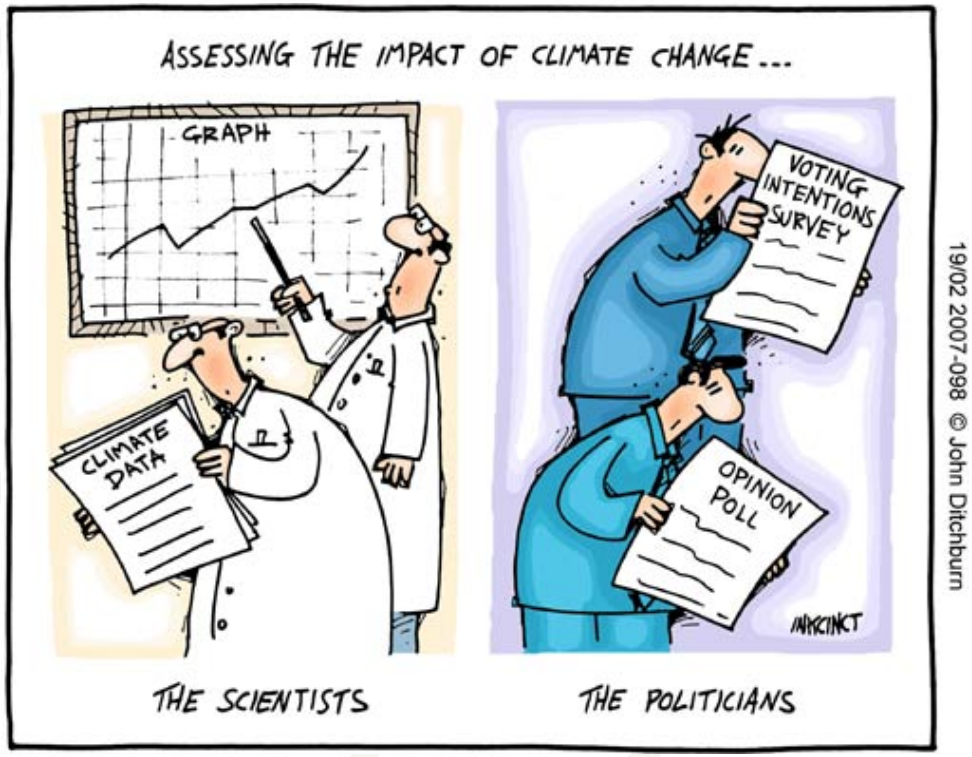
ICTs for Climate Change Adaptation in Cities

Building Smart, Sustainable & Climate Resilient Cities

Smart Sustainable Cities Training Program Module 2

SSC-2

Climate Change Adaptation in Cities



"Adaptation is the only means to reduce the now-unavoidable costs of climate change over the next few decades"
Nicholas Stern, October 2006.

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1. Aims of this Module

1. Present an overview of climate change impacts in cities and how cities respond to this challenge
2. Enable you to understand how ICT can support cities in climate change adaptation policies & programs
3. Provide you practical examples of ICTs use for climate change adaptation in cities
4. Enable you to understand the importance of ICTs for climate change adaptation in cities

2. Introduction to Subject

Climate Change Challenges in Cities

1) Mitigating Climate Change: cities generate CO2 emissions in sectors such as transport, waste management, electricity.

→ Smart Services reduce CO2 emissions (Smart buildings, smart transport, smart grids, etc)

2) Adapting to climate change: cities will be vulnerable

→ Cities are called to become much more resource-efficient & resilient

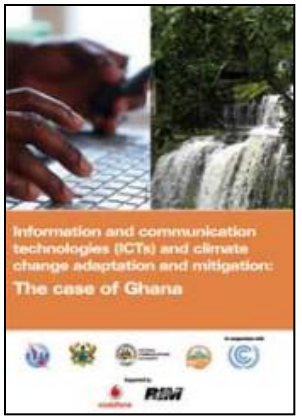
→ Infrastructure needs to be introduced to cope with rising sea level, floods, heat waves, and storms.

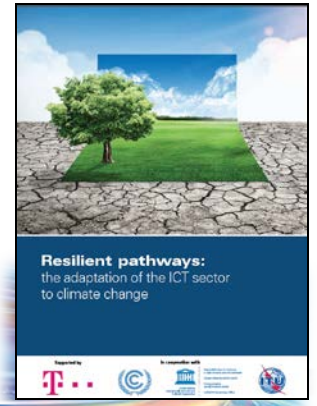
→ **ICTs have roles to play in sensing, mitigation and adaptation**.

2. Introduction to Subject

ITU-T activities on ICTs & C. Change Adaptation

1) **Question 15/SG5 – ICTs & adaptation to the effects of climate change**
   - → ITU-T L.1500 - Framework for ICTs & adaptation to the effects of climate change
   - → ITU-T L.1501 - How countries can utilize ICTs to adapt to the effects of climate change
   - → ITU-T L. Infrastructure_Adaptation - on adapting the ICT infrastructure to the effects of climate change
   - → ITU-T L. Cities_Adaptation - on how ICTs can help cities to adapt to the effects of climate change
2) **Development of Reports**
   - → ICTs and Climate Change Mitigation & Adaptation. *Case of Ghana*
   - → Resilient Pathways: The Adaptation of the ICT Sector to C. Change





2. Introduction to Technical Report

"Information & Communications Technology for Climate Change Adaptation in Cities" (March, 2015)

→ Contribution to the work on ICTs & climate change adaptation of Question 15/5 of ITU-T Study Group 5.

→ Part of WG2 "Infrastructure" documents. City infrastructure will be heavily affected by climate change

→ Report written by the ICT Sector and United Nations Convention on Climate Change (UNFCCC)

→ First document of its kind : Cover Cities & includes practical examples of ICTs for climate change adaptation

2. Introduction to the Technical Report

Key Definitions

- It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change

Adaptation

- Is the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change

Vulnerabilty

- The ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences

Adaptive Capacity

Source: Technical report on “ICTs for Climate Change Adaptation in Cities”. Box 1, page 3-4 (IPCC, 2007)

3. Climate Change Adaptation in Cities

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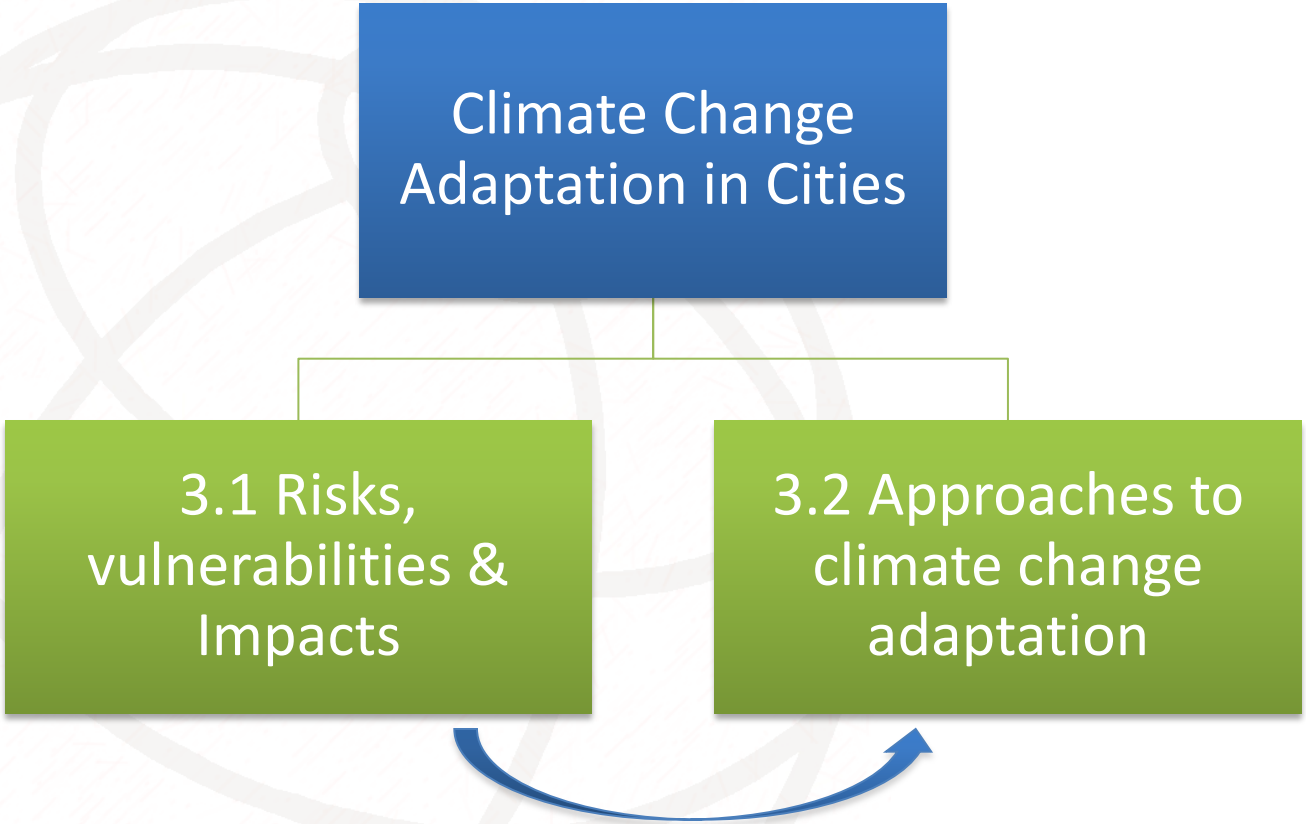
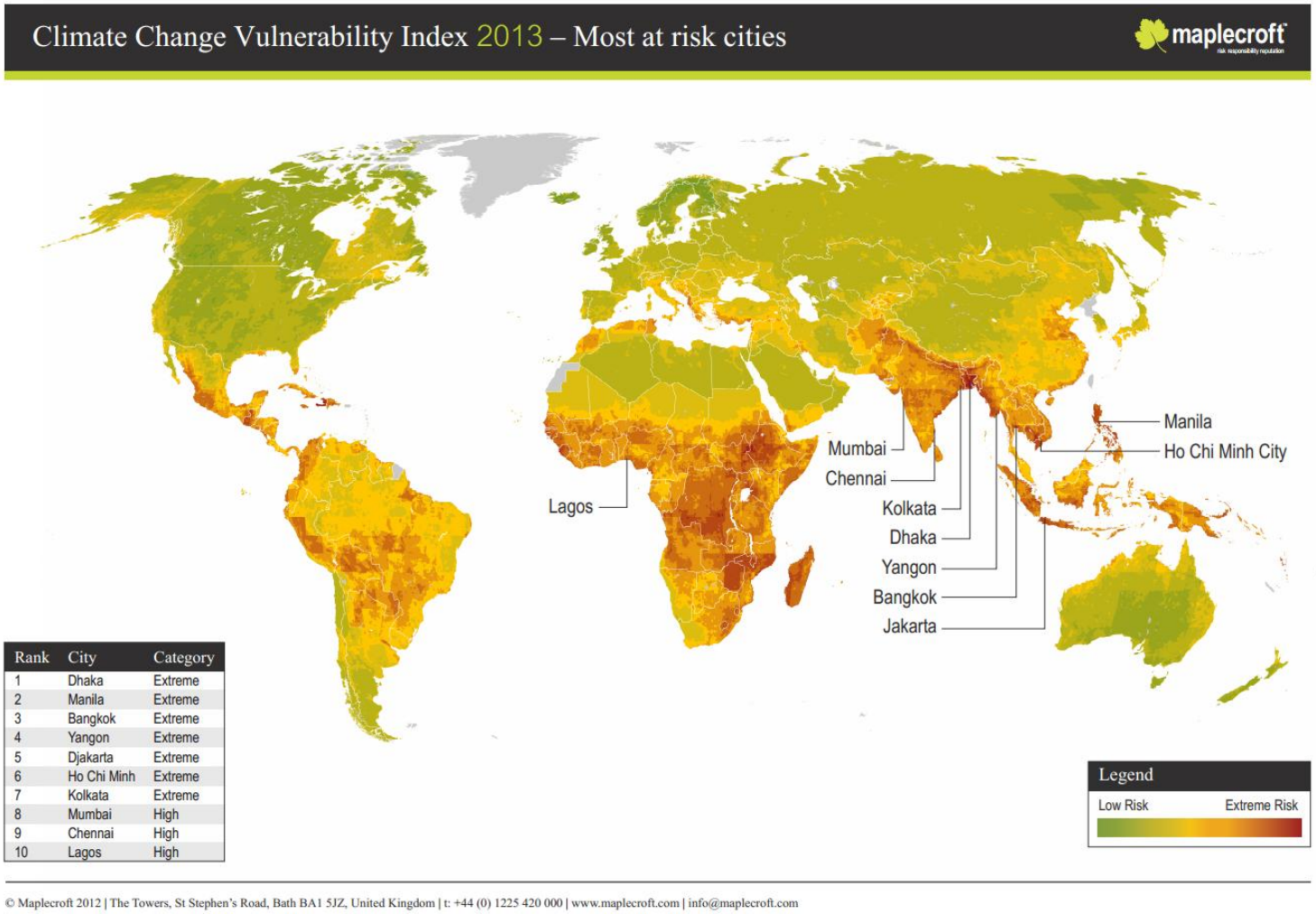


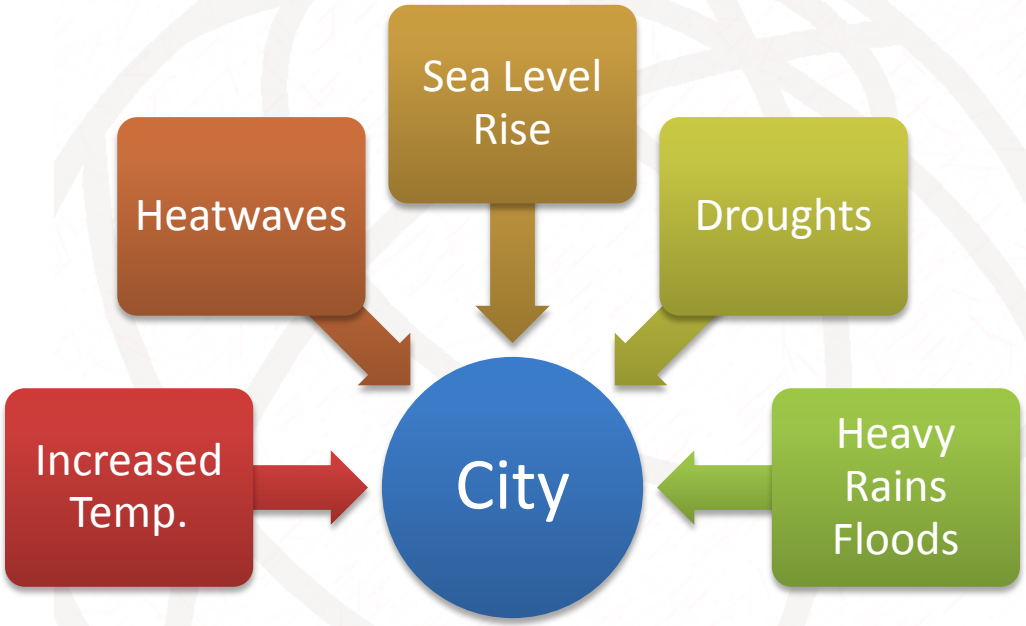
Source: Technical report on “ICTs for Climate Change Adaptation in Cities”. Box 1, page 2-12

3.1 Risks, Vulnerabilities & Impacts



Rank	City	Category
1	Dhaka	Extreme
2	Manila	Extreme
3	Bangkok	Extreme
4	Yangon	Extreme
5	Djakarta	Extreme
6	Ho Chi Minh	Extreme
7	Kolkata	Extreme
8	Mumbai	High
9	Chennai	High
10	Lagos	High

3.1 Direct Climate Change Impacts



Source: Technical report on "ICTs for Climate Change Adaptation in Cities". Page 4

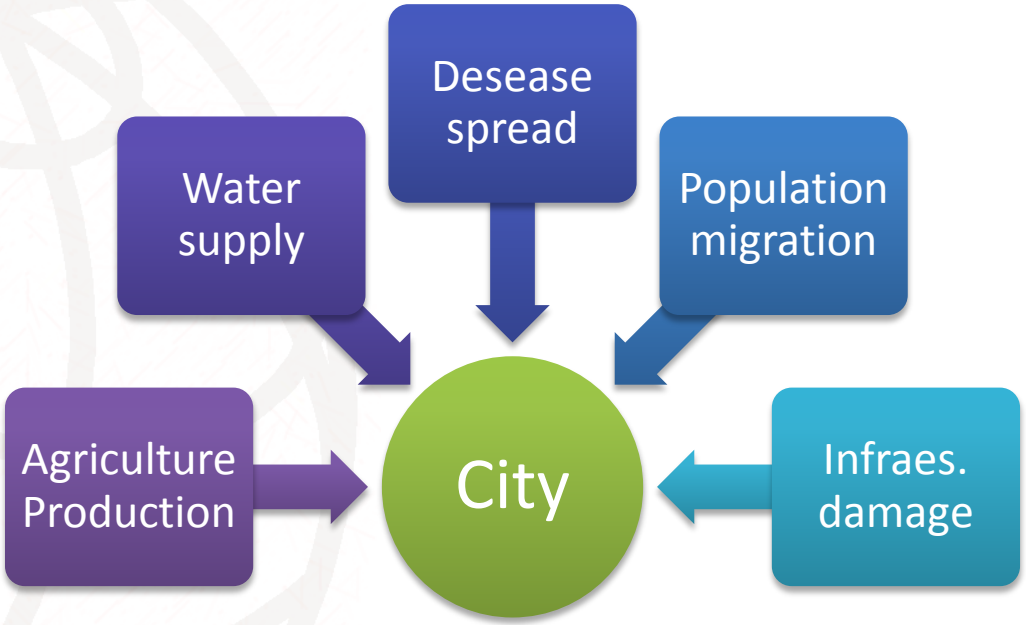
Coastal Cities: are exposed to extreme coastal water level events. 65% of cities in the world with population greater than 5 million are in these area.s

Inland cities: They are found in the interior part of the mainland. These cities like their coastal counterparts are also at risk .

3.1 Indirect Climate Change Impacts

The specific impacts on each city will depend on the actual changes experienced, and on **their geographical location,** among other factors.

City Infrastructure and services may be affected including **ICT Infrastructure**



3.2 Approaches to Climate Change Adaptation in Cities

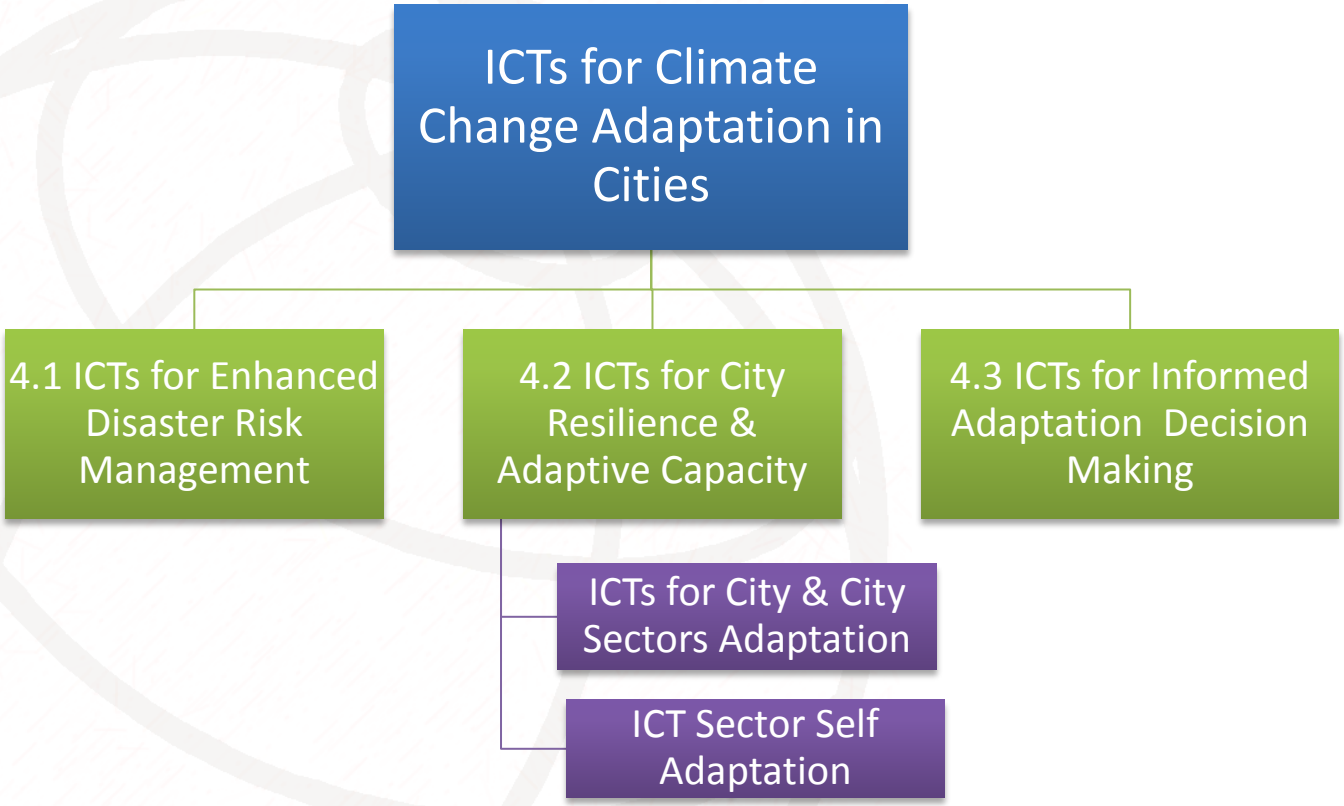
- UNFCCC has established that countries must develop National Adaptation Plans (NAP) and **Cities should apply the same planning principles.**

Element A. Lay the groundwork & address gaps	Identify available information on climate change impacts, assess development needs and climate vulnerabilities
Element B. Preparatory elements	Analyze current & future climate change scenarios; assess vulnerability per sector level, review adaptation options and communicate plans.
Element C. Implementation strategies	Prioritizing climate change adaptation in national planning and enhancing capacity for planning and implementation.
Element D. Reporting, monitoring & review	Monitoring the NAP process. Assess & report progress and effectiveness.

Source UNFCCC: http://unfccc.int/resource/docs/publications/publication_ldc_nap_techguidelines.pdf

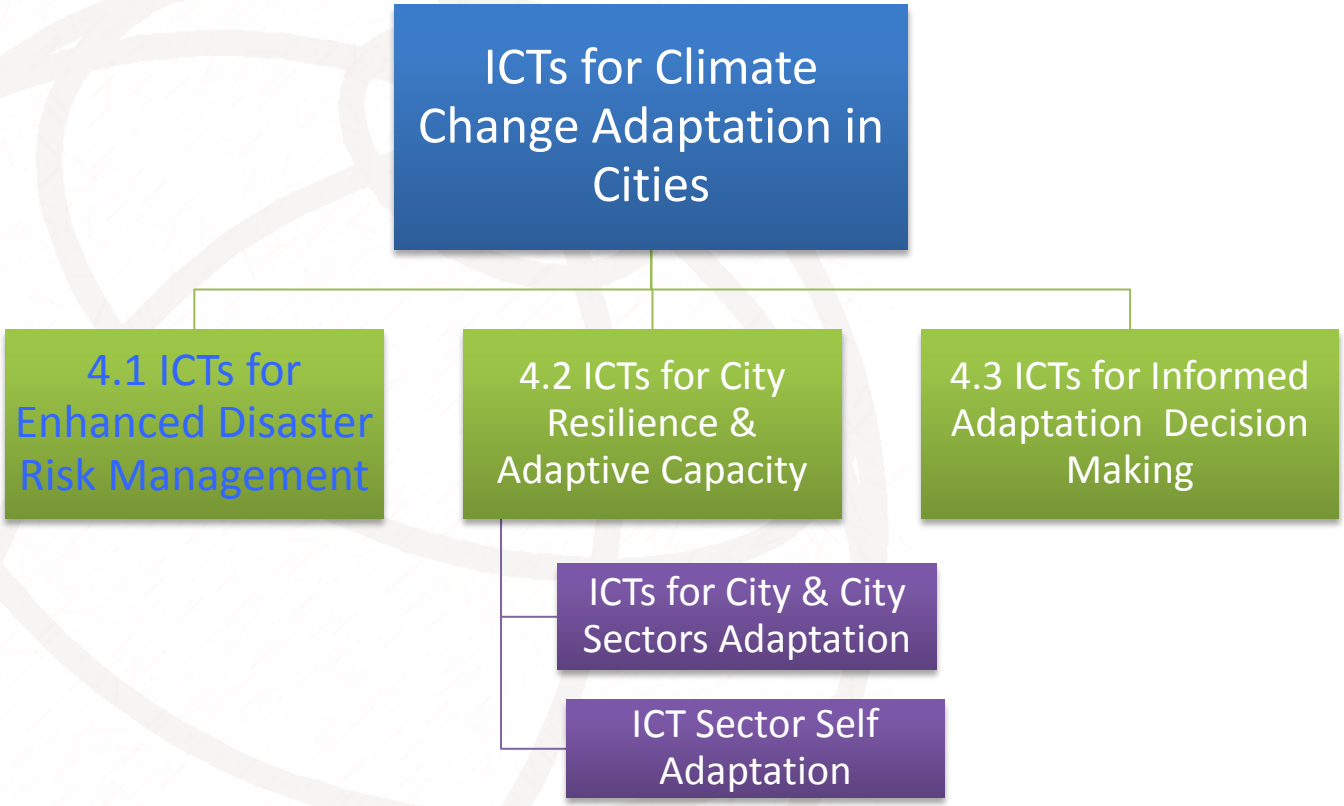
4. ICTs for Climate Change Adaptation in Cities

4. ICTs Role for CC Adaptation in Cities



All cities can benefit from ICTs

4. ICTs Role for CC Adaptation in Cities



All cities can benefit from ICTs

4.1 ICTs for enhanced Disaster Risk Management (DRM)

DRM Phases

DISASTER PREVENTION (Prediction and detection) → EMERGENCY PREPARDNESS & RESPONSE (Alerting) → RECOVERY (Relief)

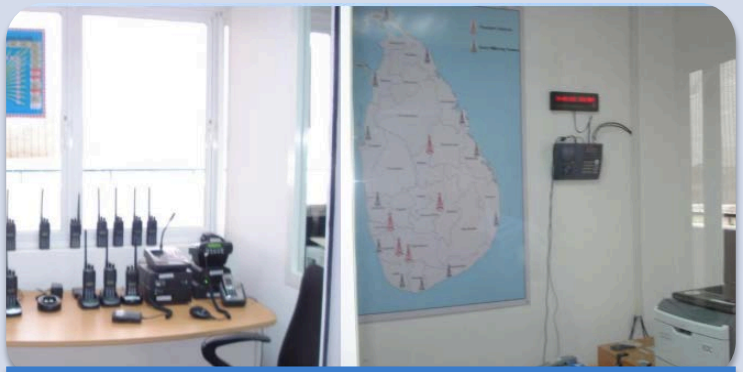
EXAMPLES

DISASTER PREVENTION (Prediction and detection)	EMERGENCY PREPARDNESS & RESPONSE (Alerting)	RECOVERY (Relief)
o Earth exploration-satellite services	o Broadcasting services terrestrial & satellite (radio, TV, etc.)	o Earth exploration-satellite services
o Geographic Information Systems (GIS)	o Fixed services terrestrial/satellite	o Mobile emergency & recovery networks
o Blogging, web 2.0 & social networking	o Mobile services (land or satellite)	o Blogging, web 2.0 & social networking

ITU-T Standards for DRM

-ITU Common Alerting Protocol (CAP) – general format to exchange all-hazard emergency alerts. Increase warning`s effectiveness & simplify warning tasks.
-ITU-T E164 that assigns the country code 888 to the UN Office of the Coordination of Humanitarian Affairs (OCHA)

4.1 ICTs for Enhanced Disaster Risk Management



Colombo - Sri Lanka

Disaster Early Warning Network (DEWN)

- Provide timely, reliable& cost-effective massscale disaster early warnings.

- Via Cell Broadcast (CB) & short messages (SMS)

Mexico City - Mexico

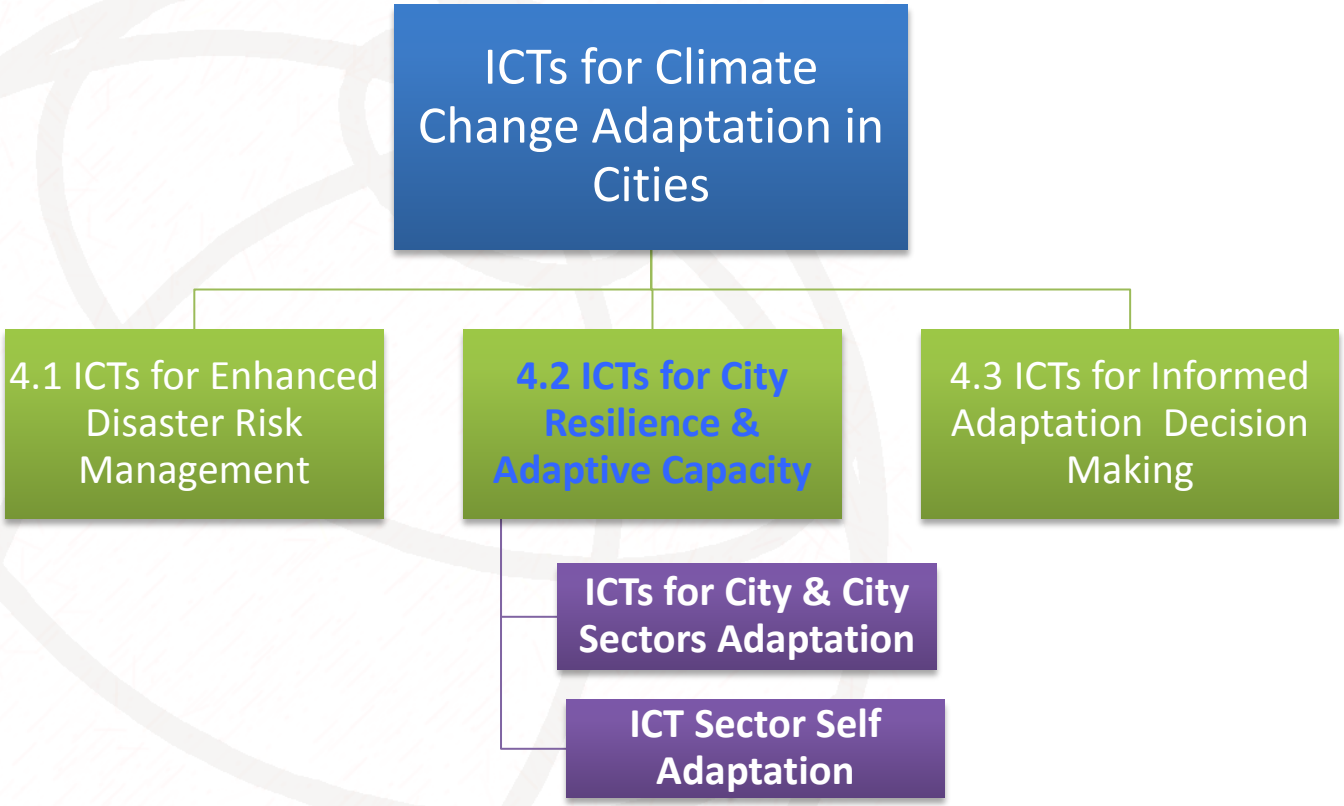
Virtual Centre on Climate Change (CVCCCM)

- Decision making tool disaster early warnings

- Metropolitan hydro.meterological monitoring (fires, native crops recovery, etc)

Source: Technical report on "ICTs for Climate Change Adaptation in Cities". Box 1, page 15-16 &
Sri Lanka http://www.wmo.int/pages/prog/amp/pwsp/documents/CAPWKSHP-2014-01-07-DMC.pdf
México http://www.cvcccm-atmosfera.unam.mx

4. ICTs Role for CC Adaptation in Cities



All cities can benefit from ICTs

ICTs for City Resilience & Adaptive Capacity is possible

Picture Source: World Bank, Climate Change Cities Leadership Program

4.2 ICTs for City Resilience & Adaptive Capacity

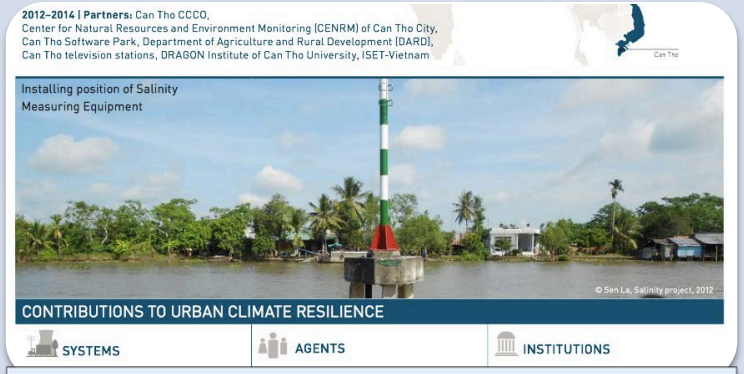
Brest - France

ClimSAT (UNDP) – TASK (UNEP)

- Climate Scence & technology hub for local & global support

- Satellite-based technology to monitor & model c. change effects.

- UNEP Territorial Approach to Global Change Services & Knowledge → TASK



Can Tho - Vietnam

Real Time Monitoring for responding saline intrusion (CVCCCM)

- City surface water system used for food & crops . Municipal water supply affected by sea level rise.

- Installation of real time salinity monitoring points linked to public warning systems via salinity maps

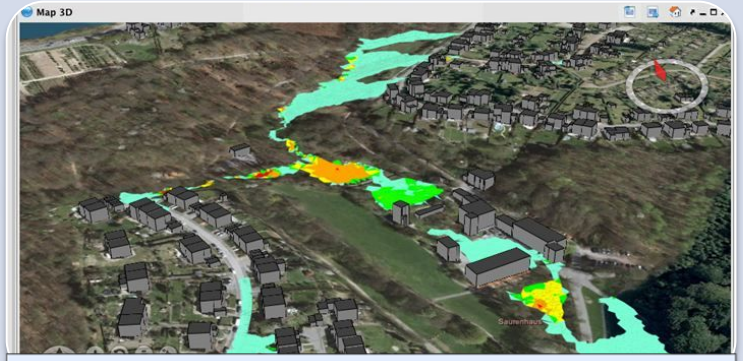
Source: Technical report on "ICTs for Climate Change Adaptation in Cities". Page 17 & 20
CanTho: http://training.i-s-e-t.org/wp-content/uploads/iset_vietnam_casestudy_cantho_salinity_1304181.pdf

4.2 ICTs for City Resilience & Adaptive Capacity

ICTs for Climate Change Adaptation in city agriculture sector. Miyagi (Japan)

- Fujitsu has worked with farmers to provide sensing network, cameras and cloud service system for environmental monitoring

- System to control GHG temperature, humidity, etc



ICTs for urban planning & climate change adaptation. Wuppertal (Germany)

- SUDPLAN Web-based planning, prediction & training tool to support long term urban planning.

- Facilitated 3D models to simulate the surface drainage during a heavy rain event, allowing climate planning.

Source: Technical report on "ICTs for Climate Change Adaptation in Cities". Page 20-21 & Germany SUDPLAN: http://sudplan.eu/results/workshop/sudplan-workshop/sudplan-workshop-on-climate-change-and-urban-planning-1.26065

4.2 ICTs Sector Self-Resilience & CC Adaptation

Information Technology & Telecommunications Network Resiliency New-York (USA)

- After Sandy the city decided "A stronger more resilient NY"

- Program to guarantee telecommunications services resilience planning & preparation. All Telecom Operators collaborate

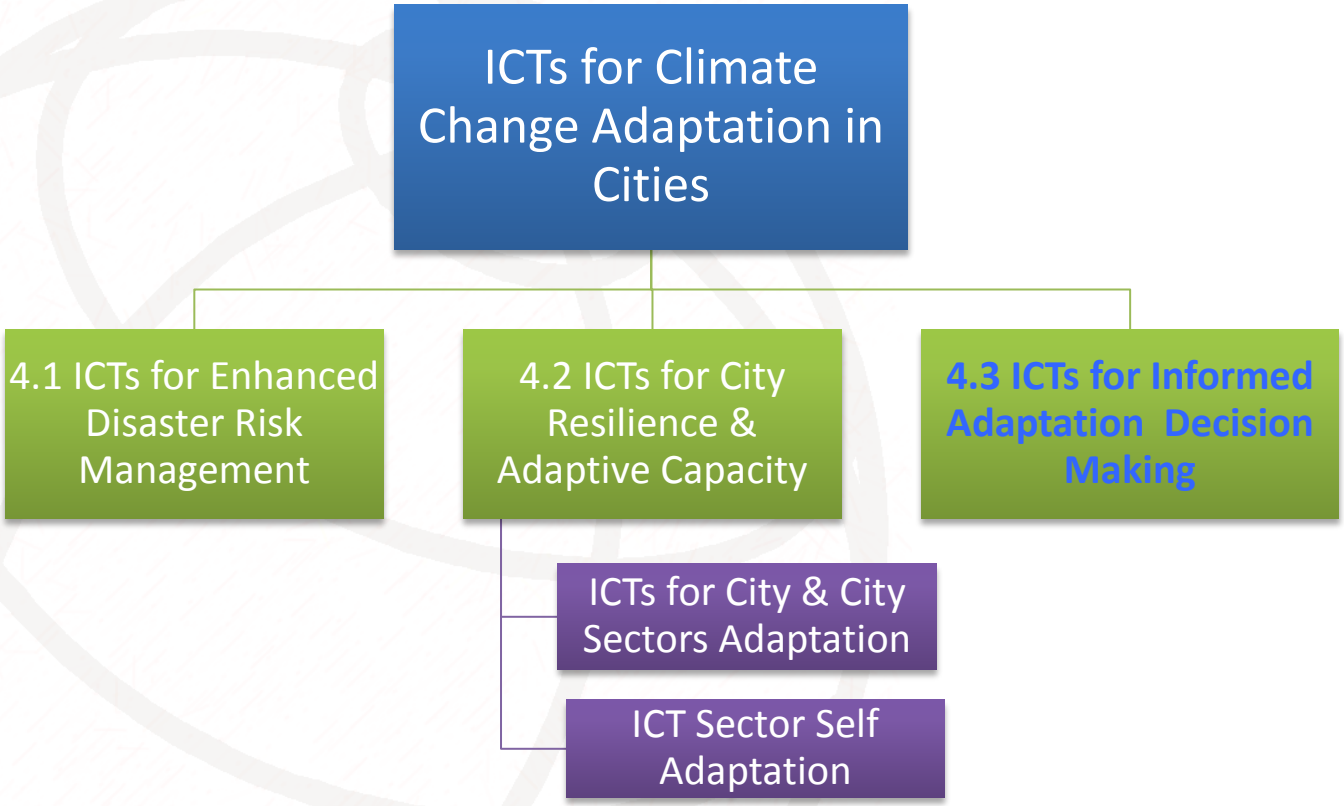
Telecommunications Networks Climate Risks Management – Lima (Peru)

- Telefonica has worked to manage the rainy season in Peru which affects mobile networks base stations with floods.

- Risk management and preparation in other counties of South America

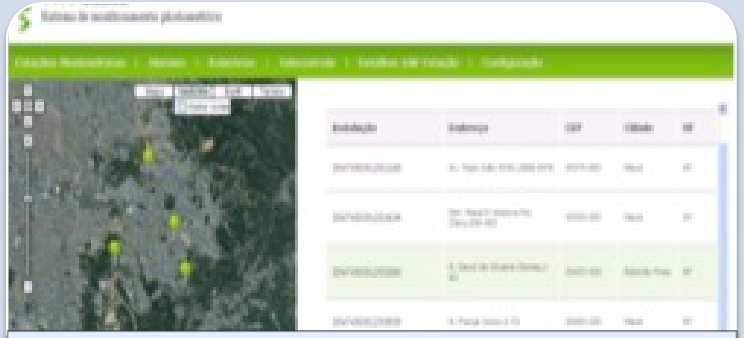
Source: Technical report on "ICTs for Climate Change Adaptation in Cities". Page 18-19
New York: http://www.nyc.gov/html/doitt/html/citywide/citywide.shtml

4. ICTs Role for CC Adaptation in Cities



All cities can benefit from ICTs

4.3 ICTs for Informed Adaptation Decision Making



Vivo-Clima: Real time rain monitoring & pubic information delivery. Maua Town (BRAZIL)

- Vivo Clima is a platform M2M that receive rain information in real time. Captured in web for pubic access

- Pluviometers installed in cell sites of Telefonica. Captured SMS are sent through mobile network (3G/GPRS)

Social Media for Rising Temperature Adaptation Eldoret (Kenya)

- To raise public awareness about how to adapt to climate change & raising temperatures

- Receive information on temperature through Facebook page and SMS in their phones

Source: Technical report on "ICTs for Climate Change Adaptation in Cities". Page 22-23
Eldoret: http://www.trust.org/item/20130716085920-k63xg/?source=spotlight

5. Framework to include ICTs in Climate Change Adaptation Policies in Cities

5. Framework to include ICTs in Climate Change Adaptation Policies

Setting the basis. Observation and understanding
(ICTs inside the initial evaluation)

Assessing climate change risks and vulnerabilities
(Assess vulnerabilities including ICT infrastructure)

Planning of adaptation options
(ICTs to find options and ICTs as an option)

Implementation of adaptation actions
(Adaptation options into actions with business models)

Monitoring and evaluating adaptation actions
(ICTs support in monitoring success)

6. Summary & expected results

- ✓ Adaptation may seem challenging due to cities need to adopt long-term time horizons and cope with deep uncertainty.
- ✓ ICTs can support this process but is important to include them in early stages of climate change adaptation planning.
- ✓ Stakeholder collaboration is needed to integrate ICTs in adaptation plans: central government, cities and citizens
- ✓ There are lots of initiatives on ICTs and climate change adaptation to learn from

Source: FG-SSC “Technical Report on Stakeholders for Smart Sustainable Cities”, page 22

Thank you

More information on ITU, ICTs, Environment & Climate Change
Visit: http://www.itu.int/en/ITU-T/about/groups/Pages/sg05.aspx
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