ICLEI ACCCRN PROCESS

BUILDING URBAN CLIMATE CHANGE RESILIENCE: A TOOLKIT FOR LOCAL GOVERNMENTS

ACCCRN
Asian Cities Climate Change Resilience Network

THE ROCKEFELLER FOUNDATION

ICLEI
Local Governments for Sustainability

ICLEI ACCCRN PROCESS
Building Urban Climate Change Resilience:
A Toolkit for Local Governments

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CONTENTS

ICLEI ACCCRN Process

FOREWORD

We, at ICLEI-Local Governments for Sustainability, constantly strive to work with and for cities to help them better respond to challenges they do, or could, face. In this endeavour, for over 20 years now, we have developed tools and processes specifically for local governments around the world. Given our in-depth understanding of the needs of cities in different regions and how they function, we have been able to successfully design processes and procedures that are most relevant and appropriate for them. The ICLEI ACCCRN Process (IAP) is another such resource that is helping several cities in South and Southeast Asia in building resilience to climate change.

Climate change is a global and local challenge with events such as increased precipitation, heat stress, and floods increasingly disrupting existing infrastructure and systems within cities. There is a growing awareness amongst cities around the world that while negotiations are held, and decisions, plans and protocols are debated and designed at the national and international levels, local governments themselves need to initiate responsive actions. Several cities are standing up to this challenge and working towards protecting their communities and assets against climate threats. The ICLEI ACCCRN Process is a tested resource that will help them in this endeavour.

Building urban climate change resilience has to intrinsically be an inclusive and participatory effort that brings together a variety of stakeholders, influences political will and promotes collective action. As the level of government closest to the people, local governments are best positioned to be the integrating force that creates synergistic links and such mutually beneficial partnerships.

As a phased process supported by tools, the IAP aims at stimulating collective learning and action at the local level. It requires local governments to take ownership of the process and to actively include all relevant stakeholders in the process of climate resilience building. It provides simple yet rigourous steps that can be largely implemented by the cities themselves, with expert inputs required at specific points.

We are grateful for the support provided by the Rockefeller Foundation under its Asian Cities Climate Change Resilience Network program that enabled us to develop and disseminate this toolkit.

We hope that the ICLEI ACCCRN Process will concretely contribute to the climate resilience building efforts of cities in the Asian region and beyond.

Emani Kumar
Deputy Secretary General, ICLEI-Local Governments for Sustainability
Executive Director, ICLEI-Local Governments for Sustainability – South Asia

The Rockefeller Foundation is proud to have collaborated with ICLEI to develop what we believe is a unique resource for cities to draw on as they think about the uncertainties, shocks, and stresses with which they need contend. The ICLEI ACCCRN Process (IAP) is derived from the practical experience from a group of pioneering cities across Asia, and will serve as a timely asset for the growing number of cities that recognize the urgency of investing in building their resilience to the impacts of climate change and urbanization. The Rockefeller Foundation defines urban climate change resilience (UCCR) as the capacity of cities (individuals, communities, institutions, businesses and systems) to survive, adapt, and thrive in the face of climate related stresses and shocks, and even transform when conditions require it. Building UCCR is a complex journey that requires effective leadership, strong partnerships, inclusive processes, and an ability to translate diverse technical data and information into practical action. This is precisely what the IAP offers.

The IAP provides step-by-step guidance in a user-friendly format, but its real value is in offering flexible ways to build on knowledge and processes that already exist. With thousands of cities needing to start their resilience building journey—each with unique political, social, and economic characteristics—a linear and prescriptive tool would be of limited value. This guide encourages iterative learning and review to maximize relevance, ownership, and engagement for the range of actors in a city. Indeed, ICLEI's process for developing the IAP has modeled these very qualities. This is a cumulative product from three year years of piloting, review, and refinement involving multiple cities and a number of expert perspectives. From across the Asian Cities Climate Change Resilience Network (ACCCRN) alone, a number of partners have been directly implementing UCCR planning efforts in cities that have informed the work of ICLEI. These include the Arup International Development, Challenge to Change, the Gorakhpur Environmental Action Group (GEAG) in India, the Institute for Social and Environmental Transition (ISET), Mercy Corps Indonesia, the National Institute for Science and Technology Policy and Strategy Studies (NISTPASS) in Vietnam, TARU Leading Edge in India, and the Thailand Environment Institute (TEI).

With huge uncertainties remaining about future climate scenarios –given the lack of global action to date –and with so much urban development and expansion yet to come, we need to recognize how nascent the field of UCCR is. As such, we believe that this guide will need to continue to evolve as we learn from its application in an expanding set of cities. We congratulate ICLEI and its team on this vital contribution to making cities – including the poor and vulnerable populations that inhabit them– more resilient.

Ashvin Dayal
Associate Vice President and Managing Director, Asia
The Rockefeller Foundation

ICLEI ACCCRN Process

INTRODUCTION

BENEFITS TO CITIES

Strengthened awareness and knowledge about potential risks at local level with engagement of stakeholders.

Better understanding of the city's vulnerabilities to climate change impacts and therefore better management of climate change impacts.

Development of a Climate Resilience Strategy for improved local economic, social and environmental resilience of the city.

Integration of the resilience strategy into urban planning and implementation processes and guidance for financing and implementation of interventions.

Cities as centres of economic activities cater to half of the world's population – and this share is growing. Not only as centres of growth but also as major consumers of resources, urban areas are one of the major emitters of greenhouse gases. In addition, these global emissions are leading to climate change and variability causing adverse impacts at the local level in terms of disruptions and damages to physical, social, economic, and environmental systems. **Cities are therefore both the cause and the victims of climate change.**

The ICLEI ACCCRN Process (IAP) has been developed by ICLEI - Local Governments for Sustainability's South Asia and Oceania offices through involvement with the Rockefeller Foundation supported Asian Cities Climate Change Resilient Network (ACCCRN) program. It enables local governments to assess their climate risks in the context of urbanisation, poverty and vulnerability and formulate corresponding resilience strategies.

The IAP toolkit draws on the experience from the ten core ACCCRN cities (see www.acccrn.org) and supplements this with learning, models, approaches and best practices of existing ICLEI approaches. The toolkit was tested in three Indian cities – Shimla, Bhubaneswar and Mysore - and subsequently used in a range of cities in Indonesia, Bangladesh, the Philippines and India.

With a strong city focus, this toolkit is targeted at city governments and their role in catalysing community building. It provides a streamlined process that is simple and yet rigorous, and which can be implemented by the cities themselves, with only minimal need for external support. **It enables local governments to assess their climate risks, formulate and implement corresponding resilience strategies.** The vision is to build resilience to climate change across all urban systems and groups, in particular the poorest and most marginalised.

The ICLEI ACCCRN Process has been designed in a step-by-step format, divided into 6 phases. A city with very little previous experience in climate change planning is advised to follow this sequence. However, other cities that have already completed some studies or analysis may wish to select only parts of the process. The process is also designed to be a continuous cycle of review and refinement, rather than a closed cycle as shown in the figure below.

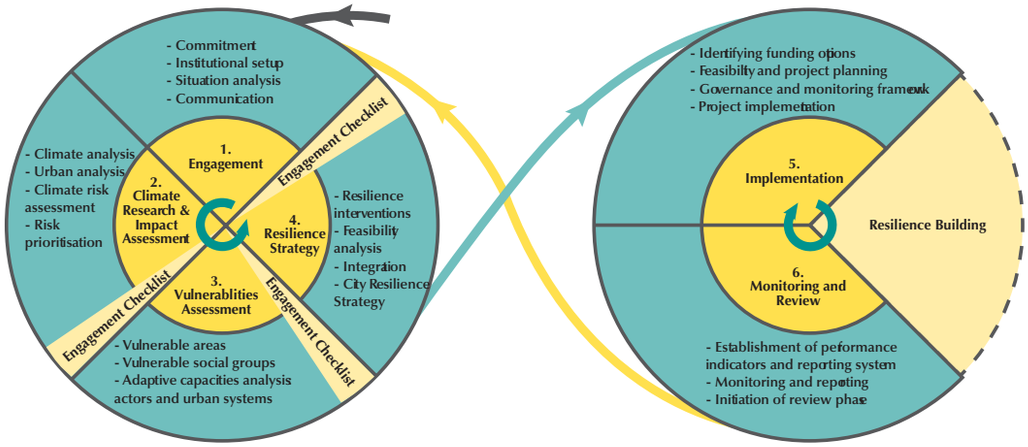

Figure:
The ICLEI ACCCRN Process

This version of the toolkit focuses on the first four phases of the ICLEI ACCCRN Process that enable cities to prepare of climate resilience strategies; these four phases are briefly described below. Phases 5 and 6 that guide cities in the implementation and monitoring phases will be included in the following edition of the IAP toolkit.

1. ENGAGEMENT

Phase 1 of the process will provide all the tools and activities needed to start work with the city. The tools help local governments gain the necessary political and administrative support, establish a climate core team, involve local stakeholders, appropriately share relevant information through a tailored communications plan, and conduct an initial assessment of the city's progress towards dealing with climate change.

2. CLIMATE RESEARCH AND IMPACTS ASSESSMENT

In Phase 2 the main impacts of climate change faced by the city are identified through shared learning dialogues and interactions with the climate core team. The fragile urban systems facing climate threats are also identified and prioritised according to their risk status.

3. VULNERABILITIES ASSESSMENT

Phase 3 will assist the city government in producing climate vulnerability hotspot maps, in identifying the vulnerable social groups, and in analysing their adaptive capacities as well as those of the impacted urban systems.

4. CITY RESILIENCE STRATEGY

In Phase 4, city governments will use the information and analysis from the previous Phases to develop a list of potential resilience building interventions. The tools in this phase help screen and prioritise these interventions, link them to existing city plans, and compile all the information into a City Resilience Strategy.

ACCCRN represents a unique initiative to develop, test and demonstrate practical strategies for responding to the impacts of climate change on urban areas. While the work of ACCCRN partners focuses on building resilience at the city level, the Network is also regional and global in its outlook and outreach. One of the key objectives of ACCCRN is to share success stories and encourage cities around the world to replicate effective strategies and activities. The Network aims to expand and deepen the base of urban climate change resilience work to achieve greater scale beyond the existing cities.

ICLEI ACCCRN Process

PHASE 1

ICLEI ACCCRN Process

Overview of Phase 1

ENGAGEMENT

TOOL 1.0

This first phase provides all the tools and activities needed to start working with the city. You will identify key stakeholders, both inside the city administration and outside, set up coordination and reporting structures, and conduct an initial assessment of the city's progress towards dealing with climate change.

The tools included in Phase 1 and their corresponding objectives are:

Tool 1.1 : Forming a Climate Core Team - to develop a responsible body for driving the ICLEI ACCCRN Process in the city, representing the interests of a wide spectrum of the city government's operations.

Tool 1.2 : Forming a Stakeholder Group – to identify the key stakeholders that need to be involved in the process and the most appropriate ways of engaging them.

Tool 1.3 : City Baseline Questionnaire: Impacts & Responses to Climate Change – to document the impacts of past climate events in the city and the local government's responses, and assess data availability for a situation analysis.

Tool 1.4 : Climate Ready Review – to assess the local government's capacity and readiness to tackle climate change based on strategies, policies, plans, programmes and procedures.

Tool 1.5 : Communication Plan - to develop a plan for communicating key messages emerging from the city's engagement in the IAP to specific target groups.

Tool 1.6 : Relevant International Initiatives – an optional tool that gives cities the opportunity to sign up for related international initiatives that will provide access to international platforms.

An introductory PowerPoint presentation on the ICLEI ACCCRN Process is provided at Reference Tool 1.

In the later phases of the toolkit you will find some checklists **(called 'Engagement checklists')**: use them to ensure that the structures established in Phase 1 are still suitable or, if needed, to appropriately revise them.

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FORMING A CLIMATE CORE TEAM

TOOL 1.1

The purpose of this tool is to help cities form a Climate Core Team (otherwise referred to as Core Team) responsible for coordinating the implementation of the ICLEI ACCCRN Process. The tool will provide support in identifying core team members, establishing terms of reference, and listing the team's activities and responsibilities.

A good Core Team represents the interests of a wide spectrum of your city government's operations. As such, it can be a valuable tool for communicating the goals that the city is aiming to achieve through the ICLEI ACCCRN Process and for ensuring that the direction your city takes provides the opportunityto address climate change considerations across all areas of the city government's activities.

Tool 1.1

FORMING A CLIMATE CORE TEAM

MEMBERSHIP

Climate change adaptation and resilience building is not just linked to the environment, so an effective Core Team will draw on staff from a range of departments. Engaging in the ICLEI ACCCRN Process staff from different areas of city operations, with different points of view and areas of expertise, is an important early step.

Who should be part of the Climate Core Team?

For example, you may invite participants from the industrial, social, environment, finance and planning areas of your city government. The Core Team may consist of representatives from city departments who have responsibilities for, or an impact on, development planning, energy use, pollution, waste, food security, water security, public health, local economic development, infrastructure, and transportation. It is important to identify a Project Nodal Officer for the core team who can be the focal point for the process in the city.

In case a similar committee/working group already exists within the city, you could choose to consider this body as the 'Climate Core Team' as long as it adopts the IAP Terms of Reference (mentioned in Exercise 1 below).

SENIOR MANAGEMENT SUPPORT

It is also important to provide for Senior Management support to the Core Team, to ensure that staff members working on the ICLEI ACCCRN Process are directly supported in their day-to-day work by management.

Senior Management should support the Climate Core Team

EXERCISE 1 – CORE TEAM, ROLES AND RESPONSIBILITIES

The identification of the Core Team members is a very crucial process as the Core Team will be responsible for driving the process in your city. However, it should be noted that the Core Team is not a fixed body and new members can be added as and when required. Given below are a set of suggested responsibilities that the Core Team should commit to:

- Serve as representatives for their city government's divisions or sectors
- Attend and participate in the ICLEI ACCCRN workshops to guide the climate resilience programme and expected outputs (tools, materials, reports)
- Lead the city government's efforts to participate in the programme
- Ensure the ICLEI ACCCRN Process is followed in its entirety
- Make sure that deadlines for each Phase are met
- Secure the participation of multiple contacts across the city government in the programme
- Organise and deliver workshops and stakeholder consultations with the stakeholder group (see tool 1.2) at different stages of the project, to gather relevant information from them and incorporate their suggestions and inputs as appropriate
- Coordinate the necessary communication and collaboration with all relevant departments of the city and other stakeholders
- Support internal institutional capacity building to effectively fulfil the long-term climate resilience plan requirements
- Prepare a City Resilience Strategy and facilitate effective integration of planned initiatives into the city's developmental plans

Who are your Climate Core Team members and what should they do?

A Project Nodal Officer for the Core Team also needs to be identified who can act as the focal point for the process in your city. **The main responsibilities of the Project Nodal Officer would be the coordination and smooth implementation of the tasks of the Core Team in implementing the ICLEI ACCCRN Process.** Responsibilities may include:

- Organise meetings of the Core Team as per the agreed schedule
- Facilitate communication and consultation with the stakeholder group
- Track the city's progress through the ICLEI ACCCRN Process and inform the Core Team regarding completed and upcoming tasks as laid out in the toolkit
- Facilitate data collection from various departments and other sources

In Table 1 below please list the members of the Climate Core Team, their position, and proposed responsibilities .

Name	Position	Responsibility
E.g. Ms. Jane Dev Khan	*Chairperson*	*Supervising the work of the Core Team and providing management support*
E.g. Mr. Ibrahim	*Project Nodal Officer*	*Coordinating all the activities of the Core Team and ensuring its smooth functioning*
E.g. Ms. Gayatri Devi	*Member*	*Coordinating activities with the Water Resources department*

EXERCISE 2 – TERMS OF REFERENCE

Once you have identified your Climate Core Team members, you will need to consider and decide an organisational framework for your Core Team. Suggested below are some key elements that you should consider:

Step 1: Vision

The Core Team should develop a vision and timeframe, which states how it would like its city to be in the future (e.g. in 5 – 10 or 20 years).This vision could be guided by an existing vision statement of the city; the team would then need to identify and elaborate further on its climate change related elements that can be noted in the table below.

First, note the various elements of the desired vision in the table below. Examples of potential elements of the vision are also provided. *Please note: keep the focus on the desired outcomes.*

Table 2: Elements of the City Vision - Example

	Elements of the Vision Statement
1	e.g. The city government routinely considers climate impacts in project planning
2	e.g. Basic services of water, sanitation, energy supply are provided equally to all citizens
3	
4	

How would you like your city to be in the future?

Step 2– Vision Statement
Now, considering the various elements listed in Table 2, discuss and formulate the Vision Statement for your city. For example:

"By 2030 the City of ..... would have climate resilient infrastructure and systems that ensure the equitable provision of basic service to all citizens....."

Set up a structured system and process

Step 3 – Monitoring and Reporting
It is important that the Core Team decides on the monitoring and reporting process for the execution of the activities. The Project Nodal Officer can be in-charge for ensuring the reporting and thereby monitoring the project.

Step 4 – Terms of office for members
The term of office for the Core Team members needs to be discussed. In case any official is completing his/her official term before the conclusion of the process, then the Core Team needs to be informed and a substitute official needs to be appointed at the end of the term.

Step 5 – Frequency of meetings
Frequency of meetings should be based on the process guide or adopted project plan. If possible, determine beforehand the schedule for the meetings, time of day, location and maximum length of meetings.

Step 6 – Decision making process
It will be helpful to decide the decision making process for the Core Team in advance. This will ensure clarity and avoid last minute confusions.

Have you:

- [ ] Set up a Climate Core Team and identified a Project Nodal Officer?
- [ ] Formulated a long-term vision for your city?
- [ ] Decided on a monitoring and reporting process for the Core Team's work?
- [ ] Discussed and agreed upon the terms of office for the Core Team members?
- [ ] Fixed the regularity and modality of meetings?
- [ ] Clarified the decision-making process?

ICLEI ACCCRN Process

FORMING A STAKEHOLDER GROUP

TOOL 1.2

A stakeholder is "one who is involved in or affected by a course of action". *~ Webster Dictionary*

The ICLEI ACCCRN Process should be supported by consultations with other groups in the city such as government agencies, local NGOs, community leaders, university partners and private sector organisations, to appropriately share responsibilities and ensure ownership. Consultation should be a multi-way process of dialogue and deliberation within the Climate Core Team and with other stakeholders, as well as amongst stakeholders themselves. **It is also critical to engage people who are active on issues pertaining to poor and marginalized groups, or those most likely to be directly affected by the changing climate (this may be urban poor groups/ residents themselves or civil society groups that have a core focus on the interests of these populations).**

You will need to determine what form(s) of stakeholder consultations you will conduct; most likely there is already a format being used. There may even be existing stakeholders meetings and structures that the city has already institutionalised and that can be applied to the ICLEI ACCCRN Process. If this is the case, it is important to ensure that such structure has been renewed to have a particular focus on Urban Climate Change Resilience.

Tool 1.2

FORMING A STAKEHOLDER GROUP

The ten core ACCCRN cities have used a particular stakeholder consultation methodology called 'Shared Learning Dialogues' (SLDs). In brief, **SLDs allow for multi-dimensional information sharing in which everyone contributes information and experience and everyone learns from the exchanges.** The SLD process is iterative, with several opportunities for members to meet and take their thinking to the next level: this is an approach that the city can consider using.

Please refer to reference tool 2 for background information on SLD's

The following exercise should be undertaken by the Climate Core Team. The Core Team may choose to involve other key individuals (from within or outside the City Government) as it may consider necessary. The exercise should then be validated by Senior Management.

EXERCISE 1 – FORMING A STAKEHOLDER GROUP

Based on your understanding of the city's climate risks, current and projected, identify the individuals and groups who may:

- be able to develop climate resilience[1] actions at the community level
- be able to develop climate resilience actions at city and/or policy level
- be able to support climate resilience actions at different levels (community, city)
- be most affected by climate resilience actions developed or supported by other groups

You can use table 1 to generate a list of stakeholders

Please note: *this is not a one-time exercise: the final listing of stakeholders can and should be revised as and when necessary.*

Table 1: Potential stakeholders - Exercise

Characteristics of Stakeholders	Government (local, city, national)	Local NGOs / CBOs	Academia	Community Representatives	Private Sectors
Have the ability to *develop* Resilience Actions at the *community* level					
Have the ability to *develop* Resilience Actions at the *community* level					
Whose support will be essential to *implement* Resilience Actions at different levels (e.g. community, city level)					
Those most *affected* by Resilience Actions developed					

Have you:

- ☐ Formed a stakeholder group?
- ☐ Ensured that it appropriately represent relevant groups in your city?
- ☐ Checked that it includes both groups who can support and develop resilience actions as well as those mostly affected by them?

[1] 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 put, it is the ability to survive and recover from the effects of climate change. It includes the ability to understand potential impacts and to take appropriate action before, during, and after a particular consequence to minimize negative effects and maintain the ability to respond to changing conditions. (Rockefeller Foundation White Paper)

ICLEI ACCCRN Process

CITY BASELINE QUESTIONNAIRE:

IMPACTS & RESPONSES TO CLIMATE CHANGE

TOOL 1.3

The purpose of this tool is to identify whether the impacts of climate change have been recognised in your city, how those impacts (if any) influence activities in development sectors, and what kind of support the city government needs to respond effectively.

The questionnaire below is designed around four primary impacts of climate change:

- temperature change,
- precipitation change,
- sea level rise, and
- extreme weather events.

Once filled out, this questionnaire will provide data and information to be used at various points in the following phases of the toolkit.

EXERCISE 1 – OVERVIEW OF SECTORAL IMPACTS OF CLIMATE CHANGE

The purpose of this table is to help provide an overview of the perceived climate threats, which main sectors are currently impacted and whether there are any ongoing plans or programmes to address these impacts.

Table 1 – Example and exercise

QUESTIONS	STATUS			INSTANCES/RESPONSES ACTIONS/PLANS/STRATEGIES *(If marked 'yes' – please elaborate)*
	Yes	**No**	**Unknown**	
1. Compared to a decade ago, have these conditions occurred in your city?				
a. Temperature change	*Yes*			*For example, "there has been a perceived increase in temperature over the last 20-25 years"*
b. Precipitation change	*Yes*			*E.g. "there has been a perceived decrease in rainfall over the last"*
c. Sea level rise				
d. Extreme weather events				
2. Are each of the sectors below being affected by these changes and events? If so, what plans or actions are already in place to respond?				
a. Industry (SME, tourism etc)			*Not Known*	
b. Food supply (supply and demand, availability)	*Yes*			*E.g. food supply from surrounding areas decreased due to poor rainfall and therefore agricultural productivity*
c. Water supply services	*Yes*			*E.g. water stress situations durig summer months*
d. Waste water management				
e. Solid waste management				
f. Transportation (e.g. public transport, number of private vehicles etc)				
g. Health (public health and health services)				
h. Energy (electricity, fossil fuels, cooking fuels etc)				
i. Building (design, energy use)				
j. Education (schooling days)				
k. Development funds (public and private funds available for developmental activities)				

QUESTIONS	STATUS			INSTANCES/RESPONSES ACTIONS/PLANS/STRATEGIES *(If marked 'yes' – please elaborate)*
	Yes	**No**	**Unknown**	
2(a). Please indicate the total area considered to be affected by the above "Yes" changes or events				
2(b). Please indicate the proportion of the population considered to be affected by the above "Yes" changes or events				
3. For each of the sectors where you have provided a 'Yes' response in Question 2, are there plans or strategies to deal with extreme events, or to plan for the future more generally?				Name of the plan
a Industry (SME, tourism etc)				
b. Food supply (supply and demand, availability)		*No*		
c. Water supply services	*Yes*			*E.g. City Development Plan includes measures for rainwater harvesting*
d. Waste water management				
e. Solid waste management *f. Transportation (e.g. public transport, number of private vehicles etc)*				
g. Health (public health and health services)				
h. Energy (electricity, fossil fuels, cooking fuels etc)				
i. Building (design, energy use)				
j. Education (schooling days)				
k. Development funds (public and private funds allocated for developmental activities)				

QUESTIONS	STATUS			INSTANCES/RESPONSES ACTIONS/PLANS/STRATEGIES *(If marked 'yes' – please elaborate)*
	Yes	**No**	**Unknown**	
4. Do you believe these climate changes will increase in the future for your city?				
a. Temperature change	*Yes*			*E.g. Observations of the past trends seem to indicate that temperature will increase*
b. Precipitation change			*Not Known*	
c. Sea level rise				
d. Extreme events				
5. What does your city need to do to improve resilience to climate change?				
a. Capacity development				*Please elaborate*
b. Technical assistance				*Please elaborate*
c. Funding/Finances				*Please elaborate*

EXERCISE 2 – OVERVIEW OF CITY RESPONSES TO CLIMATE CHANGE

Weather anomalies and extreme weather events (flooding, heat waves, cyclones, and tidal surges), strain private (homes), commercial (businesses and enterprises) and public infrastructure (buildings, roads and bridges), place stress on society and can temporarily shut down parts of the local economy (transport of goods and service provision).

The ability of city governments to anticipate and be prepared for weather anomalies and extreme weather events will help to mitigate the potential social and economic consequences associated with extreme weather events and anomalies in the future.

What three weather anomalies or extreme weather events has your city responded to in the past (last 30 years)?

Consider weather anomalies or extreme weather events such as flooding, heat waves, drought (water stress), cyclones, storms, tidal surges.

Event 1	
Event 2	
Event 3	

For one of the events listed above (e.g. the most severe one), describe the event in detail.
In describing the event, consider the following:

What was the event?	
When did it happen?	
What was the duration of the event/how many days/ months did it persist?	
What geographical area was affected?	
Who was impacted and how?	
Has this event occurred before?	
If so, was the earlier event more or less severe than the last event?	
Any other information?	

What were the social, economic and environmental impacts of this event?

Urban systems impacted	*Consider the urban systems that were impacted by this event, e.g. water supply, drainage, health*
Social impacts	*Consider the social impacts of this event, e.g. people's homes were flooded, people were displaced, there was an increase in water-borne diseases, water and food supply was disrupted.*
Economic impacts	*Consider the economic impacts, e.g. shops were closed, transportation links were disrupted, production was stopped.*
Environmental impacts	*Consider the environmental impacts, e.g. land quality was affected by flooding, saltwater intruded into ground and surface waters, trees were blown down, animals died.*

How did the city government respond to this event?
List the different responses below

1.

2.

3.

4.

5.

6.

Which city departments were involved in these responses?

1.

2.

3.

4.

5.

6.

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...).

1.

2.

3.

4.

5.

6.

Did the city government have a policy and response plan in place that anticipated the event?
Had the city government already incorporated weather anomalies into its planning and decision-making? If so, please list the various policy and response plans.

1.

2.

3.

4.

5.

6.

Based on the experience developed so far, what can your city government do to anticipate, prepare and respond to weather anomalies and extreme weather events in the future?
Please list

1.

2.

3.

4.

5.

6.

Record the data for the longest available period – 30 years minimum

EXERCISE 3 – EXISTING WEATHER DATA

This section aims to help gather and analyse some basic information regarding past weather data for the city. This will help understand some trends and patterns in temperature and precipitation. This analysis can be substantiated with inputs from an expert, but even the preliminary results will help provide a broad understanding on whether there have been any significant changes in weather patterns. Please record the data for the longest period for which it is available (minimum of past 30 years is recommended).

Table 2: Temperature Data - Exercise

Years	Annual Minimum Temperature	Annual Maximum Temperature	Annual Average Temperature

Source: Please insert the source of the information

Table 3: Precipitation Data - Exercise

Years	Average Annual Rainfall (mm)	Seasons (please define the seasons for your region/country)			
		eg. Jan-Mar	Apr-Jun	Jul-Sep	Oct-Nov

Source: Please insert the source of the information

The temperature and precipitation data can be plotted on a graph using for example MS Excel or similar softwares; a trendline for each of the various parameters (i.e. annual minimum temperature; annual maximum temperature; average annual rainfall etc.) can also be assessed. These trendlines will provide an indication of the change in these parameters over time.

EXERCISE 4: MAPPING OF DATA

It is recommended that you start producing maps of key data as early as possible in the ICLEI ACCCRN Process. In Phase 3 of the toolkit it will be necessary to map vulnerability data and any earlier maps can be used as input for this step.

Whenever possible, use digital mapping tools possible to help capture, analyse and present data. Several cities already have, or are developing, Geographic Information Systems (GIS) based maps. In case GIS maps for the city are not available, there exist several software products that can be found freely online and can be used to produce base maps for the city, on which layers of data for different geographical locations can be added. If this capacity does not exist within the city government, it is recommended to hire the services of a skilled IT person to facilitate this.

In case of limited access to the internet, hard copies of maps can also be used for participatory mapping exercises. These maps can then be scanned.

If possible, use the data collected in Exercises 1 to 3 to develop some baseline maps for your city showing the distribution of climate events and impacts . These can be refined progressively throughout the process.

Start producing maps of key data as early as possible

Reference Tool 3 contains detailed methods for mapping areas within a city or any study region using open source software.

Use the data collected in Exercises 1 to 3 to develop some baseline maps

EXERCISE 5 – AVAILABILITY OF DATA

The purpose of this exercise is to identify what data is already available to assist the ICLEI ACCCRN analysis. You are not asked to provide the actual data at this stage, but rather to indicate its availability; you might need the data in later tools.

Table 4 - Exercise

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Vulnerability and Poverty (High Level Indicators)				
Geographic area of the city considered most vulnerable to climate change	Mapping and area			
Proportion of population vulnerable to climate change, disaggregated by gender & poverty	Percentage, gender, poverty			
Ecosystems/ Biodiversity				
Area under green cover	Sq Km			
Types of ecosystems available (wetlands, riverine, forest etc)	Number / area			
Agricultural Resources				
Total area of agricultural land	Sq km			
Regional crop seasons	Months			
Primary crop	Names			
Secondary crop	Names			
Contribution to local economy	Percentage of total GDP			
Contribution to local food requirement	Percentage			
Water Resources				
Number of water bodies	Number, sq km			
Classification of water bodies	Number, sq km, type			
Depth of ground water table	Metres			
Water quality	As per pollution control board categories			
Area of city regularly subject to flooding	Sq km			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Demographics				
Population				
Total population	*Number*			
Population break up: gender: no of females/ 1000 males	*Number*			
Population break up: age	*Number (in categories)*			
Population density: average	*Number/ Sq km*			
Population distribution: ward/zone/ area wise	*Number/ Sq km*			
No of households	*Number*			
Average size of household	*Number*			
Floating/itinerant population[1]	*Number*			
Rate of annual inward migration	*Persons/ year*			
Rate of annual outbound migration	*Persons/ year*			
Employment				
Employment rates (%)	*Percentage*			
Employment distribution (M/F)	*Percentage*			
Nature of occupation	*List*			
Primary occupation	*Percentage from list*			
Secondary occupation	*Percentage from list*			
Occupation distribution (M/F)	*Percentage within list*			
Occupation distribution (economic)	*Percentage within list*			
Informal sector[2]: numbers, categories				

[1]A group of people who reside in a given population for a certain amount of time and for various reasons, but are not generally considered part of the official census count

[2]The informal sector or informal economy is that part of an economy that is not taxed, monitored by any form of government or included in any gross national product (GNP), unlike the formal economy

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Demographics				
Literacy				
Average literacy rate	*Percentage*			
Literacy distribution (M/F)	*Percentage*			
Vulnerable Groups				
Population living in slums	*Number*			
Population of minority groups	*Number*			
Population considered vulnerable to climate change (temperature, precipitation, sea level rise, extreme weather)	*Number, gender*			
Economy				
Main economic activities	*List most important to less important*			
Health				
Morbidity				
Infant mortality rate	*Number/ year*			
Maternal mortality rate	*Number/ year*			
Disease				
Total number of deaths per year from communicable diseases (number/year)	*Number/ year*			
Disease deaths distribution (M/F)	*Number/ year*			
Total number of deaths from calamities/ extreme climate events/ disasters (number/year)	*Number/year*			
Number of infant vaccinations administered per year	*Number/ year*			
Prominent diseases list	*List*			
Seasonality of diseases	*Months*			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Land				
Total city area	*Sq km*			
Zoning/ land use	*Area of different land uses, with map*			
Informal or unauthorised settlements	*Number and area*			
Slum areas (for both 'officially recognized / classified' & 'not officially recognized / classified)	*Number and area*			
Topography	*Topographic map with ward/zone/area*			
Housing				
Apartments	*Number of properties, ward/zone/area wise distribution*			
Single-family dwelling[3]	*Number of properties, ward/zone/area wise distribution*			
Huts, temporary houses and slums	*Number of properties, ward/zone/area wise distribution*			
Housing units considered at risk of flood or storm damage	*Number of. properties, locations*			

[3] The building is usually occupied by just one household or family and consists of just one dwelling unit or suite

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Infrastructure				
Water supply				
Water supply distribution network	*Maps to scale, with ward/zone/area wise breakup; % coverage of network*			
Number of authorised residential connections	*Number of ward/zone/ area wise distribution*			
Number of authorised commercial connections	*Number of ward/zone/ area wise distribution*			
Households with piped water supply	*Number, percent*			
Households having water meters	*Number, percent*			
Taps, hand pumps, tube wells, tankers	*Number*			
Total amount of water supply	*MLD*			
Total amount of water demand	*MLD*			
Total non-revenue water (NRW) / unaccounted for water (UFW)	*MLD*			
Sources of fresh water in the city	*Names and capacity in ML*			
Water treatment plant	*Number, capacity, location, ward/zone/ area covered*			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Infrastructure				
Sewage				
Sewage distribution network	*Map and % coverage*			
Total length of sewage network pipes	*Ward/zone/area wise distribution*			
Total length of underground sewage pipes	*Kms*			
Average age of network pipes	*Years*			
Volume of waste water generated per day	*MLD*			
Volume of waste water collected	*MLD*			
Volume of waste water treated	*MLD*			
Volume of treated water reused	*MLD*			
Sewage treatment plant	*Number, capacity, location, ward/zone/ area covered*			
Households connected to sewage	*Number, percent*			
Sewage				
Solid waste generated per day	*TPD*			
Amount of waste collected	*TPD*			
Amount of waste treated	*TPD*			
Categorisation of solid waste	*Percentage of total solid waste generated*			
Solid waste treatment facility	*Number, capacity, location, ward/zone/ area covered*			
Scientific landfills	*Number, capacity, location, ward/zone/ area covered*			
Open dump sites	*Number, capacity, location, ward/zone/ area covered*			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Infrastructure				
Roads				
Total length of road network	*Kms*			
Total length of concrete/sealed/ made roads	*Kms*			
Storm water drainage				
Drainage distribution network	*Map with ward/zone/ area*			
Total length of covered network	*Kms*			
Total length of uncovered network	*Kms*			
Average diameter of pipes	*Use appropriate unit*			
Transportation network				
Type of public transport systems available	*List*			
Low Emissions public transport systems				
Economy				
Industry				
Main types of industry	*List*			
Total number of work force employed	*Number/ Percentage of total workforce*			
Percentage contribution to total economy	*Percentage*			
Polluting industries	*Number, location and list*			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Infrastructure				
Commerce				
Main types of services	*Number, location and list*			
Total number of work force employed	*Number/ Percentage of total workforce*			
Percentage contribution to total economy	*Percentage*			
Access to the City				
Port/Harbour, etc	*Yes / No*			
Airport	*Yes / No*			
Road network	*Yes / No*			
Rail	*Yes / No*			
Energy				
Electricity				
Total annual supply	*MU*			
Main source of supply	*Percentage share, types*			
Total annual energy demand	*MU*			
Sector wise energy usage (residential / commercial / industrial)	*Percentage share, types*			
Average number of hours of electricity supply	*Hours/ day in Winter / Summer / Monsoon*			
Petrol				
Total annual supply	*KL*			
Total annual demand	*KL*			
Sector wise petrol usage	*Percentage share, types*			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Energy				
Diesel				
Total annual supply	*KL*			
Total annual demand	*KL*			
Sector wise diesel usage	*Percentage share, types*			
Kerosene				
Total annual supply	*KL*			
Total annual demand	*KL*			
Sector wise Kerosene usage	*Percentage share, types*			
Fuel wood				
Total annual supply	*KL*			
Total annual demand	*KL*			
Sector wise Fuel wood usage	*Percentage share, types*			
LPG				
Total annual supply	*KL*			
Total annual demand	*KL*			
Sector wise FLPG usage	*Percentage share, types*			
CNG				
Total annual supply	*KL*			
Total annual demand	*KL*			
Sector wise CNG usage	*Percentage share, types*			

Table 4 - Exercise (contd.)

Category	Unit	Is Data Available? Yes/No	Source of Data?	Time period for which data available
Energy				
RE share				
Number of Solar Water Heating systems	*Number and cumulative capacity*			
Number of solar cookers	*Number and cumulative capacity*			
Number of wind energy systems	*Number and cumulative capacity*			
Biogas plants	*Number and cumulative capacity*			
Rooftop SPVs	*Number and cumulative capacity*			

Have you:

- ☐ Prepared the overview of the sectoral impacts of climate change in your city?
- ☐ Listed past and possible responses to weather anomalies and extreme weather events?
- ☐ Collected and analysed past weather data?
- ☐ Developed a map of key data?
- ☐ Assessed the availability of data, that you might later need in the process?

ICLEI ACCCRN Process

CLIMATE READY REVIEW

TOOL 1.4

The Climate Ready Review is a self-assessment tool that will help gauge your city's capacities and readiness to tackle climate change. It is based on six aspects of your organization:

- Strategies, Policies, Plans and Procedures
- Information, Data, Tools and Processes
- Budget Allocation and Financing Processes
- Staff Participation
- Existing Initiatives
- Community Engagement

The Climate Ready Review uses a questionnaire-based approach in each of these six areas to highlight a city's success, identify where there is room for improvement and encourage cities to foster a cycle of continuous improvement within the city's culture.

The questions of the Climate Ready Review are not exhaustive and are intended to provide a guide to assist cities to develop an internal benchmark by which to measure its functioning and improve upon. Further, the questionnaire is not intended as a tool to benchmark cities implementing the ICLEI ACCCRN Process – it is only for your own internal benefit.

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INSTRUCTIONS

The Climate Ready Review comprises of a series of questions broken up into six key areas. Record your response to each question in the appropriate box, including supporting information in the Comments box. This information is important for a full understanding and assessment of your city's current situation.

How to undertake the Climate Ready Review:
The Climate Core Team should meet to discuss and collectively undertake this exercise, ideally in consultations with all relevant staff, including senior management and external parties where required, to ensure that the Climate Ready Review provides a benchmark assessment as accurate as possible.

1. STRATEGIES, POLICIES, PLANS, PROCEDURES

This section refers to existing city strategies, policies, plans, and organisational procedures currently in place (or any proposed changes). This review enables the city to identify if climate considerations are part of the current strategic direction and organisational frameworks.

Including climate change considerations into the strategic direction of the city government is crucial to building internal support and mobilising resources (time, human resources, skills) necessary for the city to respond to anticipated climate change impacts in a measured and productive manner.

Do your existing strategies, policies, plans and procedures already include environmental considerations?

Table 1.1 – Exercise

1.1 Strategies	Yes	No	Comments	Hints
What are the medium to long term strategic priorities / goals of your city?				Summarise the social, economic and environmental goals of the city. Refer to Plan documents
Are climate change issues (current and/ or future) identified in the city's strategic priorities / goals?				List issues and concerns, such as conservation of natural resources, protecting natural environments, water conservation, extreme weather events – flooding, droughts, heat waves.

Table 1.2 – Exercise

1.2 Plans and Policies	Yes	No	Comments	Hints
Which plans or policies integrate social, environment, economic elements?				Name the policies
Does your city have an environmental plan or policy?				Name the policy. State when the policy was established.
Does your city have a disaster management plan or policy?				Name the policy. State when the policy was established
Does your city have a climate change policy or plan?				Name the policy. State when the policy was established.
Does your city have any policies, plans, guiding statements or other city directives that are used to direct actions to reduce energy use and pollution?				Name the policy. State when the policy was established.
Please detail other ways in which your city could integrate climate change considerations into existing city policies and plans.				Consider energy use, pollution and emerging and future climate change issues.
Does your city use environmental and/ or disaster risk reduction criteria in its decision-making? If yes, what types of projects typically assess environmental and/or disaster risk reduction criteria?				List the environmental and/or disaster risk reduction criteria. Has your city developed these criteria? For example, criteria for contracts to industries, building work or other development activities.

2. INFORMATION, DATA, TOOLS AND PROCESSES

Climate and energy-related information and systems that process and manage that information are crucial to help city staff make better and more informed decisions about climate change issues in their day-to-day work, in implementing the city's environment and climate-related policies, and in tracking and reviewing progress of plans and individual actions.

What access does your city have to environment and climate information?

Table 2 – Exercise

2.1 Information, data, tools and processes	Yes	No	Comments	Hints
Does your city use any information-based geographical tools (maps, geographical information systems)? If yes, please mention tools and their use.				Examples of tools are institutional maps, zoning maps, socio-economic profile maps, hazard maps, future growth maps, GIS based planning tools
Does your city have access to local or regional climate projections or climate impact scenarios? If not, which national or state agencies are responsible for holding weather and climate-related information?				National agencies are using global climate change projections to inform local climate change projections that estimate environmental changes over the long term.
Please detail other ways in which your city may improve access to environment and climate information.				

What access does your city have to appropriate financial resources for your climate change projects?

3. BUDGET ALLOCATION AND FINANCING PROCESSES

Allocated budget and financial resources are paramount to implementing climate change, disaster risk reduction and environmental actions. City governments can, and do, implement a suite of innovative climate change projects with very limited financial and human resources, e.g. implementing energy saving measures - these actions are commonly referred to as 'low-hanging fruit'. However, city governments commonly encounter problems in accessing financial resources necessary to move beyond the 'low-hanging fruit'. **City governments are therefore encouraged to develop sufficient budgets for climate change projects and to seek external funding opportunities to supplement city budgets.**

Table 3 – Exercise

3.1 Budget allocation and financing processes	Yes	No	Comments	Hints
Does your city have a specific budget allocation for disaster risk reduction, environmental or climate change projects?				Describe the climate change, disaster risk reduction, or environmental projects covered by specific budgets.
Please detail other ways in which your city may access funding for its disaster risk reduction, environmental or climate change projects.				

What kind of climate related training does the city offer to staff?

4. STAFF PARTICIPATION, TRAINING AND SUPPORT

Educating and raising the awareness of staff helps to build staff capacity and skills to incorporate climate change considerations as part of their decision-making, both in their role at the city government and in their role as a citizen. This, in turn, can improve organisational performance and can build further internal support for climate change initiatives.

Table 4 – Exercise

4.1 Staff Participation, Training and Support	Yes	No	Comments	Hints
Does the city offer staff training on climate change, disaster risk reduction, environmental/energy/climate-related initiatives?				Training could be provided as part of specific projects, or other training events.

5. EXISTING INITIATIVES

This section covers specific climate change related initiatives that the city has implemented. In this section, **city staff must identify initiatives that have helped the city to manage current climate change issues** (e.g. such as conserving energy, improving access to clean water) **as well as to prepare for emerging and future climate change issues** (such as extreme weather events, higher temperatures, intense storms and rainfall, flooding, and sea level rise).

Make sure to include Disaster Risk Reduction (DRR) initiatives too!

What past or existing initiatives are already helping manage climate change issues?

Responses to this question will form part of the city's Climate Resilience Strategy.

Table 5 – Exercise

5.1 Ongoing Projects

Sector	Project	Project		Duration of the project	Achievements
		Benefits	Costs		
Water supply	Description of intended/ unintended action.	Project benefits (cost savings, re-duced energy use)	Project costs (higher capital costs)	Start and end dates	
Is your city a member of UNISDR's "Making My City Disaster Resil-ient" Campaign?					
Any DRR initiatives?					

Which on-going programmes already engage the community on climate change and environmental issues?

6. STAKEHOLDER ENGAGEMENT

City government facilitated programmes are crucial to educating and raising the awareness on environmental issues in the community. In this section , the city must identify programmes and initiatives that demonstrate the city is engaging the community on climate change, disaster risk reduction, and environmental matters, such as disaster preparedness, energy and water conservation, and pollution.

Table 6 – Exercise

6.1 Community	Yes	No	Comments	Hints
Does your city work with the community in any way to facilitate disaster risk reduction, environmental or climate initiatives? If so, which sectors of the community? And which projects?				Describe initiatives and sectors involved.
Please detail other ways in which your city could engage the community on climate change issues.				Consider current, emerging and future climate change issues.

NEXT STEPS

Following the completion of the Climate Ready Review, your city should write a summary report that:

- Identifies where the city is performing well
- Identifies where there is room for improvement
- Identifies actions to improve performance
- Commits the city to a cycle of continuous improvement within the city's culture
- Commits to completing the Climate Ready Review at Phase 2 of the ICLEI ACCCRN Process

Have you:

- [ ] Listed existing strategies and plans that already include environmental considerations?
- [ ] Analysed what access your city has to environment and climate information?
- [ ] Assessed the availability and/or accessibility of financial resources for your climate change projects?
- [ ] Looked into already existing climate related training for the city staff?
- [ ] Identified past and current initiatives that are already helping manage climate change issues
- [ ] Listed existing community engagement programmes, related to climate change and the environment?

Reference Tool 4: Local Government Self Assessment Tool for Disaster and Climate Preparedness

Given how closely climate change adaptation (CCA) and disaster risk reduction (DRR) are connected, the ICLEI ACCCRN Process provides a link to the Local Government Self Assessment Tool (LGSAT) developed by the United Nations Office for Disaster Risk Reduction (UNISDR).

ICLEI ACCCRN Process

DEVELOPING A COMMUNICATION PLAN

TOOL 1.5

Climate change may be a new topic for some people, it may raise anxiety levels or even negative reactions among stakeholders unless the rationale is carefully explained. **Developing a Communication Plan at the start of the process will help you avoid these risks and gain the engagement of the relevant stakeholders you need to carry out your city's resilience process.**

Start by developing some clear messages about why the City is undertaking this work and what it hopes to achieve. Throughout the process there will also be other moments when clear messaging will be important, e.g. after the initial climate risk analysis has been undertaken.

How to develop the Communication Plan:
The Climate Core Team should meet to discuss and collectively undertake this exercise, following the recommendations below.

EXERCISE 1 – WRITING THE COMMUNICATION PLAN

Use the following headings to develop a Communication Plan for your process:

- Objectives
- Target audience
- Key messages
- Media
- Timing

Step 1 Objectives

First, write some broad objectives you plan to achieve with your communication activities. Some examples:

(i) Build awareness among your community regarding climate threats that the City faces, especially, as the case may be, on existing challenges that could be exacerbated due to these threats

(ii) Inform your community about the adaptation strategies that the City proposes to undertake in order to deal with these threats and ensure the citizens' well being

(iii) Encourage citizens to be involved in the decision making processes by soliciting their ideas and inputs

(iv) Suggest how actions taken by individuals and groups can contribute towards the City's resilience

What do you aim to achieve with your communication activities?

Care should be taken in the kind of terminology chosen: the use of complicated and technical terms should be avoided, and risks and proposed actions that the community can relate to should be used (i.e. securing the health and well being in the event of heat stresses).

Step 2 Target Audience

Once you have defined your objectives, list the stakeholders that you intend to reach with your communication plan. Begin with the groups listed in Tool 1.2.

Whom are you talking to?

Target Audience Group	Contact Details	Primary Contact – Name & Telephone number / email	

What messages are you trying to convey?

Step 3 Key Messages

Now decide which key messages you want to communicate to each target audience at the beginning of the process - remember that new messages will be needed as you learn more about how climate change will impact your city and how to respond to it.

Target Audience Groups	Key Messages
Eg. City departments	*The City is participating in ACCCRN. Your involvement is required*
Eg. Community group	*The City is participating in ACCCRN. The City will be holding forums to hear from community groups*

Example (adapted from The Climate Impacts Group, King County & ICLEI's Preparing for Climate Change Guidebook)

Developing Key Messages

Describe changes that have already been observed. There are many indications that the Earth's climate and various physical and ecological systems are changing. Some of these may be changes that local residents have observed first-hand. Including this information can underscore that climate change is occurring and, in many respects, having a measurable impact on Earth's systems. Be careful not to attribute observed changes to human-caused climate change entirely, unless there is scientific evidence to back up the claim.

Describe changes that are expected. Using the information you collected in your Scoping Exercise and any additional information collected later, provide information on how temperature, precipitation, snowpack, and other aspects of climate and the environment are expected to change in your region as a result of climate change.

Describe how climate change may impact the community. Using the information you collected in your Scoping Exercise, explain the potential regional and local consequences of climate change. Impacts may include sea level rise, changes in water supply, and increased risk of drought, forest fires, extreme events, flooding, and/or disease. Be careful not to overstate what you know about impacts to your region or you risk losing credibility with key audiences.

Identify other communities similar to yours that are planning for climate change. It may be helpful for people to see that other communities similar to yours are taking steps to address climate change impacts. The 10 pilot cities under ACCCRN and the other 2 cities that are implementing the ICLEI ACCCRN project, as well as others, are good resources for identifying other communities working on climate change activities. With time, it will be possible to focus on those strategies that have worked for other City Governments like yours. Identifying your peers and exchanging experiences can be empowering and helpful.

Develop a course of action. Outline what you intend to achieve and the steps your City intends to take to prepare for the projected changes. Update your message with details on your community's course of action as the planning process progresses and your plan is implemented.

Acknowledge that questions remain. Do not be reluctant to admit that questions remain. Clearly communicating what you do know – while being honest about what questions still need to be answered – will be critical to gaining and maintaining credibility, interest, understanding, and support for your preparedness work. Be sure to emphasize, however, that enough information is available for (and warrants) moving forward with planning.

Step 4 Media
Decide on the most appropriate media and channels you will use to deliver the messages.

How will you get your messages through'?

Example: Approaches that could be used for engaging citizens

• Develop climate vulnerability assessments of the City. A non-technical version of the document could be shared with the citizens and their feedback solicited

• Produce communication products such as pamphlets that identify the climate vulnerabilities of the city, proposed adaptation activities and actions, as well as sources of more information and how citizens can get involved

• Organise public consultations in which potential climate impacts and corresponding adaptation plans are discussed

• Make use of web-based interactions – citizens can be invited to share their points of view and ideas on adaptation measures

• Coordinate community meetings in different and diverse parts of the community to solicit feedback and ideas – civil society organizations could facilitate such a process

• Share GIS-based climate change vulnerability maps for communicating and reviewing local areas most likely to be impacted by climate change

• Make the most of various media (audio, video, print, electronic) to spread climate change awareness throughout a larger audiences

Now finalise your communication plan!

Step 5 Finalise the Communication Plan

The following table can be used to summarise and track your communication.

Target Audience	Objective, Message	Activity	Communication Medium	Timing	Achieved yes/no
E.g. City Departments	*Inform all city departments that the city government is participating in ICLEI ACCCRN project*	*Internal Launch*	*Newsletter, staff meetings*	*October*	
E.g. Residents, Local Business	*Inform citizens that the City is participating in the ICLEI ACCCRN project*	*External Launch*	*Media release*	*October*	
E.g. City Departments	*Recruit staff to participate in the project, and identify Climate Core Team members*	*Staff recruitment*	*Newsletter*	*October*	

Please Note: The communication plan is not a one-time document and should be updated from time to time. For example, the key messages emerging from each phase of the process can be used to update the plan .

Have you:

- [ ] Listed the objectives of your communication activities?
- [ ] Identified your main target audience?
- [ ] Developed your key messages?
- [ ] Decided which channels to use to convey them?
- [ ] Drafted and finalised your communication plan?

ICLEI ACCCRN Process

RELEVANT INTERNATIONAL INITIATIVES

TOOL 1.6

For further information on the Campaign and the self assessment tool, please see Reference Tool 4.

Now that your city has undertaken the ICLEI ACCCRN Process to assess your climate risks and develop resilience strategies, you have an opportunity to sign up for relevant international initiatives that will provide you with access to additional resources as well as an international platform to showcase achievements and interact with other cities.Below you find some of these initiatives:

1. MY CITY IS GETTING READY CAMPAIGN

ICLEI works in partnership with the United Nations Office for Disaster Risk Reduction (UNISDR) to offer the My city is Getting Ready Campaign.

This campaign was launched in 2010 and there are now more than 1500 cities around the world participating. The Campaign provides support for cities to become more disaster ready, including a Local Government Self Assessment Tool (LGSAT). This tool can be used as part of the ICLEI ACCCRN Process in Phase 1, or as an action in your Resilience Strategy.

2. CARBONN CITIES CLIMATE REGISTRY

The carbon*n* Cities Climate Registry (cCCR) is a global mechanism that encourages local governments to regularly and publicly report on their greenhouse gas reduction commitments, GHG emissions inventories and climate mitigation/adaptation actions. The cCCR was developed by local governments for local governments and is hosted by ICLEI.

The cCCR enables cities and local governments to publicly register their greenhouse gas reduction commitments, report performance and showcase actions.

3. DURBAN ADAPTATION CHARTER

The Durban Adaptation Charter was launched at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 17 held in the City of Durban (eThekwini Municipality), South Africa, in December 2011, during the 'Durban Local Government Convention: adapting to a changing climate - towards COP17/CMP7 and beyond'. The convention was hosted by the South African Government, through the South African Local Government Association (SALGA), South African Cities Network (SACN), eThekwini Municipality and the Department of Environmental Affairs, and in partnership with ICLEI.

For further information please see Reference Tool 5

The Charter commits Local Governments to local climate action in their jurisdiction that will assist their communities to respond to and cope with climate change risks thereby reducing vulnerability. Its initial signing by 114 signatories, representing 950 local governments organisations from 27 countries, builds on the recognition of local governments as government stakeholders in the Cancun Agreement.

By carrying out the ICLEI ACCCRN Process your city government has initiated its action towards making your city climate resilient. The signing of the Durban Adaptation Charter will enable your city to reach out to a larger audience and showcase its commitment and actions for climate resilience on an international platform.

4. 100 RESILIENT CITIES CHALLENGE[1]

The Rockefeller Foundation launched the 100 Resilient Cities Challenge (100RC) in 2013 to enable 100 cities to better address the increasing shocks and stresses of the 21st century. It is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century.

For further information please see Reference Tool 6

Cities in the 100RC network are provided with the resources necessary to develop a roadmap to resilience along four main pathways:

1. Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city's resilience efforts;

2. Expert support for development of a robust resilience strategy;

3. Access to solutions, service providers, and partners from the private, public and NGO sectors who can help them develop and implement their resilience strategies; and

4. Membership of a global network of member cities who can learn from and help each other.

Nearly 400 cities across six continents applied to be among the first cities selected to receive technical support and resources to improve their urban resilience over three years. The first group of 32 cities was announced on December 3, 2013, selected by judges with unique expertise on tools and strategies that make a city better prepared to face natural and manmade disaster.
Support will be extended to additional cities in ensuing batches. In order to participate in the challenge please see: **http://www.100resilientcities.org/pages/about-the-challenge**

[1]Source: adapted from www.100resilientcities.org

ICLEI ACCCRN Process

PHASE 2

ICLEI ACCCRN Process

Overview of Phase 2

CLIMATE RESEARCH AND IMPACTS ASSESSMENT

TOOL 2.0

In this Phase you will analyse available climate change data and develop a projection of likely climate changes for a future year, then use this projection to assess the likely impact on critical urban systems and resultant risks.

The tools included in Phase 2 and their corresponding objectives are:

Tool 2.1 : Climate Exposure: Projections & Scenarios - to collate and analyse climate change data and generate climate exposure scenarios or projections

Tool 2.2 : Urban Systems Analysis - to assess the city's fragile urban systems and services already under great stress and the expected impacts of climate change on them

Tool 2.3 : Risk Assessment - to prioritise the expected climate impacts based on an assessment of their risk status

ICLEI ACCCRN Process

CLIMATE EXPOSURE: PROJECTIONS & SCENARIOS

TOOL 2.1

Phenomena such as increased precipitation, heat stress, floods and other extreme weather events, referred to as *climate exposures,* are increasingly having an impact on people, infrastructure and systems within cities.

This tool aims to help your city to collate and analyse climate change data and generate at least one climate exposure scenario, or projection. Ideally, the city will be able to use local climate data; however, if this is not available, the tool suggests other sources for conducting the analysis.

The tool is divided into two sections. **Section A** suggests sources of climate data and the process of collating and documenting this data. **Section B** gives guidance for a preliminary analysis of the data and for writing a Climate Scenario Summary Statement.

How to undertake the Climate Analysis:
It is suggested that the Climate Core Team meet to discuss and collectively undertake this exercise.

Consultations with climate experts are highly recommended. Such experts can be available locally and be part of the Stakeholder Group or their services may have to be hired.

SECTION A CLIMATE DATA COLLATION

First, try to find local level climate data and any other data sets or recent studies on climate phenomena and projections for your own area . This material may be available from the city's own records, universities or research institutes, NGOs or other bodies (consultation with members of the Stakeholder Group established in Phase 1 could help facilitate this process).

Find local level climate data

If there is no local level assessment available, look for a regional assessment. For example, the Indian Network for Climate Change Assessment's (INCCA) Report gives projections for 2030 for some regions in India. Similarly, the Indonesian Government in collaboration with AusAid and GIZ has developed climate projections for several regions of Indonesia (KRAPI project). Regional data will provide a good base level of data; even if it is generalised to a wider area than your city boundaries, it may still be sufficient to initiate discussions on anticipated climate changes at the city level.

You will be using the trends of the higher scale projections (e.g. increase in average annual temperatures can be expected by 2030) for both average annual figures as well as for seasonal variations. Stakeholder meetings may be used to check and validate the general trends, particularly if there is a degree of uncertainty in the available information . The city may decide to commission additional local research as part of its Resilience Strategy if it is not satisfied with the quality of available data.

Use stakeholder meetings to validate the general trends

Background:

Following are guidelines for the collection of climate data, based on the ICLEI USA User Guide "The Adaptation Database and Planning Tool (ADAPT) User Guide".

The first step is to review local and regional information about how the climate is already changing, as well as how it is expected to change in the future. This includes identifying the amount of change expected in climate, such as average temperature, precipitation, sea level rise, wind speeds and extreme events that are projected in your area. The amount of change expected will typically be expressed as a range that could increase or decrease by a specified future date, relative to the average for a given baseline set of years. When identifying changes, to the extent possible, avoid using only one projection of future climate (e.g. 30 cm sea level rise) and instead include a range (e.g. 25 to 40 cm of sea level rise by 2030 compared to 1980-1999 baseline years).

Avoid using only one projection of future climate and instead include a range

Projections for certain climate changes, such as precipitation, may show a range in the amount of expected change that includes both a potential decrease and increase, either due to uncertainty in the projection or seasonal variability, where one season is expected to see an increase and another season will see a decrease. Where possible collect information about how climate will change by season , such as "average summer precipitation" and "average winter precipitation" instead of "average yearly precipitation".

Where possible collect information about how climate will change by season

When reviewing sources of scientific data, be cautious about reading isolated studies and avoid including reports that have not been extensively peer-reviewed by top-level, credible scientists. In addition to the regional summaries provided by the sources above, you should contact nearby governments and universities, state or provincial climate change websites, environmental agencies, and local community groups or NGOs that may either have scientific projections for your particular local area, or have compiled research on climate change that you can use.

Contact local organisations that have done climate change research

Collect information about all these categories

Exercise 1
Try to collect as much of the following information as possible, then summarise it in the template provided in Table 1 (an example is given to facilitate this process):

- **Name of changing climate condition** [e.g. increase or decrease in temperature, precipitation, extreme weather events]
- **Amount of expected change** (expressed as a range) including baseline year(s) from which change is measured and the planning horizon year by which change will have occurred
- **Geographical area** for which climate projection is relevant [e.g. a specific region or location]
- **Greenhouse gas emissions scenario** for which the projection is relevant [e.g. high and/or low emission scenarios]
- **Extent of variability** (seasonal, El Nino, La Nina etc) [expected variations across seasons e.g. between summer and winter, and/or events e.g. high precipitation followed by drought]
- **Level of confidence** [degree of certainty (less certain / more certain) of the projected change]
- **Source of information** [this would need to be specified for the supplementary local assessments]

Please Note: *Some specialist assistance may be required for this process and can be sought from universities or research institutes in the area.*

Table 1: Climate Data Summary – Example and Exercise

Changing Climate Condition	Assessments	Amount of Expected Change (include baseline and planning horizon years)	Geographical Area	Green-house Gas Emissions Scenario	Extent of Variability	Level of Confidence	Source(s)
Precipitation change	Regional Assessments	*e.g. 1268±225.2 mm to 1604±175.2 mm Baseline year: 1970 Horizon year: 2030*	*Himalayan Region (Western Himalayas constituting of Jammu and Kashmir, Uttarakhand and Himachal Pradesh)*	*A1B scenario, IPCC*	*Overall increase in rainfall. June, July, August, September - 12mm January, February - 5mm October, November and December*	*High*	*4x4 Assessment report by Government of India (GoI) Assessment report by Government of India (GoI)*
	Supplementary Local Assessments						
Temperature change	Regional Assessments						
	Supplementary Local Assessments						
Extreme events (please specify the event)	Regional Assessments						
	Supplementary Local Assessments						
Sea Level Rise	Regional Assessments						
	Supplementary Local Assessments						

SECTION B ANALYSIS AND SCENARIO(S)

Is there any consistent set of projections in the data analysis?

Exercise 2: Climate Scenario Statements

Step 1
Analyse the results of the data collection to determine whether there is a consistent set of projections, particularly around the most significant direct climate impacts e.g. precipitation patterns, temperature rise, sea level rise, extreme weather events .

If the results for a particular 'changing climate condition' are quite consistent for both the regional and local assessments, a single Climate Scenario Summary Statement can be written for that climate condition. However, if there are significant variations in the projections, you may need to develop two separate Climate Scenario Summary Statements for each of the assessments. Some specialist assistance may also be required for this process.

Please Note: *that it is critical to ensure that the time horizons for the projections are similar. If the time horizons from the various data sources are different, it will be necessary to interpolate or extrapolate some of the data to a consistent year in order to assess the consistency or inconsistency of the projections.*

Write your Climate Scenario statement(s)

Step 2
Now , write one or more Climate Scenario Statements for the changing climate conditions identified in the table above. A Scenario Statements can be framed in the following manner:

*"There is a... ←insert information from **'level of confidence'** i.e. degree of certainty→... of a...←insert information from **'amount of expected change'** i.e. the range→...in the...←insert information from **'changing climate condition'**→...in the...←insert information from **'geographical area'**→...by the year...←insert information on the planning horizon year from **'amount of expected change'** column→. The projected change is expected to...←insert information from **'extent of variability'**→."*

Table 2: Climate Scenario Statement – Example and Exercise

Changing Climate Conditions	Assessments	Climate Scenario Summary Statements
Precipitation change	Regional Assessments (4x4 Assessment report by GoI)	e.g. There is a high level of confidence of an expected change of 1268±225.2 mm to 1604±175.2 mm in the precipitation in the Himalayan Region by the year 2030. The projected change is expected to be maximum in monsoon months - June, July, August and September, and minimum in October, November and December.
	Supplementary Local Assessments	
Temperature change	Regional Assessments (4x4 Assessment report by GoI)	
	Supplementary Local Assessments	
Extreme events (please specify the event)	Regional Assessments (4x4 Assessment report by GoI)	
	Supplementary Local Assessments	
Sea Level Rise	Regional Assessments (4x4 Assessment report by GoI)	
	Supplementary Local Assessments	

Have you:

- ☐ Looked for and collected local level climate data?
- ☐ Analysed the collected data to determine whether there are consistent sets of projections?
- ☐ Written your Climate Scenario Statements?
- ☐ Consulted climate experts during the process?

References

Kajian Risiko dan Adatasi Perubahan Iklim (KRAPI)
http://www.paklim.org/library/publications/?category=24

Climate Change and India: A 4 x 4 Assessment. A Sectoral and Regional Analysis for 2030
http://moef.nic.in/downloads/public-information/fin-rpt-incca.pdf

The Adaptation Database and Planning Tool (ADAPT) User Guide, ICLEI USA, November 2010
www.icleiusa.org

ICLEI ACCCRN Process

URBAN SYSTEMS ANALYSIS

TOOL 2.2

Implementing this tool is a critical step in the ICLEI ACCCRN climate resilience building process as proposed actions or resilience strategies would be based on its outcomes. It examines urban systems to identify fragile systems and how they would be impacted by climate change.

This tool provides guidance for working through two exercises:

1. Identification of "fragile urban systems" i.e. the systems or services in your city which are already weak or under great pressure.
2. Assessment of the impact of climate change on these fragile systems.

This analysis is based on the "Urban Climate Resilience Planning Framework (UCRPF)" developed by ISET as part of the original ACCCRN program.

Please refer to Reference Tool 7 for the theoretical background of this framework.

How to undertake the Urban Analysis:
The city Climate Core Team should conduct a 1-2 day workshop to identify the unique and potentially fragile features of their city, and the likely impacts of projected climate change, following the UCRPF. The recommended steps are to:

- Identify critical and potentially fragile urban systems
- Hypothesise which of these systems may be most impacted by climate change

It is important to incorporate the views of the stakeholder group as well. There are two ways in which the Core Team could proceed:

1. The Core Team undertakes this exercise on their own and then shares the results with the Stakeholder Group for their feedback and support
2. This entire urban analysis exercise is undertaken jointly by the Core Team and the Stakeholder Group as part of a consultation process.

The 2nd option is recommended as it is more participatory and inclusive and allows for greater interactions and discussions between the Core Team and the Stakeholder Group. It allows for the same issue (e.g. identification of fragile urban systems – Exercise 1 below) to be discussed by different groups of heterogeneous participants and it provides an opportunity to every group to present their results and to debate and finalise together the outputs of the exercise. This approach can be repeated for other exercises as well as for generating greater discussions and consensus building on the outputs.

Please follow the instructions and steps listed for each of the exercises. Please note that it may be worth hiring the services of a workshop facilitator to conduct this workshop.

Tool 2.2

URBAN SYSTEMS ANALYSIS

Urban systems may include 'core systems', such as water and food, essential for the survival of the city, and 'secondary systems' such as education and social services, which rely on the core services. The table below provides an indicative menu of both core and higher level urban systems to assist your thinking. Note that this list is not complete, so please do not be limited by it and add and/or select systems that you feel are appropriate for your city.

Example 1: Indicative checklist of core and secondary urban systems:

Some Core Urban Systems	Some Secondary Urban Systems
• Ecosystems • Land • Energy • Water • Food • Shelter • Transport • Communications	• Health care • Education • Finance • Markets • Sanitation • Community services • Public security • Taxation

Source: Adapted from ISET, 2011

EXERCISE 1: FRAGILE URBAN SYSTEMS

In order to identify the fragile urban systems in your city complete the Excercise 1 Matrix by following these steps:

Step 1

First, identify the systems or services in your city which are already failing or are under great pressure .

To help identify fragile systems you could refer to:

- Exercises **1 & 2 of Tool 1.3** in which the sectors that are perceived as being impacted by climate change have already been discussed and listed by the Core Team. This can provide a very useful starting point for discussions on identifying the fragile urban systems in the city
- The highest priorities in your city's development / master plan. If your city has a City Development Plan (CDP), use this as a reference document
- Your city's /district's disaster management plan
- The key concerns raised with the city administration by the community and private sector

Step 2

Define your reasons for rating them as fragile. You can use your own reasons for this assessment, and can also refer to some "resilience characteristics" as follows:

Achieving resilience is the desired outcome of developing and maintaining urban systems. **Resilience** is defined as:

"The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change (IPCC, 2007)."

Therefore, in the case of the ICLEI ACCCRN Process, **resilient urban systems** would be those urban systems **that are able to maintain their functions and linkages in the face of climate stresses and changes.**

Which systems in your city are already failing or under great pressure?

To help identify fragile systems you could refer to: exercises **1 & 2 of Tool 1.3**

Why are these systems fragile?

Characteristics of resilient systems include:

Flexibility and diversity - mix of multiple options, key assets and functions are distributed or decentralised, not all affected by a single event
Example: A network of hospitals rather than a single, central hospital

Redundancy - alternatives / back-up systems / contingency plans, capacity for contingency situations, multiple pathways and options for service delivery in case one or several options fail
Example: Hospitals and emergency communications facilities have shared or linked backup electrical generators

Safe failure – ability to absorb sudden shocks or slow onset stress so as to avoid catastrophic failure
Example: Dikes are designed so that if their capacity is exceeded, they fail in predictable ways, channelling flooding away from populated areas

How will their fragility impact other systems?

Who is responsible for these systems?

And now write your fragility statement

Step 3
Next , consider the existing and anticipated problems caused by the fragility of the urban systems. The guiding question here is: 'How does the fragility of this urban system impact other functions, systems and services in your city?'

Step 4
Now , define who is responsible. Is it part of the city government's function, the responsibility of another entity, or a shared responsibility? This will help define whether the city government will be able to take action to reduce the fragility of this system solely on its own, in collaboration with another department, or will need to approach some other entity with the issue and the proposed action.

Step 5
Finally, based on the information generated in the earlier steps, write a summary 'fragility statement'. (Please see the example in italics in Table 1 on the next page)

Table 1: Identifying Fragile Urban Systems - Example and Exercise

Urban system	Why is it critical or fragile?	What are the existing and anticipated problems caused by the fragility of this system?	Part of city function (Completely / Shared / No)	Fragility statement
e.g. Water supply	**Flexibility & Diversity:** *Traditional water sources have been lost due to the urbanisation process and the city depends on centralised pumping systems that transport water from significant distances to the city. Supply cannot meet the growing demand* **Redundancy:** *Alternatives usually include water supplied by tankers (trucks). Given the mountainous region this limits access of these trucks in addition to them being an expensive and polluting fallback option* **Safe failure:** *in case of a disruption in water supply, individual households have to fend for themselves. One of the systems is over a 100 years old*	*• Disruption of water supply to citizens* *• Additional financial burden on individual households to purchase water from water tankers* *• Water shortage adversely impacts the tourism industry* *• Increased pollution and emissions from the plying of water tankers*	*Shared with the Irrigation & Public Health Department*	*The water supply system in the city is old and largely dependent on transporting water over large distances, whereby even minor disruptions cause significant shortages in the city in the face of an ever growing demand; alternatives are not cost effective or sustainable.*

Take the fragile systems and fragility statements from Exercise 1

How will climate change impact these fragile systems?

Write your climate risk statement

EXERCISE 2: CLIMATE IMPACTS ON FRAGILE URBAN SYSTEMS

To assess the impacts of climate change on the fragile systems identified in the Exercise 1 above, complete the Exercise 2 Matrix by following these steps:

Step 1:
Begin with the fragile systems identified in your city and the corresponding fragility statements developed in Exercise 1 above

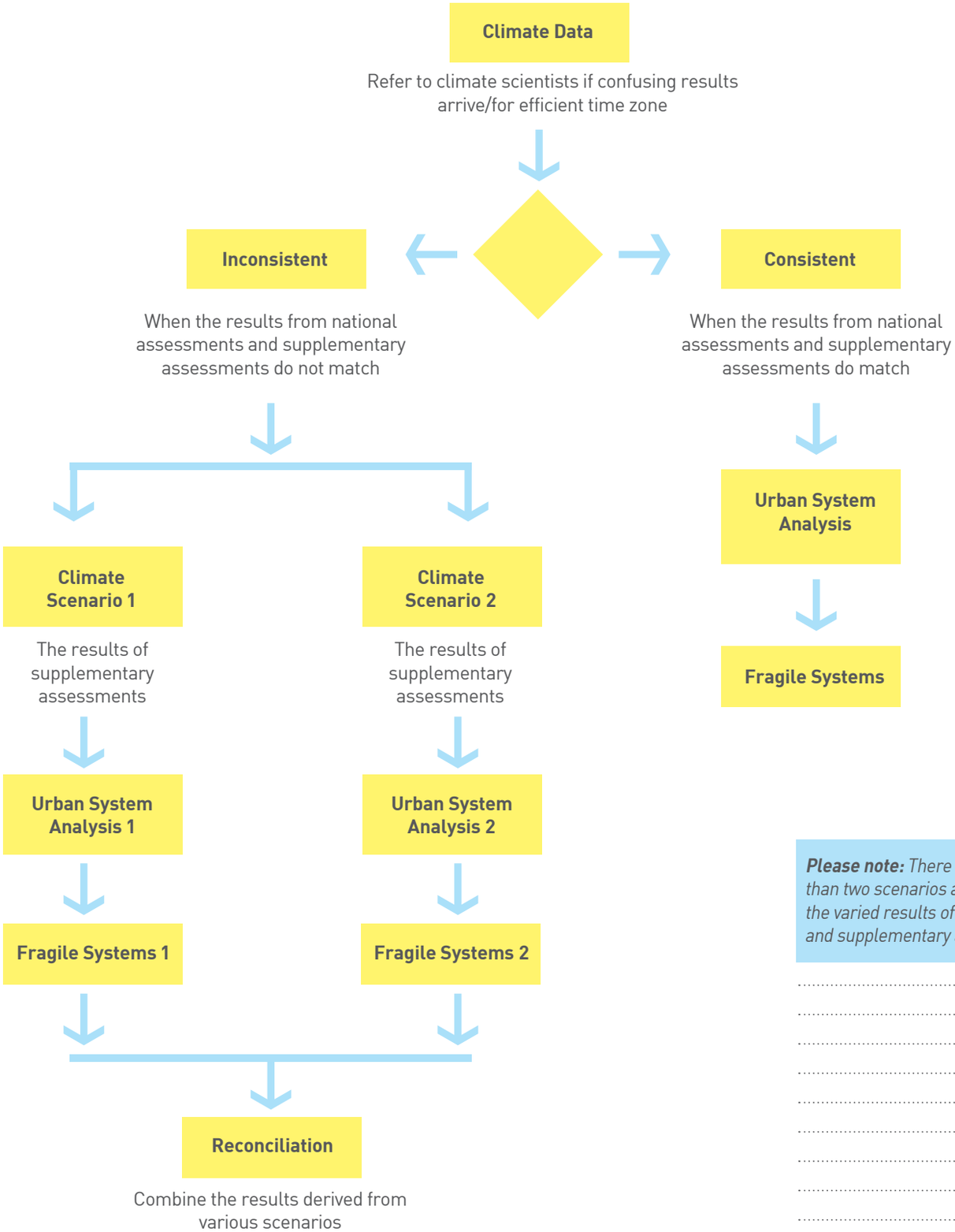
Step 2:
Next, consider the Climate Scenario Summaries developed in Tool 2.1. The question to answer here is:
'How might the projected climate changes impact on the critical / fragile systems that you have identified in Exercise 1?'

For this, each Fragility Statement developed in Table 1 above should be listed. Remember that in most cases climate change may threaten or weaken a system (e.g. already poor drainage systems may be worse off in case of expected increases in precipitation), but in a few others climate change may bring benefits to the system too (e.g. water supply systems that are inadequate due to lack of availability of sufficient water resources could benefit from an expected increase in precipitation).

Step 3:
Finally, based on the information generated in the earlier steps, write a 'climate risk statement' that identifies the characteristics of the fragile system and the potential climate impacts on this system .

Please Note: *If you have generated a second climate scenario summary, you will need to undertake the Fragile Urban Systems analysis a second time. Then compare the two lists of fragile systems: the systems which feature in both lists will obviously be high priorities for the city. Any system identified as fragile under one climate scenario, but less fragile in the second scenario, may be given a lower priority for action, or may be targeted for further study and analysis. This process of comparing the two lists of fragile systems is illustrated in the flow chart below .*

Flow chart Showing Scenario Treatment



Please note: *There can be more than two scenarios arising from the varied results of the national and supplementary assessment*

Table 2(a) Climate Impacts on Fragile Urban Systems (Climate Scenario 1) - Example and Exercise

Urban system	Fragility statement	Climate fragility statement **Climate risk 1:** e.g. Increased precipitation	Climate fragility statement **Climate risk 2:** e.g. Increased temperatures	Climate fragility statement **Climate risk 3:**	Climate fragility statement **Climate risk 4:**
e.g. Water supply	*The water supply system in the city is old and largely dependent on transporting water over large distances, whereby even minor disruptions cause significant shortages in the city in the face of an ever growing demand; alternatives are not cost effective or sustainable*	*Increased precipitation disrupts / damages water supply infrastructure* *Increased precipitation can cause water to freeze in the pipelines*	*Increased temperatures will lead to increased demand for water thereby posing additional stress on the supply system*	*e.g. Water supply*	*e.g. Water supply*

Table 2(b) Climate Impacts on Fragile Urban Systems (if needed for a second Climate Scenario) - Exercise

Urban system	Fragility statement	Climate fragility statement	Climate fragility statement	Climate fragility statement	Climate fragility statement
		Climate risk 1: eg. Increased precipitation	**Climate risk 2:**	**Climate risk 3:**	**Climate risk 4:**
e.g. Water supply					

Have you:

- [ ] Identified your fragile urban systems, the reasons for their fragility and the entities responsible for these systems?
- [ ] Looked into how this fragility will impact other systems?
- [ ] Written your Fragility Statements?
- [ ] Analysed how climate change will impact these systems?
- [ ] Written your Climate Risk Statements?
- [ ] Involved or at least consulted the Stakeholder Group in your Urban Systems Analysis?

References

Moench, M., S. Tyler, et al. (2011), Catalyzing Urban Climate Resilience: applying resilience Concepts to Planning Practice in the aCCCrn Program (2009–2011), The Institute for Social and Environmental Transition, International, Boulder, CO, USA

ICLEI ACCCRN Process

RISK ASSESSMENT

TOOL 2.3

At the end of Tool 2.2 you produced a series of Climate Risk Statements. Tool 2.3 now helps you to prioritize these risks using a Risk Assessment methodology.

Note that this exercise can be quite subjective as it depends on the opinions and personal experiences of participants. Therefore it is recommended to conduct the risk assessment with a broad group of city representatives and preferably to repeat the exercise with the Stakeholder Group to validate the priorities.

How to undertake the Risk Assessment:
It is recommended that the city Climate Core Team conducts a workshop to assess the status of climate risk statements. It is important to incorporate the views of the stakeholder group as well. There are two ways in which the Core Team could proceed:

1. The Core Team undertakes this exercise on their own and then shares the results with the Stakeholder Group for their feedback and support
2. This entire Risk Assessment exercise is undertaken jointly by the Core Team and the Stakeholder Group as part of a consultation process

The 2nd option is recommended as it is more participatory and inclusive and allows for greater interactions and discussions between the Core Team and the Stakeholder Group. It allows for the same issue (e.g. each group assign a Risk Score – described below – for each of the climate risk statements) to be discussed by different groups of heterogeneous participants, and it provides an opportunity to every group to present their results and debate and finalise together the outputs of the exercise. This approach will help generate greater discussions and consensus building on the final risk prioritization of the climate risk statements.

EXERCISE 1: PRIORITIZATION OF THE CLIMATE RISKS

Step 1

Transfer the Climate Risk Statements (taken from table 2, in Tool 2.2) to the first column of Table 1 below .

Look again at your Climate Risk Statements (Tool 2.2)

Step 2

Now, assess the likelihood of each risk occurring and assign a score from 1 to 5, using Example 1 for guidance. It is recommended that you refer back to the 'Level of Confidence' that has been assigned to each of the identified climate change conditions in Table 1 of Tool 2.1. For example, if the projected increase in precipitation has a 'high' level of confidence, its likelihood of occurrence is higher.

What is the likelihood of each risk occurring? Check table 1 of Tool 2.1 for help

Example 1: Likelihood Rating and Scoring

Likelihood rating	Description	Score
Almost certain	Is highly likely to occur, could occur several times per year. Likelihood probably greater than 50%	5
Likely	Reasonable likelihood, may arise once per year. Likelihood 50/50 chance	4
Possible	May occur, perhaps once in 10 years Likelihood less than 50% but still quite high	3
Unlikely	Unlikely but should still be considered, may arise once in 10 to 25 years	2
Rare	Likelihood probability significantly greater than zero. Unlikely in foreseeable future – negligible probability	1

Step 3

Next, for each climate risk, assess the consequence, or impact, if the risk does occur. **Consequences** can range from Catastrophic to Moderate to Insignificant. **Assign a score from 1 to 5** for each risk where 5 is Catastrophic and 1 is Insignificant. Example 2 shows one way of assessing the different consequence rating, using "Impact on the System" and "Impact on the City Government" as measures. However, you may also write your own Consequence Scale.

What type of consequence would this risk have?

A particular focus of this assessment is to identify systems failures which could have direct and serious impacts on the poorest and most vulnerable groups in the city. Therefore it is recommended to consider the impacts on both, the system as well as the poor and vulnerable, while deciding on the Consequence ratings of each of the climate risks.

Reference Tool 9 Local Government Strategic Priorities Consequence Scale

Another way of assessing the consequence of a climate risk on the city is to measure it against the city's strategic priorities. Reference Tool 9 provides an example.

Example 2: Consequence Rating and Scoring

Consequence rating	Impact on system	Impact on poor and vulnerable	Score
Catastrophic	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
Major	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
Moderate	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
Minor	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
Insignificant	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

What is the risk score for each Climate Risk Statement?

Now assess the risk status of each risk statement

Step 4
Having assigned a 'Likelihood' and 'Consequence' score to each of the identified climate risks, now multiply both these values (score from step 2 and score from step 3) to arrive at the 'Risk Score' for each Climate Risk Statement.

Step 5
Finally, for each of the climate risk statement, assess their Risk Status based on their respective Risk Scores. Please refer to the 'Summary of Risk Matrix' in Example 4 for assessing the risk status.

Example 4: Summary of a Risk Matrix

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium (RS* = 5)	Medium (RS = 10)	High (RS = 15)	Extreme (RS = 20)	Extreme (RS = 25)
Likely	Low (RS = 4)	Medium (RS = 8)	High (RS = 12)	High (RS = 16)	Extreme (RS = 20)
Possible	Low (RS = 3)	Medium (RS = 6)	Medium (RS = 9)	High (RS = 12)	High (RS = 15)
Unlikely	Low (RS = 2)	Low (RS = 4)	Medium (RS = 6)	Medium (RS = 8)	Medium (RS = 10)
Rare	Low (RS = 1)	Low (RS = 2)	Low (RS = 3)	Low (RS = 4)	Medium (RS = 5)

*RS: Risk Score

Please Note: *if more than one climate scenarios were used in Exercise 1 then this risk assessment would need to be repeated .*

Please see the example provided in the Exercise table 1 below. The climate risk statements are taken from Tool 2.2 and used as an example; you can fill out a similar table with your own statements and scoring.

Table 1: Prioritisation of Climate Risks – Example and Exercise

Climate Risk Statements	Likelihood	Consequence	Risk score (Likelihood x Consequence)	Risk Status
Increased precipitation disrupts/ damages water supply infrastructure	4	4	16	High
Increased precipitation can cause water to freeze in the pipelines	4	4	16	High
Increased temperatures will lead to increased demand for water thereby posing additional stress on the supply system	3	3	9	Medium

Have you:

- [ ] Considered the likelihood of each climate risk?
- [ ] Foreseen the consequences these risks would have?
- [ ] Assessed the risk status of each risk statement?
- [ ] Involved or at least consulted the Stakeholder Group in your Risk Assessment?

ICLEI ACCCRN Process

ENGAGEMENT CHECKLIST

PHASE 2

As you work through the process you may discover issues and groups of stakeholders that were not identified initially. There will be points where you need to consult external groups and points where you need to report back to the city decision makers. It is therefore essential that you revisit and review at key points the engagement decisions taken so far and ensure that the support structures for the climate planning are in place. This is also the moment to identify key messages to be shared without the larger group.

Categories	Questions	Yes/No	Comments
Climate core team	Do you have the relevant department/sectoral representatives, do you need to invite additional people if you have identified unexpected climate impacts or actions?	*(You might have to go back to Tool 1.1 and update the information)*	
External stakeholders	Do you have the key stakeholders to cover each climate issue or action identified?	*(You might have to go back to Tool 1.2 and update the information)*	
Consultation	Have you reached a point where you need to consult widely, or consult particular groups?		
Communication	Is there new information, or better understanding of climate issues, which should now be communicated? If so, to whom, how and when?	*(You might have to go back to Tool 1.5 and update the information)*	
Reporting	Is it time to report back to the Mayor, or council, or senior management (or another key stakeholder?)		

Notes

ICLEI ACCCRN Process

PHASE 3

ICLEI ACCCRN Process

Overview of Phase 3

VULNERABILITIES ASSESSMENT

TOOL 3.0

In this Phase you will produce maps of the high priority climate risks and assess the impact on the most vulnerable groups of people, then analyse the adaptive capacity of the urban systems involved. The final tool will assist you in collating all this information and identifying gaps in data.

The tools included in Phase 3 and their corresponding objectives are:

Tool 3.1: Vulnerable Places and People – to identify areas in the city that are vulnerable to the expected climate impacts and assess the adaptive capacities of the affected actors

Tool 3.2: Assessing the Adaptive Capacities of Urban Systems – to determine the adaptive capacity of the fragile urban systems in terms of economic, technology/ infrastructure, governance, social, and ecosystem perspectives

Tool 3.3: Data Gap Analysis - to identify data gaps for each fragile urban system that would need to be addressed to improve the planning process

In Phase 2 it was necessary to work through the tools in a specific sequence. However, in this phase you can work through the first two tools in either order, or you could undertake the two tools in parallel with separate working groups. The results are then collated in Tool 3.3.

How to undertake the Vulnerabilities Assessment:
The city Climate Core Team should conduct a 1 – 1.5 days workshop in which Tool 3.1, Tool 3.2 and Tool 3.3 can be implemented. The outputs of this workshop would be:

- The vulnerable areas of the city are mapped and the actors/ stakeholders who may be most affected or who may be instrumental in responses are identified (Output of Tool 3.1)
- The adaptive capacity of the fragile urban systems is determined and the outputs of Tools 3.1 and 3.2 are consolidated (Output of Tool 3.2)
- Data gaps of the fragile urban systems are identified (Output of Tool 3.3)

It is important to incorporate the views of the stakeholder group as well. There are two ways in which the Core Team could proceed:

1. The Core Team undertakes each exercise (Tool 3.1, Tool 3.2 and Tool 3.3.) on their own and then shares the results with the Stakeholder Group for their feedback and support
2. This entire Vulnerabilities Assessment exercise is undertaken jointly by the Core Team and the Stakeholder Group as part of a consultation process.

The 2nd option is recommended as it is more participatory and inclusive and allows for greater interactions and discussions between the Core Team and the Stakeholder Group. It allows for the same issue (e.g. mapping of areas vulnerable to the prioritised climate impacts) to be discussed by different groups of heterogeneous participants and it provides an opportunity to every group to present their results and to debate and finalise together the outputs of the exercise. This approach can be repeated for all exercises as well as for generating greater discussions and consensus building on the outputs.

ICLEI ACCCRN Process

VULNERABLE PLACES AND PEOPLE

TOOL 3.1

In this Tool you will produce maps showing the distribution of the high priority climate risks across the city area. You will then identify which social groups are most vulnerable to the impact of these climate risks and assess their capacities to respond to these impacts.

How to undertake the Vulnerable Places and People Assessment

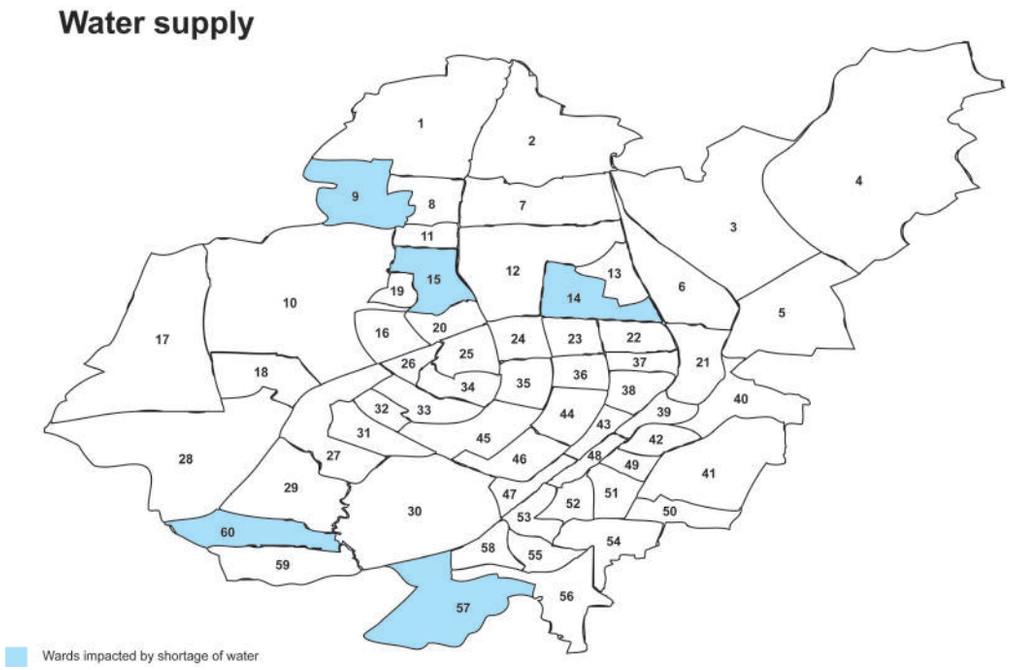
It is suggested that the Climate Core Team meet to discuss and collectively undertake this exercise. This can be done only for Tool 3.1 or together with Tool 3.2 and Tool 3.3. The results should then be shared with the Stakeholder Group for their feedback and support.

Ideally the entire Vulnerabilities Assessment exercise should be undertaken jointly by the Core Team and the Stakeholder Group as part of a consultation process.

EXERCISE 1: MAPPING OF EXISTING VULNERABLE AREAS

In this exercise, the vulnerable areas under each fragile urban system in the city are identified. This can be done using hard copies of the city ward map and different colours representing different climate risk statements. For example, for the climate risk statement: 'Increased precipitation disrupts / damages water supply infrastructure', the areas (or wards) most likely to be affected can be coloured blue (instead of colours, symbols can be used if more than one risk affect the same ward) on a map of the city that shows the boundaries of the smaller administrative units that the city is divided into (e.g. a Ward Map). Similarly, other areas / wards within the city affected by each of the other identified climate risks can be marked by using a different colour for each one. This will help develop a fair idea of the wards / areas where the identified climate risks, and therefore the corresponding fragile urban systems, are most critical.

Example of Climate Risks map from Bhubaneswar



Before undertaking this exercise,make sure to identify those wards / areas that have higher populations of poor or marginalised groups (e.g. slums, temporary settlements) and to consider the impacts on these areas during the mapping exercise.

Look back at the prioritised risk statements of Tool 2.3

Which areas in your city will be most affected by these risks?

Which areas in the city are impacted by most climate risks?

Below you find some further steps to follow:

Step 1:
Refer to the climate risk statements (and fragile urban systems) that were prioritised in Tool 2.3, i.e. those that have been allotted an Extreme, High (or in some cases Medium) risk score. Categorise these according to their corresponding fragile urban systems (refer to exercise 2 in tool 2.2) and assign a colour to each of these climate risk statements.

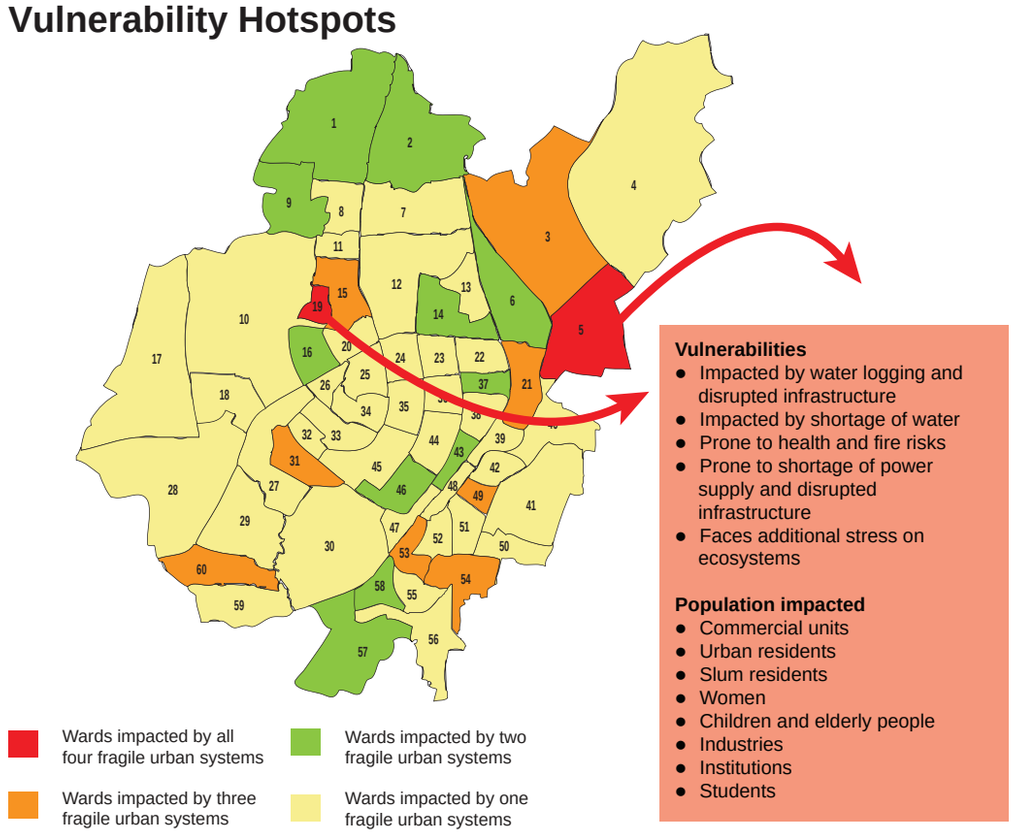
Step 2:
For the first climate risk, identify the areas / wards of your city that will be most affected and mark them with the appropriate colour. Then repeat this process for each climate risk. You may want to use separate maps for each of the fragile urban systems for clarity.

Step 3:
In this step you will identify which areas of the cities are impacted by the greatest number of high climate risks. These areas will represent the Vulnerability Hotspots in the city. To identify the vulnerability hotspots, overlay each of the climate risk maps.

For example, assume that the city has identified 5 high climate risks. If an area of the city is impacted by all 5 high climate risks, it would be a vulnerability hotspot of the city. Next, the affected areas can be ranked according to the number of risks they are exposed to.

This mapping of the 'vulnerability hotspots' of the city will help easily (and visually) determine the areas within the city that are most vulnerable and which would probably require immediate attention.

Example of Vulnerability Hotspots map from Bhubaneswar



EXERCISE 2: ANALYSIS OF ADAPTIVE CAPACITY OF URBAN ACTORS

The exercise draws on the Urban Climate Resilience Planning Framework (UCRPF) introduced in Tool 2.2.

Check Reference Tool 7 for more information on the Urban Climate Resilience Planning Framework (UCRPF)

Some Background:
Actors (i.e. individuals, households and public/private sector organisations), play a critical role towards building urban resilience. Their ability to contribute to resilience and adaptation is broadly dependent on the following three key capacities:

Capacity to organise and respond - the capacity to organise and re-organise in response to threat or disruption.
Example: slum communities residing in a flood prone area have received training on how to purify water for drinking and maintaining hygienic conditions to prevent the outbreak of post flood diseases. Or, trained Search and Rescue Teams exist within the community that can respond effectively during floods.

Resources – access to the resources necessary to respond (manpower, technology, funds)
Example: slum communities residing in a flood prone area have been provided with water filters that will ensure that they have safe drinking water even during flood situations. Or, the Search and Rescue Teams have the necessary equipment and medicines.

Access to information – availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions.
Example: slum communities residing in a flood prone area have access to improved information that can be locally managed e.g. Early Warning Systems, which would enable them to respond more effectively. Or, regular refresher and updating training courses for the members of the Search and Rescue Teams.

The combination of these three characteristics would help determine the adaptive capacity of each of the urban actors.

Exercise 2 helps to identify the specific key actors in the identified vulnerable areas. In Exercise 1, you have identified the most vulnerable areas/wards in your city; now you will identify the key groups of people in each high risk locality.

The Actors analysis can be used to identify:

1. How different categories of actors relate to different systems (who, what, where, why)
2. What categories of actors may be missing
3. Groups of actors that may be disempowered, lacking in capacities or otherwise marginalised

Look back at your Climate Risks Map

What are the key actors involved?

Step 1 :
Select the Climate Risk from the maps in Exercise 1 above

Step 2 :
For each Climate Risk, list the key actors involved – those affected by, and those who have control over, the system.

For example, Ward XY is vulnerable to flooding, so the specific actors affected could be
- the residents, specifically the poor households in the area
- a hospital
- a NGO working on education in this ward
- street vendors

The specific actors who may have control may be the Department of Water Resources or the Department of Sewerage and Drainage.

When defining the actors, you are encouraged to be as specific as possible. Therefore, rather than mentioning 'residents of Ward XY' you should try and specify'women, children and elderly in Slum 22'. **The more precise you are in determining the actors, the simpler it would be to target and organise an effective response.**

Are you sure you have identified all vulnerable people? Check again!

Step 3 :
We now need to double-check that we have not overlooked any groups of poor or vulnerable people who may not be located in the Hotspots identified in Exercise 1. This is very important as there may be groups which could be affected by a particular climate risk which has not been identified through the urban systems analysis in Phase 2. Look particularly for poor communities, or groups which may already be struggling and for whom a small change in temperature, rainfall, flooding could be a tipping point which causes high vulnerability.

Any groups identified in this step should be added to Table 1 below.

Rate the actors' capacities

Step 4 :
Using Table 1 below, rate the actors against the three criteria - Capacity to Organise and Respond, Resources, and Access to Information. For each of the criteria you need to determine whether the capacity of a particular actor is Low, Medium or High, and accordingly assign the corresponding score as indicated in the table.

Table 1: Actors' Capacities Rating and Scoring - Example

Key Capacities of Actors	Score
Capacity to Organise and Respond	
Low capacity to organise and re-organise in response to threat or disruption	1
Medium capacity to organise and re-organise in response to threat or disruption	2
High capacity to organise and re-organise in response to threat or disruption	3
Resources	
Low access to the resources necessary to respond (manpower, technology, funds)	1
Medium access to the resources necessary to respond (manpower, technology, funds)	2
High access to the resources necessary to respond (manpower, technology, funds)	3
Access to Information	
Low availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions	1
Medium availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions	2
High availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions	3

Step 4:
Finally, for each actor calculate their 'Adaptive Capacity Score' by multiplying the scores allocated to each of the 3 characteristics.

Step 5:
Based on the Adaptive Capacity Scores of each of the actors, for a particular fragile system, you can determine which actors have a High, Medium and Low adaptive capacity. Refer to Table 2 to help you assess the level of adaptive capacity of each of the actors.

What is the Adaptive Capacity Score of each actor?

Assess the level of adaptive capacity of each actor

Table 2: Levels of Adaptive Capacity of Urban Actors

Adaptive Capacity Score	Level of Adaptive Capacity
1 – 8	Low
9 – 17	Medium
18 – 27	High

Actors having a 'Low' level of adaptive capacity would be those that would need to be specifically targeted in the actions (or resilience strategies) that are undertaken to reduce the fragility of the identified urban system.

Actors with a 'High' level of adaptive capacity can be engaged in the proposed actions as they have the capacity to effectively respond to the impacts of the fragile systems. Similarly, those falling in the 'Medium' category might also need to be specifically targeted or can also be engaged in the proposed actions, depending on which end of the range they are on i.e. closer to the 'low' category or closer to the 'high' category.

Exercise 2: Actors Analysis

Climate Fragility Statements	Area/ward	Actors	Capacity to Organise & Respond (A)	Resources (B)	Access to Information (C)	Adaptive Capacity Score (A)*(B)*(C)	Supporting Notes
e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources	Ward 5	Slum dwellers	1	1	1	1 (Low)	Dependent on shallow aquifers that are easily contaminated; access to water tankers too expensive; no information on water purification techniques
		Private Sector	2	3	2	12 (Medium)	
		Resident Welfare Association	2	2	1	4 (Low)	
		Water authority	2	3	3	18 (High)	
		NGO	2	1	3	6 (Low)	

Have you:

- ☐ Mapped the most vulnerable areas in your city?
- ☐ Developed a Vulnerability Hotspots map?
- ☐ Identified the key actors for each Climate Risk?
- ☐ Made sure to include all kind of vulnerable people?
- ☐ Assessed the adaptive capacity of each group of actors?

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ASSESSING THE ADAPTIVE CAPACITIES OF URBAN SYSTEMS

TOOL 3.2

Adaptive capacity is the capacity of the systems to absorb shocks and their response to these shocks. It therefore plays an important role in determining the resilience of these systems. In this tool, the adaptive capacity of the fragile urban systems of the city will be determined.

Some Background:
The Urban Climate Resilience Planning Framework describes the importance of adaptive capacity as:

the ability to shift strategies as conditions change in order to maintain the well-being of populations and the ecosystems on which they depend. In the context of climate change, adaptive capacity requires agents [actors] to make choices and respond to opportunities in ways that manage both direct and indirect climate impacts. Agents' [actors] level of access to resilient systems influences their adaptive capacity, as does the manner in which institutions [rules and practices] structure relationships among agents [actors] and between agents [actors] and systems (pg. 156-157).

Adaptive capacity can be described on the basis of five broad categories – economic, technology/ infrastructure, governance, social, ecosystem services.

EXERCISE 1 DETERMINING THE ADAPTIVE CAPACITY OF URBAN SYSTEMS

Step 1
Complete Table 1 below. Select only the identified fragile urban systems used for analysis in Tool 2.2 (and not the climate risk statements), e.g. Water Supply .

Step 2
For each fragile urban system describe its adaptive capacity in terms of five broad categories:
- economic,
- technology/ infrastructure,
- governance,
- social,
- ecosystem services.

Table 1 provides a description of each of the categories.

Step 3:
For each fragile system rate each of the five categories of adaptive capacity as high/medium/low .

Take the fragile urban systems from Tool 2.2, Exercise 1

Describe the adaptive capacity of these fragile urban systems

Rate their adaptive capacity

Your responses in the Baseline Questionnaire, Tool 1.3 may help with this assessment.

Some Guiding Questions

Economic – does the system have the financial resources to undertake the necessary actions to manage Climate Change – e.g. budget allocation, tax base, ability to charge fees? Is it able to operate as a "business" or does it follow the traditional public service model?

Technology/ Infrastructure – does the system have the necessary technological knowledge and resources? Is current infrastructure adequate to cope with additional stresses from Climate Change? Are major changes to technology needed? What is the capacity to introduce required changes?

Governance – 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?

Social – 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 – 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?

Example: Following is a reference table for compiling information about the adaptive capacity of the fragile urban systems.

Examples of Resources to Enhance Adaptive Capacity					
	Economic	**Technology/ Infrastructure**	**Governance**	**Societal**	**Ecosystem Services/Natural Environment**
Low	Limited inherent economic ability to adapt to impacts (e.g. no legal authority to raise funds; no strong tax base to call upon)	Limited inherent technology/ infrastructure to adapt to impacts (e.g. use of outdated materials in structural codes; no system for integrating new knowledge into changes)	Limited governance structure in place to adapt to impacts (e.g. no interagency collaboration; no support from higher levels) i.e. Rules and Practices	Limited societal structure in place to adapt to impacts (e.g. disenfranchised or uninvolved citizenry; lack of community & aid)	Limited ecosystem services/natural environmental ability to adapt to impacts (e.g. no marsh or dune system to provide storm protection; all habitat is isolated and disconnected from other natural areas)
High	Robust inherent economic ability to adapt to impacts (e.g. mechanism for raising funds exist; very strong tax base to call upon)	Robust inherent technology/ infrastructure to adapt to impacts (e.g. most structures are new and have used the latest materials & structural codes; new knowledge is regularly integrated into purchasing agreements)	Robust governance structure in place to adapt to impacts (e.g. good interagency collaborative processes; work closely with higher levels) i.e. Rules and Practices	Robust societal structure in place to adapt to impacts (e.g. citizens are heavily involved in their communities; active and effective community & aid)	Robust ecosystem services/natural environmental ability to adapt to impacts (e.g. highly functioning dune or marsh system provides storm protection; habitat systems are connected allowing for species and sediment movement)

Table 1 Adaptive Capacity of the Fragile Urban System - Example and Exercise

Fragile urban system	Economic	Technology/ Infrastructure	Governance	Societal	Ecosystem Services
e.g. Water supply	**Low** (funds not available for new infrastructure)	**Medium** (access to improved technology can be accessed through engagement of private companies)	**Medium** (coordination with Irrigation and Public Health Dept to be improved)	**High** (increasing demand from citizens for improved water supply systems)	**Low** (water bodies being lost in the city)

Look back at the vulnerable actors and places (tool 3.1)

And now bring it all together in table 2

EXERCISE 2 BRINGING IT ALL TOGETHER

This section summarises the assessment carried out in Tool 3.1 and Tool 3.2

Table 2 below provides a summary of the analysis from Phases 2 and 3 and can be used as a progress report for the city decision makers.

Step 1
Note the climate risk statements in your city which have been identified to have medium or high risk (refer back to Tool 2.3).

Step 2
Sum up the information documented in Tool 3.1 for these climate fragilities. This information includes identification of vulnerable areas and of urban actors .

Step 3
Next, sum up the adaptive capacity of the fragile urban systems using the results of Exercise 1 above .

Table 2 Bringing It All Together - Example and Exercise

Climate Fragility Statements	Vulnerable Areas	Urban Actors		Adaptive Capacity of the System		
		Vulnerable Actors	Potential Supporting Actor	Low	Medium	High
e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources	*Ward 5*	*• Slum Dwellers* *• Resident Welfare Association* *• NGOs*	*• Private sector* *• Water Authority*	*Economic* *Ecosystem Services*	*Technology* *Governance*	*Societal*

Have you:

- ☐ Rated the adaptive capacity of the fragile urban systems?
- ☐ Listed, for each Climate Risk Statement, the vulnerable areas, actors and the adaptive capacity of the urban system?
- ☐ Finalized Table 2? This will provide you with key information later on.

References

Moench, M., S. Tyler, et al. (2011), Catalyzing Urban Climate Resilience: applying resilience Concepts to Planning Practice in the ACCCRN Program (2009–2011), The Institute for Social and Environmental Transition, International, Boulder, CO, USA
http://www.i-s-e-t.org/images/pdfs/ISET_CatalyzingUrbanResilience_allchapters.pdf

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DATA GAP ANALYSIS

TOOL 3.3

Having understood the key fragilities of your city's critical urban systems, this section highlights the various data gaps present in these systems. It therefore helps in identifying further data collection or research which may be required for a particular system. The scoping exercise, climate ready review, and urban system analysis together help in gathering data about these systems. This section draws from the information gathered under these tools.

How to Assess the Adaptive Capacity of Urban Systems:
As mentioned in Tool 3.1, the exercises in this tool should be part of the same workshop organised by the Core Team. Having mapped the vulnerable areas of the city and identified the actors/stakeholders who may be most affected or who may be instrumental in the responses (Output of Tool 3.1), and having determined the adaptive capacity of the fragile urban systems (Output of Tool 3.2), we now identify data gaps of the fragile urban systems.

The exercises mentioned in this tool can be undertaken jointly by the Core Team and the Stakeholder Group in the manner detailed out in the 'How to' section of Tool 3.1.

EXERCISE 1: DATA GAP ANALYSIS

The exercise helps in identifying the gaps present in the availability of data for each fragile urban system. This will help in determining the need for detailed sectoral studies that need to be undertaken for each of these urban systems.

Please follow the steps below to complete Exercise 1.

Step 1:
Select the climate risk statements which have been mapped in Tool 3.1 .

Step 2:
For each of the climate risk statements, list data that has been gathered in the previous tools .

Please Note: *refer also to* ***Tool 1.3: Exercise 5 - Availability of Data***

Step 3:
For each of the climate risk statements identify the main data gaps that have been observed.

Look back at the climate risk statements of tool 3.1

For each one, list data available

What are the data gaps?

Exercise 1: Data Gap Analysis - Example and Exercise

Climate Risk Statement	Data Available	Data Gaps
e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources	• Water supply in litres per capita per day for each ward •	• Water supply to un-notified slums • Regular monitoring of water quality • .....

Based on this exercise, and discussions within the Climate Core Team, please assess whether there is a need for sector-specific studies to be undertaken to develop an improved understanding of the climate vulnerabilities and corresponding resilience actions.

Please list the sector studies to be undertaken, potential agencies (from within the Stakeholder Group if possible) that could undertake it, and where funding for this study could come from.

Have you:

- ☐ Listed the data available for each Climate Risk Statement?
- ☐ Identified the gaps in data?

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ENGAGEMENT CHECKLIST

PHASE 3

As you work through the process you may discover issues and groups of stakeholders that were not identified initially. There will be points where you need to consult external groups and points where you need to report back to the city decision makers. It is therefore essential that you revisit and review at key points the engagement decisions taken so far and ensure that the support structures for the climate planning are in place. This is also the moment to identify key messages to be shared without the larger group.

Categories	Questions	Yes/No	Comments
Climate core team	Do you have the relevant department/sectoral representatives, do you need to invite additional people if you have identified unexpected climate impacts or actions?	*(You might have to go back to Tool 1.1 and update the information)*	
External stakeholders	Do you have the key stakeholders to cover each climate issue or action identified?	*(You might have to go back to Tool 1.2 and update the information)*	
Consultation	Have you reached a point where you need to consult widely, or consult particular groups?		
Communication	Is there new information, or better understanding of climate issues, which should now be communicated? If so, to whom, how and when?	*(You might have to go back to Tool 1.5 and update the information)*	
Reporting	Is it time to report back to the Mayor, or council, or senior management (or another key stakeholder?)		

Notes

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PHASE 4

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Overview of Phase 4

CITY RESILIENCE STRATEGY

TOOL 4.0

In this Phase you will use the information and analysis from Phases 2 and 3 to develop a list of possible adaptation actions, or "interventions". You will then screen and prioritise the interventions, link them to existing city plans, and assemble all the information into a City Resilience Strategy.

The tools included in Phase 4 and their corresponding objectives are:

Tool 4.1: Resilience Interventions - to develop a list of possible adaptation actions or "interventions" to address the climate risks and vulnerabilities identified in Phases 2 and 3

Tool 4.2: Prioritisation of Resilience Interventions - to evaluate the proposed list of interventions against a set of resilience indicators

Tool 4.3: Integration into City Plans - to determine whether the required interventions can be integrated with no or minimum additional resources into an existing departmental programme or project, rather than be a stand-alone initiative

Tool 4.4: City Resilience Strategy – to support the development of a City Resilience Strategy (CRS). The CRS will collate all the information generated in the first four phases of the ICLEI ACCCRN Process and present a synthesized set of proposed actions

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RESILIENCE INTERVENTIONS

TOOL 4.1

This tool will help you to develop a list of possible adaptation actions or "interventions" to address the climate risks and vulnerabilities identified in Phases 2 and 3.

We will use the term "intervention", but you will also see "actions" and "measures" at times in the text. This is distinct from the term "strategy", which will be used to mean the overall collection of interventions.

How to Identify Climate Resilient Interventions:
The city Climate Core Team should conduct a 1 – 1.5 days workshop in which Tool 4.1, Tool 4.2 and Tool 4.3 can be implemented one following the other, since each is dependent on the previous Tool. The outputs of this workshop would be:

- Identification of potential climate resilient interventions for each of the high-risk climate fragilities targeting specific vulnerable urban actors and areas in the cities (Output of Tool 4.1)
- A prioritised list of these interventions based on resilience indicators and feasibility criteria (Output of Tool 4.2)
- Linking prioritised interventions to ongoing or planned programmes (Output of Tool 4.3)

It is important to incorporate the views of the stakeholder group as well. There are two ways in which the Core Team could proceed:

1. The Core Team undertakes this exercise on their own and then shares the results with the Stakeholder Group for their feedback and support
2. The exercises in tools 4.1, 4.2 and 4.3 are undertaken jointly by the Core Team and the Stakeholder Group as part of a consultation process.

The 2nd option is recommended as it is more participatory and inclusive and allows for greater interactions and discussions between the Core Team and the Stakeholder Group. It allows for the same issue (e.g. identification of potential climate resilient interventions) to be discussed by different groups of heterogeneous participants and it provides an opportunity to every group to present their results and to debate and finalise together the outputs of the exercise. This approach can be repeated for other exercises as well as for generating greater discussions and consensus building on the outputs.

EXERCISE 1: DEVELOPING CLIMATE RESILIENCE INTERVENTIONS

Some Background:
Each locality or community experiences climate change in unique ways, depending upon topography, geographic location, features of the local ecosystem, along with social, urban and economic factors. Therefore the adaptive responses of each community will be individual. However, collectively, many communities have already identified responses to particular climate exposures, and this can be useful information for a city which is starting out on the process.

Resilience means the ability to withstand or accommodate stresses and shocks to a system while still maintaining the system's function (ISET, 2011). It is the capacity and ability of a community to withstand stress, survive, adapt, bounce back from a crisis or disaster and rapidly move on. **Urban resilience building is more than just successful climate change adaptation - water, energy, food security, greenhouse gas reductions, ecosystem protection, disaster risk reduction, must all be integrated into City Development Planning.** Urban resilience should integrate climate change strategies with all the other key sectors and priorities.

Proposals for resilience actions or interventions can be developed in several ways :

APPROACH 1

In some cases an action or response is obvious, has already been identified or observed in another locality. Stakeholder Group and City Core Team members will typically already have a number of ideas quite early in the process – these are legitimate and should be listed.

Reference Tool 10
Menu of climate adaptation actions. This reference tool gives examples of lists of actions and projects developed in a range of climate resilience programs

APPROACH 2

Research into case studies and best practices from other areas can provide a rich source of possible interventions. ICLEI can provide a large number of case studies from all over the world (www.iclei.org); there are also several websites which will provide a useful starting point for research.

APPROACH 3

The limitations with Approaches 1 and 2 is that you are not moving beyond the predictable, already known responses. **Your city context is unique so it is important that you undertake an analysis which can uncover some of the underlying causes.** One way of doing this is through an Intervention Mapping process, developed by ICLEI Oceania.

Please refer to Reference Tool 11 Intervention Mapping PowerPoint

Look back at table 2 of Tool 3.2 and list responses for each Climate Risk Statement

Step 1
Build on **Table 2: Bringing it all Together in Tool 3.2** (see Exercise in Table 1 on the next page). Start generating responses by one or more of the approaches listed above for each of the Climate Risk Statements.

Step 2
Consult stakeholders and sectoral agencies affected. Ideally, the city Climate Core Team should conduct a 1 – 1.5 day workshop in which Tool 4.1 (as well as Tool 4.2 and Tool 4.3 since each is dependent on the previous tool) can be implemented.

Step 3
Remember to:
• Focus on the most vulnerable groups (please make sure to include poor and marginalized ones), sectors, neighbourhoods
• Develop measures to address current issues and measures to prevent future problems
• Aim for a mix of "hard" (i.e. infrastructure related) and "soft" (i.e. non or minor infrastructure related e.g. policy changes, capacity building) solutions
• Consider links with other existing plans and processes to identify actions which may already be included in city plans

Compile a list of possible interventions for each Climate Risk Statement

Step 4
For each Climate Risk Statement, compile a list of possible interventions, specifically keeping in mind the vulnerable actors and how the intervention would benefit them and the adaptive capacity of the urban system under consideration. You may want to refer to Reference Tool 10 at this point.

Refer to Reference 10, "Intervention Mapping", for help

Table 1: Identifying Resilience Interventions – Example and exercise

Climate Fragility Statements	Vulnerable Areas	Urban Actors		Adaptive Capacity of the System			Potential Climate Resilience Interventions
		Vulnerable Actors	Potential Supporting Actor	Low	Medium	High	
e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources	Ward 5	• Slum Dwellers • Resident Welfare Association • NGOs	• Private sector • Water Authority	Economic Ecosystem Services	Technology Governance	Societal	•Rooftop water harvesting and safe storage •Capacity building on hygiene and sanitation •Provision of low cost, effective water purifiers

Have you:

- ☐ Drafted responses for each of the Climate Risk Statements previously identified?
- ☐ Compiled a list of possible interventions for each one?
- ☐ Involved or at least consulted the Stakeholder Group when carrying out this process?

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PRIORITISATION OF RESILIENCE INTERVENTIONS

TOOL 4.2

In this tool the proposed interventions are first assessed for their contributions to urban resilience using a set of resilience indicators. The higher scoring interventions are then assessed for feasibility and impact.

How to Prioritise Climate Resilient Interventions:
As mentioned in Tool 4.1, the exercises in this tool should be part of the same workshop organised by the Core Team. Having identified potential climate resilient interventions for each of the high-risk climate fragilities, we will now prioritise these interventions based on resilience indicators and feasibility criteria.

The exercises mentioned in this tool can be undertaken jointly by the Core Team and the Stakeholder Group in the manner detailed out in the 'How to' section of Tool 4.1.

EXERCISE 1 PRIORITISING RESILIENCE INTERVENTIONS

Earlier in the toolkit we used several criteria to assess the resilience of systems (Tool 2.2) and of actors (Tool 3.1). In this Tool, these criteria have been combined for the following exercise, aimed at testing the resilience of interventions based on the characteristics mentioned below:

Redundancy: A resilient system can function and achieve results through multiple paths or nodes when one fails and when performance is critical. In contrast, a "single best solution" is not resilient because if this single option fails, the system collapses. Back-up systems, or decentralised nodes for service delivery in a linked network, are preferable.
Example: Hospitals and emergency communications facilities have shared or linked backup electrical generators

Flexibility and diversity: Essential systems should be able to work under a variety of conditions; they should not be rigid or designed only for one specific situation. Any system will fail if overloaded beyond its capacity, but it should be designed to fail under stress in a safe and predictable way, rather than suddenly and catastrophically.
Example: Dikes are designed so that if their capacity is exceeded, they fail in predictable ways, channelling flooding away from populated areas

Re-organisation and responsiveness: Under extreme conditions, systems should be able to respond and change to meet unexpected shocks. This requires flexible organisations and access to different kinds of resources (information, skills, equipment, knowledge and experience). It also means a high level of coordination and flexible organisational structures capable of adjusting to new conditions.
Example: Houses in flood-prone areas are designed with flat roofs as emergency refuges for family members and possessions above flood water level

Access to information: Resilient systems have mechanisms to learn from and build on experience, so that past mistakes are not repeated and lessons from other cities can be integrated into planning. This requires procedures for monitoring and evaluating performance under stress, and requires multiple sources of knowledge and documentation (strengthening "corporate memory").
Example: Different government agencies share a common monitoring and reporting system to track groundwater quality and extraction in the face of more frequent drought or sea level rise

Assign a resilience score to each intervention (from Tool 4.1) based on the resilience indicators above.

Step 1
List the resilience interventions from Tool 4.1 .

Step 2
Evaluate them on the basis of the above resilience indicators.

Step 3
Complete Table 1 by determining the overall resilience score for each intervention on the basis of the number of resilience indicators that the intervention is perceived to fulfil.

For example, *if an intervention meets the criteria of redundancy, and enhances the urban system's capacity to learn but does not help the system in being responsive and is not flexible or robust - thereby meeting 2 out of the 4 characteristics of resilience – then the overall resilience of the intervention will be 2/4 – 'Average' (see Table 1 below).*

Table 1: Prioritising resilience interventions – Example and exercise

Potential Climate Resilience Interventions	Resilience Indicators				Overall Resilience 4/4: High 3/4: Medium 2/4: Average 1/4: Low
	Redundancy (yes/no)	Flexibility (yes/no)	Responsiveness/ re-organisation (yes/no)	Access to Information (yes/no)	
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	*Yes* *Supports a higher degree of self sufficiency at the household level*	*Yes* *System allows for water to be channelized towards recharging groundwater as well*	*Yes* *In case of shutdown of the city's water supply system, households have stored rainwater for use*	*No* *City helplines exist, but responsibility lies with individual households*	*Medium*

EXERCISE 2 FEASIBILITY AND IMPACT

As well as building resilience, interventions should be checked for their feasibility and expected impact.

Feasibility can be assessed using the following criteria:
- **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 (Please refer back to your responses on 'part of city function' in Table 1 of Tool 2.2)

Impact can be assessed using:
- **Timeframe –** most actions should be able to be completed within a short or medium timeframe.
- **Overall impact -** the proposed intervention will have a significant and measurable impact on the targeted climate risk

Step 1
Using Table 2, list the resilience interventions that have been assessed to have either a High or Medium score in Exercise 1.

Step 2
Now, evaluate the interventions in terms of their feasibility and impact.

Evaluate the feasibility and impact of the 'high' and 'medium' resilience interventions

Table 2 Feasibility and Impact – Example

Feasibility				Impact
Potential Climate Resilience Interventions	**Technically (high/medium/low)**	**Politically (high/medium /low)**	**Cost (high/medium /low)**	**(short/medium/long term)**
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	High (technology is easily available)	Medium (would require a change in building by- laws and building codes)	High (not an expensive option to implement with substantial results)	Short term

Develop a final list of recommended interventions

Step 3
Use these ratings to develop a final list of recommended interventions. The method for arriving at a recommended list may vary according to your city's way of making decisions. Some options:

1. Apply scores to the Feasibility and Impact ratings and use total scores to prioritise. Keep in mind that this might be over-simplistic as there may be very good reason to choose an intervention which does not score as highly as some others.

2. Conduct discussions with the Climate Core Team and/or the Stakeholder Group to validate the ratings and search for any other reasons which may help with the shortlisting

3. Provide a longer list to city decision makers and allow the city's normal budget prioritisation system to make a final selection.

Have you:

- ☐ Assigned a resilience score to each intervention?
- ☐ Evaluated the feasibility and impact of the 'high' and 'medium' ones?
- ☐ Developed a final list of recommended interventions?
- ☐ Involved or at least consulted the Stakeholder Group in this analysis?

Notes

ICLEI ACCCRN Process

INTEGRATION INTO CITY PLANS

TOOL 4.3

In the previous tool, a shortlist of recommended interventions has been developed using Feasibility and Impact criteria. Tool 4.3 will now assist you to align the proposed actions with existing city plans.

A city government will already have a comprehensive set of plans, ongoing programs and projects. **Wherever possible, climate resilience interventions should be linked with, or built into, existing departmental workplans.** It is far better for the City to **integrate** the City Resilience Strategy (CRS) into existing plans than to adopt another new plan. The CRS should be seen as a way of strengthening the resilience of city plans, rather than an additional workload.

How to Integrate Climate Resilient Interventions into City Plans:
As mentioned in Tool 4.1, the exercises in this tool should be part of the same workshop organised by the Core Team. Having identified potential climate resilient interventions for each of the high-risk climate fragilities, and having prioritised these interventions based on resilience indicators and feasibility criteria, we would now aim to identify ongoing or upcoming programs and projects to streamline these resilience interventions.

The exercises mentioned in this tool can be undertaken jointly by the Core Team and the Stakeholder Group in the manner detailed out in the 'How to' section of Tool 4.1.

EXERCISE 1: LINKING RESILIENCE INTERVENTIONS TO ONGOING PROGRAMS

Step 1
Begin with the list of recommended interventions from Tool 4.2 .

Step 2
For each of the resilience interventions identify the relevant plans and programs of the city government into which the intervention can possibly be incorporated.

Step 3
Now, check the timeframe of the existing program to ensure it is consistent with the proposed intervention.

Step 4
Finally, determine if the programme can be **leveraged** to include the intervention:
• Can the intervention be included without requiring additional resources?
• Can the intervention be included with minimal extra resources, as compared to undertaking the intervention as a stand-alone initiative?

Look back at the recommended interventions from Tool 4.2

Are there existing plans in which these interventions can be incorporated?

Do the timeframes match?

Can this be done with no or minimal extra resources?

Table 1 Linking Resilience Interventions to Ongoing Programs – Example and Exercise

Resilience Interventions	Relevant Programs	Ongoing/upcoming/ planned	Can the program be leveraged – yes/no; if yes how?
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	*Housing Scheme for the Urban Poor*	*Upcoming (following financial year)*	*Yes. Design of buildings can be modified to include a rooftop water harvesting and safe storage system*

Bring together interventions, vulnerable areas and actors, and related city plans

EXERCISE 2 SUMMARISING RECOMMENDED RESILIENCE INTERVENTIONS

The following table is a way of summarising the recommended interventions, the target areas and actors (both of these are listed in Exercise 1 of Tool 4.1), and opportunities to link and leverage interventions to existing city plans. This is just one example of a summary document. In this case, the interventions which cannot be easily linked to existing city plans are listed separately. These may need separate budget decisions, or funding from alternative sources.

You may need to design your own summaries according to local reporting and decision-making requirements.

Table 2 Summary of recommended interventions and related city plans – Exercise and Example

Recommended Resilience Interventions	Vulnerable Areas	Target Actors	Related City Plans
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	*Ward 5*	• *Slum Dwellers* • *Resident Welfare Association* • *NGOs*	*Housing Scheme for the Urban Poor*

Recommended Resilience Interventions	Vulnerable Areas	Target Actors	Not Related to Existing City Plans

Notes

Have you:

- [ ] Analysed existing plans in which the recommended interventions can be incorporated?
- [ ] Checked if the timeframes match?
- [ ] Ensured that no or minimal additional resources are needed?
- [ ] Involved or at least consulted the Stakeholder Group in this exercise?

ICLEI ACCCRN Process

CITY RESILIENCE STRATEGY

TOOL 4.4

The City Resilience Strategy (CRS) collates all the information generated in the first four phases of the ICLEI ACCCRN Process, and presents a synthesised set of proposed actions. It is both a strategic statement and also the basis for an implementation plan.

The document should be written in a format consistent with your city's planning documents. The primary audience for the CRS will be the city's decision makers. However sections may also be written for broader audiences, or a summary version may be produced for wider use.

This tool provides some recommended headings and content for a CRS, but the actual format may vary according to local requirements.

EXAMPLE OF CITY RESILIENCE STRATEGY OUTLINE

INTRODUCTION

This section in the City Resilience Strategy introduces the concept of urban climate change resilience for the city, the rationale of conducting an assessment of vulnerability to climate change for the city and the methodology used for this assessment.

Introduce the concept of urban climate change resilience and explain the methodology used

1. Brief outline of urban climate change resilience

a What is climate change
b. What is climate resilience

2. Benefits of climate change resilience building for cities

a. What are the possible benefits of climate resilience for urban local bodies

3. Please explore economic, environmental and social benefits of resilience actions

4. Methodology of assessment

a Explanation of the different steps of the ICLEI ACCCRN Process
b. Possible annexes
i. List of members of climate core team
ii. List of members of stakeholder group
iii. Public communications from the climate core team (for instance, minutes of meeting, newspaper cuttings, memos, etc)

CITY PROFILE

This section of the City Resilience Strategy provides detailed information regarding the city. The section should include basic information on:

Provide city-specific information

1. Location of the city

a. Reference with respect to latitude/longitude
b. Regional location of the city and geography
c. Information on area, number of wards, etc

2. Socio-economic profile of the city

a. Information on population, number of households, number of slums, marginalised groups, urban poor
b. Information on economic profile of the population in the city

3. Demography of the city

a. Population data – general v/s urban poor
b. Population projections

4. Climate pattern of the city

a. General climatic pattern of the city
b. Seasonal information on temperature, precipitation

Describe past major climatic events

PAST HAZARDS AND CLIMATE EVENTS IN THE CITY

This section gives detailed information of major climatic events faced by the city in the past years. Each extreme event faced by the city in the recent past is outlined with information on:

1. Date of occurrence of event

2. Details of the event (for instance, reasons of occurrence of the event, details of the event)

3. Impacts of the event on life and livelihood of the citizens, urban systems, and environment

4. Measures undertaken by the city or regional government to mitigate impacts of the event

5. Actions or measures undertaken by the city or regional government to address such occurrences in future, if any

Analyse past and future climatic trends

CLIMATE SCENARIO IN THE CITY

This section of the City Resilience Strategy analyses the past and future climatic trends of the city. Since city level climatic data trend analysis may not already be available, a preliminary analysis is conducted on the basis of climate data collected from official climate records. (Refer back to tool 2.1)

1. Past Climatic Trends

A basic trend analysis is done for the past climate data collected for temperature and rainfall in the city collected from official records. Graphical representation of this analysis is presented in this section.

2. Future Climatic Projections

In order to plan for increasing the climate resilience of a city it is crucial to know how the climate of that city would be in future. Therefore it is important to have the projected climate data. However, since local or city level projections of climatic trends are rarely available, regional level climatic projections can be used for this purpose. The projected climatic trends are outlined in this sub-section.

Provide information on the vulnerable systems, areas and actors in your city

VULNERABILITY ASSESSMENT

In this section of the City Resilience Strategy, the vulnerability of the major urban systems in the city and the principal actors in the city is assessed.

1. Urban Systems Analysis

The major and critical urban systems in the city are identified, and the impacts of climate change identified in the previous section on these systems are analysed. This section determines the status of the urban systems and their fragility in terms of their flexibility, redundancy, and capacity of safe failure. The Urban Systems Tool 2.2 provides information for this section.

a. Information on each fragile urban system and the reasons for its fragility
b. Explanation on the impacts of climate change identified on these fragile urban systems

2. Risk Assessment

This section will prioritise the fragile urban systems in terms of the risk posed by the system to the city. The Urban Systems Tool 2.3 provides information for this section.

a. Information on scoring mechanism used for risk assessment
b. Table of fragile urban systems with calculated risks

3. Vulnerability Assessment

This section identifies the vulnerable areas, relevant actors and the adaptive capacity for each fragile urban system. The vulnerability assessment tool provides information which can be used in this section. For each fragile urban system, information is provided on

a. Vulnerable areas identified for the fragile urban system, including map of the city showing vulnerable area
b. Actors involved, for both supporting and managing the urban system and those who are vulnerable to the impacts of these systems.
c. Adaptive capacity of the fragile urban system

5. Vulnerability Hotspots

The maps of the city, showing areas vulnerable to the different fragile urban systems are overlapped to create a vulnerability hotspot map, which shows the areas vulnerable to multiple fragile systems. This helps to focus resilience interventions in these areas while planning the resilience strategy

RESILIENCE INTERVENTIONS

This section provides a list of all the resilience interventions identified to minimise and adapt to climate impacts for the identified fragile urban systems. Strategy should consist of:

1. List of interventions and their applicability to the city evaluated in terms of their resilience (redundancy, flexibility/robustness, responsiveness/re-organisation, capacity to learn), feasibility (technical, political, cost), and benefits of the action (short term/medium term/long term).

2. Institutional responsibility – identification of responsible local/regional/national authority or private organisation who would be responsible for carrying out the intervention in the city

3. Timeframe – identification of possible and realistic timelines to carry out the identified interventions

4. Costs – identification of possible sources of funds for carrying out the interventions.

5. Institutional mechanism in the city – details of political and administrative institutional mechanism that can be set up in the city for implementation of the resilience strategy thus developed.

List the resilience interventions planned

To see examples of City Resilience Strategies developed by ACCCRN cities, write to iclei-southasia@iclei.org

WHAT IS A "GOOD" CITY RESILIENCE STRATEGY?

The prime purpose of your CRS is to assist with your own city's planning. However, international climate funding opportunities are now being developed for cities through a number of initiatives.

One initiative is the Urban Climate Change Resilience Trust Fund (UCCRT), which was launched in November 2013. This is jointly funded by the British Government's Department for International Development and the Rockefeller Foundation, and will be managed by the Asian Development Bank. The Trust Fund will be used to fund planning, projects and knowledge sharing to help 25 second tier cities in Bangladesh, India, Indonesia, Pakistan, Philippines and Vietnam mitigate the risks of increasing urbanisation and climate change on their population, particularly the urban poor. To qualify for this fund, cities will first have to demonstrate that they have followed a systematic process to assess their climate risks and generate project proposals .

The CRS will provide the necessary documentation to demonstrate the planning process followed by the city.

To ensure that your CRS is judged of good quality, it should:

- have a minimum of 3 components :
  - ***Climate impacts and vulnerabilities***
  - ***Proposed resilience actions***
  - ***Priorities***
- be based on a ***systematic and comprehensive*** survey of climate impacts
- include a balance of ***hard and soft, long term and shorter term*** interventions
- promote ***future sustainability*** and resilience and fulfil the "Do No Harm" principle
- include mechanisms for ***integration*** with other city plans
- include a system for ***Monitoring and Reporting***
  (the subject of Phase 6 of the ICLEI ACCCRN Process)

Have you:

- ☐ Developed your City Resilience Strategy?
- ☐ Made sure it includes all relevant information?

ICLEI ACCCRN Process

ENGAGEMENT CHECKLIST

PHASE 4

As you work through the process you may discover issues and groups of stakeholders that were not identified initially. There will be points where you need to consult external groups and points where you need to report back to the city decision makers. It is therefore essential that you revisit and review at key points the engagement decisions taken so far and ensure that the support structures for the climate planning are in place. This is also the moment to identify key messages to be shared without the larger group.

Categories	Questions	Yes/No	Comments
Climate core team	Do you have the relevant department/sectoral representatives, do you need to invite additional people if you have identified unexpected climate impacts or actions?	*(You might have to go back to Tool 1.1 and update the information)*	
External stakeholders	Do you have the key stakeholders to cover each climate issue or action identified?	*(You might have to go back to Tool 1.2 and update the information)*	
Consultation	Have you reached a point where you need to consult widely, or consult particular groups?		
Communication	Is there new information, or better understanding of climate issues, which should now be communicated? If so, to whom, how and when?	*(You might have to go back to Tool 1.5 and update the information)*	
Reporting	Is it time to report back to the Mayor, or council, or senior management (or another key stakeholder?)		

Notes

Notes

ICLEI ACCCRN Process

REFERENCE TOOL 1

REFERENCE TOOL 1

Benefits to Cities from ICLEI ACCCRN Process

Awareness generation about potential risks and city's vulnerability

Better management of climate change impacts

Knowledge exchange with other cities and technical partners

Development of Climate Resilience strategy

Integrating the resilience strategy into urban planning

12 months!!

Benefits to Cities from ICLEI ACCCRN Process

Awareness generation about potential risks and city's vulnerability

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Knowledge exchange with other cities and technical partners

Development of Climate Resilience strategy

Integrating the resilience strategy into urban planning

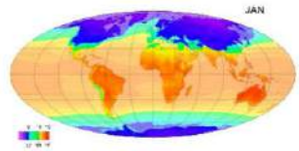
12 months!!

SOME DEFINITIONS

Definitions: General

WEATHER:
It is a hot and humid day.

CLIMATE:
The region has tropical climate.



Source: Wikipedia

Weather: Day-to-day temperature, humidity, precipitation activity, wind, atmospheric pressure.
Climate: Statistical distribution of weather patterns over long periods of time.

Definitions: Climate Change

- **CLIMATE VARIABILITY:** Weather conditions that vary in a particular season but are not regularly repeated.

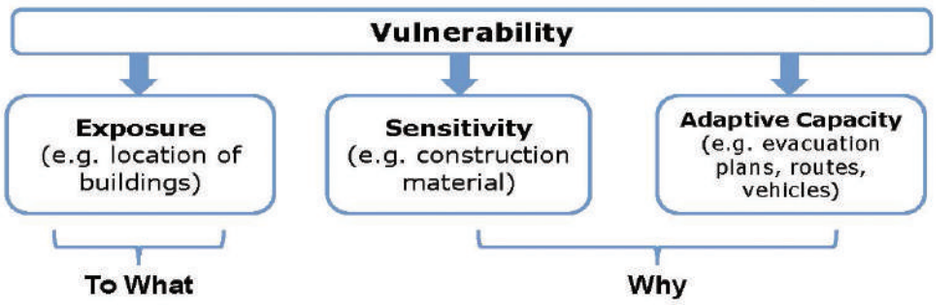
  Example: *Variations in precipitation during Monsoons in different years*

- **CLIMATE CHANGE (CC):** is a shift in weather conditions that occur and persist for an extended period, typically decades or longer.

  Example: *Winters are not as cold as they used to be*

Vulnerability

Who or What is vulnerable to What and Why?



Who or What: Population groups, zones/wards, and sectors (e.g. infrastructure for water supply, SWM etc.)
To What: Impacts of climatic threats (e.g. water scarcity, spread of vector borne diseases etc.)
Why: Capacities and resources to deal with the impacts of climatic hazards

Definitions: Measures

- **CLIMATE CHANGE MITIGATION (CCM)**

  Reduction of the sources or enhance the sinks of greenhouse gases (*Ex: use of Renewable Energy / Increased green cover*)

- **CLIMATE CHANGE ADAPTATION (CCA)**

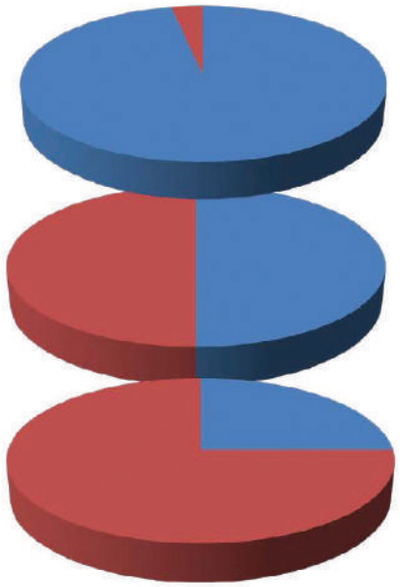
  Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (***Ex:*** *rooftop water harvesting / restoration of wetlands*)

- **DISASTER RISK REDUCTION (DRR)**

  Set of activities carried out to minimize vulnerabilities and disaster risks in a society (***Ex:*** *Earthquake proof buildings / bio-shields against tsunamis*)

WHY CITIES?

WHY CITIES??

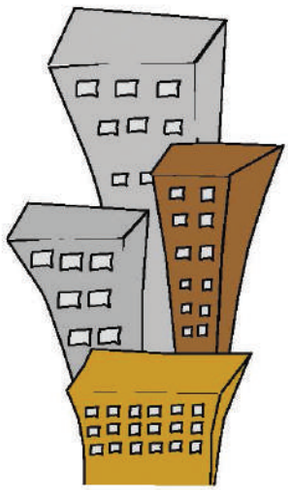


<3% land area

>50% population

75% resources

Why Cities & CCA?



Urbanization contributing to drivers of climate change –

- land use change,
- demand for energy
- demand for resources

Opportunity for awareness generation and action on CCA

- most people
- most power
- significant climate risks

Why Cities & CCA?





Climate Change in Cities

Cities & Climate Change: Impacts


Source: Wikipedia

Source: Wikipedia

Source: Wikipedia

- Biodiversity
- Water

Ecosystems

Social systems

CC

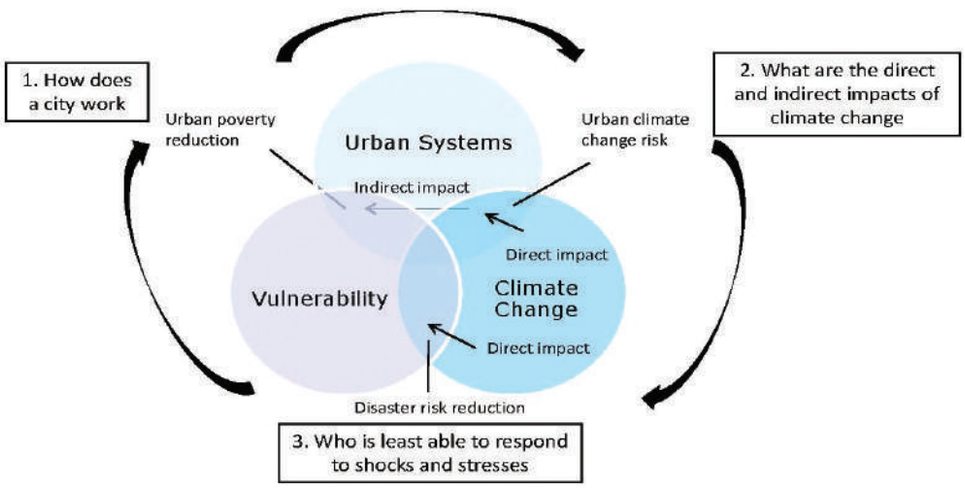
- Competition for land, water, food
- Migration

- Cost increase
- Resource loss

Economic systems

ABOUT THE ICLEI ACCCRN PROCESS

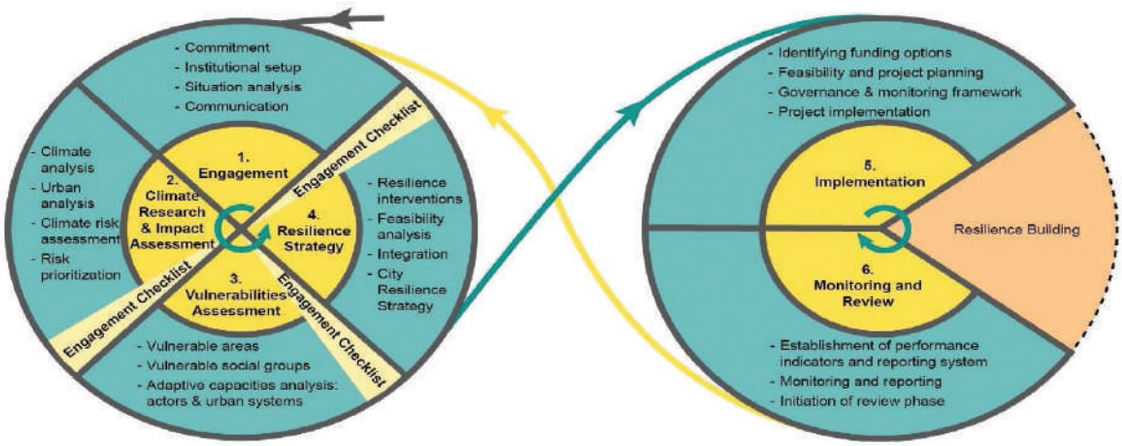
Framework for building urban climate change resilience



What are the projected **Climate Change** trends?
Who are the most **vulnerable**?
How does the city **function**?
Need to consider **all three** components to effectively build urban resilience

Source: Arup

ICLEI ACCCRN Process



Set of 16 tools, refined through trial as well as internal and external review

Benefits of ICLEI ACCCRN Process

- Safeguard city investments
- Protect infrastructure and urban systems
- Secure livelihoods
- Improved capacity of individuals, community and institutions to respond to climate impacts
- Avoided/reduced damage and cost due to climate change and natural disasters

CITY'S ROLE IN THE ICLEI ACCCRN PROCESS

City's Role

- To form a Climate Core Team that would drive all the activities under the ICLEI ACCCRN Process
- To collect relevant data required for the execution of the process
- To facilitate Stakeholder Consultations with Stakeholder Group, to incorporate their suggestions and inputs as appropriate
- To gain political ratification through city council resolution at various stages of the process
- To prepare Climate Resilience Strategy and facilitate effective integration of planned initiatives into the city's developmental plans
- To identify programs and schemes relevant for implementation of the activities indentified in the Resilience Strategy
- To encourage institutional capacity building to effectively fulfill the long-term adaptation plan requirements


Economic Resilience – Sustainable Growth
Flexible and Robust Systems
Resilient Communities
Smart Infrastructure
Building Adaptive Capacities
Risk-informed Decision Making
Local Action Moves the World!
Secure Investments
Reduced Vulnerabilities
Emergency Preparedness

ICLEI ACCCRN Process

REFERENCE TOOL 2

SHARED LEARNING DIALOGUE

SHARED LEARNING DIALOGUE

1. PURPOSE OF THIS TOOL

This tool provides a recommended methodology for conducting stakeholder engagement. The Shared Learning Dialogue method was trialled in the ten original ACCCRN cities and is documented in the ISET publication "Catalyzing Urban Climate Resilience".

2. ABOUT THE TOOL

Introduction

A Shared Learning Dialogue (SLD) is a method of engagement with the relevant Stakeholders that your city government has identified in Phase 1 "Stakeholder Engagement".
The objectives of the Shared Learning Dialogue are:
1. To introduce the ICLEI ACCCRN initiative to the Stakeholder Group and a larger audience
2. To present the results of progress so far under the project
3. To solicit, discuss, and define the supporting role of the stakeholders in the ICLEI ACCCRN process
4. To potentially identify some key stakeholders from the group whose active participation could assist the implementation of the ICLEI ACCCRN process

Draft Terms of Reference

Developing Terms of Reference for the stakeholder consultations will help streamline the process and develop greater clarity on why, for what, how and when such consultations should be organized. Provided below are indicative headings with supporting questions and examples that you could use to develop a Terms of Reference for the Stakeholder Consultations that your City will organize.

Rationale

What is the reason for conducting these dialogues and using the SLD approach?

Example (from ISET)
Stakeholder concerns and feedback are a valuable source of information that can improve the design and outcome of your City's Climate Resilience Strategy, and can help your Core Team to identify adaptation actions. For stakeholders, consultations are an opportunity to:

- Learn about the City's Climate Resilience Strategy process
- Discover potential connections to their own programs, planning and funding mechanisms
- Raise issues and concerns, potentially helping to shape the strategy by making suggestions to the Climate Core Team

What is special about Shared Learning Dialogues?
- Information sharing is multi-dimensional. Everyone contributes information and experience, everyone learns from the exchanges. This helps to break down traditional boundaries between government, academic and community actors
- The process is conducted in an open manner and allows time for participants to absorb and use climate information
- The process is iterative, with several opportunities for members to meet and take their thinking to the next level

REFERENCE TOOL 2

Facilitation / Chairing of Stakeholder Consultations

Experience has shown that SLDs need to be highly structured and are best conducted by skilled, independent facilitators. However it may also be desirable to have a formal Chairperson, whose responsibility will be to report back to the City.

Roles & Functions

The roles may vary as the process progresses – from information sharing to problem solving and strategy designing. Define the roles and functions of the stakeholder consultation.

Recording, Reporting & Communications

It is important to be clear about the status of SLD outcomes, how these are fed into the city planning process. It should also be determined who is able to make public statements about the SLD proceedings and outcomes.

Timing & Logistics of Meetings

Timing of meetings should be based on the process guide or adopted project plan. If possible, determine in advance at what points in the process SLD meetings will be required. Also determine time of day, location and maximum length of meetings.

Finally, careful planning for the Stakeholder Consultation is important. The example below provides an indicative checklist that could be used to ensure that all necessary preparations have been made.

Example (from ISET)

Preparation Checklist:

- List of participants, based on Section A, and invitations
- Determine the day and date
- Prepare agenda and time tables
- Will a government institution be the host? Determine the venue
- Form and lay out tables – Round tables are recommended to facilitate discussion
- Responsibilities: Determine who is responsible for what activities

Key Steps & Proposed Structure for SLDs

Possible agenda

The workshop agenda may include:

1. Aims and objectives of the ICLEI ACCCRN Process, and how the city and its citizens will benefit
2. The purpose of the SLD and the expected outcomes; proposed role of stakeholders in the process
3. Progress so far
4. Ongoing initiatives by various stakeholders that could support the ICLEI ACCCRN Process
5. Local knowledge and experience related to climate impacts and response / adaptation actions
6. Any other points that the stakeholders may want to discuss
7. Next steps for the Climate Core Team and Stakeholder Group

If possible, an independent facilitator should be engaged to conduct the workshops. The workshop may comprise of:

1. Open forum discussion: the suggested topics for discussions are displayed for all participants and they are invited to respond to them. In this approach the role of the Facilitator is very critical

2. Group Discussions: the participants are divided into groups comprising of 4-6 members per group, depending on the number of participants. Each group is then given 30 – 40 minutes to discuss amongst themselves the discussion points that have been provided to them (along the lines suggested above). One member of each group will be nominated to keep notes of the discussions in his/her group and then report back to all the participants. Once the group discussions are complete, each group representative would be given 5 – 8 minutes to present the points raised in their respective group to the larger group. Some time should also be provided to the other participants to question the group that is presenting.

Follow Up

It is recommended that within a period of 8 – 10 days after the workshop is organized, the proceedings of be circulated to all participants - for the records of both the city government and the stakeholders.
The proceedings could include:

1. The main discussion points during the workshop: for this, you should consider appointing at least 2 people to keep notes of the discussions

2. The list of participants: the Names, Designations, Organizations, and Contact Details of all participants (that should be recorded at the start of the workshop)

3. REFERENCES, LINKS

"Catalyzing Urban Climate Resilience", ed Moench M, Tyler S, Lage J, 2011, ISET, Chapter 4
www.i-s-e-t.org

ICLEI ACCCRN Process

REFERENCE TOOL 3

MAPPING TOOL SUPPORT

MAPPING TOOL SUPPORT

Introduction

Mapping of Vulnerable areas can be executed using free software alone or using multiple software in combination. This part of the toolkit contains detailed methods for mapping vulnerable areas within a city or any study region using open source software. The list of software/tools required is given below with download links:

a) Google Earth – Download Here: *http://www.google.com/earth/download/ge/agree.html*
b) DNR Garmin – Download Here: *http://files.dnr.state.mn.us/aboutdnr/bureaus/mis/gis/tools/arcview/extensions/dnrgarmin/dnrgarmin54setup.zip*
c) SAGA GIS – Download Here: *http://sourceforge.net/projects/saga-gis/files/latest/download?source=files*

Other tools required to execute this process are:
a) Ward Map / Base Map
b) Microsoft Excel

Using the above mentioned tools/Software, mapping of vulnerable areas can be done in two ways viz.

Method A: Using Google Earth, DNR Garmin & SAGA GIS in combination.

I) Creating polygons over an imported image in Google Earth and saving them in *.kml format.

Ward map image when imported in Google Earth will serve as a base for tracing outlines (boundaries) of respective wards. Each of these wards when traced will form a polygon (shape) which can be later used to represent a score with some colour coding.

II) Converting the Polygon (*.kml) files to ESRI shape file using DNR Garmin.

Polygons made in Google Earth are saved in *.kml format. This format is not supported by SAGA GIS and thus these files cannot be imported directly. Converting the file format to *.shp (ESRI Shapefile format) makes the import possible.

III) Importing ESRI Shapefiles in SAGA GIS and attaching attributes/Scores/data to be represented on the map.

Importing shapefiles to SAGA GIS will facilitate in attaching scores to respective wards/polygons. These scores can be assigned some colour coding so that each colour or colour shade depicts a score/value.

REFERENCE TOOL 3

Method B: Using SAGA GIS Only.

I) Importing Ward/Base Map in SAGA GIS

Ward map image when imported in SAGA GIS will serve as a base for tracing outlines (boundaries) of respective wards.

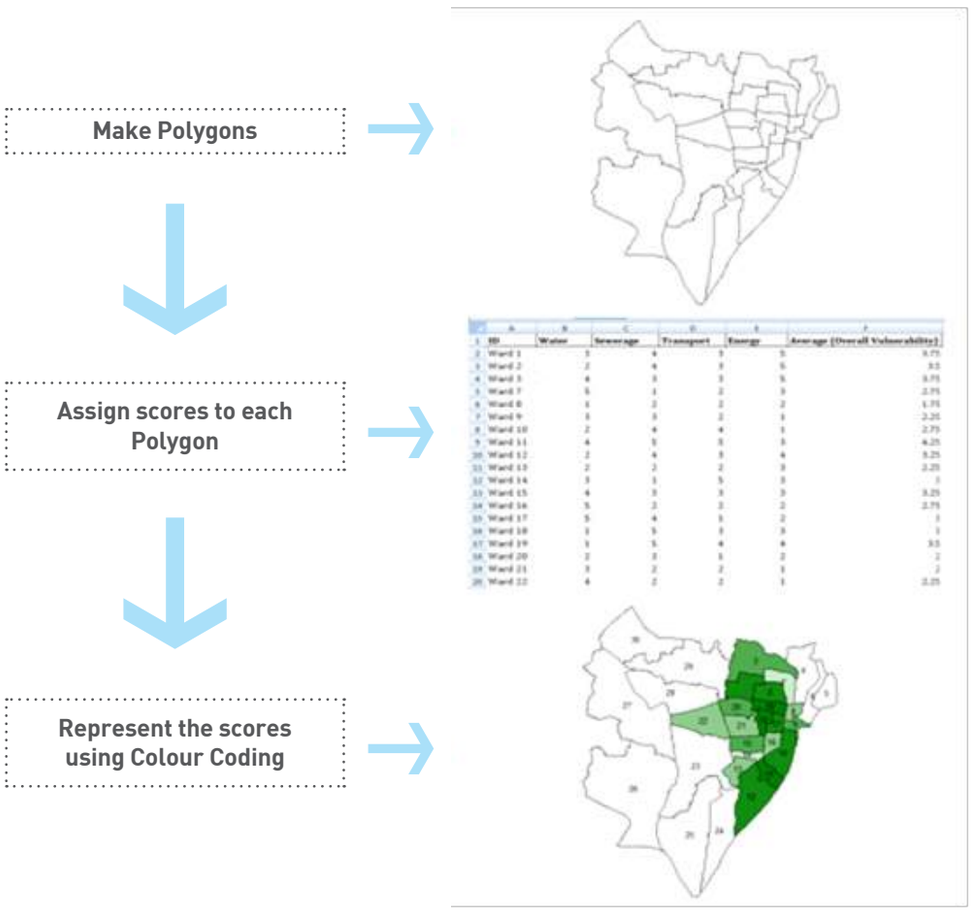
II) Making polygons/Shapefiles (Digitizing)

Polygons can be made by tracing respective ward boundaries from the ward map image. These polygons can be later associated with some score/value which can be represented using some colour coding.

III) Adding attributes/Scores/Data to the Shapefiles and Exporting the Map.

Attribute table can be defined as the table containing information about a particular shape/ polygon. In this case, the attributes will be scores for different systems within a ward. Attaching attribute table will associate each polygon (Ward) with some scores/Values. These scores can be assigned some colour coding so that each colour or colour shade depicts a score/value.

Basic flow of both these methods is as follow:

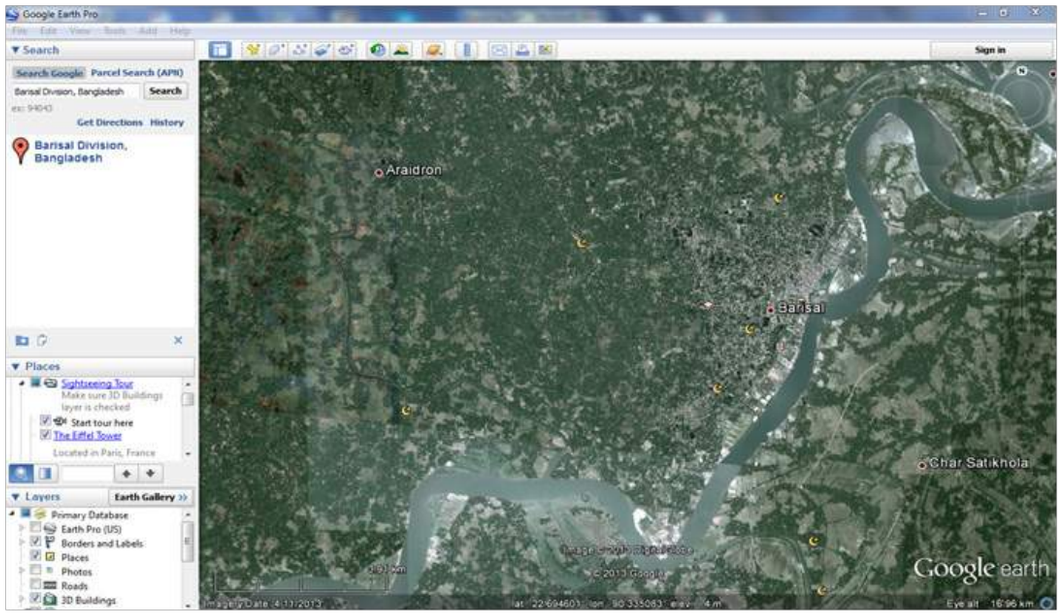


METHOD A: USING GOOGLE EARTH, DNR GARMIN & SAGA GIS IN COMBINATION

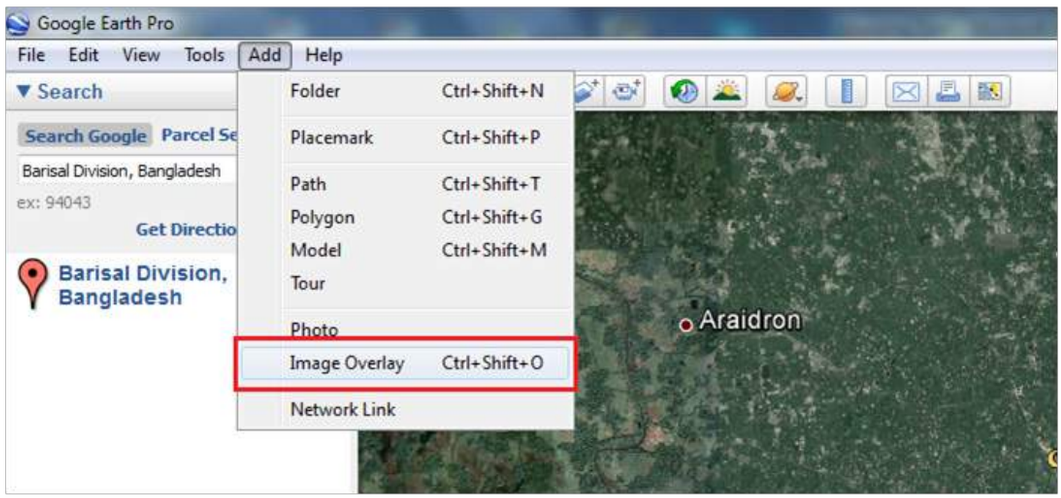
I) Creating polygons over imported image in Google Earth and Saving them in *.kml format

Step 1: Download and install the required software. It is worth noting that Google Earth, DNR Garmin & SAGA GIS are free software and can be downloaded from the links provided above.

Step 2: Start Google Earth and Locate your study region/city using the search box given in the top leftmost corner of your screen. The city of Barisal in Bangladesh is taken as an example in this case.

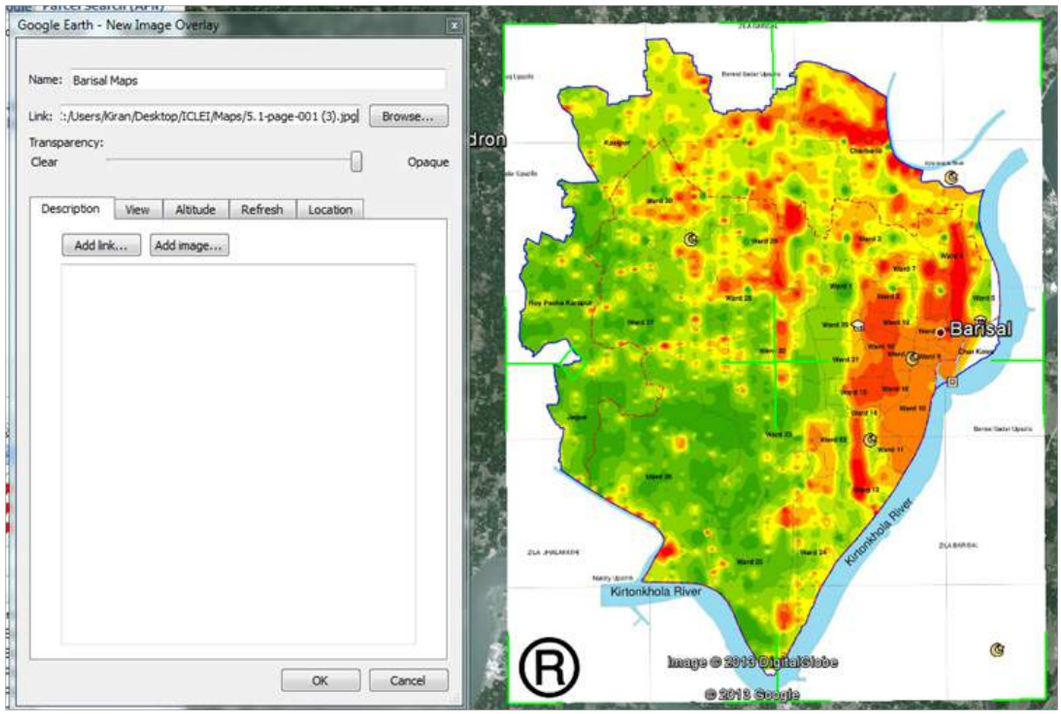


Step 3: Import an Image file of Ward/Base Map. This can be done by using the **"Add → Image Overlay" f**unction or by simply using the shortcut **"Ctrl + shift + O".**



After clicking on **"Image Overlay"**, a window will pop-up. This window will help you browse your Map Image.

REFERENCE TOOL 3

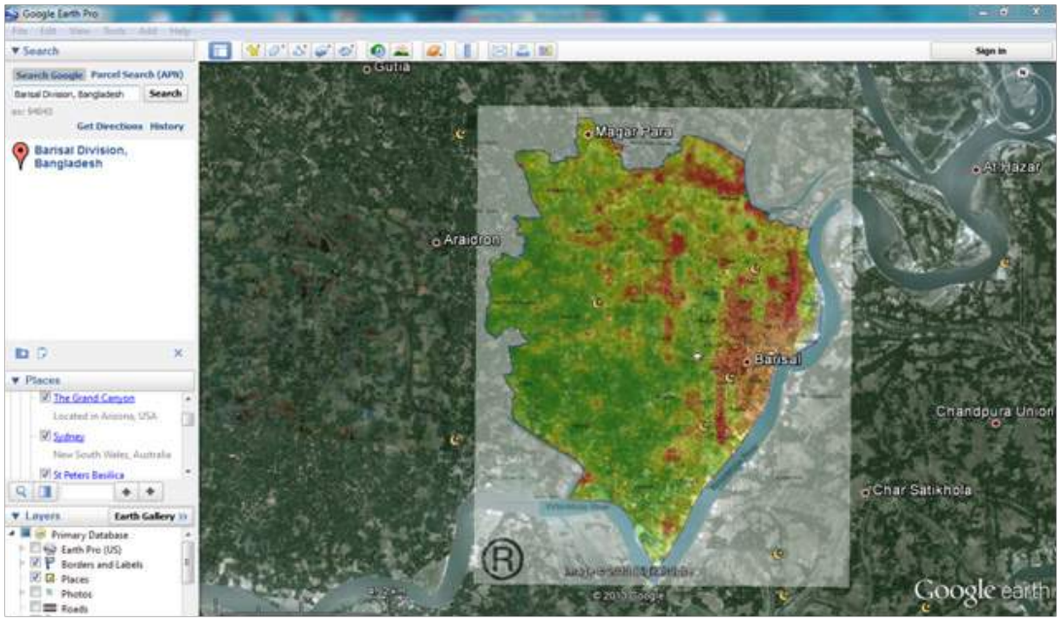


After browsing the image, it will appear on the Google Earth interface. Before clicking **"OK",** adjust the image size and position so that it perfectly overlays on the Study region/City. This can be done by increasing the transparency of the image and matching it with some identical features like rivers and land edges (if any). Image size can be adjusted using **four corner brackets (Green)** surrounding the image. Image position can be adjusted using the **Cross/intersection/ plus sign** in the centre. **Diamond shaped box** on the left edge of the image can be used to rotate it. Once the image is adjusted, Click **"OK"** to add image.

In this example, the image was resized and overlaid using a river and land edges as reference. Transparency was kept less than 50%. Refer to the figure below to see the overlay. After overlaying, the image transparency can be reduced from image properties in "My Places."

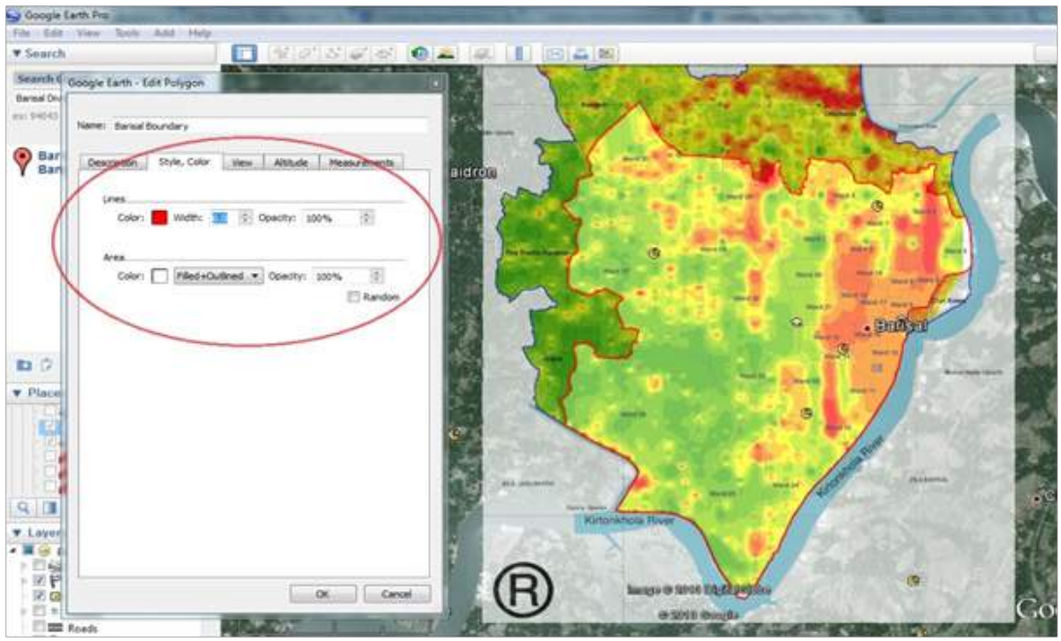
Note: *Appropriate/Perfect overlaying of the image is necessary only when the actual position of study region on Earth is to be displayed. This is termed as "Geo-referencing". Geo-referencing once done can be useful for performing Digital Elevation Model (DEM) Analysis and for adding other geographic features, if required.*

However, if attaining an overlay is difficult or cumbersome, skip this step. Keep the image wherever it appears at first (after browsing) and Click OK and proceed to the next step.

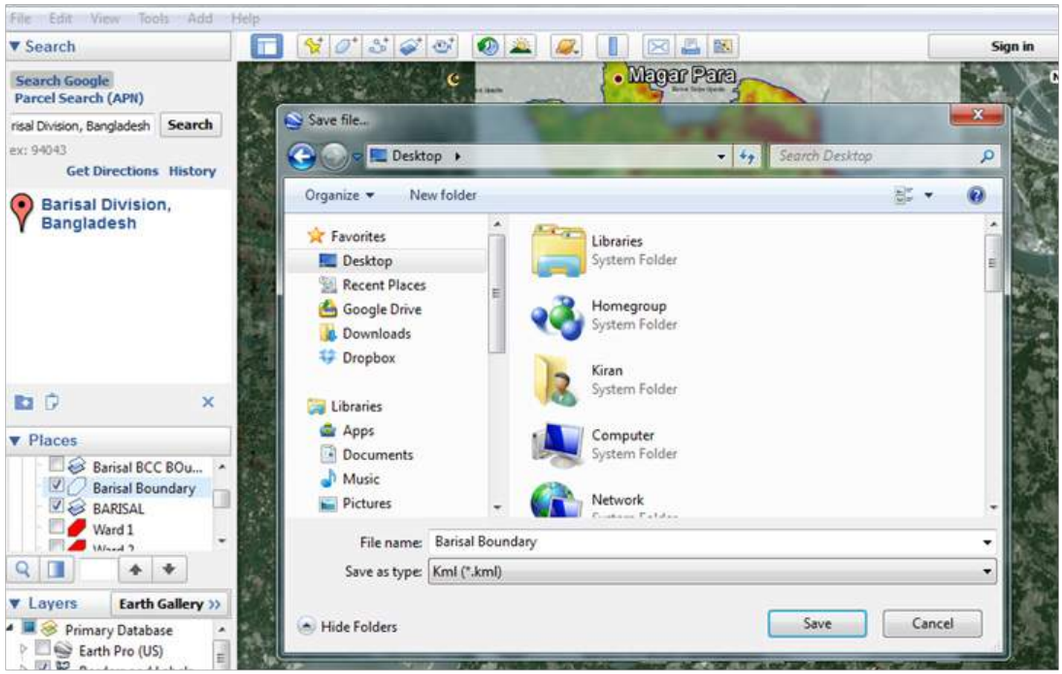


Step 4: Next, we need to draw (trace) the polygons (i.e City/Municipal Boundary or Ward Boundaries) using a very simple tool embedded in Google Earth. Start with clicking the **"Add Polygon"** Tool on the Google Earth Tool Menu (Refer the figure below).

After clicking the "Add Polygon" tool, a new window will pop-out and will prompt for the name of the Polygon. Give a name (Eg: Municipal Boundary, Ward 1, Ward 2, etc.) and before clicking OK extract/trace the polygon point to point. For a better accuracy, zoom in the map to get detailed shape of the desired polygon. Click the **"Style, Color"** Tab of the same window and select the line and fill colour of the polygon. Refer to the figure below.



Click **"OK"** to finish extraction. Follow the same procedure for other polygons/boundaries/wards. It should be noted that the polygons/shapes will be on the left hand-side panel of Google Earth under **"Places →My Places"**. This place should be saved on the computer by **"Right-clicking the place and simply selecting 'Save as'"**. Please note that the files should be saved in ***.kml** format (Refer the figure below).



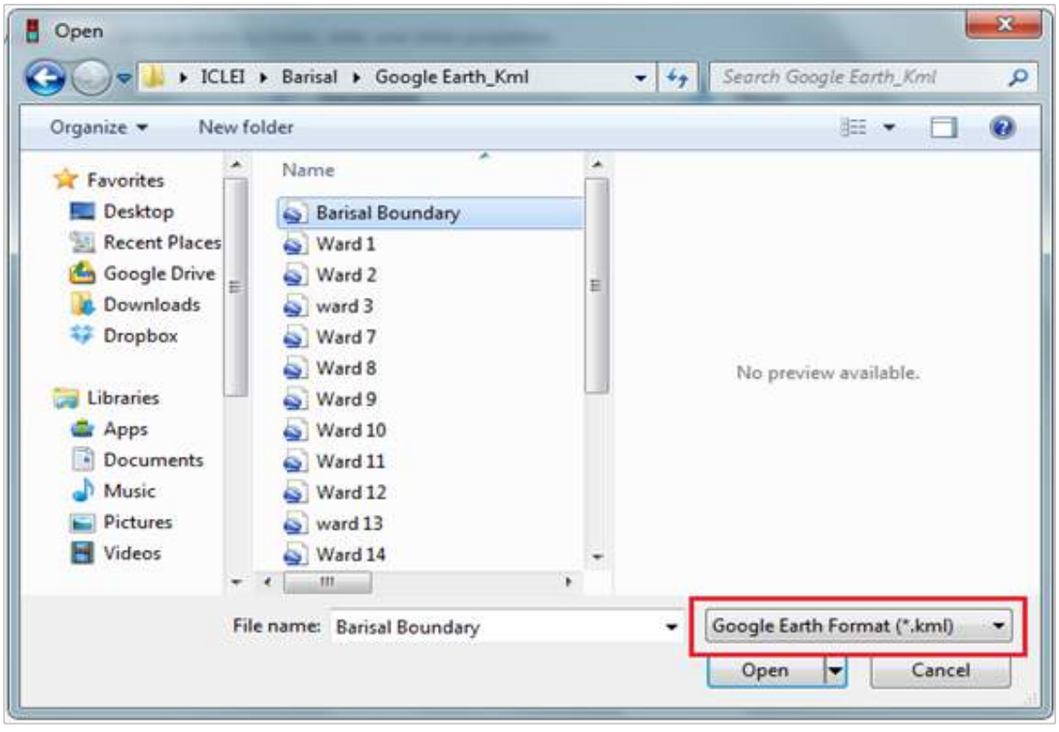
Before closing Google Earth save all your places/Polygons. This can be done by selecting **"File → Save → Save My Places." T**his will help you in accessing the extracted polygons in Google Earth later.

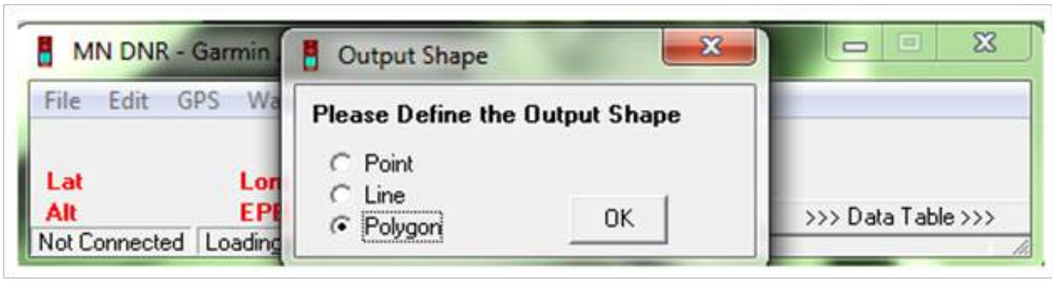
II) Converting the Polygon (*.kml) files to ESRI shape file using DNR Garmin.

Step 1: In this step we'll use DNR Garmin 5.4.1 to convert the previously saved ***.kml** (Google Earth) files to ***.shp** files (Shapefiles) so that these files can be further opened in SAGA GIS for spatial representation. Run DNR Garmin first. Sometimes, one or more error messages may appear regarding 'Port', simply ignore them **(by Clicking OK).**

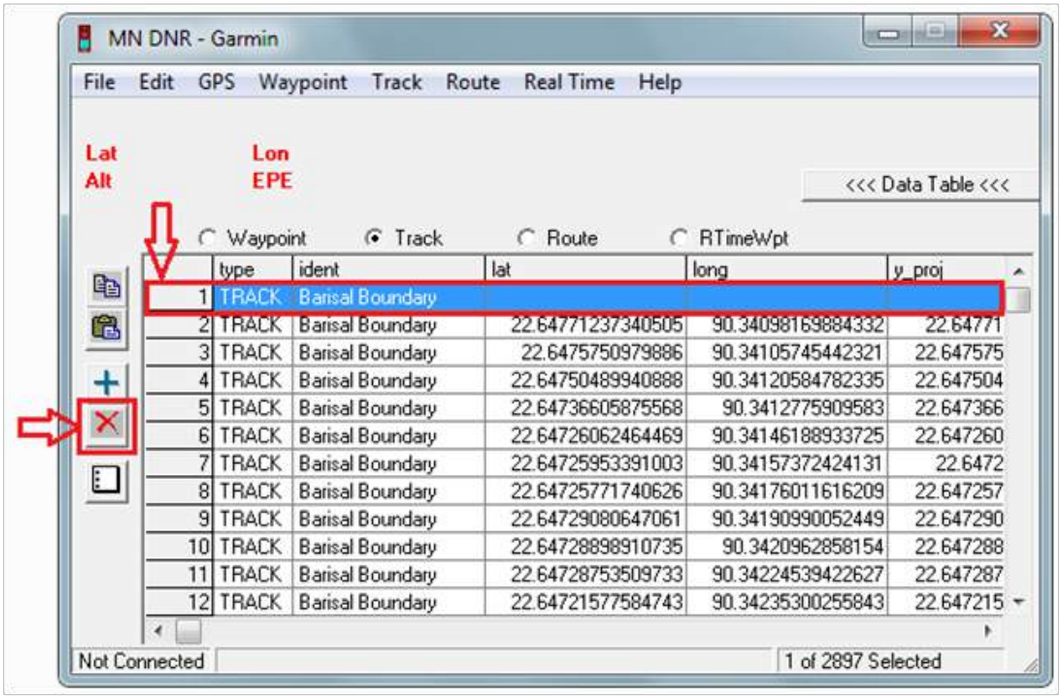
To import the ***.kml** files in DNR Garmin, click **"File → Load From → File"**. A window will pop-up with the help of which the file can be browsed. While selecting the file make sure that the file type is set to ***.kml** (Google Earth Format). When you locate your desired polygon file, the tool will prompt for the required **'Output Shape'** in a new window (Ex: Point, Line or Polygon). Since we'll be dealing with Municipal and ward boundaries, Polygon should be selected as our desired output shape.

Step 2: After selecting the output shape, a new window will appear showing all the points forming the polygon and their respective latitudes and longitudes. In most of the cases, the first point may not have the Latitudes and Longitudes. In order to avoid error it's advisory to select the first row and delete it. Refer to the figures below.



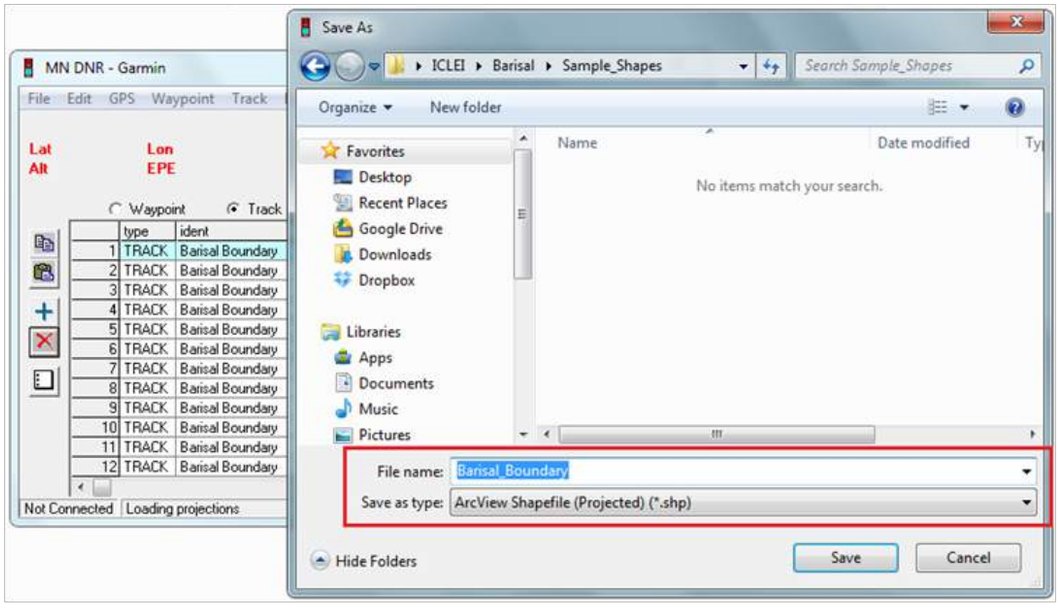


REFERENCE TOOL 3



Step 3: After deleting the first row, set the projections (Co-ordinate system to represent Latitude & Longitude). This can be executed by Selecting **"File → Set Projections"** which will open a small window. Once the window appears, Select **"None (in red) → OK"**. This will set the projections to **WGS 1984 (by default). Not performing this might cause error in converting shapefiles.**

Step 4: After Setting the projections, go to **"File → Save To → File"**. This will prompt for a file name and file format. Select '**ArcView Shapefile (Projected) (*.shp)**' as the file format and assign a name. If prompted again, select the output shape as polygon. Refer to the figure below.



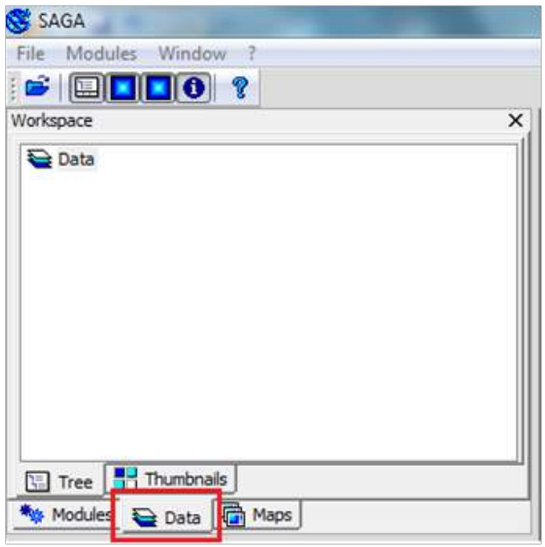
Repeat the same procedure for other Boundaries like Wards, Water Bodies,etc. Save all *.shp files in one folder.

III) Importing ESRI Shapefiles in SAGA GIS and attaching attributes/data to be represented on the map.

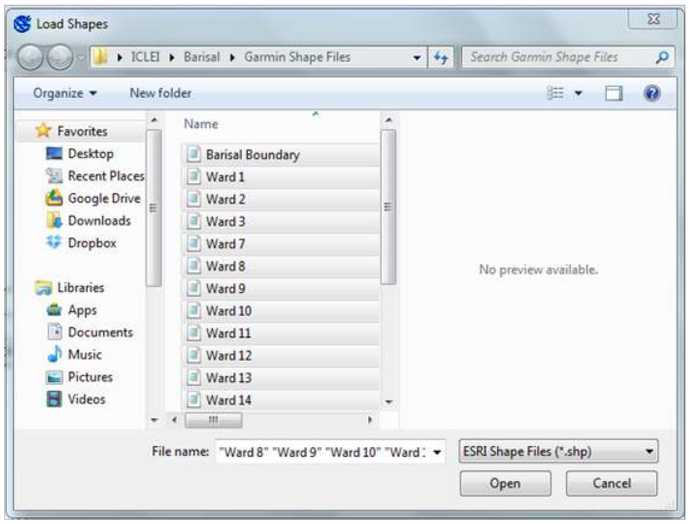
In this step we will import all the ***.shp** files in SAGA GIS, merge the necessary ones and add data/scores/attributes to these files so as to represent the data spatially. Following steps will guide you through.

Step 1: After downloading SAGA GIS, open the folder where it has been downloaded and double click on **"saga_gui" (with blue icon).** This software requires no installation.

SAGA GIS once started, will display three panels **(Left, Middle and Right).** The top of the left panel consists of three tabs viz. **Modules, Data and Maps.** Selecting **"Data"** will display all the polygons/shapes that you might import later. Refer to the figure below.

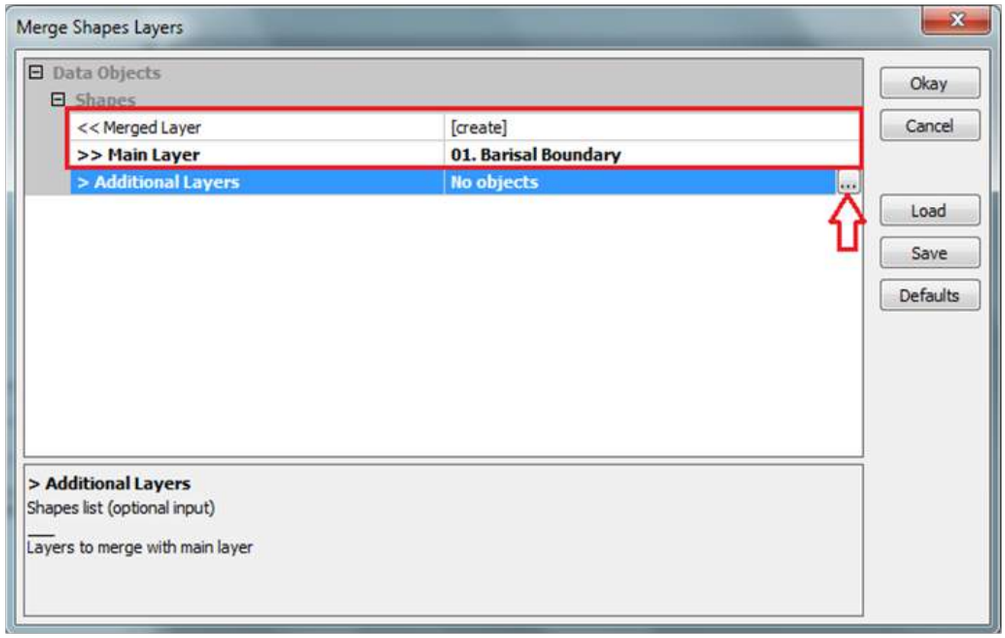


Step 2: The next step here is to import shapefiles in SAGA GIS. This can be executed by selecting **"File → Shapes → Load"** from the toolbar. Browse the folder where previously converted shapefiles were saved. Select all **(Ctrl + A)** of them and Click **OPEN.** Importing all files may take 2-3 minutes depending on the number of files.

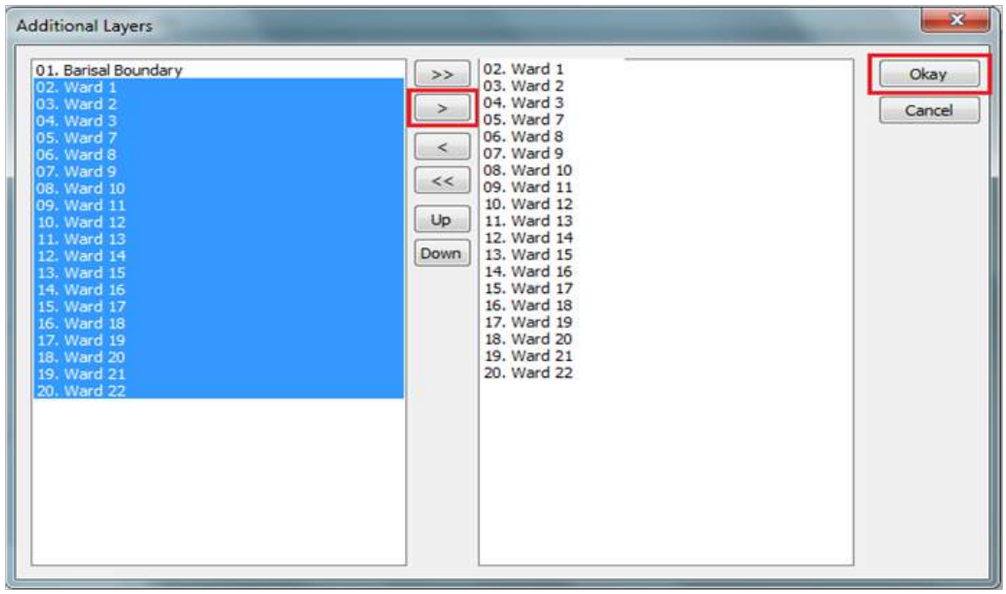


REFERENCE TOOL 3

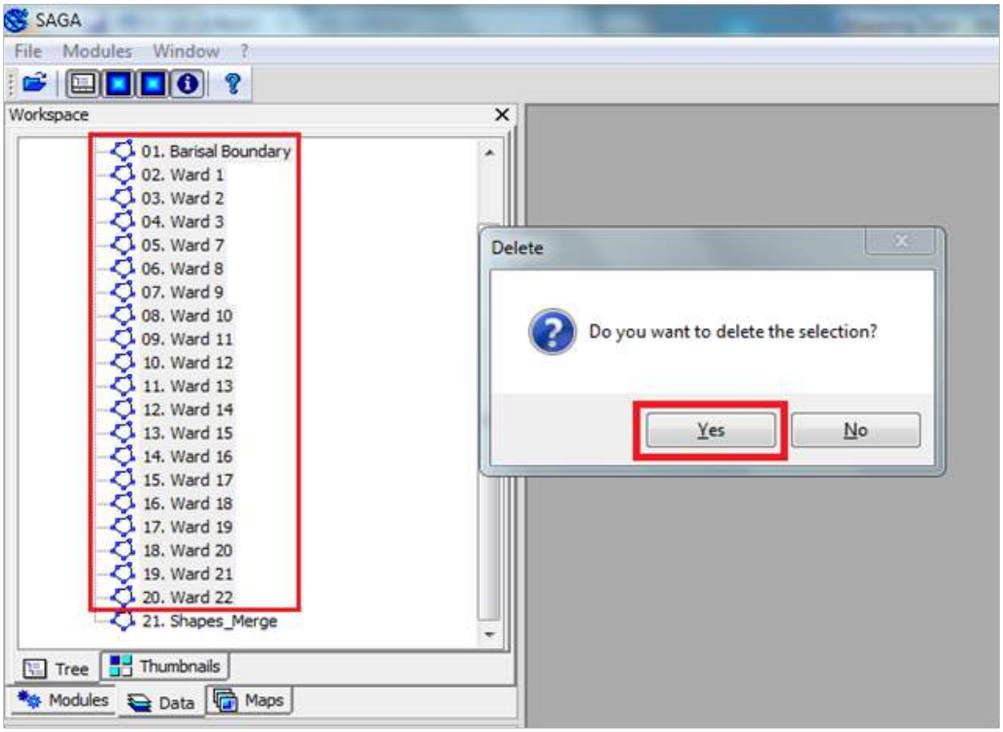
Step 3: The next step here is to merge all the shapefiles into one Layer. Merging will help us in assigning scores/attributes to all the shapes/polygons (Wards) in one go. Merging can be done by selecting **"Modules → Shapes → Construction → Merge Shapefiles".** A window will pop-up and will prompt for three field viz. **Merged Layer, Main Layer and Additional Layers.** Keep settings as shown in the figure below. The City/Municipal Boundary should be set as the **"Main Layer"**. All Ward shapefiles should be added as **"Additional Layers".** This can be executed by using the tab shown in the figure (Red Arrow). Click the tab and add all ward shapefiles. It should be noted that the City Boundary Polygon should not be included in the selection since it has been already set as the **"Main Layer".**



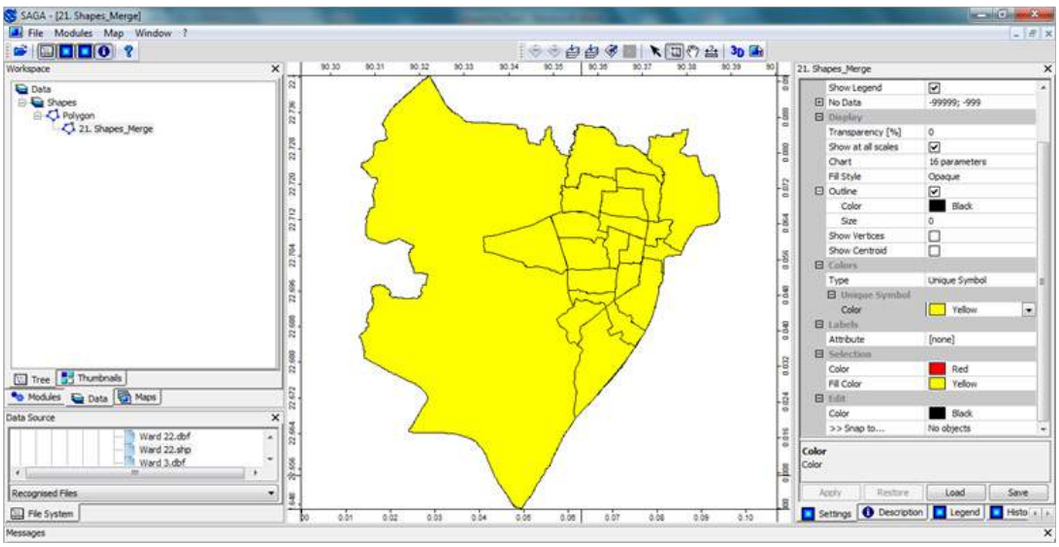
Following screen will appear on clicking the add tab. Select only the ward shapefiles and click **"Okay".** The previous window will appear again. Click **"Okay"** and let the merging execute. This will create a new shape layer in the **"Data Frame"** with the name "**Shapes_Merge".**



Step 4: Now that we have all shapefiles merged into one layer i.e **"shapes_merge"**, except for this **"Shapes_merge"** layer, Close / remove all the previously imported layers,. This removal/ deletion can be executed by selecting these layers and pressing the **"Delete"** key on the keyboard. This will take a couple of minutes.



Step 5: Double click on the **"Shapes_Merge"** layer to open it. This will display all wards and the city/municipal boundary in one layer.

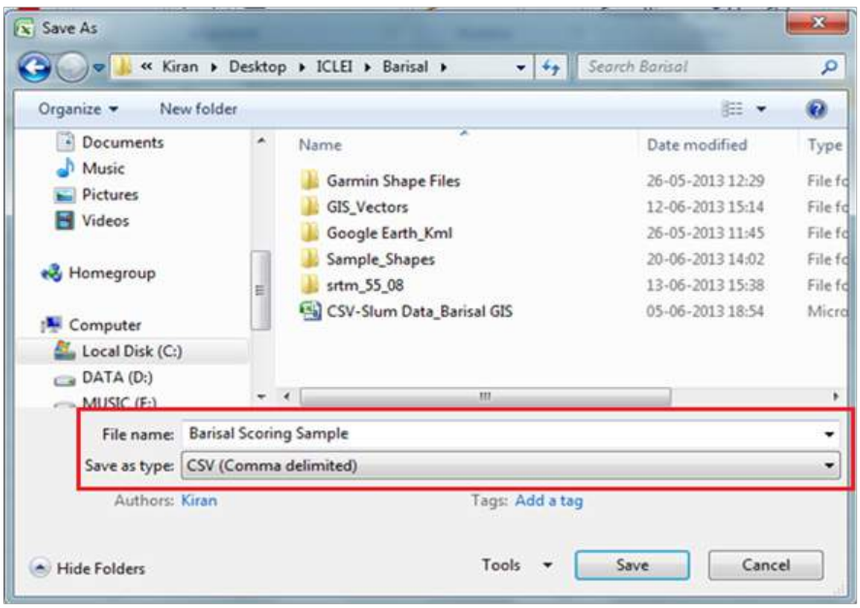


REFERENCE TOOL 3

Step 6: As explained in the **"ICLEI-ACCCRN Tool 3.1"**, identify the Climate risks and corresponding fragile systems. For example, assume that the city of Barisal has 5 identified climate risks and four corresponding fragile systems viz. Water, Sewerage, Transportation and Energy. Based on the **"number of risks"** impacting, these fragile systems will be given scores out of 5. For example, if a system within a ward is impacted by all five identified risks, then it'll be given a score of 5 (out of 5). Scores can be entered in Microsoft Excel as shown below.

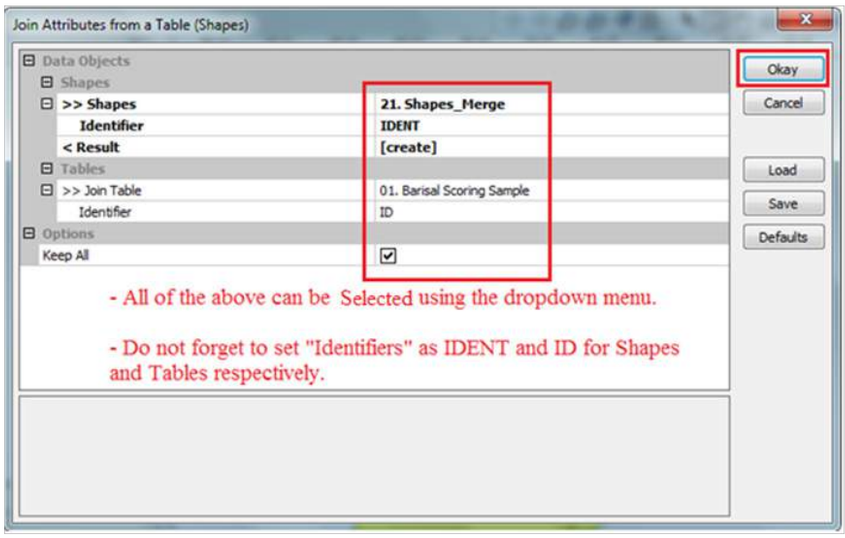
	A	B	C	D	E	F
1	ID	Water	Sewerage	Transport	Energy	Average (Overall Vulnerability)
2	Ward 1	3	4	3	5	3.75
3	Ward 2	2	4	3	5	3.5
4	Ward 3	4	3	3	5	3.75
5	Ward 7	5	1	2	3	2.75
6	Ward 8	1	2	2	2	1.75
7	Ward 9	3	3	2	1	2.25
8	Ward 10	2	4	4	1	2.75
9	Ward 11	4	5	5	3	4.25
10	Ward 12	2	4	3	4	3.25
11	Ward 13	2	2	2	3	2.25
12	Ward 14	3	1	5	3	3
13	Ward 15	4	3	3	3	3.25
14	Ward 16	5	2	2	2	2.75
15	Ward 17	5	4	1	2	3
16	Ward 18	1	5	3	3	3
17	Ward 19	1	5	4	4	3.5
18	Ward 20	2	3	1	2	2
19	Ward 21	3	2	2	1	2
20	Ward 22	4	2	2	1	2.25

The title of the first column should be preferably kept as **"ID"**. Also, the ward names should be the same as the ones given while making shapes in Google Earth. After entering all the scores and calculating the Average score for all systems (ward-wise), save the file to **CSV (Comma Separated Values)** format so that it can be imported in SAGA GIS later. This can be done by selecting **"File → Save As"** and selecting **CSV (Comma Delimited)** as the file format.



Step 7: Now, import the previously saved Scoring Table (attribute table) in SAGA GIS. This can be done by selecting **"File → Table → Load"** and browsing the file location.

Step 8: Attach the **"Scoring Table"** to the **"Shapes_Merge"** layer by selecting **"Modules → Shapes → Tables → Join attributes from a Table (shapes)"** and keeping the following settings.



This will create a new shape layer with the name **"Shapes_Merge [Table File Name]"**. To check whether the attributes are well attached or not, **"Right click on the layer → Attributes → Table".** This will open the attribute table. Check if all values are correctly attached or not. If not, repeat the step.

Step 9: Open the **"Shapes_Merge [Table File Name]"** layer and keep the following settings in the right hand side panel.

In the colours section, change the type to **"Graduated Colour"**. This will change the colour shade with score value. **(Ex: Low Score = Light Shade, High Score = Dark Shade)**

From the same window; select the attribute to be displayed. Example, If Wards having problem with water are to be displayed, then select water.

If the Overall Vulnerability of wards is to be displayed then select **"Average (overall Vulnerability)".**

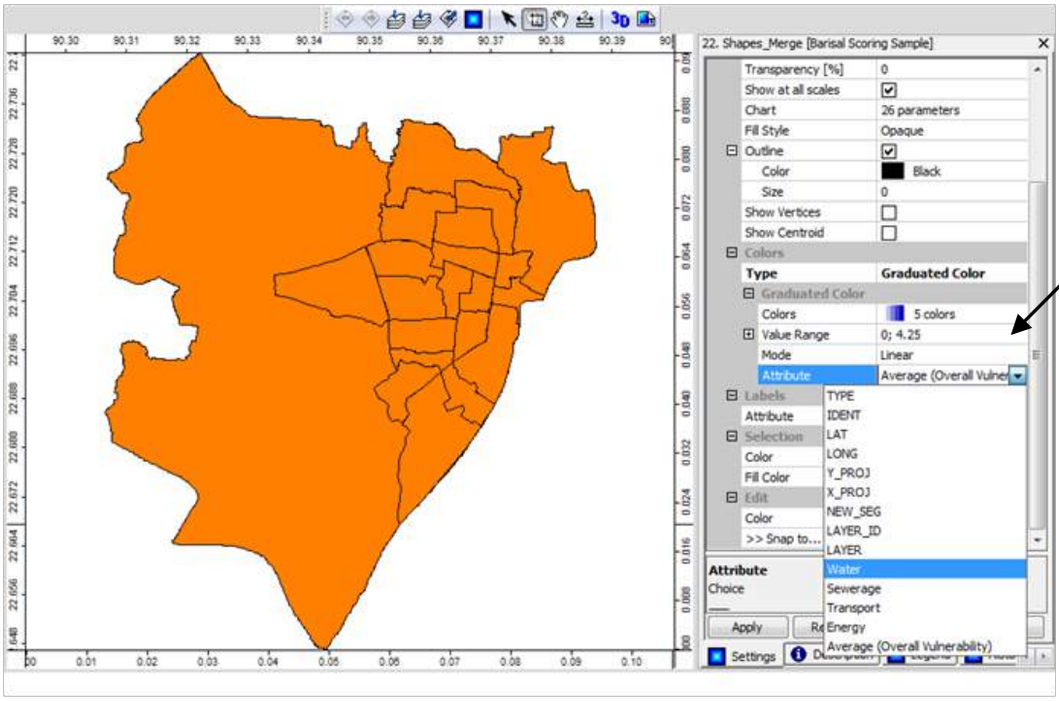
Set Label as **"IDENT"**, so that the ward names are displayed (since this column contains ward names).

Set the number of colours equal to the **"number of identified Climate Risks"** from **"Graduated Colours → Colours → Count = No. of Climate Risks".** This will create Classes equal to number of risks in the Map Legend. **Ex: If number of risks = 5, then five classes will be created viz. 0-1, 1-2, 2-3, 3-4, 4-5. Each of these classes will be represented with different colour shades on the map.**

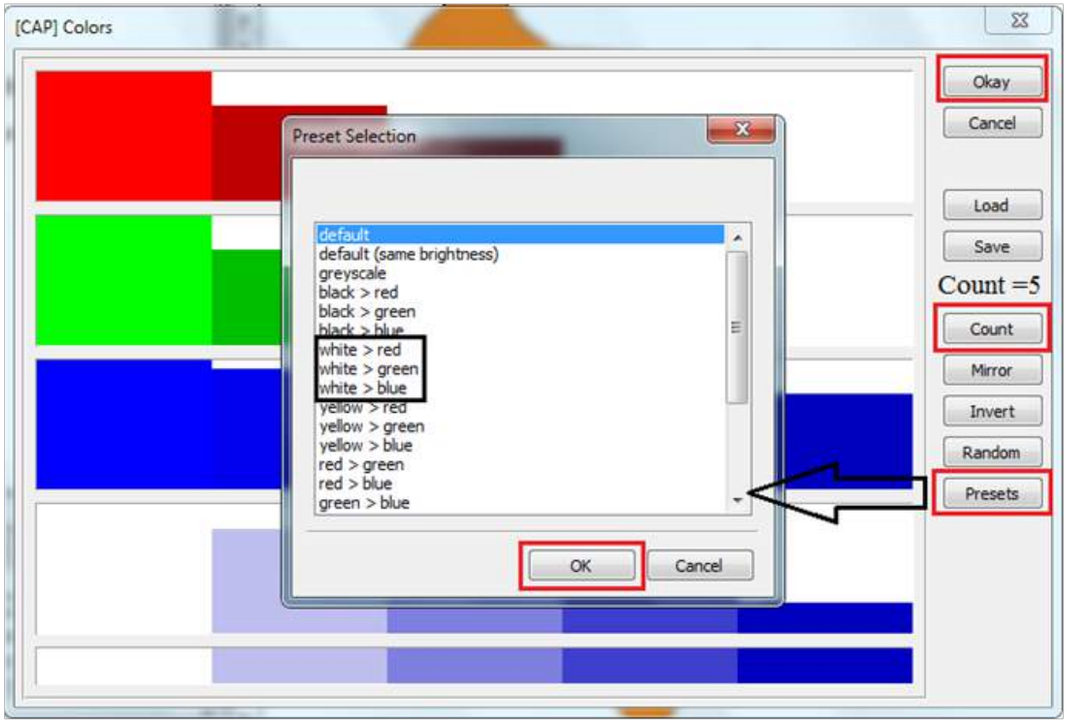
Colour Ramp (i.e the transition of colour with value) can be selected from **"Graduated Colours → Colours → Presets".** For better display select bright presets like **"White → Red / White → Blue / White → Green".**

Click **Apply** to see the changes on your screen.

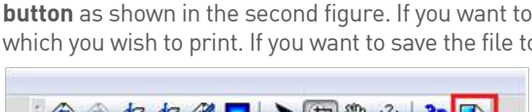
REFERENCE TOOL 3

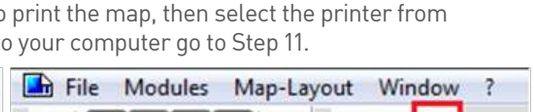


Click here for Changing the **Colour Ramp** and **Count.**

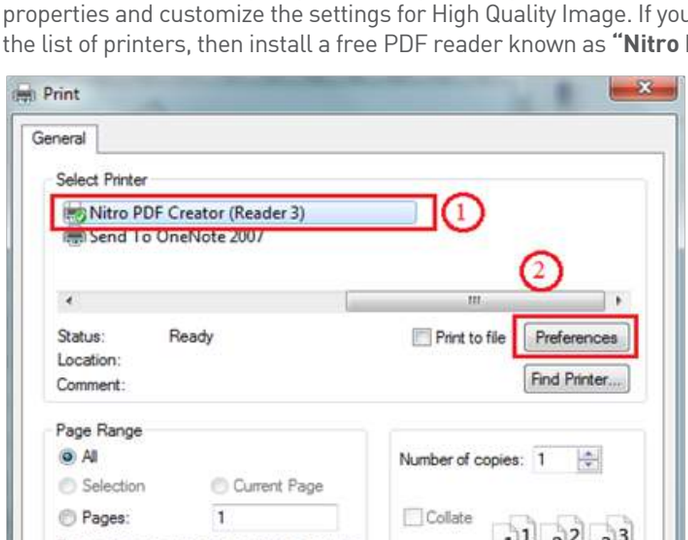


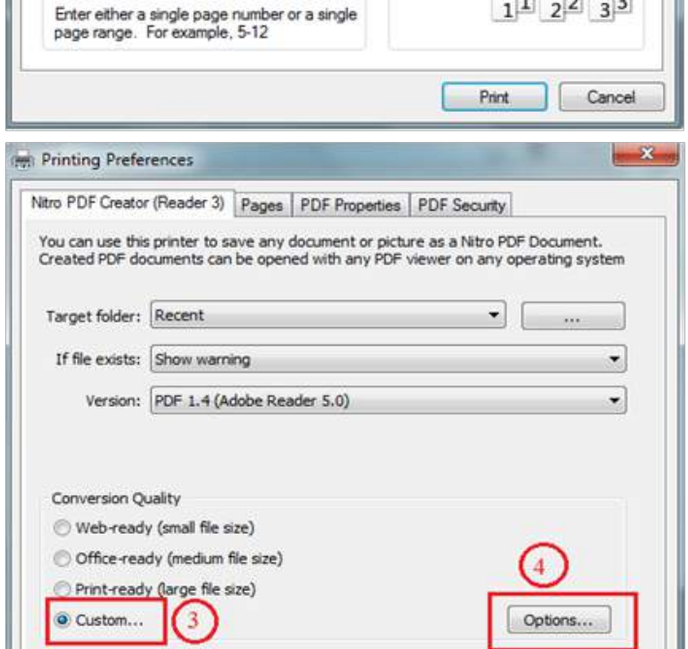
Step 10: To export/Print map, click on the **blue icon (next to 3D)** and then click on the **print button** as shown in the second figure. If you want to print the map, then select the printer from which you wish to print. If you want to save the file to your computer go to Step 11.





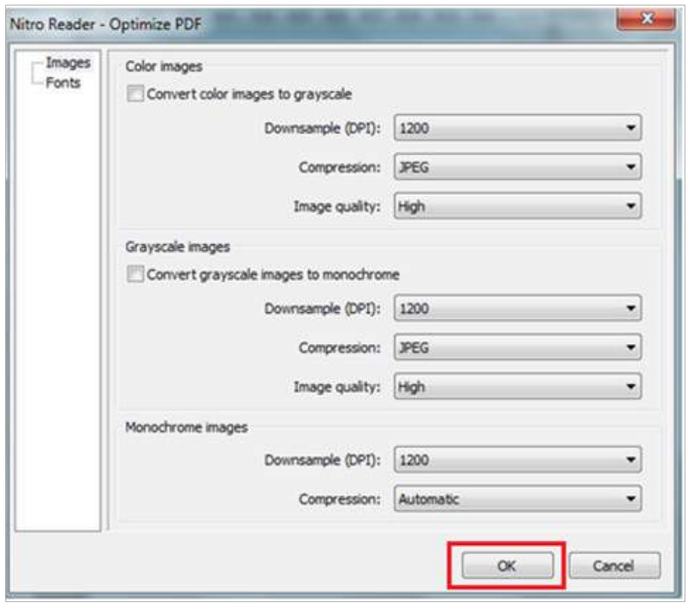
Step 11: To save the map on your desktop, select your PDF reader as your printer, go to properties and customize the settings for High Quality Image. If you don't see your PDF reader in the list of printers, then install a free PDF reader known as **"Nitro PDF Reader".**



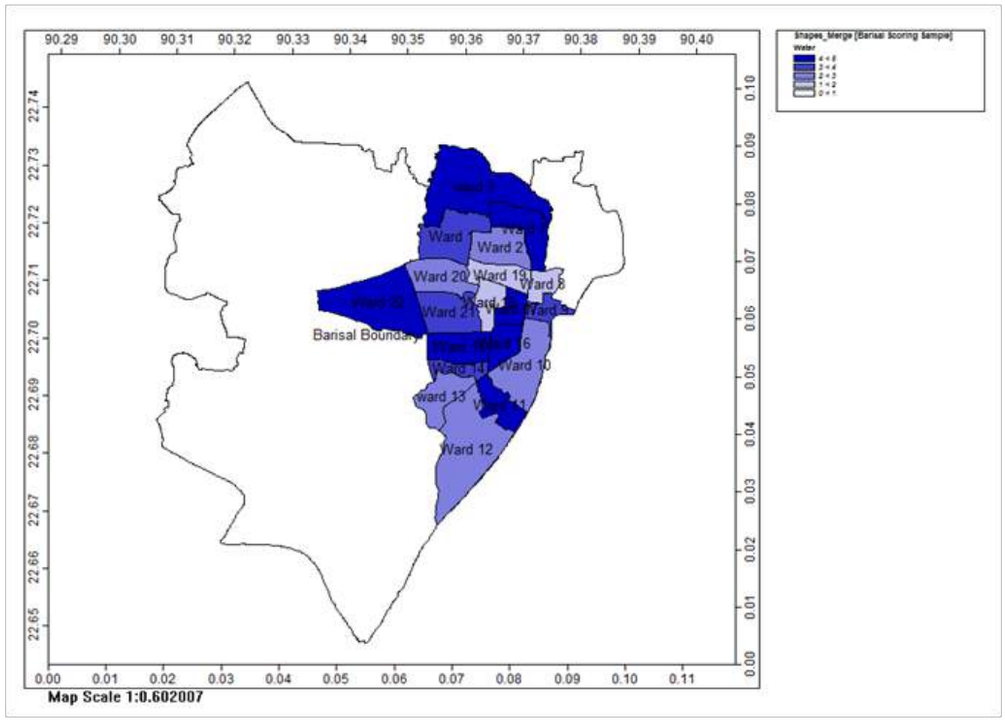


REFERENCE TOOL 3

Keep the following settings after clicking on **"Options".**



Click **"OK"** and **Print.** This will prompt you for file Name and Location for saving it. Assign a name and location and Click **"SAVE".** Below is a sample of an exported map for Barisal (Water). Similar maps can be generated for different attributes like Transportation, Energy, Sewerage, Overall Vulnerability (Average),etc.



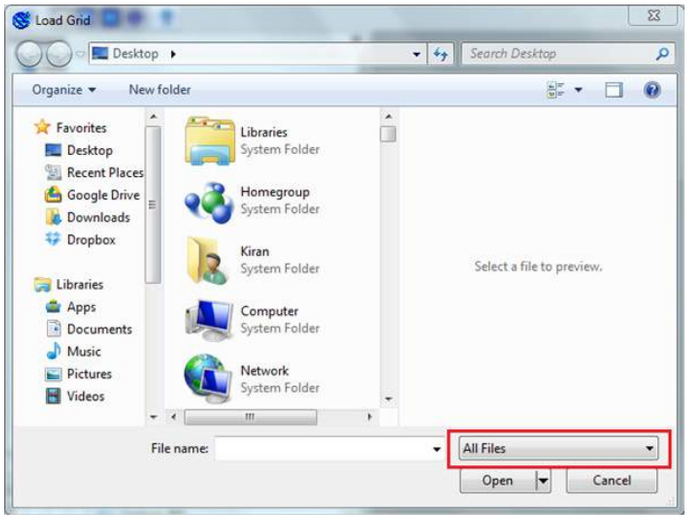
Step 12: After saving maps for all desired attributes, Go to **"File → Project → Save Project As".** Assign a name and location and Click **SAVE.** This will pop-out a window asking for the files to save. Select **"Save All"** and Click **OKAY.** The file will be save in ***.spr (SAGA Project)** format. To open the project, go to **"File → Project → Load Project"** and browse the file location.

METHOD B: USING SAGA GIS ONLY

I) Importing Ward/Base Map in SAGA GIS

Step 1: After downloading SAGA GIS, open the folder where it has been downloaded and double click on **"saga_gui" (with blue icon).** This software requires no installation.
SAGA GIS once started, will display three panels **(Left, Middle and Right).** The top of the left panel consists of three tabs viz. **Modules, Data and Maps.** Select the **"Data"** tab. Refer **Step 1 of III (Method A)** for figure.

Step 2: Import the ward map image in SAGA GIS using the **"File → Grid → Load"** function and browsing the file location. While browsing the file location, make sure that the file format is set to **"All Files".**



Step 3: Once the file is imported in SAGA GIS, a new layer (Grid) will appear in the **"Data Panel".**

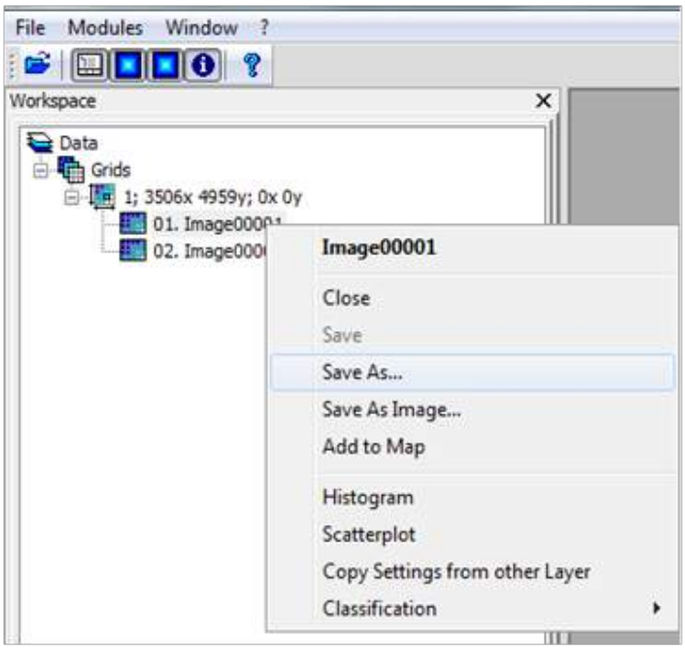
Note: *If the grid is imported properly, the "Message Panel" will display a message with* ***"Success/Okay"*** *at its end (example: Load grid: C:\Users\Kiran\Desktop\ICLEI\Maps\Image00001.jpg...okay). Similarly, if the grid is not imported properly, the "Message Panel" will display a message with "Failed" at its end (example: Load grid: C:\Users\Kiran\Desktop\ICLEI\Maps\Image00001.jpg...failed).*

REFERENCE TOOL 3

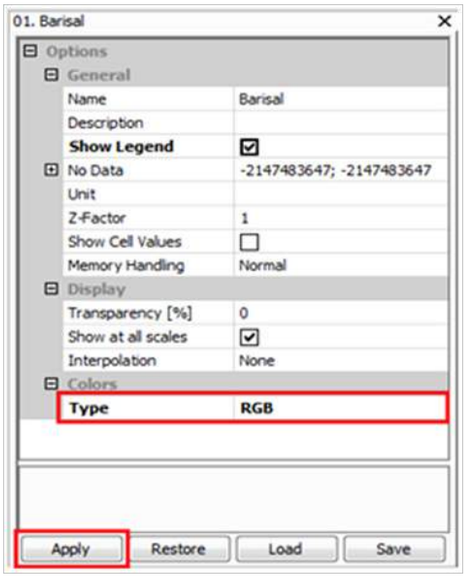
Step 4: In case the grid/Image is not successfully imported, **2-3 layers** of the same image may appear. This is probably because of the software's multiple attempts to load the grid/Image. In such cases, select any of these layers and save it in **"*.sgrd" (SAGA GRID)** format. This can be done by **"Right Clicking on Selected Layers → Save As → Assign a name & location".**

After saving the layer in *.sgrd format, **Delete** the previously imported image/images **(Select All → Right Click → Close)** and **Import** the recently saved one **(File → Grid → Load)**.

Please note: *that the file format should be set to *.sgrd while importing.*
Refer the figure below.

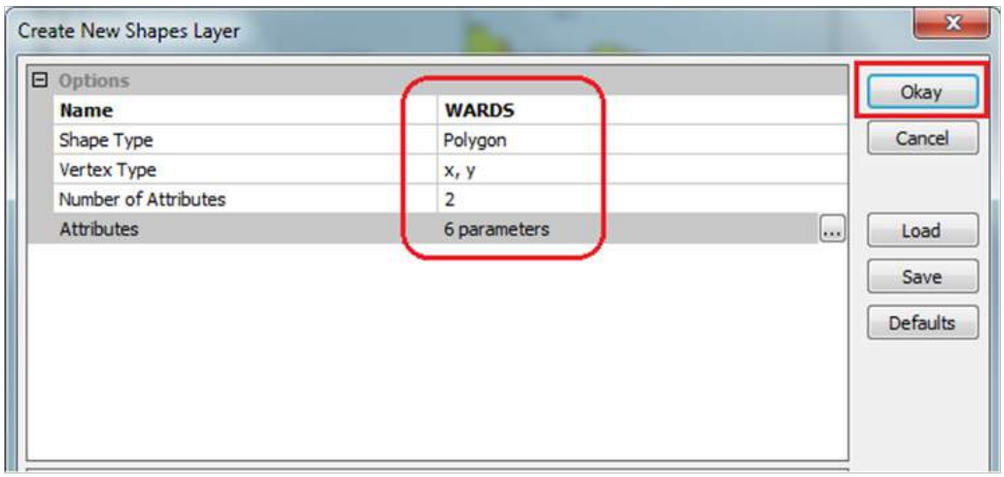


Step 5: Open the imported image by double-clicking on it. If the image is imported in ***.sgrd** format (i.e if **Step 4** was performed), change the Colour type to **"RGB"** and click **"Apply"**. This will display the image in its original form (Colour C)



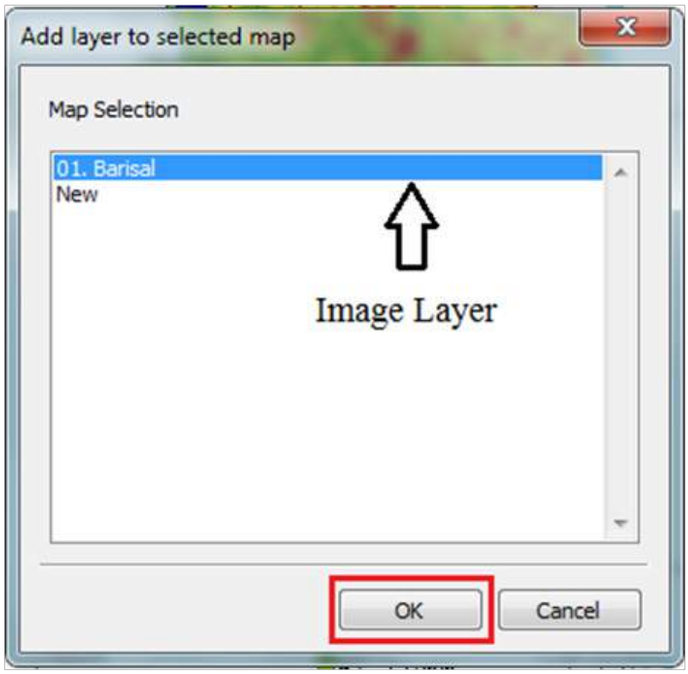
II) Making polygons/Shapefiles (Digitizing)

Step 1: For making polygons/shapefiles, create a shape layer first. This can be done by selecting **"Modules → Shapes → Construction → Create New Shape Layer"** and Keeping the following Settings in the pop-up window.



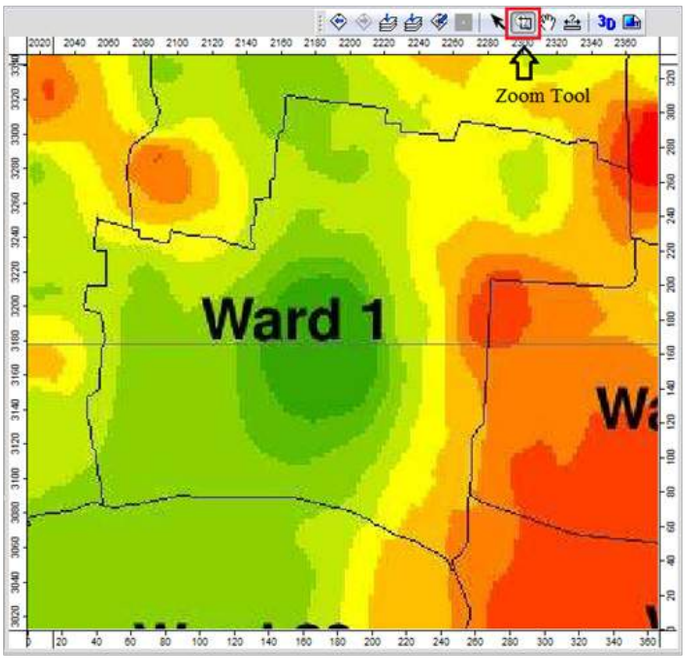
This will add a new layer in the Data Frame.

Step 2: Add the Shape Layer (WARDS) to Ward Map Image. To do this, **double click on the shape layer (in left panel) and select the Image layer when prompted.** Refer to the figure below.

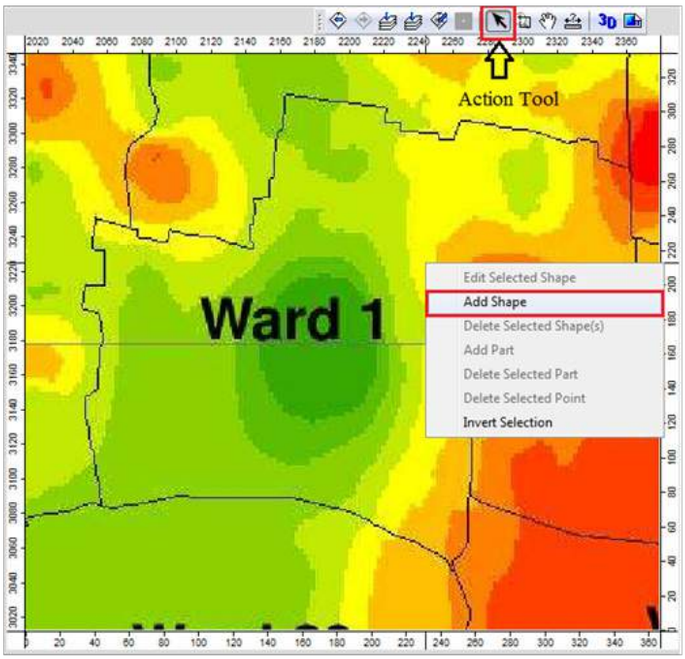


REFERENCE TOOL 3

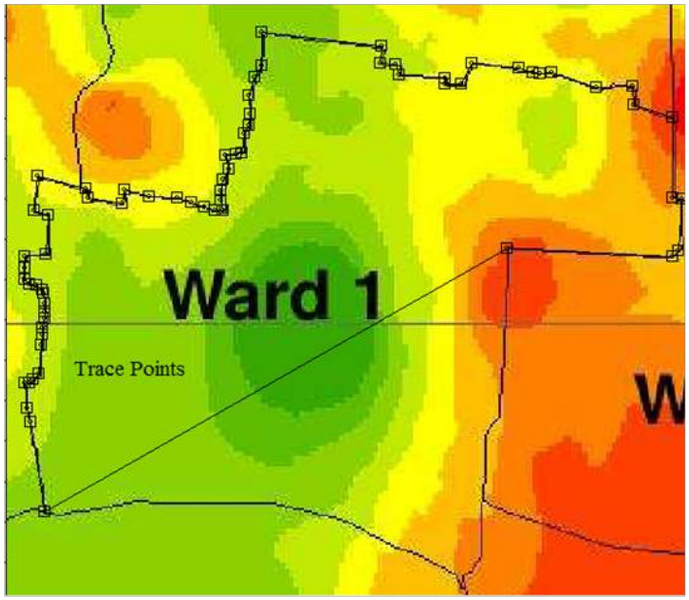
Step 3: Using the **zoom tool** (Fig.), zoom to the **first ward** of your area.

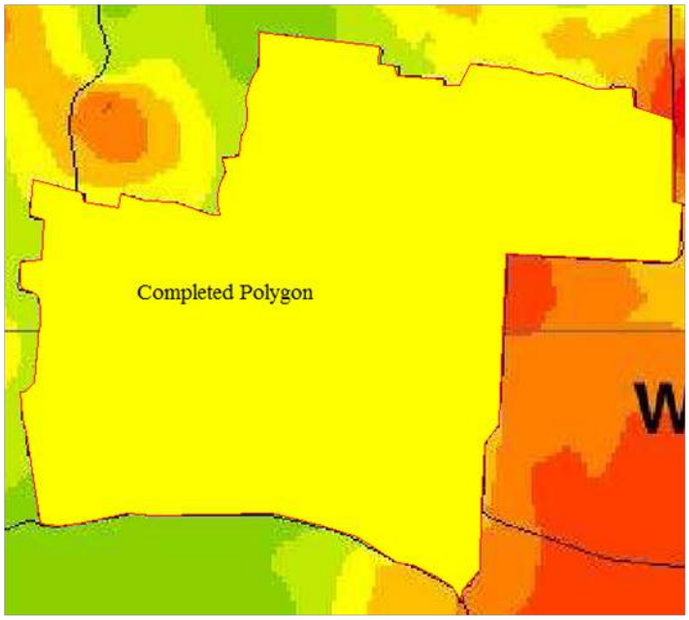


Step 4: Now, select the **action tool** (Fig), right click on the map and select **"Add Shape".**



Step 5: Using the left click of your mouse, Trace the outline of first ward by clicking repeatedly. Zoom in for better accuracy. On completing the trace, press **"Enter"** and a polygon will appear in yellow.





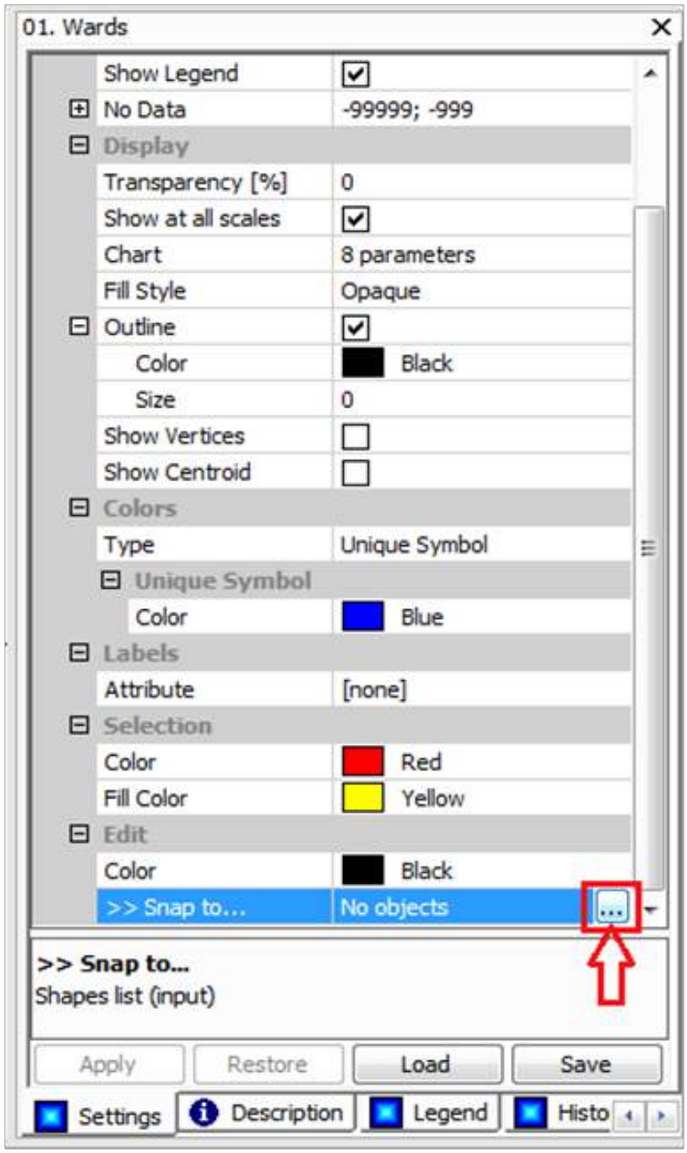
Step 6: Open the Attribute Table **(Right Click on Wards → Attributes → Show)** and Enter the **ID** and **Name** for the newly digitized/traced polygon.

For Ward 1, Keep ID as **"1"** and Name as **"Ward 1".** Similarly for Ward 2, Keep ID as **"2"** and Name as **"Ward 2"** and so on. (This will generate a column **"Name"** with Ward Names which can be later used as a common column for joining the scores table which will in-turn assign scores to respective wards/polygons)

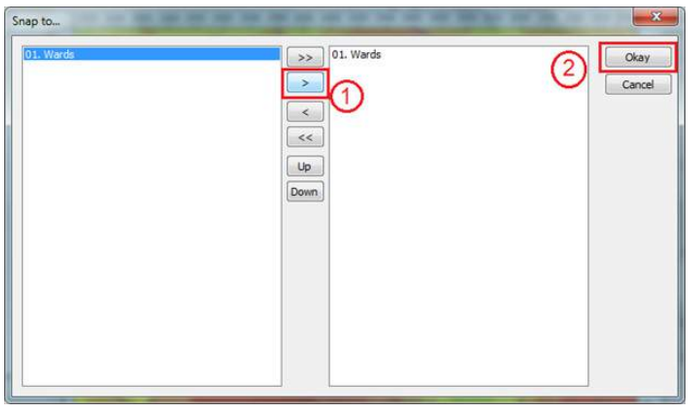
	ID	Name
1	1	Ward 1

Close the Attribute Table once these fields are filled.

Step 7: Before tracing the next ward, enable **Snapping** by using the **"Snap to"** function in the **right hand side settings panel.** Snapping will avoid unwanted gaps between adjacent polygons (Wards).



After clicking on the **"Snap to"** tab, following window will appear. Add your **"Wards"** Shape layer and Click **"Okay".**



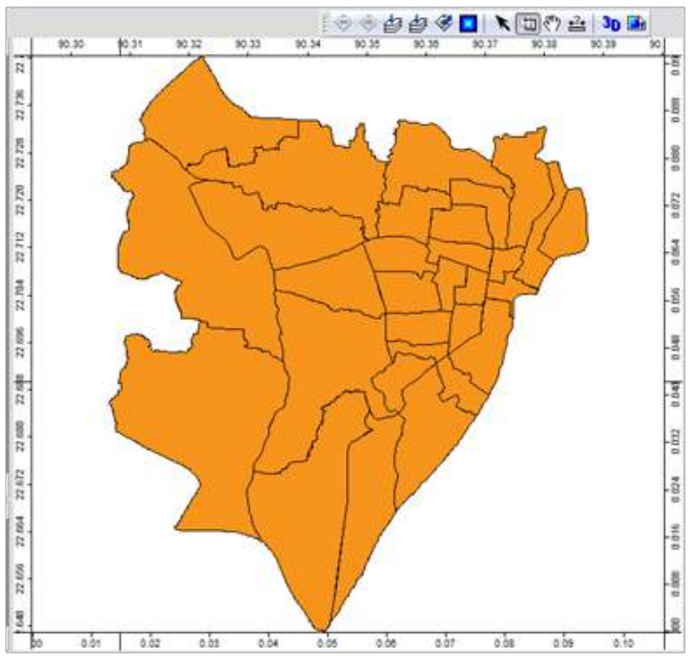
After clicking **"Okay"**, Click **"Apply"** on the right hand side settings panel.

Step 8: Now using the **Zoom Tool**, Zoom in to the next Ward. Using the **Action Tool,** right click and select **"Add Shape"** (Ref. Step 4 of II (Method B) for figure). This time, a bubble will appear on the top left corner of the middle panel which will indicate that snapping is on. Follow **Step 5** for digitizing the ward & **Step 6** for making changed in the attribute table.

Step 9: Follow the same procedure **(Step 3, 4, 5 & 6)** for all wards within the study region.

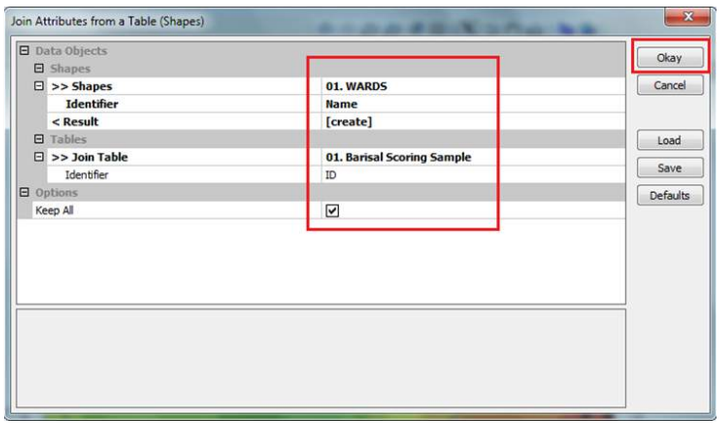
Note: *Enable snapping before digitizing/tracing every Ward (except for the first ward). For this* ***"Steps 7 & 8"*** *can be referred.*

Step 8: After digitizing all the wards, double click on the shape layer **"Wards"** open it as a **"New"** Layer. This will display all digitized wards in a **"New Window".**



III) Adding attributes/Scores/Data to the Shapefiles and Exporting the Map.

Step 1: Follow **Step 6** to **Step 8** of **III (Method – A)** for adding attribute/score table. Keep the Following settings in **Step 8.**



This will create a new layer with the name **"WARDS [Scoring Table Name]".**

Step 2: Open the **"WARDS [Scoring Table Name]"** layer (Double Click) and apply the colour settings as discussed in the **Step 9 of III (Method A).**

Step 3: Follow **Steps 10, 11 & 12 of III (Method A)** for exporting maps and Saving the Project File.

References:

1) Minnesota Department of Natural Resources: Minnesota DNR. 2013. Minnesota Department of Natural Resources: Minnesota DNR. [ONLINE] Available at: **http://www.dnr.state.mn.us/. [Accessed 25 May 2013].**

2) SAGA - System for Automated Geoscientific Analyses. 2013. SAGA - System for Automated Geoscientific Analyses. [ONLINE] Available at: **http://www.saga-gis.org/en/index.html. [Accessed 28 May 2013].**

3) Google Earth . 2013. Google Earth . [ONLINE] Available at: **http://www.google.com/earth. [Accessed 20 May 2013].**

COMPARISON BETWEEN METHOD A AND METHOD B

METHOD A	METHOD B
Method A Requires three tools/ Software viz. Google Earth, DNR Garmin & SAGA GIS.	In Method B, One Software i.e SAGA GIS, does all the work
This method is pretty time consuming due to file format conversions.	This method consumes relatively less time, since no file format conversion is required.
This method results in creation of too many files. However, these files are not heavy.	The number of files created in this method is less.
Since the wards and boundaries are digitized/ traced in Google Earth, Gaps between adjacent polygons may appear. However, these are noticeable only when the screen is zoomed.	Gaps between adjacent polygons can be avoided using the "Snap to" function.
Since this method uses well known and easy software like Google earth, it might appear user friendly to those who have no experience in mapping.	SAGA GIS may appear a bit complicated for those having no experience in mapping. However, it is said to have a very easy interface.

REFERENCE TOOL 3

ESSENTIAL TOOLS – SAGA GIS

Introduction to Saga GIS layout

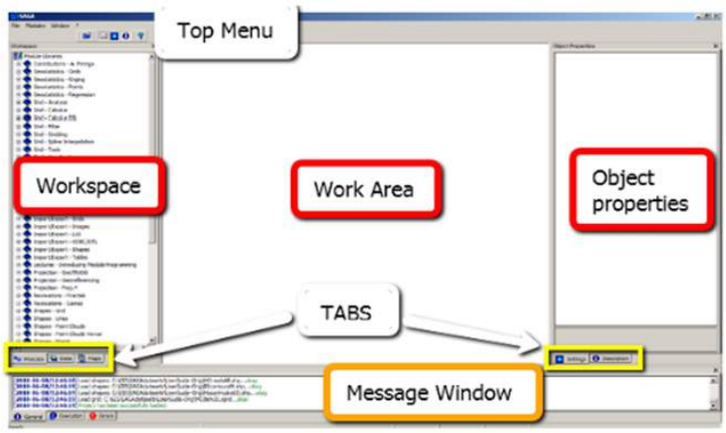
When you open SAGA you will see a layout consisting of the following windows:

Workspace/Left Panel: Is the window where you can, by click through the tabs at the bottom of the window, view processing modules, the data you have loaded and the display maps you have created from your data.

Work area/Middle Panel: Is where image maps and other associated data (Attribute Tables, Histograms, Plots) are displayed.

Object Properties/Right Panel: This window displays and allows you to alter information about your loaded data and map displays.

Message Window: Provides information about processes being run by SAGA.



Each of these windows can be opened and closed from the top menu by clicking on their associated buttons.

Work Area Tools

	Cursor/Action tool – *for selecting points or areas*
	Zoom – zoom in or out of a map display
	Pan Tool – move around a displayed map
	Measuring tool
	Zoom to layer tools

Important links for SAGA GIS:

SAGA GIS Manual: **http://volaya.es/pdf/SagaManual.pdf**

Introduction to SAGA Interface: **http://www.cdu.edu.au/itl/AII-RS/SAGA_GIS_TUTORIAL_ENG.pdf**

ICLEI ACCCRN Process

REFERENCE TOOL 4

UNISDR LOCAL GOVERNMENT SELF ASSESSMENT TOOL (LGSAT)

REFERENCE TOOL 4

UNISDR LOCAL GOVERNMENT SELF ASSESSMENT TOOL (LGSAT)

1. PURPOSE OF THIS TOOL

A very important part of developing resilience to climate change is to set up systems to deal with climate related disasters. ICLEI works in partnership with the United Nations Office for Disaster Risk Reduction (UNISDR) to offer the My city is Getting Ready Campaign.

This campaign was launched in 2010 and there are now more than 1500 cities around the world participating. The Campaign provides support for cities to become more disaster ready, including a Local Government Self Assessment Tool (LGSAT). This tool can be used as part of the ICLEI-ACCCRN scoping process in Phase 1, or as an action in your Resilience Strategy.

2. ABOUT THE TOOL

Following is some information taken from Preventionweb.net about the LGSAT and how to register to use the tool:

Description

The 'Local HFA: Local Government Self-Assessment Tool' is an online tool developed by UNISDR and its partners to assist local governments to assess their progress in building resilience to disaster. It is part of a series of tools for measuring the progress of nations and communities towards meeting the objectives of the **Hyogo Framework for Action (HFA),** which is the world's universally-accepted guide for reducing disaster risk.

The Local HFA is an important element of UNISDR's work with local governments. In 2010, UNISDR and its partner organizations launched the global campaign **Making Cities Resilient – "My City is Getting Ready!"** The objectives of the campaign are to increase understanding and encourage commitment by local and national governments to make disaster risk reduction and resilience a policy priority and to bring the global Hyogo Framework closer to local needs.
At the end of each assessment, local governments will have enough information to:

- Map and understand existing gaps and challenges in disaster risk reduction in their locality.

- Enhance understanding among stakeholders in the local community on disaster risk reduction.

- Set a baseline and develop a status report on their progress in fulfilling the Ten Essentials for making cities disaster resilient, in the context of the Making Cities Resilient campaign.

- Benefit from interactions with their national government in cases where the national government has undergone a similar review using the National HFA Monitor.

How to sign up to the campaign

The campaign aims to encourage cities and local governments in all countries to sign up to the ten essentials and identify activities and plans to improve the city resilience. It first targets Mayors / Governors / Commissioners and City Councils in the first instance, whilst also addressing technical staff and national authorities responsible for local and urban development planning and disaster risk management and reduction.

The term 'city' refers to urban areas in general, and the term 'local government' includes both urban and rural communities of different scales (i.e. regional, provincial, metropolitan, cities, towns, municipalities, districts and villages).

"Participating Cities" in the Campaign

All cities and local governments that are interested in participating in the campaign are encouraged to sign up on the campaign website using the online application form: **www.unisdr.org/campaign** or by submitting the relevant documents to: isdr-campaign@un.org. Local governments are requested to fill in the online form or submit the nomination form (Annex 2).

In both cases, a letter from the Mayor's office addressed to UNISDR shall confirm the participation in the campaign, confirming the participation in the campaign and indicating which other organizations the city will engage during the campaign.

Community groups, National Associations of local governments, academia and others can initiate the nomination process through contacting the Mayor´s office.

By signing up online and sending the mayor´s letter or by sending the nomination form and the mayor's letter to UNISDR, the local government automatically participates in the campaign and will be added to the web-based campaign city map. After signing up the local government can create its own online profile on the campaign website.

A campaign certificate that will be either sent virtually or given in a signing ceremony will complete the sign-up process.

UNISDR encourages the Mayor's office to seek the approval of the City Council to be officially involved as a "participating city" in the campaign. The local government shall inform the central government about the participation and notify the official Hyogo Framework for Action focal point or the National Platform for Disaster Risk Reduction (contact information can be requested from UNISDR secretariat.)

3. FURTHER REFERENCES, LINKS

You can follow these links from the ISDR and "Preventionweb" sites to learn more about the Campaign and LGSAT:

http://www.unisdr.org/campaign/resilientcities/

http://www.preventionweb.net/english/hyogo/hfa-monitoring/local/

Your ICLEI office can also assist you to register for the Campaign and the LGSAT, and to commence the assessment exercise

ICLEI ACCCRN Process

REFERENCE TOOL 5

DURBAN ADAPTATION CHARTER

DURBAN ADAPTATION CHARTER

1. PURPOSE OF THIS TOOL

There are many cities around the world that have started to take climate action similar to the ICLEI ACCCRN process you have commenced. In addition to working at the local level, your city can join an international movement of cities tackling climate change. One way of doing this is to join ICLEI. Another is to sign the Durban Adaptation Charter so that your city makes public its commitment to climate resilience.

2. ABOUT THE TOOL

The Durban Adaptation Charter was launched at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 17 held in the City of Durban (eThekwini Municipality), South Africa in December 2011.

The South African Government, through the South African Local Government Association (SALGA), South African Cities Network (SACN), eThekwini Municipality and the Department of Environmental Affairs partnered with ICLEI - Local Governments for Sustainability in hosting the Durban Local Government Convention: adapting to a changing climate - towards COP17/CMP7 and beyond.

The initial signing of the Durban Adaptation Charter by 114 signatories, representing 950 local governments organisations from 27 countries builds on the recognition of local governments as government stakeholders in the Cancun Agreement.

By going through the ICLEI ACCCRN Process your city government has started taking action towards making your city more climate resilient. The signing of the Durban Adaptation Charter will enable your city to reach out to a larger audience and showcase its commitment and actions for climate resilience on an international platform.

The Commitment

By committing to the Durban Adaptation Charter, your city will demonstrate its political will to address climate change, pledging to enhance its local adaptive capacity, mainstreaming adaptation in local government planning, and instigate greater resilience to climate change.

The Durban Adaptation Charter commits Local Governments to local climate action in their jurisdiction that will assist their communities to respond to and cope with climate change risks thereby reducing vulnerability. By signing the Durban Adaptation Charter they commit to inter alia:

1. Key information of all local government development planning;
2. Ensuring that adaptation strategies are aligned with mitigation strategies;
3. Promoting the use of adaptation that recognizes the needs of vulnerable communities and ensuring sustainable local economic development;
4. Prioritizing the role of functioning ecosystems as core municipal green infrastructure;
5. Seeking innovative funding mechanisms.

How to sign the Charter

In order to sign the charter your local government or association of local governments can visit the web link for the charter at following address:
http://www.durbanadaptationcharter.org/

3. FURTHER RESOURCES, LINKS

The Durban Adaptation Charter, **http://www.durbanadaptationcharter.org**

ICLEI ACCCRN Process

REFERENCE TOOL 6

CARBON*N* CLIMATE REGISTRY

CARBON*N* CLIMATE REGISTRY

ABOUT THE REGISTRY

The carbon*n* Climate Registry (cCR) is a global mechanism that encourages local governments to regularly and publicly report on their greenhouse gas reduction commitments, GHG emissions inventories and climate mitigation/adaptation actions. The cCR was developed *by* local governments *for* local governments.

The cCR enables cities and local governments to publicly register their greenhouse gas reduction **commitments**, report **performance** and showcase **actions.**

The cCR ensures that local climate action is **measurable, reportable** and **verifiable**, and that data are consistent with the standards of the global climate regime.

The cCR supports the global credibility of local climate action and ensures transparency, accountability and comparability.

Why register local climate data with the cCR?
• To promote local climate action the world can count on.

• Local governments are taking a lead role in global climate protection and have already driven, mirrored and supported national and international climate processes.

• The cCR supports the global credibility of local climate action by ensuring comparability, transparency and accountability.

• Local Governments involved in the process will have continuous support in capacity and knowledge development through the services of the Bonn Center for Local Climate Action and Reporting – carbonn®.

For more information on the registry and how to join, please see:
http://carbonn.org/

ICLEI ACCCRN Process

REFERENCE TOOL 7

URBAN CLIMATE RESILIENCE PLANNING FRAMEWORK

This part of the ICLEI ACCCRN Process is based on the Urban Climate Resilience Planning Framework (UCRPF) developed as part of the ACCCRN program. The framework is outlined in detail in the paper "Catalyzing Urban Climate Resilience" (ISET, Rockefeller Foundation, July 2011, **www.i-s-e-t.org)**

Some key elements of this framework as stated in the ISET publication are:

The framework is intended to be a tool to help simplify and analyse complex relationships between urban residents, urban systems, urban institutions, and climate change. It can help clarify the factors that need to be included in diagnosis of climate vulnerability and refine the process of strategic planning to build urban resilience to climate change (pp 7).

By focusing on urban systems (the foundation on which urban areas survive), urban agents (the diverse organizations that make up the urban social environment), urban institutions (the rights, laws, regulations, and other social structures that mediate relationships among agents and between agents and systems), and the impact of climate change, the UCRPF helps to identify specifically **who might do what to build climate resilience (pp 3).**

Within the framework, building resilience means identifying and ameliorating fragile systems through strengthening those characteristics that reduce their vulnerability to climate impacts. It also means strengthening the capacities of social agents to access urban systems and to develop adaptive responses. Finally, building resilience means addressing the institutional factors that constrain effective responses to system fragility or undermine the ability to build agent capacity (pp 10[1]).

The three key components of the Urban Climate Resilience Planning Framework are:
(i) Urban Systems; (ii) Agents; and (iii) Institutions.

Urban systems:
Include ecosystems and infrastructure systems along with the knowledge required to manage, maintain, and develop them (pp 37)

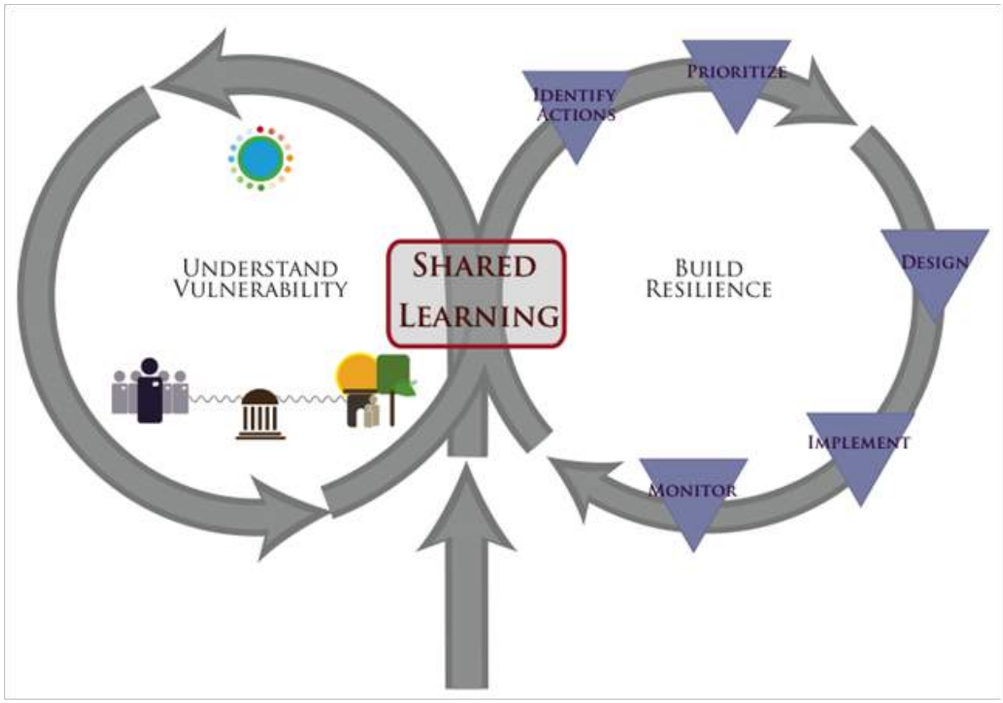
Actors (Agents):
Include individuals (e.g., farmers, consumers); households (as units for consumption, social reproduction, education, and capital accumulation); and private and public sector organizations (government departments or bureaus, private firms, civil society organizations). They have identifiable but differentiated interests and are able to change behavior based on experience and learning (pp 45)

Rules and Practices (Institutions):
The rights, laws, regulations, and other social structures that mediate (Institutions) relationships among agents [Actors] and between agents [Actors] and systems (pp 3)

[1]Please note that the text and page references are based on an early draft version of the UCRPF and may be different in the final version of the document.

REFERENCE TOOL 7

The diagram below indicates the inter-relationship between these three components and the process in which it contributes towards building climate resilience. The interactions between the urban systems, actors, and rules and practices (represented by symbols in the left circle) help understand the vulnerabilities of the city which would feed into the process of building resilience (the circle on the right). Further, as depicted in the diagram, the process of 'shared learning' is the binding element between these other two processes.




Represents 'Urban Systems'


Represents 'Actors'


Represents 'Rules and Practices'


Represents Climate Exposure

Source: ISET, 2011

ICLEI ACCCRN Process

REFERENCE TOOL 8

CONSEQUENCE SCALE: LOCAL GOVERNMENT EXAMPLE

REFERENCE TOOL 8

Please view both pages as the same table.

Consequence Rating	Success Criteria	
	Public Safety	**Local Economy and Growth**
Catastrophic	Large numbers of serious injuries or loss of lives	Regional decline leading to widespread business failure, loss of employment and hardship
Major	Isolated instances of serious injuries or loss of lives	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth
Moderate	Small number of injuries	Significant general reduction in economic performance relative to current forecasts
Minor	Serious near misses or minor injuries	Individually significant but isolated areas of reduction in economic performance relative to current forecasts
Insignificant	Appearance of a threat but no actual harm	Minor shortfall relative to current forecasts

CONSEQUENCE SCALE: LOCAL GOVERNMENT EXAMPLE

Success Criteria		
Community and Lifestyle	**Environment and Sustainability**	**Public Administration**
The region would be seen as very unattractive, moribund and unable to support its community	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage	Public administration would fall into decay and cease to be effective
Severe and widespread decline in services and quality of life within the community	Severe loss of environmental amenity and a danger of continuing environmental damage	Severe loss of environmental amenity and a danger of continuing environmental damage Public administration would struggle to remain effective and would be seen to be in danger of falling completely
General appreciable decline in services	Isolated but significant instances of environmental damage that might be reversed with intensive efforts	Public administration would be under severe pressure on several fronts
Isolated but noticeable examples of decline in services	Minor instances of environmental damage that could be reversed	Isolated instances of public administration being under severe pressure
There would be minor areas in which the region was unable to maintain its current services	No environmental damage	There would be minor areas of public administration being under more than usual stress but it could be managed

Source: Commonwealth of Australia (2006): Climate Change Impacts and Risk Management – A Guide for Business and Government

ICLEI ACCCRN Process

REFERENCE TOOL 9

MENU OF CLIMATE ADAPTATION ACTIONS

1. PURPOSE OF THIS TOOL

Research into case studies and best practice from other areas can provide a rich source of possible actions, or interventions. This tool provides some lists of possible actions and resources which cities can use for their own research.

2. ABOUT THE TOOL

Following is a selection of actions which have been taken by cities to adapt to climate change. However, every city is unique and care should be taken to ensure that chosen actions are appropriate for local conditions and will be understood and "owned" by local stakeholders.

IPCCC

The 2007 Climate Change Synthesis Report, Chapter 4, Adaptation and Mitigation Options, gives a selection of possible adaptation actions by sector, along with policy considerations, constraints and opportunities:

Sector	Adaptation option/ strategy	Underlying policy framework	Key constraints and opportunities to implementation (Normal font = constraints; *italics = opportunities*)
Water	Expanded rainwater harvesting; water storage and conservation techniques; water re-use; desalination; water-use and irrigation efficiency	National water policies and integrated water resources management; water-related hazards management	Financial, human resources and physical barriers; *integrated water resources management; synergies with other sectors*
Agriculture	Adjustment of planting dates and crop variety; crop relocation; improved land management, e.g. erosion control and soil protection through tree planting	R&D policies; institutional reform; land tenure and land reform; training; capacity building; crop insurance; financial incentives, e.g. subsidies and tax credits	Technological and financial constraints; access to new varieties; markets; *longer growing season in higher latitudes; revenues from 'new' products*
Infrastructure/settlement (including coastal zones)	Relocation; seawalls and storm surge barriers; dune reinforcement; land acquisition and creation of marshlands/wetlands as buffer against sea level rise and flooding; protection of existing natural barriers	Standards and regulations that integrate climate change considerations into design; land-use policies; building codes; insurance	Financial and technological barriers; availability of relocation space; *integrated policies and management; synergies with sustainable development goals*

Table continued on the next page

REFERENCE TOOL 9

3. FURTHER RESOURCES, LINKS

There are many other useful resources and lists of actions available on the internet, including:

ICLEI Case Studies

ICLEI has compiled more than 165 case studies from many countries showing how cities are adapting to climate change and becoming more energy efficient. The ICLEI Case Study series highlights the role of ICLEI Members and other local governments as key drivers and implementers of urban sustainable development across the globe by illustrating successful approaches, innovative models and transferable best practices in the field of urban development and sustainable projects.

In general the case studies are maximum 8 pages and include the following standard headings:
- the local context of the project
- the anatomy of the project
- results
- lessons learned
- the project's replication potential
- budgeting and financial issues

The ICLEI case studies series is available at no charge and can be accessed at:
www.iclei.org/casestudies

Catalyzing Urban Climate Resilience, ISET
Chapter 7 of this publication, already introduced in Reference Tool 1.2, gives examples of City Resilience Strategies from the four original ACCCRN countries – India, Indonesia, Vietnam and Thailand. The publication can be found on the ISET website at
www.i-s-e-t.org

World Bank
Carmin& Zhang, 2009 Achieving Urban Climate Adaptation in Europe and Central Asia (World Bank Paper)

UN Habitat
Planning for Climate Change, A Strategic, Values-Based Approach for Urban Planners, P.112
Planning for Climate Change

Sector	Adaptation option/ strategy	Underlying policy framework	Key constraints and opportunities to implementation (Normal font = constraints; *italics = opportunities*)
Human Health	Heat-health action plans; emergency medical services; improved climate-sensitive disease surveillance and control; safe water and improved sanitation	Public health policies that recognise climate risk; strengthened health services; regional and international cooperation	Limits to human tolerance (vulnerable groups); knowledge limitations; financial capacity; *upgraded health services; improved quality of life*
Tourism	Diversification of tourism attractions and revenues; shifting ski slopes to higher altitudes and glaciers; artificial snow-making	Integrated planning (e.g. carrying capacity; linkages with other sectors); financial incentives, e.g. subsidies and tax credits	Appeal/marketing of new attractions; financial and logistical challenges; potential adverse impact on other sectors (e.g. artificial snow-making may increase energy use); *revenues from 'new' attractions; involvement of wider group of stakeholders*
Transport	Realignment/relocation; design standards and planning for roads, rail and other infrastructure to cope with warming and drainage	Integrating climate change considerations into national transport policy; investment in R&D for special situations, e.g. permafrost areas	Financial and technological barriers; availability of less vulnerable routes; *improved technologies and integration with key sectors (e.g. energy)*
Energy	Strengthening of overhead transmission and distribution infrastructure; underground cabling for utilities; energy efficiency; use of renewable sources; reduced dependence on single sources of energy	National energy policies, regulations, and fiscal and financial incentives to encourage use of alternative sources; incorporating climate change in design standards	Access to viable alternatives; financial and technological barriers; acceptance of new technologies; *stimulation of new technologies; use of local resources*

http://www.ipcc.ch/publications_and_data/ar4/syr/en/spms4.html

MENU OF CLIMATE ADAPTATION ACTIONS

ACCCRN projects catalogue

The Asian Cities Climate Change Resilience Network (ACCCRN), from which the ICLEI-ACCCRN toolkit was developed, has documented climate adaptation actions, or "projects", initiated by the original ten ACCCRN cities, in a Project Catalogue. This gives a 2-page summary of each city project. Following is the list of projects from the May 2013 edition:

INDIA
Gorakhpur: Implementing and Promoting Ward-level Micro Resilience Planning
Gorakhpur: Implementing and Promoting Adaptive Peri-urban Agriculture
Indore: Testing and Promoting Decentralized Systems for Differential Water Sources and Uses
Indore: Strengthening Vector-borne Disease Surveillance and Response Systems
Indore: Peri-urban Lake Restoration to Create Emergency Water Management Options
Indore & Surat: Promoting Cool Roof and Passive Ventilation for Indoor Temperature Comfort
Surat: End-to-end Early Warning System
Surat: Urban Health and Climate Resilience Center

INDONESIA
Bandar Lampung: Integrated Solid Waste Management Master Plan
Bandar Lampung: Ground Water Conservation (Biopores)
Bandar Lampung: Building Teachers and Students Climate Change Resilience Capacity
Semarang: Pre-feasibility Study for Expanding Rainwater Harvesting Systems
Semarang: Flood Forecasting and Warning System
Semarang: Actions Changing the Incidence of Vector-Borne Endemic Diseases (ACTIVED)
Semarang: Enhancing Coastal Community Resilience through Strengthened Mangrove Ecosystem Services and alternative livelihoods

THAILAND
Chiang Rai: Restoration of Kok River for Urban Flood Management
Chiang Rai: Developing Climate-Resilient Urban and Economic Development Plans
Hat Yai: Community-based Flood Preparedness and Institutional Coordination Systems
Hat Yai: Building Long-Term Resilience to Flood Impacts though Climate-Informed Flood Plans

VIETNAM
Can Tho, Da Nang, QuyNhon: Climate Change Resilience Coordination Offices (CCCOs)
Can Tho, Da Nang, QuyNhon: Vietnam Youth Urban Resilience Competition
Can Tho: Strengthening Dengue Fever Surveillance and Response System
CanTho: Developing and Implementing Real-time Salinity Monitoring, Dissemination and Response Mechanisms
Can Tho: Community-Based Canal and Riverbank Strengthening
Da Nang: Hydrology, Hydraulic and Urban Development Simulation Model
Da Nang: Storm and Flood Resistant Credit and Housing Scheme
Da Nang: Developing, Testing and Promoting New Education Modules to Increase Youth Awareness on UCCR
Da Nang: Pathways to Water Resilience: A Comprehensive Assessment
QuyNhon: Hydrology and Urban Development Modeling for Flood-related Land-use Planning
QuyNhon: Urban Mangrove Restoration for Storm Surge Protection and Resilient Land-use Practice
QuyNhon: Developing Real-Time Flood Monitoring and Community Flood Communications and Response System in the Lower Ha Thanh and Kon Rivers

http://www.acccrn.org/resources/documents-and-tools

ICLEI ACCCRN Process

REFERENCE TOOL 10

INTERVENTION MAPPING

ICLEI ACCCRN Process

Intervention Mapping

This is a mind-mapping technique which can be used in a workshop format when actions are not so obvious or when the response needs to be multi-faceted and involving multiple actors.

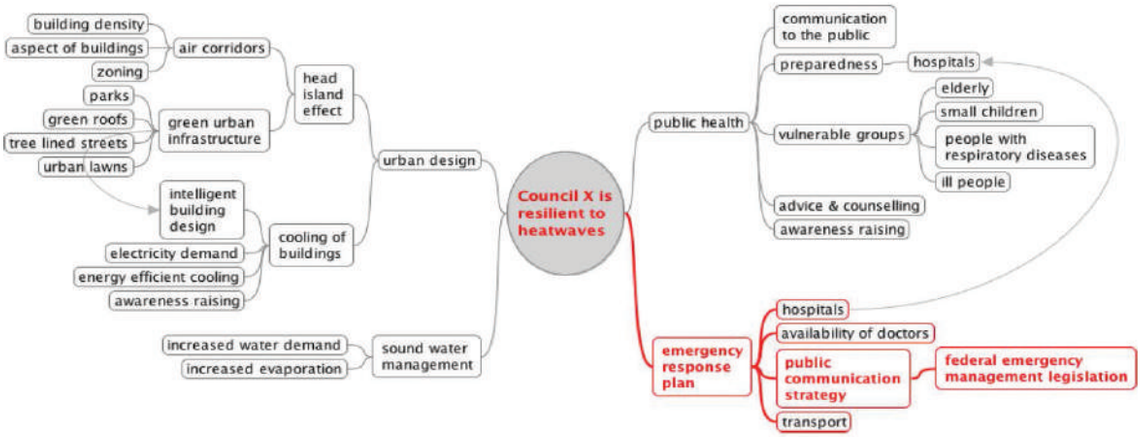
The process begins with a statement of the desired objective, or end-point (Target Condition), then analyses the city sectors which are involved and seeks to identify how each sector could respond.

The technique can also be extended to include external agencies and stakeholders. The Actors analysis from Phase 3 will provide a useful guide to this process.

The next slide shows you what a completed Intervention Map might look like for a Target Condition.

An example of the outcome of a modelling exercise, focussing on achieving greater resilience to heatwave conditions.

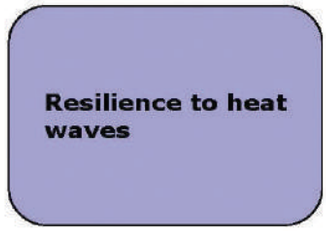
Resilience to Heatwaves: Intervention Mapping



Intervention modelling: Step 1

For each impact, choose Target Condition

- A state that you want your City or community to achieve in relation to a particular climate change impact



There are many ways of constructing conceptual models.
We are suggesting developing one that is based on the following different model elements - an approach that in our experience has proven suitable to conceptual modelling for climate change adaptation.
A target condition is a vision, a state that City wants to be at in relation to a particular climate change impact.

Intervention modelling: Step 2

Free Brainstorming

Brainstorm all processes and activities at the City level and within the community that would help achieve the Target Condition

Write each 'finding' on a card - don't worry about sorting them yet

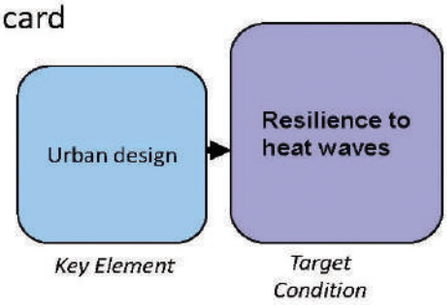
Try to use succinct, active statements that include a verb (e.g. 'Develop heatwave response plan' rather than 'Heatwave response')

Be creative and think broadly and laterally!

Intervention modelling: Step 3

Choose Key Elements (City Functions)

- Choose City functions that would need to be involved in achieving the Target Condition
- Write each of them on a card



Important that this step focuses on City functions – over which the City has reasonable control and can therefore effect change.

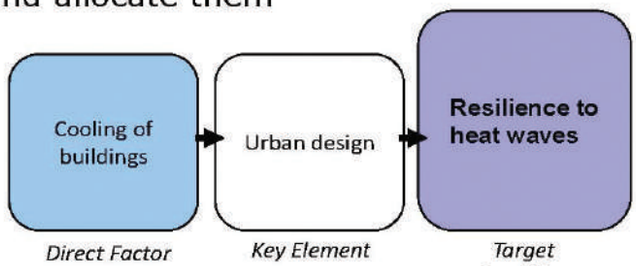
City Functions

Local Government Authority	
Obligatory Functions	**Elective Functions**
1. Education	1. Sea & Fishery
2. Health	2. Agriculture
3. Environment	3. Forestry
4. Public Works	4. Energy & Mineral Resources
5. Spatial Planning	5. Tourism
6. Development Planning	6. Industry
7. Housing	7. Trade
8. Youth and Sport	8. Transmigration
9. Investment	
10. Cooperation & SME	
11. Demography & Population Administration	
12. Work Force	
13. Food Security	
14. Women Empowerment and Children Protection	
15. Family Planning and Welfare	
16. Transportation	
17. Communication & Informatics	
18. Agrarian	
19. National Unity & Politics of Home Affair	
20. Regional autonomy, General Government Administration, Financial Administration, Organization, Government Employment, and Coding	
21. Community & Village Development	
22. Social	
23. Culture	
24. Statistic	
25. Archives	
26. Library.	

Intervention modelling: Step 4

Identify Direct Factors

- Processes or activities that need to be undertaken to contribute to Target Conditions
- Can be things the City is already doing OR things it should be doing
- Select cards and allocate them

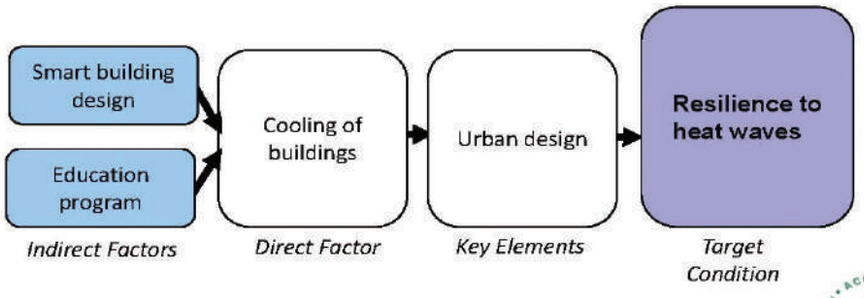


Direct factors are all those processes, events and activities that directly and immediately affect each of the components – no matter whether they are under the direct influence of City or not.

Intervention modelling: Step 5

Identify Indirect Factors

- Processes or activities that influence or determine the success of a Direct Factor
- Select cards and allocate them

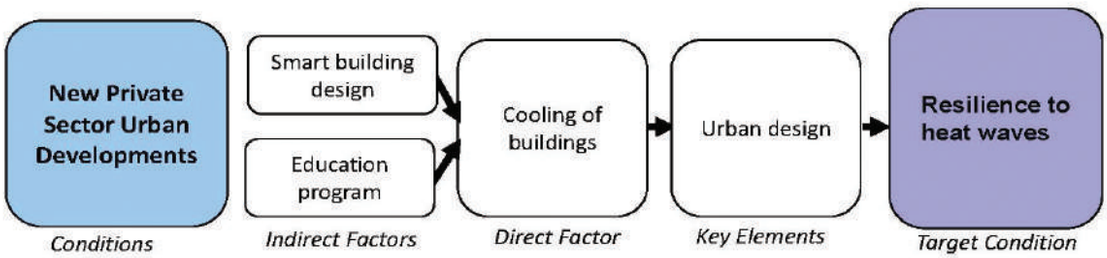


Direct factors, then again, are influenced and defined by a range of issues, such as particular legislation, the legacy of particular historic events or specific processes of organisational reform, for example. You can see that you could theoretically subdivide the model further and further. This is up to the user to decide – where it makes sense to go into more detail and where it doesn't.

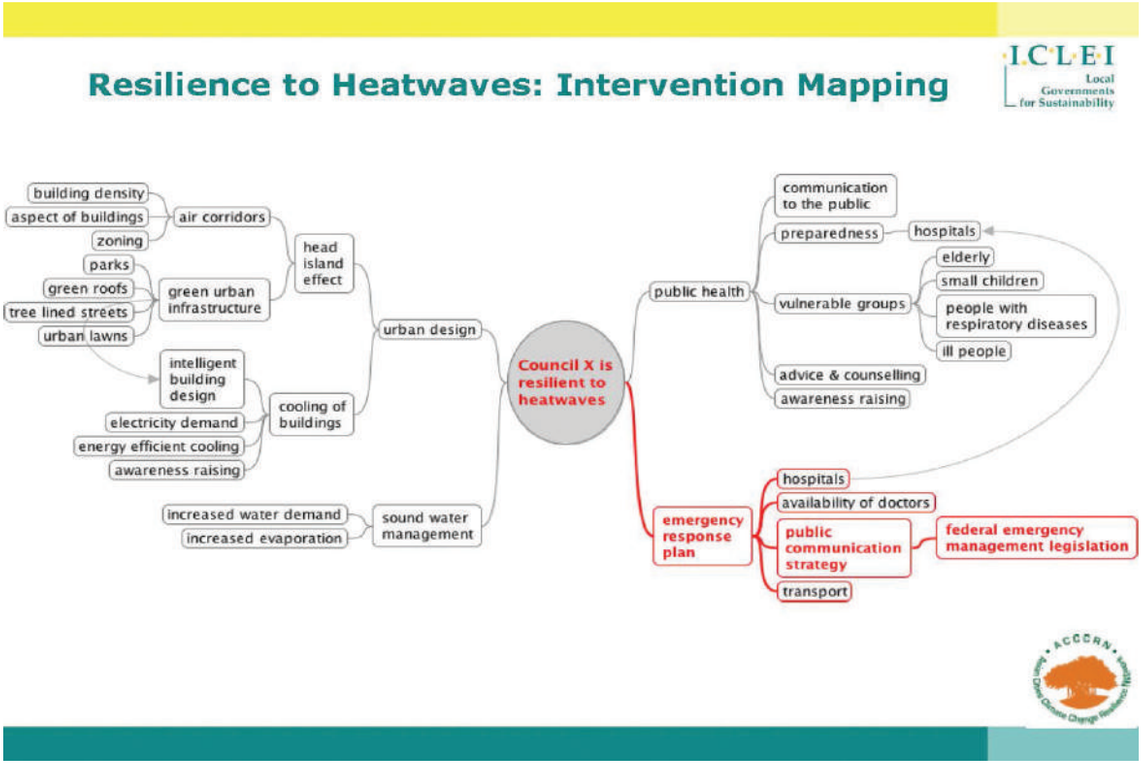
Intervention modelling: Step 6

Identify Conditions

- Broader issues that affect the entire Local Government Area
- Can be social, economic or environmental
- Won't fit into one particular spot in Conceptual Model - keep them to one side



Conditions are general influences that are not directly connected to Factors or Components, but that still influence the system on the whole, at various points. In this case, a large proportion of elderly population is the condition.



The cards are then assembled to produce a map of possible interventions.

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BUILDING URBAN CLIMATE CHANGE RESILIENCE: A TOOLKIT FOR LOCAL GOVERNMENTS

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