



October 2013

RESPONDING TO CLIMATE CHANGE IN AFRICA



A guide for Action

CLimate change and Urban Vulnerability in Africa

CLUVA is a FP7 EU project which represents the integrated effort of seven European institutions and six African research establishments to improve the capacity of scientists, governmental authorities and the civil society to cope with climate related events in Africa.

Social vulnerability assessment in relation to disasters aims at understanding and conceptualising the condition of people when affected by a hazard. To do this, different approaches were developed to highlight how individuals and communities anticipate, resist and cope as well as recover from hazardous climatic events.

The **CLUVA cities** Addis Ababa, Dar es Salaam, Douala, Ouagadougou and Saint Louis are confronted not only with increasing weather related burdens but also with the pressure of a growing population and rapid socio-economic transformation which then demand more attention on the urban vulnerability dimension of African settlements.

The following guide offers snapshots of selected findings (deliverables) in CLUVA.



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CLIMATE CHANGE & SUB-SAHARAN AFRICA

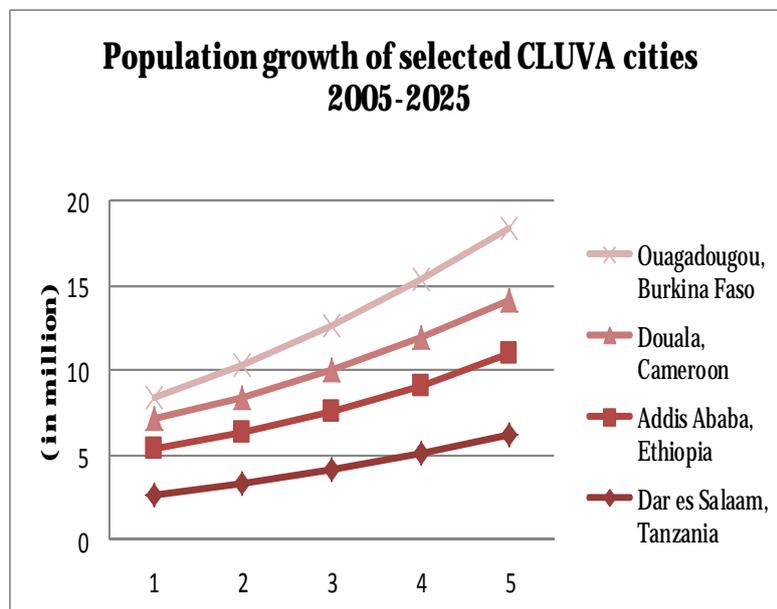


Urban growth and challenges in Sub-Saharan Africa

Despite many international and local initiatives on disaster risk management and advances in scientific knowledge, the social and economic impact of natural disasters in Sub-Saharan Africa is growing. Fragile economies and weak institutions, combined with the rapid growth of urban population are unable to absorb the shocks caused by natural disasters. Most of African countries are currently struggling to implement an effective risk reduction strategy. In many urban areas rates of economic growth and infrastructure development have lagged urbanization rates, resulting in high levels of unemployment, inadequate standards of housing and services, and impacts on human health.

Population growth of selected CLUVA cities 2005–2025 (in million)

City and country	2005	2010	2015	2020	2025
Dar es Salaam, Tanzania	2,680	3,349	4,153	5,103	6,202
Addis Ababa, Ethiopia	2,633	2,930	3,365	3,981	4,757
Douala, Cameroon	1,767	2,125	2,478	2,815	3,131
Ouagadougou, Burkina Faso	1,328	1,909	2,643	3,457	4,332



(Source: State of African Cities 2010, UN-Habitat)

Facing climate related changes

Climate change is likely to rapidly exacerbate the risk of extreme events particularly in fast urbanising coasts where about 38 per cent of Africa's population lives, that is to say 297 million people living in urban areas. By 2030, this is expected to grow to approximately 54 per cent of Africa's projected population of around 1405 million. Africa's rate of urbanization of 3.5 per cent per year is the highest in the world, resulting in more urban areas with large population, as well as in the expansion of existing urban areas.

Environmental disasters and conflicts have also caused many people to flee rural areas and to seek refuge in urban centres. Weather-related disasters are doing increasing damage to water supply already scarce in many places, and other critical infrastructure such as energy, transport, and telecommunications may become more vulnerable to climate change related risks. These add to African cities' significant sustainability challenges, including urban sprawl, population growth, pollution and the loss of biodiversity.





Flooding is one of the most common and damaging climate related event affecting African cities. This is not only related to heavy rainfalls but also to urban built-up patterns.



The vulnerability of African cities is considered to be influenced not only by changing biophysical conditions, but also by dynamic social, economic, political, institutional and technological structures and processes. Thus, planners, managers and researchers within African cities need reliable forecasts of the local impact of climate change and need to be better equipped to strengthen the coping capacities of urban communities. The subsequent extension of knowledge of the direct and indirect impacts of climate change and the spatial and temporal scales over which they are felt will ultimately benefit urban communities more widely, both within and beyond the developing world.



EFFECTS OF CLIMATE RELATED HAZARDS



Key definitions

Hazard: anything that can potentially generate adverse events and consequently create damage to the population and/or environment.

Intensity: the measure of entity with which a phenomenon can happen or cause damages.

Exposure: people, property, systems, or other elements present in hazard zones that are thereby subjected to potential losses.

Vulnerability: degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes (UCCRN, 2010).

Resilience: the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Risk: a combination of the consequences of an event (hazard) and the associated likelihood of its occurrence

(Source: CLUVA Deliverable 5.2, www.cluva.eu)

Most common types of climate related hazards

A) FLOODS :

Floods usually result from a combination of meteorological and hydrological extremes, such as extreme precipitation and flows. Descriptions and categorizations of floods vary and are based on a combination of sources and impacts. Based on such combinations, floods can be generally characterized into river (or fluvial) floods, pluvial (or overland) floods, coastal floods, groundwater floods or the failure of artificial water systems (GFDRR, 2012).

B) DROUGHTS:

Deficiency of precipitation from expected or “normal” that, when extended over a season or longer period of time, is insufficient to meet demands. Three main types of droughts can be considered: meteorological drought, and agricultural drought and hydrological drought.

C) DESERTIFICATION:

Desertification is land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities (*United Nations Convention to Combat Desertification – UNCCD*). It is a phenomenon that develops over long periods and it will be defined as a trend.

D) HEAT WAVES (HW):

Meteorological HW defined by summertime weather conditions substantially hotter and/or more humid than average for a location at that time of the year. Because how hot it feels (human body effects) depends on the interaction of multiple meteorological parameters (e.g. temperature, humidity, cloud cover), HW criteria typically shift by location and time of the year. Different definitions have been used to evaluate its impact on health.

E) SEA LEVEL RISE:

When the mean high tide level increases over years it may cause the inundation of wetlands and low lands. It may also increase the salinity of estuaries and aquifer, change the heights, frequencies and other main characteristics of waves, erode shorelines and exacerbate coastal flooding.



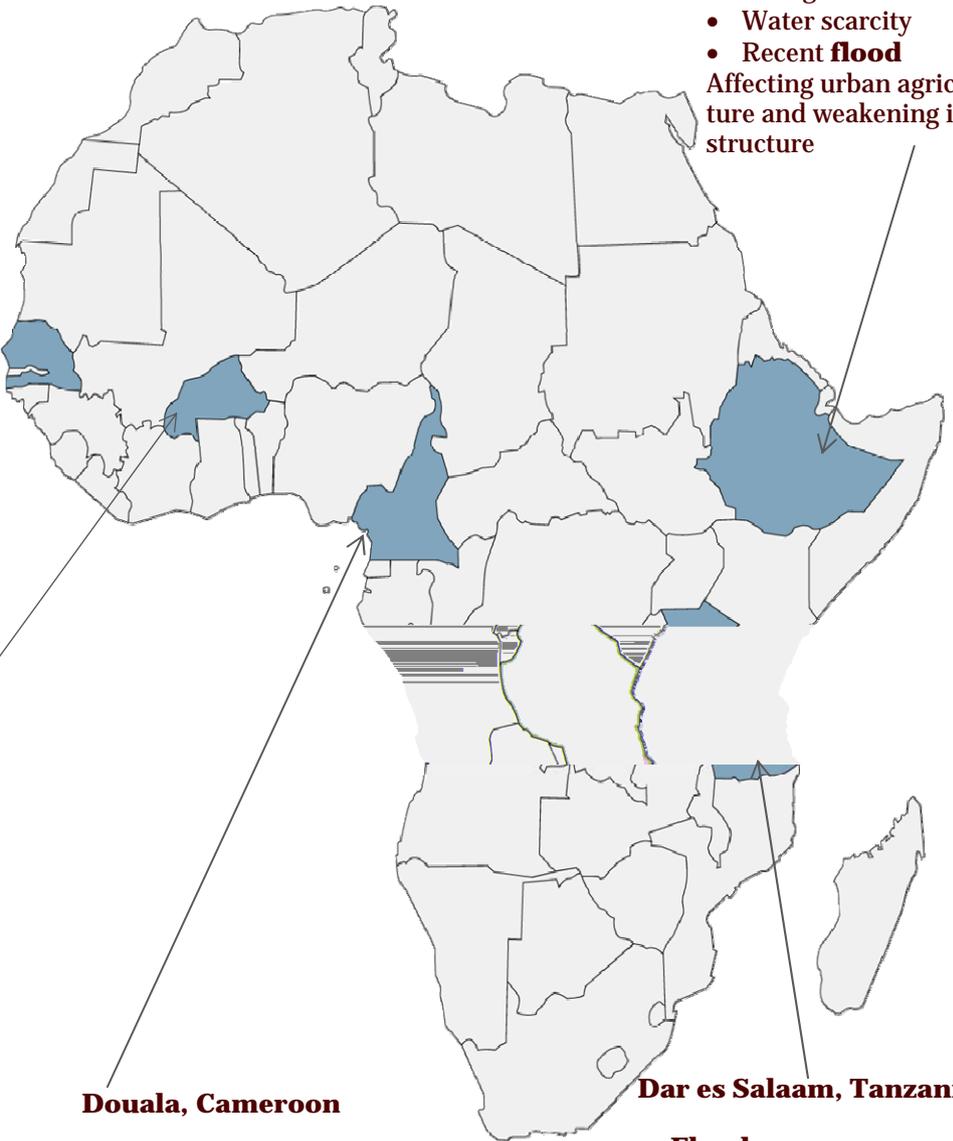
IMPACTS OF FLOODING IN AFRICAN CITIES



Impact of flood and other events on CLUVA cities

Addis Ababa, Ethiopia

- Drought
 - Water scarcity
 - Recent **flood**
- Affecting urban agriculture and weakening infrastructure



> **Health impacts**

(prevalence of water born related diseases)

> **Economic impacts**

(destruction or loss of properties, loss of fertile land/soil for agriculture, damages of household assets)

> **Social impacts**

(alteration urban livelihood, interruption of schools and infrastructure)

> **Impacts on infrastructure**

(destruction of roads, water supply lines, and bridges)

Saint Louis, Senegal

- Sea level rise
 - **Flood**
 - Coastal erosion
- Exerting pressure on available land, city development and also affecting coastal livelihood

Ouagadougou, Burkina Faso

- Drought
 - **Flood**
 - Intense rainfall
- Heat wave & Dust storm
Affecting production and livelihood sectors and enhancing chronic health issues

Douala, Cameroon

- Sea level rise
 - **Flood**
- Acting on livelihood, health and the transportation system

Dar es Salaam, Tanzania

- **Flood**
 - Sea level rise
 - Coastal erosion
- Disturbing local businesses and causing land management stress



SOCIAL VULNERABILITY OF LOCAL COMMUNITIES



Understanding social vulnerability

The term 'social vulnerability' describes how susceptible people are to a hazard. It highlights both the social and temporal dimensions of a disaster and focuses on the question of how individuals and social groups anticipate, resist and cope with, as well as recover from, a disaster.

(Source: CLUVA Deliverable 2.11, www.cluva.eu)

Dimensions of vulnerability:

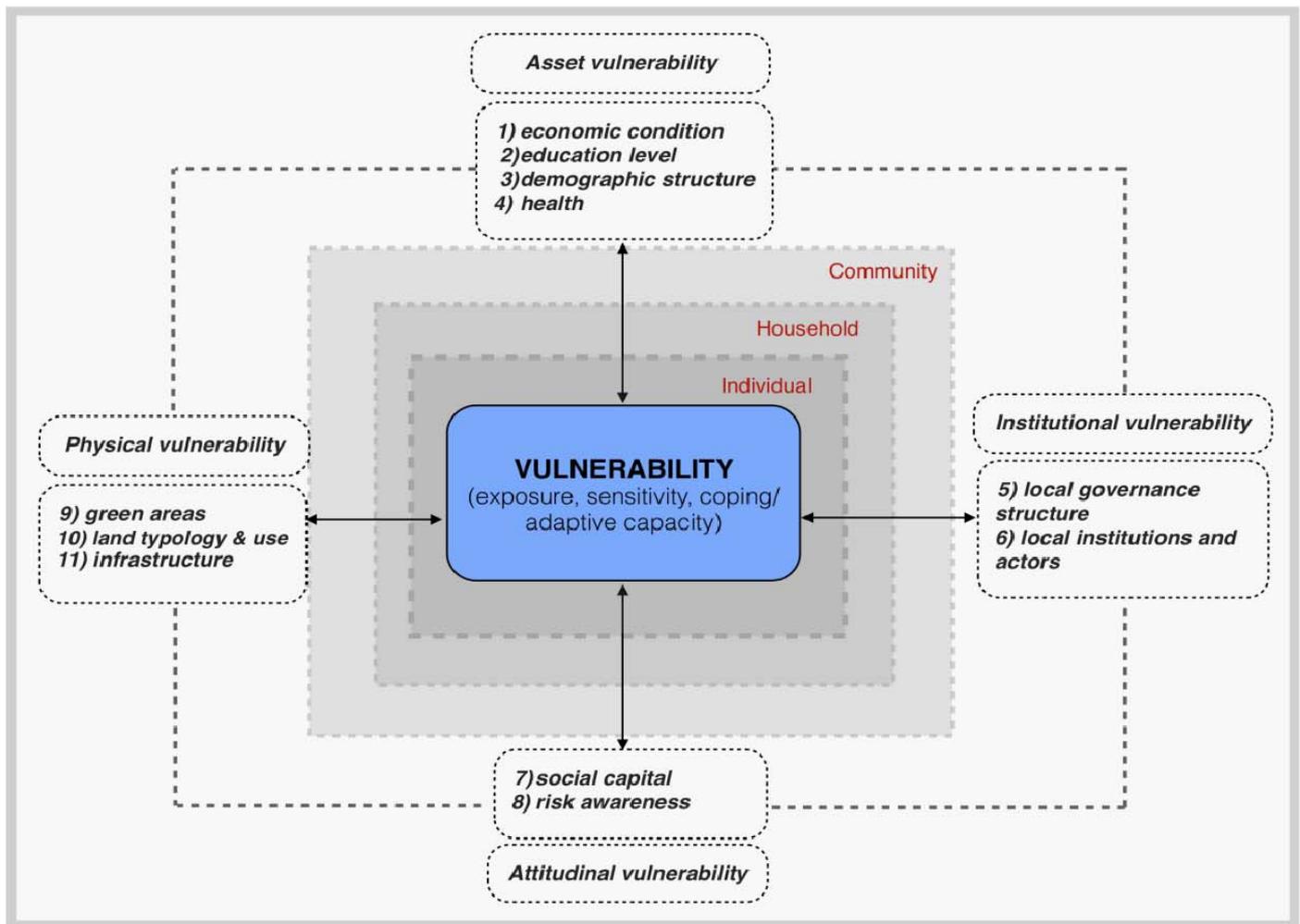
Asset vulnerability: encompasses the human livelihood and material resources including health and education, also considered as elements of well-being. In other words, the term embodies the human, economic and social resources that individuals possess given them advantages or disadvantages in a changing environment.

Institutional vulnerability: refers to the state of local authorities and civil action groups that operate to respond to extreme weather events. Institutions (formal and informal) mould interaction in society and as such they play an important factor in increasing and/or decreasing the vulnerability of households, communities and entire urban areas.

Attitudinal vulnerability: conveys the perception and risk management attitude of those at risk and for which social capital and networks play an important role. In addition the everyday processes by which settlers perceived risk is crucial to effectively cope and recover from climatic events

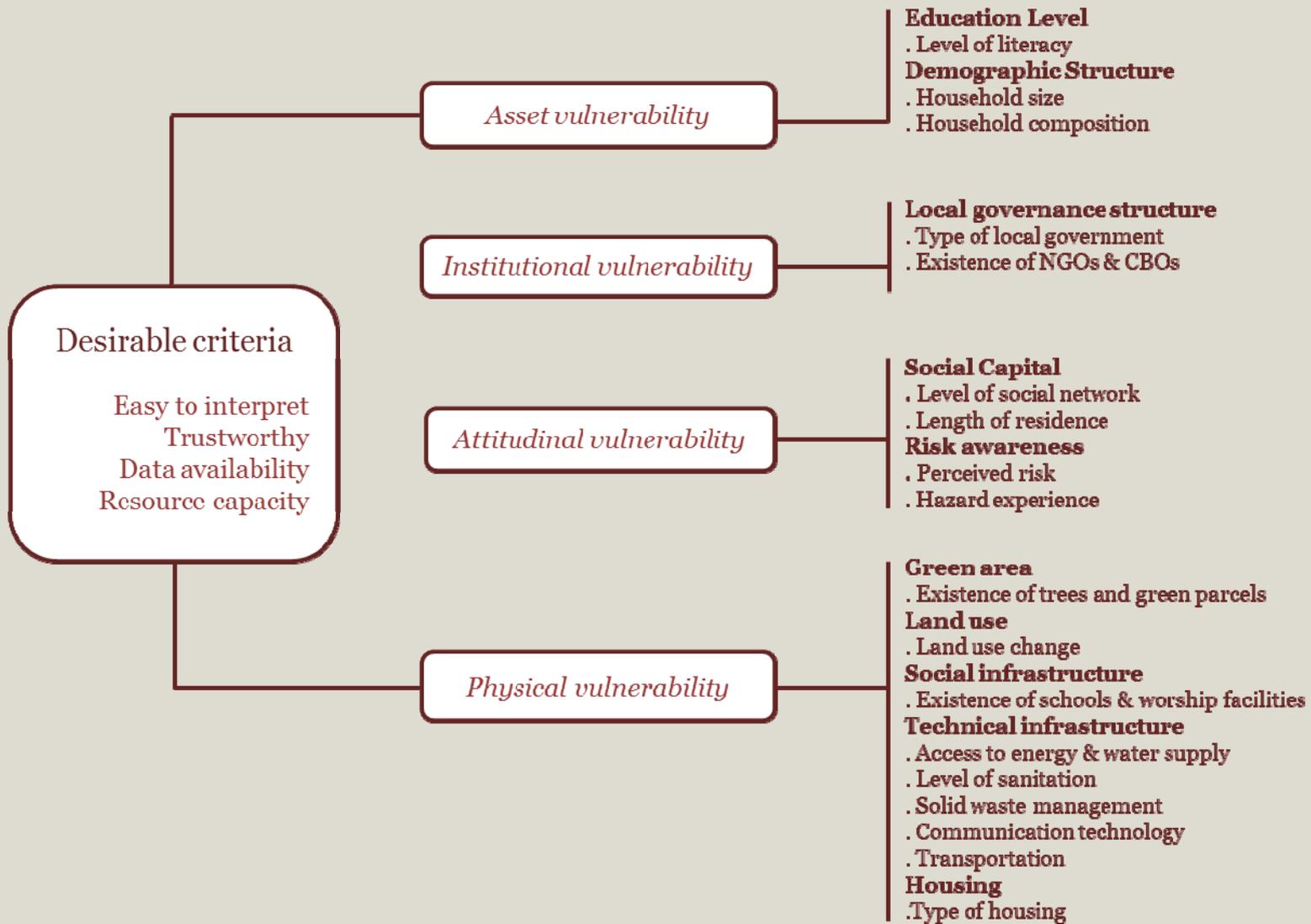
Physical vulnerability: is determined by the characteristics of the built environment and land cover may it be natural and/or man-made, it implies considering the urban ecosystem, existing green areas, the use of land as well as the conditions of buildings and the infrastructure.

Vulnerability dimensions and key themes in CLUVA cities



(Source: CLUVA Deliverable 2.11, www.cluva.eu)

Selected vulnerability indicators





RISK AWARENESS, PERCEPTION AND ATTITUDES



Risk awareness, perception and attitudes

Risk awareness: is the everyday processes by which humans perceive risk without referring to statistical data and exact calculation models. Risk awareness is hence the more or less intuitive awareness of risks based on the evaluation of its likelihood as well as its adverse consequences.

Perception and attitudes: The perception of risk is more concerned with behavioral attributes. It involves actors' own perception and their outlook on their capacities.

(Source: CLUVA Deliverable 2.11, www.cluva.eu)

“We can't say that people are not conscious of the risk. Some of them say: We can't afford to go somewhere else. We realize that we are put at risk but how to do something else? With which support ?”

Mrs. Badini- Kinda – Sociologist, University of Ouagadougou

“... I had few assets but they were all destroyed. I did not take any measures before, I had no option, this is not my house and my income can only let me stay here. I look forward into moving to somewhere else when my economic situation improves ...”

Mr. Joshua George – Tenant in Magomeni Suna, Dar el Salaam

“The people are sensible to the problem of flood (...), they know that their situation is precarious. They come to the city council to express themselves, (...) but in the absence of anything better, they are staying there.”

Mrs. Da – Civil servant, Social affairs, Ouagadougou City Council

“... We did not take any measure because of contempt. We heard the warning information but we said, this is a journalist agenda, they want to sell news ...”

Household in Magomeni Suna, Dar es Salaam

(Source: Field-work in Ouagadougou by Fatoumata Badini Kinda, Tanga Pierre Zoungrana, Nathalie Jean-Baptiste, Saidou Bani Samary & Household interview in Dar es Salaam by Regina John)



LOCAL ADAPTATION TO CLIMATE CHANGE



Multi-level adaptation to climate change

CITY

DISTRICT

NEIGHBOURHOOD

Effective city governance

- Key institutions in the adaptation agenda need to be identified.
- Appropriate nexus of national and city governance for local climate change impact assessments, identification of adaptation options as well as their implementation.
- City adaptation planning approaches combined with sectorial, municipal and local plans for exposed areas.

Integration of different sectors

- **Urban infrastructures:** coping with present climatic conditions.
- **Green areas development:** providing a number of essential ecosystem services (increasing biodiversity, recreational activities, reducing air pollution and preventing urban flooding)
- **Resettlement of affected people:** dealing with increased population displacement due to mitigation and adaptation projects (de Sherbinin et al., 2012).

Inclusion of individual Projects

- **Local coping strategies:** Communities are already involved in activities that enhance the resilience of individuals and households. They are taking measures to protect themselves using autonomous or bottom-up measures.



STAKEHOLDER PARTICIPATION AND ACTORS INVOLVEMENT



Multiplicity of actors and stakeholders

Urban development that incorporates adaptation to climate change entails addressing already existing deficits in urban services provision such as water, solid waste disposal, healthcare, drainage and transport in a way that tackles vulnerability to climate change as well. As such adapting to climate change cannot be treated as a “stand alone” task to be the responsibility of one stakeholder; rather it requires a concerted effort from all sectors of government, business and households (UN-Habitat, 2011).

Participatory tools

- Transect walks*
- Focus group discussion
(KETSU Tool)*
- Interviews with key individuals*

- Allow the integration of local stocks of knowledge, experiences and perceptions into the assessment
 - Actors can identify and assess their own vulnerabilities and capacities
 - Make different or conflicting views and opinions apparent

Advantages	Disadvantages
Facilitating communication and exchange of information	Many stakeholders with different opinions and perceptions are difficult to handle
Invoking local knowledge otherwise Unattainable	Large potential for conflicts
Invoking private resources in problem solving	Local perceptions may be contradictory
Creating engagement and ownership	Failed processes create disillusionment, apathy or protest
Raising awareness	Time intensive
Empowerment of involved parties (awareness, confidence, skills, cooperation)	(Partly) giving up control of the plan
Increasing the quality of decisions and long-term sustainability through ownership	

Pictures index



Flood prone area in Ouagadougou



Household protection measure in Addis Ababa



Flood prone area in Douala



Urban agriculture in Addis Ababa



Water scarcity in Addis Ababa



Landscape in the dry season in Ouagadougou



Flood event in Dar es Salaam



Fishermen and community meeting in Dar es Salaam



Sodden road in Ouagadougou



Flooded land in Ouagadougou



Transportation in flood prone area in Douala



Focus group with women farmers in Addis Ababa



Proximity to water channel in Ouagadougou



Houses with flooded courtyard in Douala



Flood rescue in Dar es Salaam



Interview with traditional chiefs in Ouagadougou



Flood prone area in Douala



Destruction of houses in Dar es Salaam



Protection of home and assets during flood in Dar es Salaam



Evacuation during flood in Dar es Salaam



Effects of floods in Ouagadougou



Elevation of pit latrine against flood in Dar es Salaam



Impact of flood, Dar es Salaam



Flood event in Dar es Salaam



Loss of property in Ouagadougou



Project Information:

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