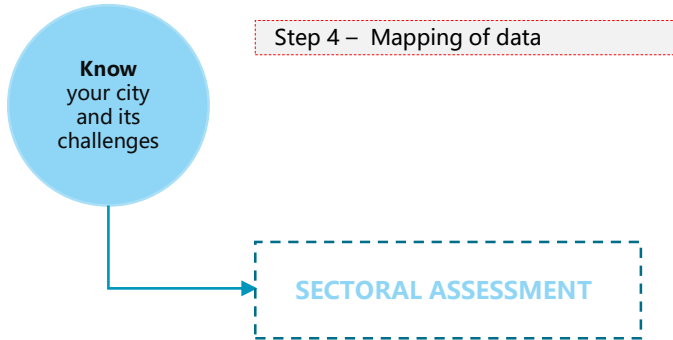
Locations identified for relief camps or rehabilitation after evacuation during major hazards / Safe routes / Evacuation plans

Population - Elderly / Differently-abled / Women and children

Any welfare schemes / development programs for the identified vulnerable groups?

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Approach : Qualitative and Quantitative



Urban services monitoring and maintenance



Eco systems and biodiversity

ECOSYSTEMS AND BIODIVERSITY

Reserves ; sanctuaries or marine protected areas, if any?

Area under green cover

Any concerns of encroachment identified? (Eg : land conversions ; clearing of coasts ; mangroves) If so, encroached area

Any concerns of pollution/degradation of the ecosystems?

Are there byelaws/regulations of landuse and building construction (Eg: CRZ zones ; Flood lines in rivers etc)

Is there adequate understanding and data about the current status of the different ecosystems within the city, their strengths, and their weaknesses? If so, any GIS mapping/analysis reports available?

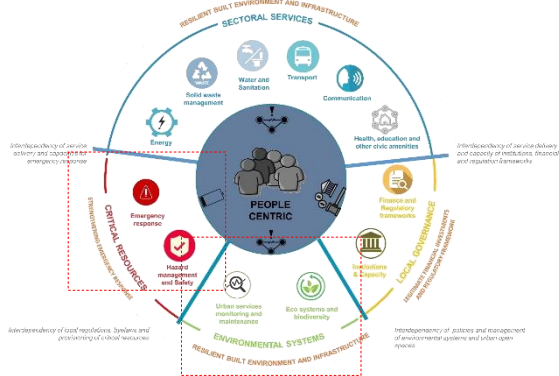
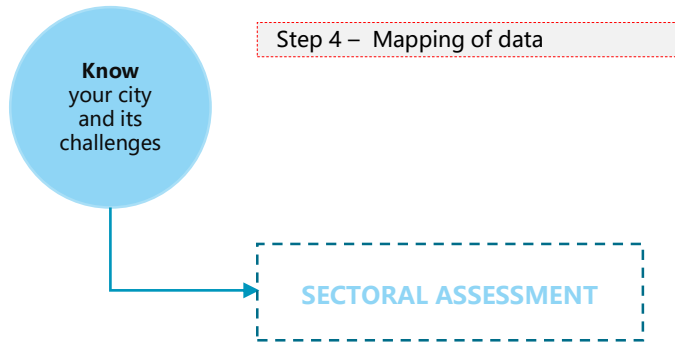
Monitoring and Maintenance models ; NGO Activities - Community participation etc

Any existing schemes for protection and management of the identified ecosystems?

Funds allocated or staffs appointed by the municipal council to monitor and maintain the ecosystem?

Phase 1

I.



Approach : Qualitative and Quantitative



Urban services monitoring and maintenance



Eco systems and biodiversity

AGRICULTURE AND LIVESTOCK

Total area of agricultural land

Regional crop seasons

Primary crop

Secondary crop

Contribution to local economy (%)

Contribution to local food requirement (%)

Annual crop damages due to extreme events

Total livestock wealth

Livestock management mechanisms

Contribution to local economy

No. of losses of livestock due to hazards annually?

WATER RESOURCES

Number of water bodies in the regional level

Water bodies in the city

Depth of ground water table

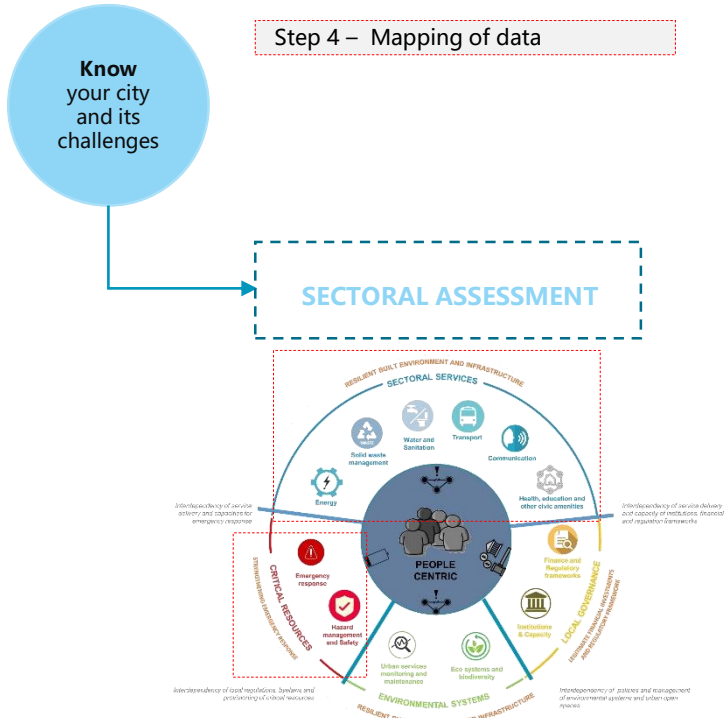
Water quality (as per Pollution control board categories or any other authorised standard)

Flood control structures, if any? If so, any instances of failure of the flood control structures?

Area/ Points of the city regularly subject to flooding (sq.km)

Phase 1

I.



Approach : **Qualitative and Quantitative**



Water and Sanitation

Is seasonal dependency on alternate sources observed?

Water supply duration variation during different seasons observed? / Any disruptions in water supply during hazards like floods?

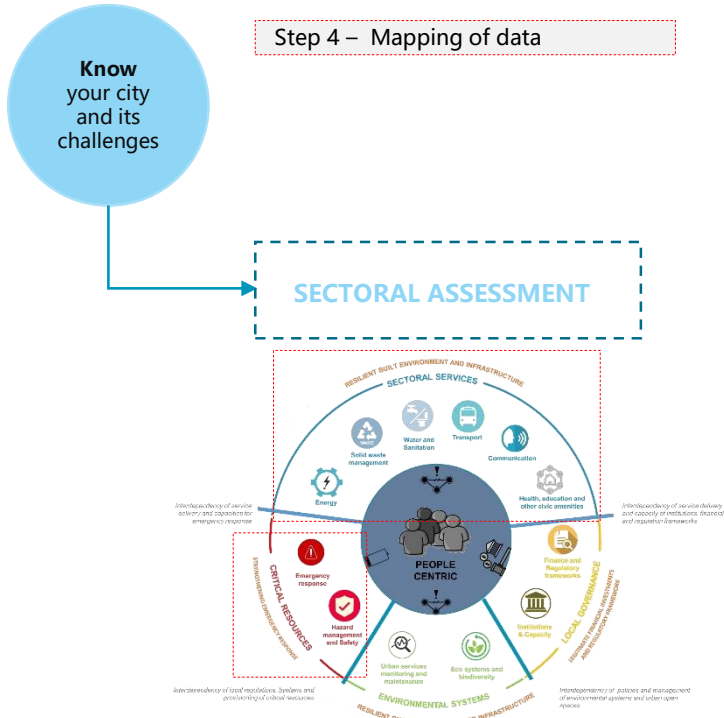
Are there alternative sources of water supply during emergency? Capacity from alternate sources

Are spare capacities retained for emergency like fire or drought? If so how much capacity is retained under each head?

Are there byelaws for emergency capacity retainment at the local level or any advisory from the state government or the district authority that the city is following?

Phase 1

I.



Approach : Qualitative and Quantitative



Solid waste management

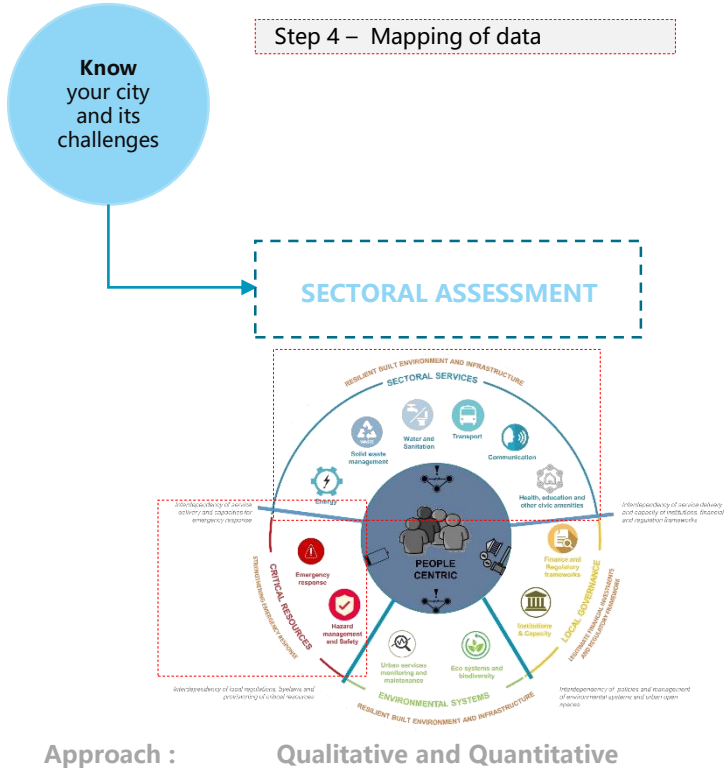
Any prominent nuisance points? (Location and number)

How is industrial waste handled? Existing mechanisms, if any?

How is the bio medical waste from medical facilities handled? Existing mechanisms, if any?

Phase 1

I.



Energy

Sector wise energy usage (domestic / commercial / industrial / Agriculture)

Average duration of electricity supply per day during various seasons

No. of households with electricity connections

Are there any alternate options of energy used for electrification (E.g. Solar)?

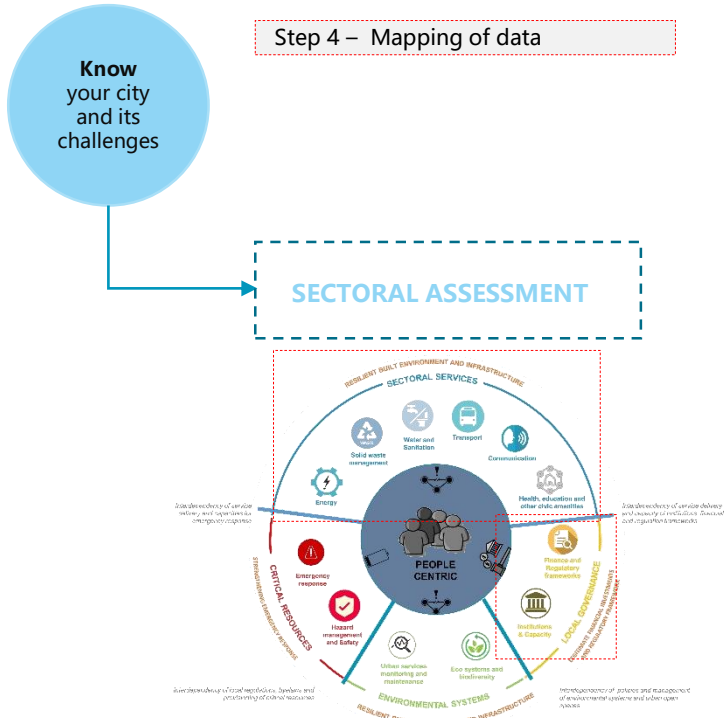
Fuel used for cooking - LPG/ biogas etc - No. of households and dependency

Frequency of power outages? Duration? Reasons for the same? (monthly or annual)

Are alternate energy options (for fuel, power etc.) sourced to the city? If so, what are they, their purpose of use and are those alternate options viable financially?

Phase 1

I.



Approach : Qualitative and Quantitative



Water and Sanitation



Solid waste management



Energy

Involvement of private sectors for contractual services - Responsibilities assigned and contract periods

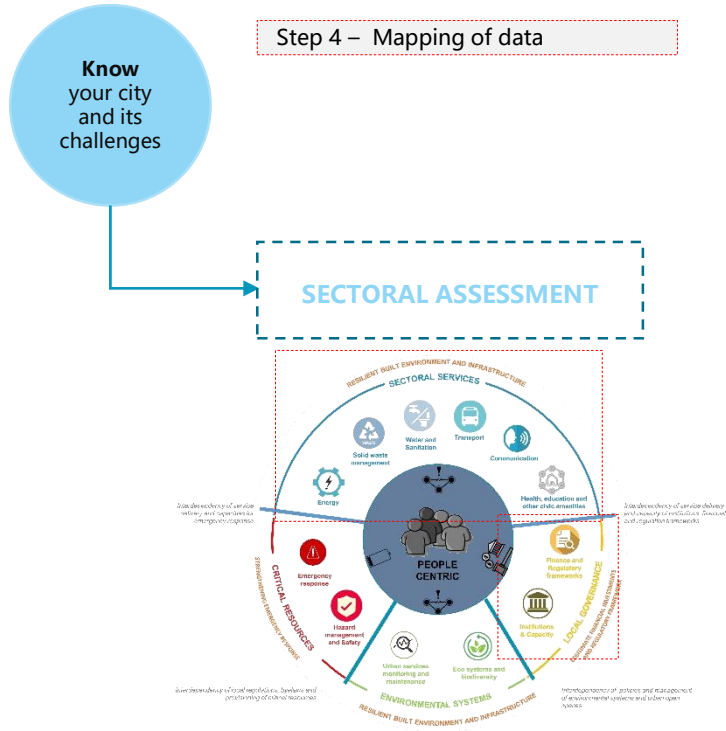
Academia - industries - government collaborations observed in the sector, if any?

Schemes the city works under for improvement of the sector's services, financial allocation and their status

Involvement of NGOs and community in the management or monitoring of this service, if any? Details on the same

Phase 1

I.



Approach : Qualitative and Quantitative



Transport



Communication

TRANSPORT

Types of public transport systems available

Is the public transport system accessible by all?

Dependency on public transport / Modal share of transport

Has there been road blockages or failures during the past year? If so, how frequent? And reasons for the same?

Are there traffic congestion points in the city?

Are there road safety volunteers in the city?

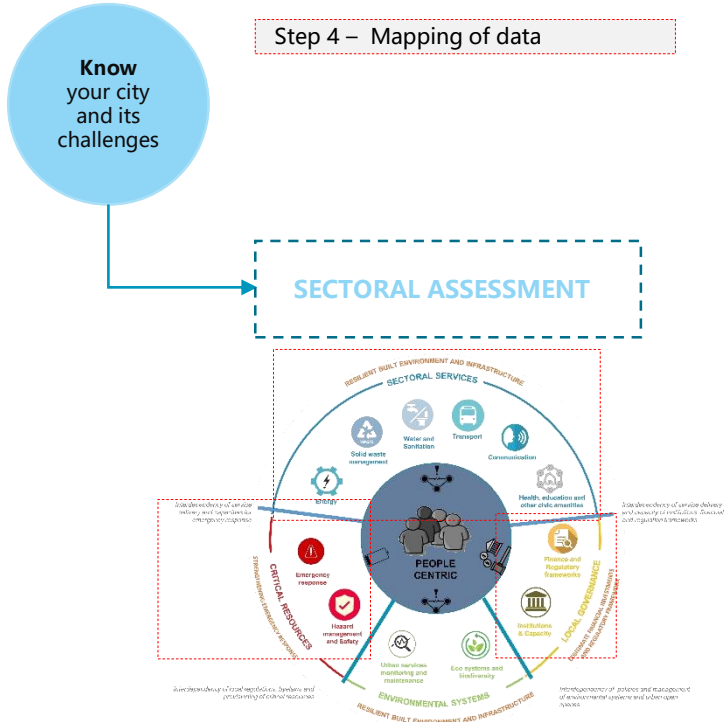
COMMUNICATION

Is the city well serviced by network connectivity for communication through phone and internet? (Coverage)

How do people communicate in times of network shutdowns during disasters like floods? Any rescue patrol/helpline services in practice?

Phase 1

I.



Approach : **Qualitative and Quantitative**



Health, education and other civic amenities

HEALTH

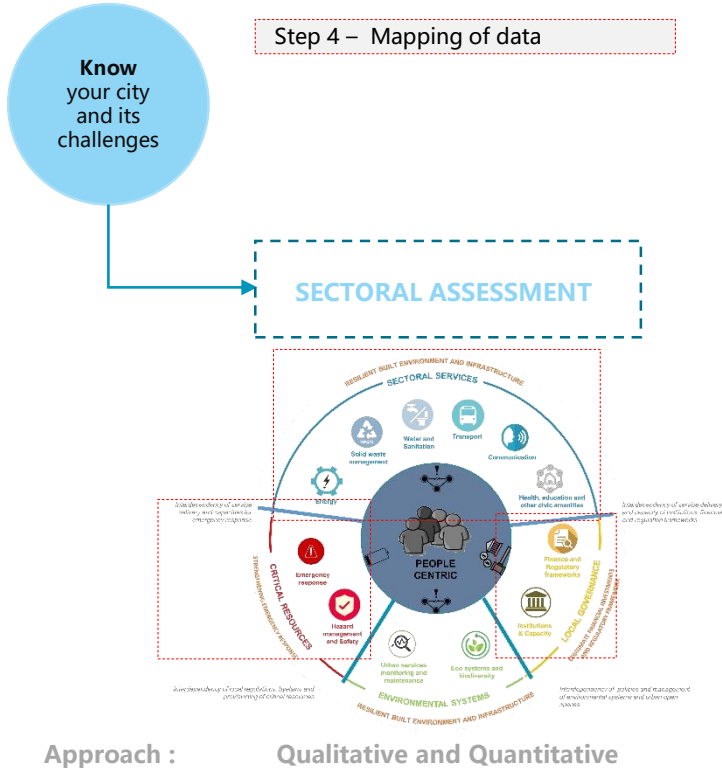
- Infant mortality rate (annual)
- Maternal mortality rate (annual)
- Deaths per year from communicable diseases
- Disease deaths distribution (M/F)
- Deaths from calamities/ extreme climate events/disasters (number/year)
- Number of infant vaccinations administered per year
- Prominent diseases list
- Seasonality of diseases

EDUCATION

- Do schools and institutions follow building code (NBC) on the minimum standards for fire safety?
- Technical training and safety drills conducted in schools? If yes, details on organization involved (private or public) and frequency of drills conducted?

Phase 1

I.



Health, education and other civic amenities

PUBLIC AMENITIES

No of public parks in the city

Are parks, public open spaces/heritage sites maintained well? Reasons?

Heritage structures in the city? Details on ongoing conservation plans / maintenance mechanisms?

Are there tourist shelters in the city? If yes, No of tourist shelters?

Burial/ Cremation grounds in the city

HOUSING

No. of housing properties/units considered at risk of flood or landslide damage (Properties on red lines ; CRZ zones etc)

No. of homeless people identified, if any ?

PUBLIC DISTRIBUTION SYSTEM

No. of ration shops, municipal markets in the city and no. of days they are open/ functional?

Is relief provided through the PDS during emergencies?

Any other issues faced in the distribution system during hazard situations?

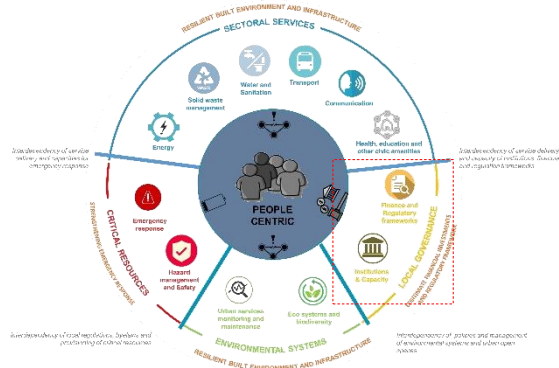
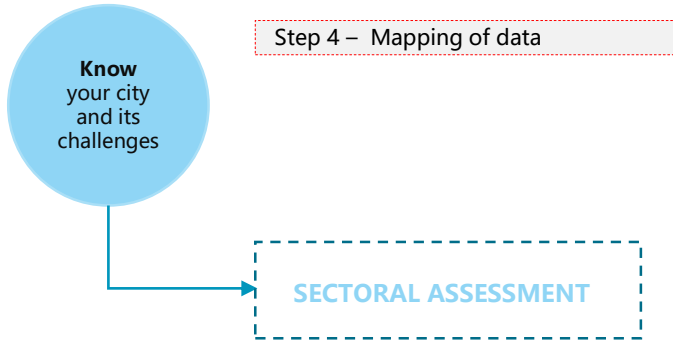
FIRE

Fire service stations and its proximity to wards/prabhags?

No. of fire brigades in the city and their respective capacities?

Phase 1

I.



Approach : Qualitative and Quantitative



Finance and Regulatory frameworks

Department wise budget allocation and usage for operation, maintenance and new facility construction (Annual)

Department wise user charges/ fees collected at local levels - per year sector/department wise (Annual)

Amount of own funds used by the ULB for city management annually

Grants, donations or funds received from other external agencies



Institutions & Capacity

Overview of Institutional framework of the city - Roles and responsibilities

Departments identified and staffing capacities

Distribution of employment sector/department wise (M/F)

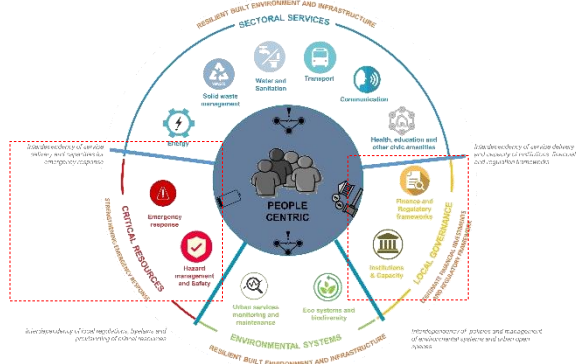
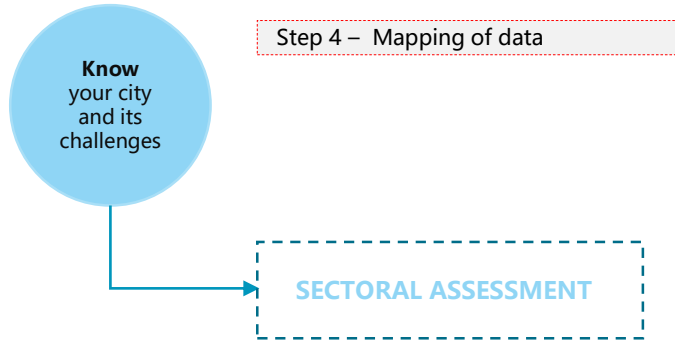
Are staff trained to respond to emergencies? (Safety drills - Training workshops/ Other sensitization mechanisms). If yes, frequency of training workshops?

Grievance addressal mechanisms? Time period for response?

Does the system have mechanisms to collect user input and feedback from the communities for provisioning management of services?

Phase 1

I.



Approach : Qualitative and Quantitative



Emergency response



Hazard management and Safety

Is the emergency response centralised/decentralised?

Does the Taluka have a disaster management plan?

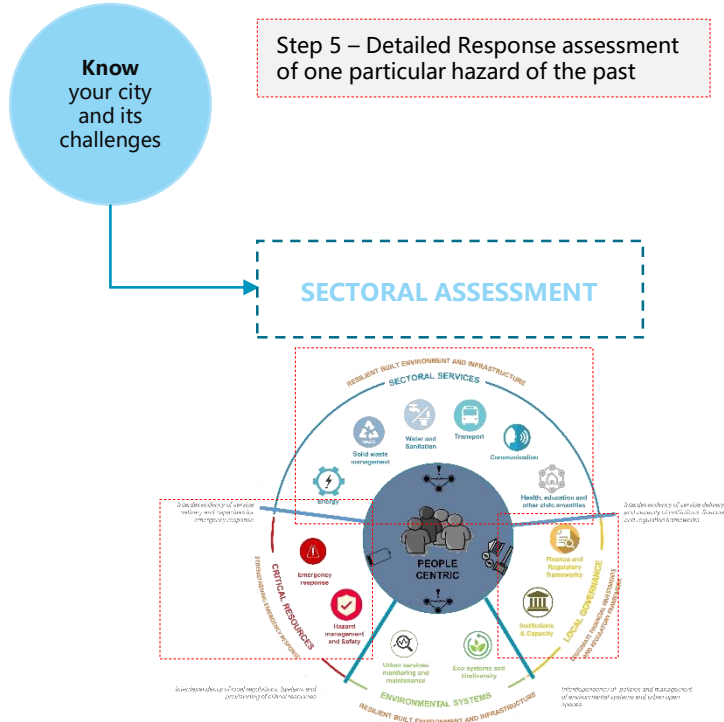
Are effective early warning systems in place?

Is there a communication plan used by the municipal council for a emergency response? If yes, what are the roles and responsibilities identified?

Are the NGOs, self help groups or community representatives involved in the communication plan?

Phase 1

I.



Step 5 – Detailed Response assessment of one particular hazard of the past

SECTORAL ASSESSMENT

Identifying urban systems and delivery of services that were impacted during an extreme event – a case specific response assessment

How is the city dealing with the (extreme event)/crisis? What are the measures taken?

Which city departments were involved in these responses?

Which stakeholders (beyond the local government) were involved in these responses? Indicate what type of relationship, if any, each stakeholder has with the city (e.g. partner, collaborator, adviser...)

How are funds devoluted from the State to the ULBs for hazard management? (Relief ; Recovery ; Reconstruction ; Mitigation / Long term plans)

Are individual people and communities trained to respond to emergencies? (Safety drills - Training workshops/ Other sensitization mechanisms). If yes, frequency of training workshops?

Approach : Qualitative and Quantitative

Phase I

I.



Know
your city
and its
challenges



CITIZENS' PERCEPTION

Step 6 – Citizens' Perception survey

Step 7 – Individual capacity analysis

Purpose :

- A quick survey to assess citizen's perception of the city and its service provisioning at a granular level ward/area wise – Mapping vulnerable people and places
- To assess individual capacities of identified vulnerable actors and potential supporting actors who can make a positive impact based on,
 - I. Capacity to organise and respond
 - II. Resources
 - III. Access to information

Approach :

Qualitative and Participatory

Output :

Scores of adaptive capacity levels for actors identified



Phase I

I.



Step 6 – Citizen's Perception survey



Performed at ward levels to gain granular reflections on actual scenarios. Sampling is to be done at ward level by assessing the population of each ward for individual surveys or FGD ; NGOs/Community groups - SHGs, Resident Welfare Groups ; Women SHGs etc. The set of guiding questions are to be rated on a scale of 1 to 5 with reasons asked for the same.

Aspects to be questioned are adopted from the CRI indicators :

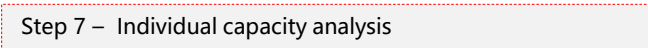
Guiding questions

Perceptions to be rated on a scale of 1 to 5

1.Minimal human vulnerability	Access to basic services - adequate quantity and safe quality?
2. Diverse livelihoods and employment	Local level measures for protection of livelihood following a shock? (Examples of grants received during or after disasters?)
3. Promotes cohesive and engaged communities	Is there regular communication with ward level authorities through meetings/workshops with SHGs, community representatives etc.? Is public opinion asked for in case of any new service provisioning and projects?
4. Effective safeguards to human health and life	Emergency health service responses available timely? Does the council or any other private agencies/NGOs conduct safety drills and provide technical assistance to be prepared for disasters like floods? Safety, rescue equipment and resources provided during hazardous/required situations?
5. Reduced exposure and fragility	Success stories of rule enforcements and standard operating procedures followed in response to shocks/ prolonged stresses across service sectors?
6. Effective provisioning of critical services	During an emergency/ crisis when any service provisioning system(water supply, sanitation, SWM,public health, transport, PDS etc) becomes non-functional, is there an alternate mechanism/ source opted at the household or community level?
7. Empowered stakeholders	Does the municipal council facilitate access to reliable information? Are people informed about what the city's current status of services, issues and growth trends?

Phase I

I.



Identification of potential actors can be done through a maximum of 2 workshops conducted with the ULB officials, community groups and ward committees ; To make the evaluation process easier the responses for questions can follow the format of Yes/No with a supporting statement and availability of capacities quantified under three categories of (Less than 50% ; 50% ; More than 50%) which can be further adopted for the scoring method equivalence of LOW ; MEDIUM ; HIGH

Issue identified across the 8 indicators to be compiled sector wise	Area / Ward where the issue has been identified	Actors			Adaptive capacity score C*R*A
		Vulnerable actors (Communities, NGOs etc)	Potential supporting actors (Authorities, Private agencies etc)	C R A	

Phase I

I.



CITIZEN'S PERCEPTION

Step 7 – Individual capacity analysis



Adaptive capacity scoring is done by assessing the information compiled from the citizens' perception survey under the 12 urban systems identified in the framework ; mapping/ identification of vulnerable actors who are affected by it and the potential supporting actors who can bring about a positive impact to the vulnerability identified depending upon the following three categories,

Adaptive capacities and Scoring			
Category	Scores		
	LOW Less than 50%	MEDIUM 50%	HIGH Above 60%
Capacity to organise and respond (In response to threat or disruption) - C	1	2	3
Resources - necessary to respond (manpower, technology,funds) - R	1	2	3
Access to information (Availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions) - A	1	2	3

Note : Adaptive capacity = C*R*A

Levels of adaptive capacities for urban systems

Adaptive capacity score	Levels of adaptive capacity
1 to 8	Low
9 to 17	Medium
18 to 27	High

Phase I

I.

Know
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and its
challenges

ASSESSMENT OF ADAPTIVE CAPACITIES OF URBAN SYSTEMS

Step 8 – Assessment of information of urban systems

Step 9 – Scoring adaptive capacities

Purpose :

- To compile the information gathered across the 12 systems and assess its capacity under the following concerns,
 - I. Infrastructure/Technology
 - II. Economic
 - III. Governance
 - IV. Societal
 - V. Ecosystems
- To score the adaptive capacities based on,
 - I. Capacity to organise and respond
 - II. Resources
 - III. Access to information

Approach :

Qualitative and Quantitative

Output : Scores of adaptive capacity levels for the urban systems identified

Phase I

I.



ASSESSMENT OF ADAPTIVE CAPACITIES OF URBAN SYSTEMS

Step 8 – Assessment of information of urban systems



The information gathered from step 4 of mapping the data under the 12 urban systems identified in the framework are compiled under the following categories as summary statements answering the guiding questions under each category for each urban system. To make the evaluation process easier the responses for questions can follow the format of Yes/No with a supporting statement and availability of capacities quantified under three categories of (Less than 50% ; 50% ; More than 50%) which can be further adopted for the scoring method equivalence of LOW ; MEDIUM ; HIGH

Categories	Questions
Economic	<ul style="list-style-type: none"> – does the system have the financial resources to undertake the necessary actions to manage extreme events, pre and post disaster? – e.g. budget allocation, tax base, ability to charge fees? – Is it able to operate as a “business” (ability to involve PPP, contracts, increase tax bases etc) or does it follow the traditional public service model? – Does the municipal cashflow cover the operation and maintenance costs?
Technology/ Infrastructure	<ul style="list-style-type: none"> – does the system have the necessary technological knowledge and resources (local level standards and codes)? – Is current infrastructure adequate to cope with pre existing stresses and accidental shocks? – Are major changes to technology needed? – Does it have the capacity to introduce required changes?
Governance	<ul style="list-style-type: none"> – Is responsibility for this system clearly established? Does the responsible entity have the necessary authority to make the required changes? – Is there sufficient support from higher levels of government? – Are the stakeholders coordinated and supportive of necessary change? – Is the governance at local level monitored during extreme events? Or how accountable is the municipal service provisioning and management by the ULB during extreme events?
Social	<ul style="list-style-type: none"> – Does the community have the understanding and resources necessary to play their part in this system? – Does the system have in-built mechanisms to incorporate community and user input and feedback? – Does the system recognize the needs of poor and vulnerable groups in the community?
Ecosystems	<ul style="list-style-type: none"> – What is the capacity of this system to protect or restore the ecosystem? – Is there adequate understanding and data about the current status of the different ecosystems within the city, their strengths and weaknesses?

Phase I – Example of Wai

SECTORAL ASSESSMENT

Summary of assessment of inherent capacities to adapt to stresses/impacts of shocks



Infrastructure/ Technology	Economic	Governance	Societal	Ecosystems
Limited reliability of alternate sources ; No water storage practices at household levels. Lack of metering system.	An adequate tax base to call upon ; support from grants/schemes claimed for new infrastructure	An identified executive wing with adequate staffing ; A timely responsive grievance addressal system. No identified interagency collaborations	Involved citizenry with willingness to participate	Limited ecosystem capacity to adapt to impacts
Introduction of new knowledge, plans and mechanisms to increase efficiency of onsite sanitation ; revised monitoring standards and advisories.	Support from higher authorities and other potential actors for new infrastructure management systems covers up for the limited tax base	An identified executive wing with adequate staffing ; A timely responsive grievance addressal system. Strong inter agency collaborations ; Contract based service delivery that is continual during stresses.	Involved citizenry and willingness to participate	Medium capacity of existing ecosystems as natural drains
Limited capacity of waste management at the city level by type ; Inadequate treatment efficiency. Certain interdependencies include – aging infrastructure of bridges that restrict waste collection services during extreme events.	An adequate tax base to call upon ; No identification of support grants/ schemes under this sector	Sanitation wing is responsible for SWM. A timely responsive grievance addressal system. Contract based service delivery that is continual during stresses.	Limited involvement of citizenry and willingness to participate	Limited ecosystem capacity to adapt to impacts

Phase I

I.



ASSESSMENT OF ADAPTIVE CAPACITIES OF URBAN SYSTEMS

Step 9 – Scoring adaptive capacities



Adaptive capacity scoring is done by assessing the information of the 12 urban systems compiled under the 5 categories as identified in the previous step ; The assessment is done across the following three aspects and the scoring is done.

Adaptive capacities and Scoring			
Category	Scores		
	LOW Less than 50%	MEDIUM 50%	HIGH Above 60%
Capacity to organise and respond (In response to threat or disruption) - C	1	2	3
Resources - necessary to respond (manpower, technology, funds) - R	1	2	3
Access to information (Availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions) - A	1	2	3

Note : Adaptive capacity = C*R*A

Levels of adaptive capacities for urban systems

Adaptive capacity score	Levels of adaptive capacity
1 to 8	Low
9 to 17	Medium
18 to 27	High

Phase I – Example of Wai

SECTORAL ASSESSMENT

Scoring adaptive levels – **C x R x A**



Category	Scores			Scores			Scores		
	LOW Less than 50%	MEDIUM 50%	HIGH Above 60%	LOW Less than 50%	MEDIUM 50%	HIGH Above 60%	LOW Less than 50%	MEDIUM 50%	HIGH Above 60%
Capacity to organise and respond (In response to threat or disruption) - C	1	2	3	1	2	3	1	2	3
Resources - necessary to respond (manpower, technology, funds) - R	1	2	3	1	2	3	1	2	3
Access to information (Availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions) - A	1	2	3	1	2	3	1	2	3

Adaptive capacity score	Levels of adaptive capacity
1 to 8	Low
9 to 17	Medium
18 to 27	High

8

LOW

12

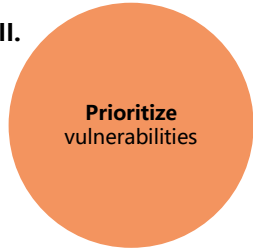
MEDIUM

4

LOW

Phase II

II.



Prioritize
vulnerabilities

**IDENTIFYING AREAS FOR
IMMEDIATE INTERVENTION**

Purpose : To assess the adaptive level scores of urban systems, identify lowest scores, and prioritize sectors/vulnerabilities that require immediate intervention, done through stakeholder consultations.

Approach : Qualitative and Participatory

Output : Identification of sectors that require an immediate resilience intervention using the adaptive level capacity scores



Phase III

III.

Resilience as a team effort
(multi-stakeholder approach)

FORMATION OF STAKEHOLDER GROUP

This tool is used only after formulating resilience interventions for the prioritised vulnerabilities. The step helps strengthen the identified interventions of the core team/ULB by involving multiple stakeholders.

- Purpose :**
- To identify key stakeholders for collaboration and institutionalism by assessing them on terms of,
 - I. Have the ability to develop Resilience Actions at the community level
 - II. Whose support will be essential to implement Resilience actions at different levels (e.g. Community, city level)
 - III. Those most affected by Resilience Actions developed

Approach : Qualitative and Participatory

Output : Identification of stakeholders across various sectors (Government ; Private ; NGOs ; Community groups ; Academia ; Industry)

	GOVERNMENT - LOCAL, CITY AND NATIONAL	ACADEMIA	INDUSTRY	LOCAL NGOs	COMMUNITY REPRESENTATIVES	PRIVATE SECTORS
SECTORS						

Phase III

III.

Resilience as a team effort (multi-stakeholder approach)

PRIORITISATION OF RESILIENCE INTERVENTIONS

Step 10 – Resilience quotient analysis

The resilience interventions are made and assessed for an adequate resilience quotient across the following indicators. Depending on the positive answers they are scored for resilience. The process is conducted with the core team of the city (ULB) and the stake holder group that has been formed in the previous step.

Purpose :

- To assess interventions for their resilience quotient based on,
 - I. Self Sufficiency
 - II. Flexibility
 - III. Responsiveness
 - IV. Technical assistance

- **Self sufficiency/ Redundancy** - In terms of catering to various scales of functioning i.e. city, community and household levels
- **Flexibility** - Ability to be flexible in terms of usage and operation at various scales i.e. city, community and household levels (For e.g.: A water supply network that facilitates metering also)
- **Responsiveness or Re-organization** - Able to re-organize and decentralise/centralise functioning in case of any disruption in services (For e.g.: A grid network for water supply wherein the distribution system can be based on ward area/ city area)
- **Technical assistance** - In terms of the responsibility for the system and its operation, if there is a management/monitoring level institutional responsibility or is it limited to the individual/household?

Approach :

Qualitative and Participatory

Output :

Resilience score

Phase III

III.

Resilience as a team effort (multi-stakeholder approach)

PRIORITISATION OF RESILIENCE INTERVENTIONS

Step 10 – Resilience quotient analysis



The resilience interventions are made and assessed for an adequate resilience quotient across the following indicators. Depending on the positive answers they are scored for resilience. The process is conducted with the core team of the city (ULB) and the stake holder group that has been formed in the previous step.

Purpose :

- To assess interventions for their resilience quotient based on,
 - I. Self Sufficiency
 - II. Flexibility
 - III. Responsiveness
 - IV. Technical assistance

Resilience Intervention	Indicators				Resilience Score
	Self sufficiency/ Redundancy	Flexibility	Responsiveness or Re-organization	Technical assistance	4/4: High 3/4: Medium 2/4: Average 1/4: Low
	YES	YES	YES	NO	3
<i>E.g.: Roof top water harvesting to be made mandatory to deal with water stress due to depleting surface water resources</i>	<i>Supports a higher degree of self sufficiency at the household level</i>	<i>System allows for water to be channelized towards recharging groundwater as well</i>	<i>In case of shutdown of the city's water supply system, households have stored rainwater for use</i>	<i>City helpines exist, but responsibility lies with individual households</i>	MEDIUM

Approach :

Qualitative and Participatory

Output :

Resilience score

Phase III

III.

Resilience as a team effort (multi-stakeholder approach)

PRIORITISATION OF RESILIENCE INTERVENTIONS

Step 11 – Analysis of feasibility and impact

Purpose :

- To assess feasibility of the interventions based on,
 - I. Technical
 - II. Political
 - III. Cost
 - IV. Responsibility (Government / Need of private sector)

Approach :

Qualitative and Participatory

Output :

Prioritisation of resilience interventions based on feasibility and expected impact

The resilience interventions with high resilience scores are then in terms of their feasibility and impact across the following aspects ; The process is conducted with the core team of the city (ULB) and the stake holder group that has been formed.

Feasibility analysis

- **Technical**– the city has the necessary technical expertise to implement the project, or can access the required skills
- **Political**– the intervention will be seen as acceptable to city leaders and the community and is consistent with the city's values and vision
- **Cost-benefit**– the cost is within the capacity of the city, or the city will be able to access required funds, and the anticipated benefits of the action will justify the cost
- **Responsibility**– An assessment of whether this action falls within the role of the city government, or which other agencies may need to be involved

Impact analysis

- **Timeframe** - Short/ Medium term
- **Overall impact** - The resultant effect the intervention will have on the identified vulnerability

Phase III

III.

Resilience as a team effort (multi-stakeholder approach)

INTEGRATION INTO CITY PLANS

Step 12 – Action plan formulation

The resilience interventions are then mainstreamed into the city plans by the following two exercises; The process is conducted with the core team of the city (ULB) and the stake holder group that has been formed.

Exercise 1 - Identification of existing programs and city plans to mainstream Resilience

Resilience Interventions	Relevant programs/city plans - Ongoing/ upcoming / planned	Proposed timeframe of the existing program and proposed timeframe of the intervention made - Do they match ?	Can the program be leveraged (In terms of institutional capacity, resources, funds)? If so, how?
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Exercise 2 – Summary of Resilience Interventions

Resilience Interventions	Vulnerable areas	Target actors	City plans
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Approach : Qualitative and Participatory

Output : City Action Plan



THANKYOU

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CWAS CENTER FOR WATER AND SANITATION

CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION

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