

Workshop on Tools and Indicators for Assessing Urban Resilience
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Framework and indicators for climate compatible urban development

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- **Adaptation at a glance**
- **Building Resilience**
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Climate Compatible Development

- Climate compatible development'... **minimizes** the harm caused by climate impacts and **maximizes** human development opportunities presented by a low emissions, more resilient, future (Mitchell and Maxwell, 2010).
- Aims towards **low emissions**, **build resilience** and promote **development** simultaneously.
- Cities are major contributors to climate change, despite less than 2% coverage of the earth's surface; cities consume 78% of the world's energy.
- Cities also produce over 71% of global energy related CO₂ emissions and more than 60% of total greenhouse gas emissions combining energy generation, vehicles, industry, and biomass use.
- Cities have **crucial role in the global response to climate change** by cutting their greenhouse gas emissions and adapting to the effects of a changing climate. **Urban policy can contribute to national targets** of GHG reductions (Kamal-Chaoui, 2009)
- Cities can also provide **good pilots for action** on climate change. Several cities are already taking actions.

Climate Compatible Development

Establish overall vision for climate mitigation and adaptation

Secure political commitments for leadership roles to achieve vision

Secure multi-stakeholders, cross sectoral support

Develop communication plan for adequate participation

Mitigation

Adaptation

- ✓ City wise greenhouse gases inventories
- ✓ Conduct Scenario Analysis
- ✓ Access local capacity to reduce emissions.
- ✓ GHG reduction goals

- ✓ City wise vulnerability assessment
- ✓ Conduct Scenario Analysis
- ✓ Access local capacity to address climate impacts.
- ✓ Set adaptation goals

Identify and prioritize actions

Develop plan for implementation

Typical climate action planning process, UN-Habitat (2015)

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City level data available for most cities

Targets defined by numbers in CO₂

Identify and prioritize actions

Develop plan for implementation

No indicators to track adaptation progress

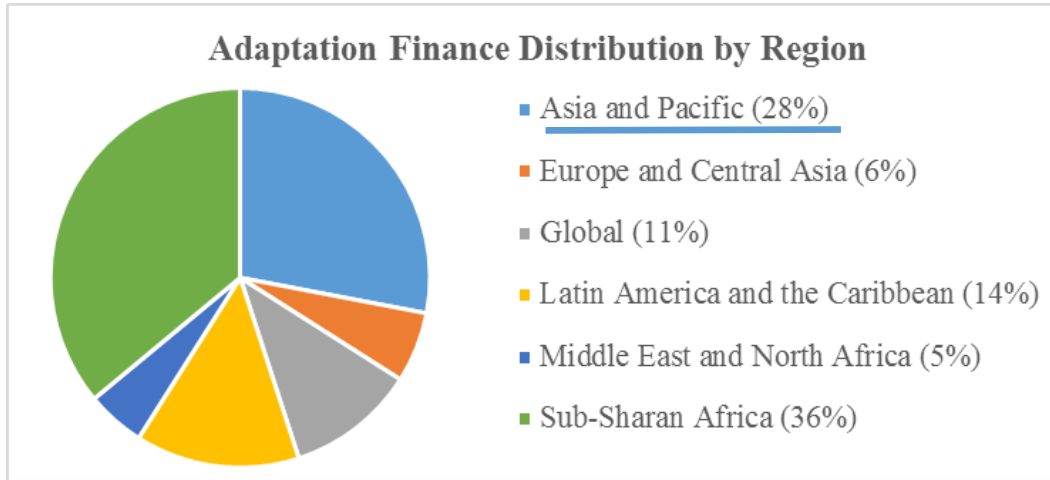
Adaptation at a glance

- “an **adjustment** in **natural or human systems** in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC, 2007).
- Classified into numerous **forms** based on their purpose, mode of implementation, or on the institutional form they take.
- Can be range of activities and processes varying across **contexts** and across **scales**; local, national, regional or international scales.
- Adaptation can be (1)major focus on **building resilience** of human societies and systems to cope with existing **climate variability** (2) focus on **climate proofing** to increase the capacity of societies to cope with extremes and variability; (3) Adapting to qualitative changes in climate and environmental transitions focusing on transformational change to transform or replace existing systems in order to ensure that development is viable and sustainable under climate change implications.
- Much of this adaptation is **reactive**, in the sense that it is **triggered by past or current events**, but it is also anticipatory in the sense that it is based on some assessment of conditions in the future (Adger et al., 2005).

Adaptation at a glance

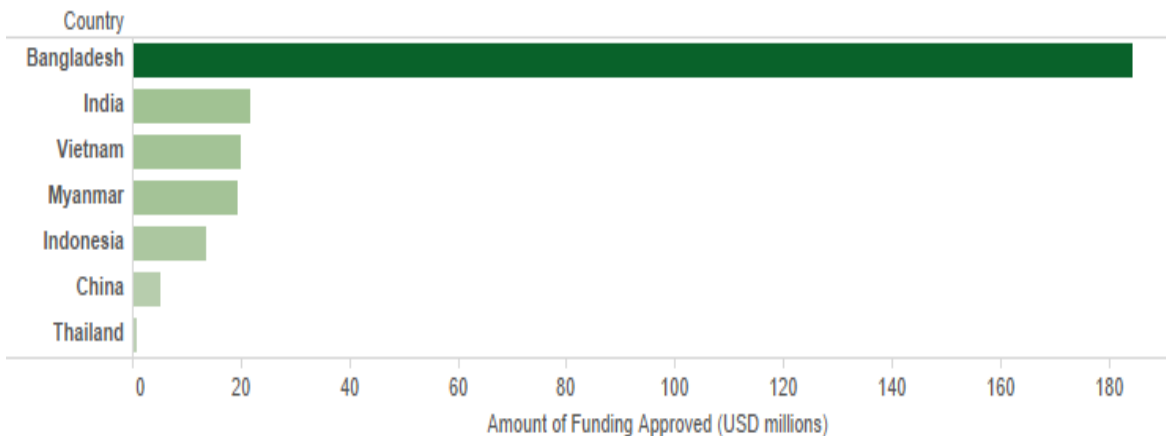
- Adaptation **costs are significant** especially for the developing countries.
- Developed countries are committed to support adaptation in Least Developed Countries (LDC) and Small Island Developing States (SIDS) with pledge amount of USD 3 billion cumulatively to multilateral adaptation funds.
- The largest sources of approved funding for adaptation projects are currently the Pilot Program for Climate Resilience (PPCR) of the World Bank's Climate Investment Funds and the Least Developed Countries Fund (LDCF) administered by the Global Environmental Facility.
- The top 20 recipients of **adaptation finance** (out of 114 countries) receive 54% of the total amount, which is lower than for **mitigation finance** (where the top twenty recipients receive 89% of total approved amount).
- Top recipients Bangladesh, Mozambique, Niger, Nepal, Zambia all receive between USD 94 - 190 million each (all five are also PPCR recipient countries), with the next five top countries receiving from USD 55 to 90 million each. Asia and Pacific adaptation finance is 28%, the second largest by region

Adaptation at a glance

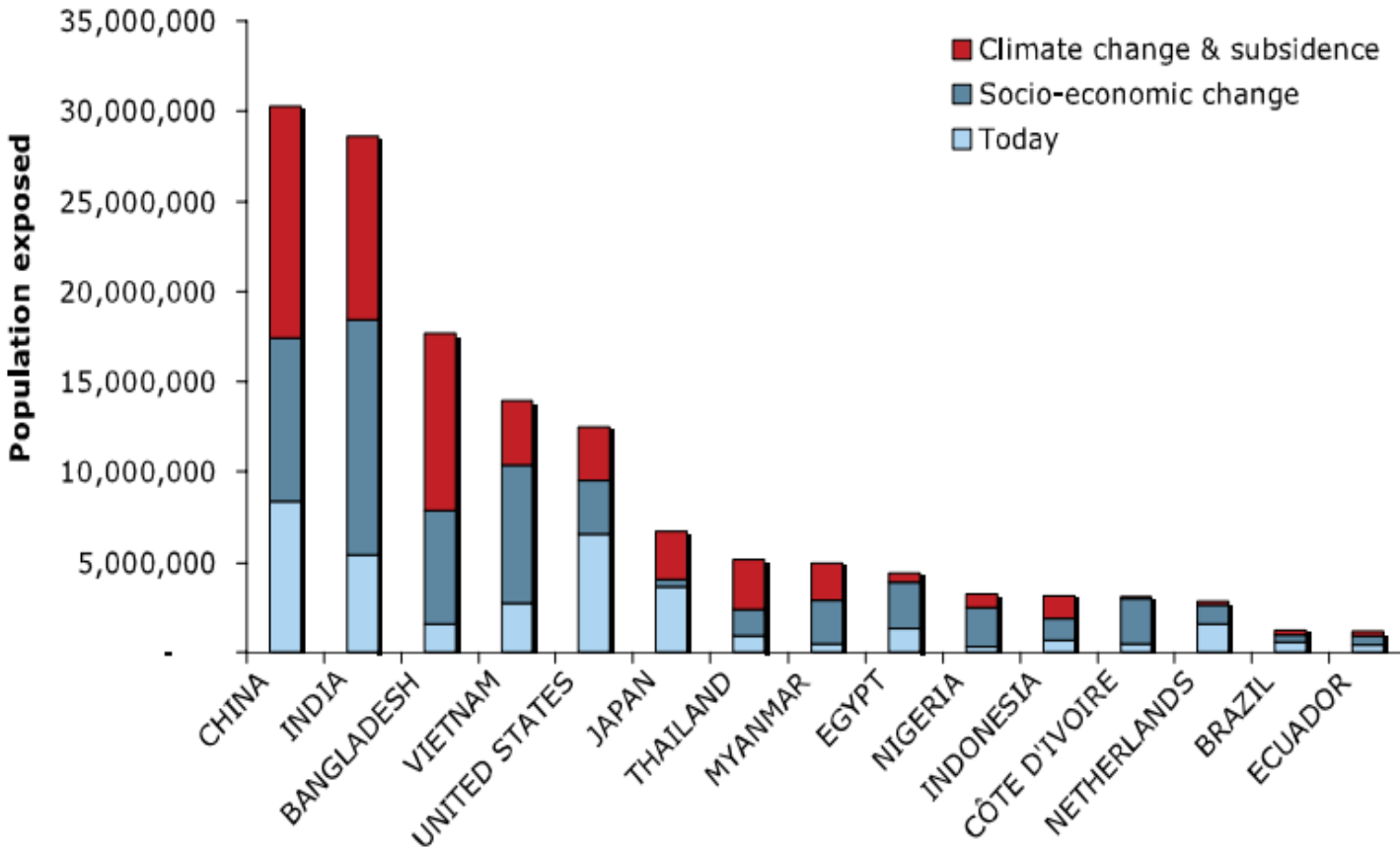


*Regional
adaptation finance
distribution
(Source: ODI,
2014)*

Multilateral climate finance recipients



Building Resilience



Top 15 countries by population exposed today (i.e. 2007) and in the 2070s, showing the influence of future climate change vs. socioeconomic change (OECD, 2007).

Those top 10 cities to be affected most by 2070s in terms of population exposure (due to environmental and socioeconomic factors), are Kolkata, Mumbai, Dhaka, Guangzhou, Ho Chi Minh City, Shanghai, Bangkok, Rangoon, Miami and Hai Phòng.

Adaptation in Asian context

- **National adaptation are well documented.**
- **Most of the Asian countries have presented progress in**
 - ✓ **National Communications**
 - ✓ **National Adaptation Programs of Actions**
- **Covers all sectors: Forestry, Agriculture, Coastal and Fisheries resources, Infrastructure, Health**
- **Including structural and non structural measures.**

Building Resilience

Climate risks in cities can be defined in the aspects of disaster risk, hazard, vulnerability, resilience, coping capacity, resistance and exposure.

$$R = H \times E \times V \times R \times CC$$

- ✓ **Risk (R)** is existence of the possibility that the natural phenomena can cause harm to those elements that are exposed or susceptible to being affected.
- ✓ **Hazard (H)** is potential to cause harm to humans and objects.
- ✓ **Vulnerability (V)** is the state of being prone to or susceptible to harm.
- ✓ **Resilience (R)** is capacity to adjust to threats and to mitigate or avoid them.
- ✓ **Coping capacity (CC)** is combination of all strengths and resources available within a community or organization that can reduce the level of risk, or the effect of disaster.
- ✓ **Exposure (E)** is the number of people or other elements at risk that can be affected by a particular event.

Need for Adaptation Tracking

- To **ensure** that adaptation **investments** are leading to climate resilient development, and the goal is that development trajectories are maintained despite climate change effects.
- To ensure that adaptation investments are leading to **climate resilient development**, and the goal is that development **trajectories** are maintained despite climate change effects.
- Different level of governments, funding agencies, policy makers and planners are being involved in developing adaptation plans.
- Developing common framework and indicators helps in setting precise **targets**, **monitor** utilization of funds, **benchmark progress** across different **scales**. Cities, region and countries evaluate policy interventions, develop future policies, effective communication among stakeholders and efficient climate change negotiations.
- Common framework for indicators helps cities to **transfer** best adaptation measures.

Issues on Developing Tracking Framework

- lack of **measurable indicators** to define adaptation in numbers, and common framework defining the data requirements to create comparable benchmarks.
- **Lengthy timescales** associated with climate change, the difficulties in distinguishing natural **climate variability vs anthropogenic climate change**, and the indirect impacts of climate-driven socio-economic change.
- Adaptation initiatives intended to address longer-term changes in climate will take many years or even decades to unfold.
- Inherent **uncertainty** associated with climate projections.
- **Multi-sectoral nature of adaptation** and the involvement of a large number of responsible organizations and delivery partners at different scales (for e.g., each may have different requirements for indicators and their own appropriate monitoring and evaluation systems and information networks).

Issues on Developing Tracking Framework

- **Absence of agreed definitions of **acceptable performance** in adaptation, or even agreement over what constitutes success, coupled with the wide range of potential adaptation activities and a need for multi-stakeholder agreement on levels of acceptable risk.**
- ***Examples:***
 - **Adaptation tracking in different sectors are available for **United Kingdom** (Harley et al. 2008, Krebs et al. 2010, Harvey et al. 2011, Krebs et al. 2011) where indicators are identified for both impact and vulnerability outcomes and the uptake of adaptation action.**
 - **Other example is in **Germany** (Schonthaler et al. 2010), where initial set of indicators for measuring progress towards meeting the objectives of the national adaptation strategy have been proposed.**

Indicators

Ref.	Related Indicators	Description
Cutter (2010)	Disaster resilience indicators	<p>A list of indicators geared toward larger issues of resilience.</p> <ul style="list-style-type: none">○ Social resilience – Age, Education Equity, Transportation Access, Communication, Capacity, Language, Competency, Special Needs, Health Coverage○ Economic resilience – Housing Capital, Employment, Income and Equality, Single Sector, Employment, Business Size, Health Access○ Institutional resilience – Mitigation, Flood Coverage, Municipal Services, Political Fragmentation, Previous Disaster, Mitigation and social connectivity.○ Infrastructure resilience - Housing Type, Shelter Capacity, Medical Capacity, Access/Evacuation Potential, Housing Age, Sheltering Needs, Recovery○ Community capital - Place Attachment, Political Engagement, Social Capital – Religion, Social capital – civic involvement, Social capital – advocacy, Innovation

Indicators

Ref.	Related Indicators	Description
Moss et al. (2001)	Vulnerability-resilience indicators	<p>A national level indicators for vulnerability and resilience to define sensitivity and coping capacity covering different sub sectors.</p> <ul style="list-style-type: none"> ○ Environmental resources – Settlement/infrastructure sensitivity (Sea level rising, population with access to water and sanitation), food security (production, protein demand per capita), ecosystem sensitivity (Managed land, fertilizer use), water resource sensitivity (Water sensitivity, based on availability and consumption), environmental capacity (emissions) ○ Economic Resources – Economic capacity (GDP, income)
Harley et al., (2008)	Conceptual framework of adaptation indicators	<p>Process based indicators</p> <ul style="list-style-type: none"> ○ <u>No. of direct beneficiaries</u> in project milestone decision making (household level) through community mobilization activities ○ <u>People (Male/Female %)</u> applying drought- resistant agricultural practices learned in program-sponsored workshops ○ Government disaster preparedness personnel are <u>monitoring and analyzing</u> climate change observations and projections as per trainings provided by program. ○ <u>Training quality</u> as perceived by participants ○ Increase in household saving through increased availability of financial services

Indicators

Ref. Related Indicators	Description
Harley et al., (2008) Conceptual framework of adaptation indicators	<ul style="list-style-type: none">○ <u>No. of schools participating</u> in climate change awareness activities for children through project engagement with schools and teachers <p>Outcome based indicators</p> <ul style="list-style-type: none">○ Coping strategies <u>index score</u>○ <u>Disaster early warning system</u> is in place and effectively communicates to public○ No. of people with safe, convenient access to sufficient quantity of water for household use year-round○ Coastal city's protective infrastructure upgraded to meet international standard○ Percentage of <u>buildings with insurance coverage</u> for extreme weather events○ Percentage <u>reduction</u> of population living in <u>flood plain</u>

Conclusion

- **The tracking framework should be parallel to the adaptation strategies covering sectors relevant to cities:**
 - **Water management**
 - **Water induced disasters**
 - **Agriculture**
 - **Energy management**
 - **Energy production**
 - **Built environment**
 - **Public Health**
- **As most of the cities in Asia are vulnerable to the exposure of climate risks, and much of adaptation strategies are still in developing phase, common framework to track adaptation can uplift the learning curve and robustness of adaptation.**

Thank You

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