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Workshop on Climate Compatible Development in Asian and Pacific Cities



Shobhakar Dhakal and Ashish Shrestha
 School of Environment, Resources and Development
 Asian Institute of Technology

OUTLINE

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- Tracking Climate Adaptation
- Building Resilience
- Need for Adaptation Tracking
- Issues on Developing Tracking Framework
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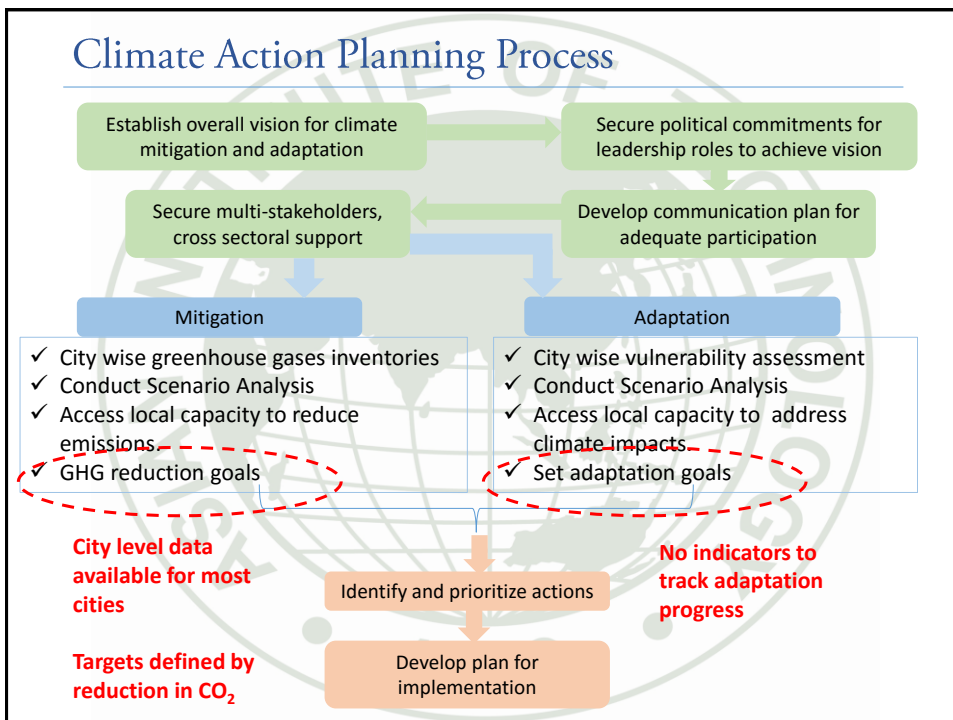
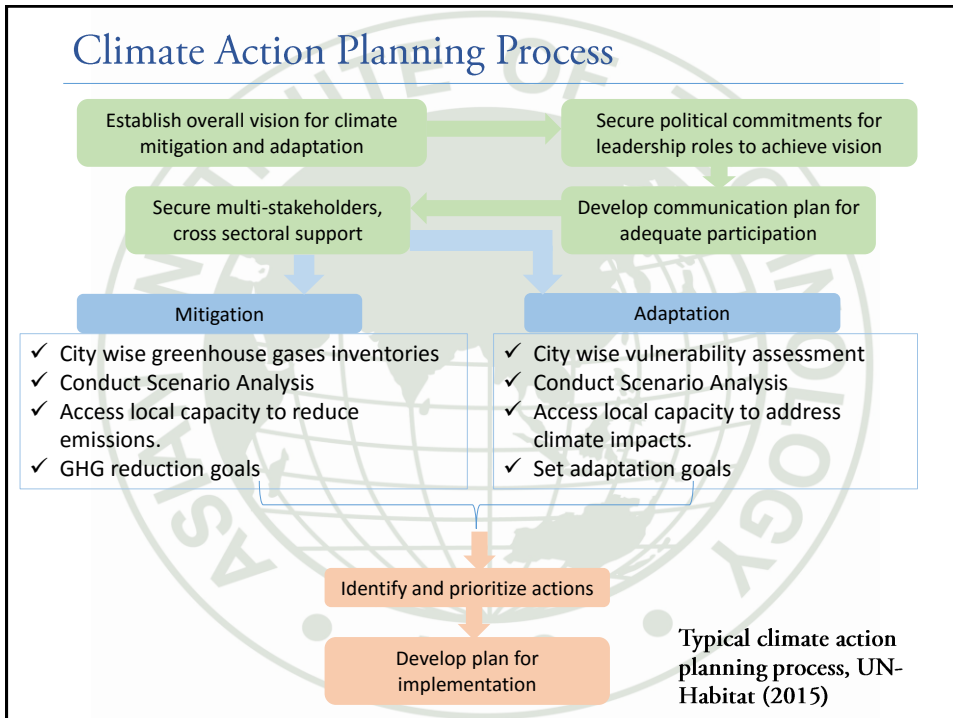
Important Question

Are current actions taken by cities are good enough or are the cities moving toward climate compatible development?

How can we track such developments?

Background

- 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.
- World's urban population expected to double up to 6.3 billion from 3.48 billion (in 2014) by 2050.
- Governments are trying to address climate change mitigation and adaptation by
 - ❖ quantifying emissions,
 - ❖ setting greenhouse gases reduction targets,
 - ❖ developing risk assessment and the adaptation plans.



Climate Compatible Urban 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).
- “Triple win Strategy” aims towards **low emissions**, **build resilience** and promote **development** simultaneously.
- Climate change bring both **threats and opportunities** in the cities.
- Cities can reduce their greenhouse gas emissions while simultaneously addressing other pressing local environmental problems such as air pollution, waste, and transport, not to mention other challenges such as local economic development.
- Urban policy can contribute to national targets of GHG reductions

Tracking Climate Mitigation & Adaptation

- Cities' GHGs emission reflect the structure of a city, its energy sources, and its residents' lifestyles.

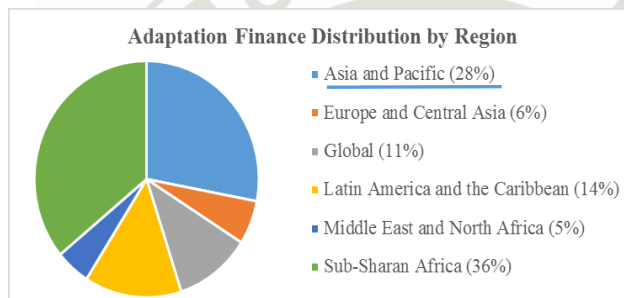


Tracking Climate Mitigation & Adaptation

“Progress is harder to monitor in adaptation than in mitigation, because there is no clear metric like carbon emissions and no clear target” (ASC, 2011).

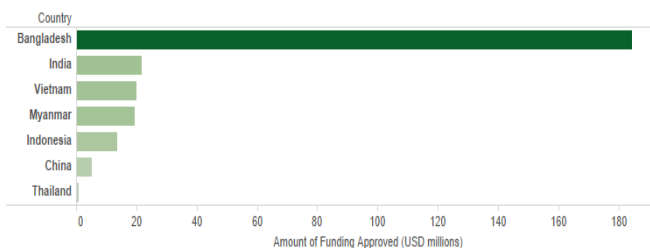
- Classified into numerous **forms** based on their purpose, mode of implementation, or on the institutional form they take.
- Can be range of activities and processes varying across **contexts** and across **scales**; local, national, regional or international scales.
- Adaptation **costs are significant** especially for the developing countries.
- UNFCCC Article 4 requires developed countries to assist developing countries that are “particularly vulnerable” to climate change in meeting costs of adaptation to its adverse effects.

Tracking Climate Mitigation & Adaptation



Regional adaptation finance distribution (Source: ODI, 2014)

Multilateral climate finance recipients



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.
- 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** , 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.
- 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.

- Related Indicators
- Examples: Application of Adaptation Indicators

Disaster resilience indicators (Cutter , 2010)

A list of indicators geared toward larger issues of resilience.

- **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

Vulnerability-resilience indicators (Moss et al. 2001)

A national level indicators for vulnerability and resilience to define sensitivity and coping capacity covering different sub sectors.

○ 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)

Conceptual framework of adaptation indicators (Harley et al., 2008)

Process based indicators

- No. of direct beneficiaries in project milestone decision making (household level) through community mobilization activities
- People (Male/Female %) applying drought- resistant agricultural practices learned in program-sponsored workshops
- Government disaster preparedness personnel are monitoring and analyzing climate change observations and projections as per trainings provided by program.
- Training quality as perceived by participants
- Increase in household saving through increased availability of financial services
- No. of schools participating in climate change awareness activities for children through project engagement with schools and teachers

Conceptual framework of adaptation indicators (Harley et al., 2008)

Outcome based indicators

- Coping strategies index score
- Disaster early warning system 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 buildings with insurance coverage for extreme weather events
- Percentage reduction of population living in flood plain

➤ Examples:

1. German Strategy for the Adaptation to Climate Change (DAS) (Umweltbundesamt, 2010; 2015)
2. Adaptation related indicators in UK (Sniffer, 2012)

Adaptation to Climate Change: Germany

German Strategy for the Adaptation to Climate Change (DAS)

- DAS comprises 13 Action Fields (Human health, Building sector, Water regime, water management, coastal and marine protection, Soil, Biological diversity, Agriculture, Woodland and forestry, Fishery, Energy industry (conversion, transport and supply), Financial services industry, Transport, transport infrastructure, Trade and industry, Tourism industry) and
- two Cross-sectional Issues (Spatial, regional and physical development planning, Civil protection).
- Indicators are developed for impacts and responses.

Adaptation to Climate Change: Germany

Action Field 'Water Regime, Water Management, Coastal and Marine Protection'			
WW-I-1	Changes in the amount of groundwater	WW-R-1	Frequency of forced circulation in reservoirs
WW-I-2	Changes in the climatic water balance	WW-R-2	Developments regarding the surfaced area (in ha), which is connected to a) mixed systems, b) separate systems
WW-I-3	Changes in the salinity of groundwater	WW-R-3	Developments regarding runoff from surfaced areas (in m ³ /a), divided into a) mixed water discharge, b) rainwater runoff from separate system ducts and from road drainage
WW-I-4	Changes in the monthly mean runoff (mMQ) values of selected levels of rivers	WW-R-4	Proportion of municipalities with joint and split rates in relation to the municipal scale of fees for wastewater removal (where applicable, subdivided according to the population densities of the municipalities concerned)
WW-I-5	Changes in the annual and monthly flood water runoff (HQmo) or changes in the annually highest flood water runoff (HQa)	WW-R-5	Investment into technical floodwater protection
WW-I-6	Changes in the low-water characteristics (NM1Q and NM7Q) (for NQ stations that are not or hardly affected)	WW-R-6	Developments regarding the * number of rain basins in separate systems and their storage capacities * number of rainwater discharge facilities and their storage capacities in mixed systems
WW-I-7	Number of days per annum indicating a level of <150 cm with regard to selected levels relevant to inland shipping	WW-R-7	Changes in water intensity (amount of water in m ³ per 1,000 EUR gross value added (prices prevailing at the time)) categorised per production sector
WW-I-8	Sea level rise		
WW-I-9	Changes in the frequency of storm tides		
WW-I-10	Water temperature of rivers		
WW-I-11	Water temperature of lakes		
WW-I-12	Changes in the duration of ice cover of lakes		
WW-I-13	Changes in the duration of ice cover of navigable rivers		
WW-I-14	Changes in the intensity of hydroturbation in winter (hydroturbation index)		
WW-I-15	Changes in time schedules with optimal vertical hydroturbation		
WW-I-16	Changes in sea ice		
WW-I-17	Temperature anomalies in the sea water		
WW-I-18	Changes in the carbonate balance of sea water		
WW-I-19	Changes in the salinity of sea water		
WW-I-20a	Drinking water temperatures in the supply network		
WW-I-20b	Raw water temperatures in the treatment of surface water		
WW-I-21	Proportion of bank filtrate in relation to the drinking water supply		
WW-I-22	AOX content in raw water of bank filtrates (from selected measuring points)		
WW-I-23	Frequency of heavy precipitation (separately for hydrological measurements in summer and winter)		
WW-I-24	Deployment of fire brigades in flooding events in residential areas		
WW-I-25	Increase in overflow events concerning mixed water (divided into summer and winter events)		
WW-I-26	Developments regarding the epi-/hypolimnion relationship in reservoirs compared to water abstraction		

Adaptation related indicators in UK (Sniffer, 2012)

Adaptation indicators for a range of sectors (Harvey et al. 2011)

- Critical infrastructures
- Water-Supply Demand
- Energy Demand Patterns
- Health and Well being
- Built Environment
- Natural Environment
- Business & Economy

Conclusion

- Indicators that can demonstrate that adaptation interventions have reduced vulnerability will play a key role in the evaluation of adaptation interventions.
- 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

Thank You

Contact

Dr. Shobhakar Dhakal
Associate Professor, Energy Field of Study, School of Environment, Resource and Development,
Asian Institute of Technology
Email: Shobhakar@ait.asia

Ashish Shrestha
Research Associate, School of Environment, Resource and Development, Asian Institute of Technology
M. Eng. Urban Water Engineering and Management (2013), AIT/UNESCO-IHE
Email: ashish@ait.asia

