CSRS
Centre Suisse de Recherches Scientifiques en Côte d'Ivoire

INNOVATIVE STRATEGIES FOR CLIMATE MITIGATION AND ADAPTATION IN URBAN AREAS IN AFRICA


1

CHALLENGES

Climate change is impacting the world at large through both fast and slow onset events. Extreme events such as sea-level rise, floods, and urban heat-stress are impacting urban areas severely (Khan, 2012; The Planning and Climate Change Coalition, 2012; Cobbinah et al., 2017, 2019). The effect of climate change in metropolitan areas covers environmental, social, economic and spatial impacts. The following challenges exacerbate these impacts:

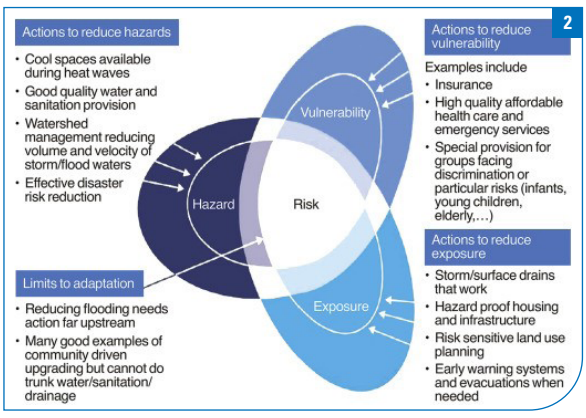
- Rapid Urbansiation to meet the needs of the growing African population. This urbanization trend is expected to continue in the coming decades. Although Africa is presently the least urbanized continent, estimates show that its urban dwellers are expected to double by 2030 (UN-Habitat, 2008). Urbanization affects the natural functions of the ecosystem.
- Informal development and Infrastructure deficit: In Sub-Saharan Africa, around 55.9% of urban dwellers live in areas regarded as slums and informal settlements - the highest proportion globally. High density, poor sanitation conditions, lack of basic infrastructure and combination of other socio-economic and environmental factors found in these areas increase their vulnerability to climate impacts.
- Data scarcity for integerated planning and response to climate change. Information from Household surveys is often lacking or inadequate in many Africa cities. Censuses involve figures that are often disputed and lacking in relevant nuance and detail to cater for socio-spatial heterogenuity in cities.
- Weak local and national governments, and poltical crisises, preclude appropriate governance for urban climate challenges.

FACTS AND FIGURES

- With its 20 million people, Lagos, Nigeria is exposed to frequent and intense rainfall, storm surges, coastal flooding and predicted 1.5 m sea level rise (SLR). This poses serious risks to infrastructure, housing, lives and livelihoods of over 5 million people in coastal communities.
- Cities are becoming warmer. Dar es Salaam's Mean annual temperatures have increased by 1°C since the 1960s, leading to more hot days and hot nights. In Lagos, mean annual temperature rise of 0.04°C until 2046 is predicted, leading to an increase in the number of days of extreme heat.
- Changing land use patterns have involved reduction in vegetation cover and increase in built up areas (See figure). More covered and built up areas reduce natural drainage (Increasing impermeability), which during heavy rains can lead to more severe urban floods. In Côte d'Ivoire flooding has caused displacement of 16% of impacted population and created the dislocation of family units.
- Prevalence of built-up areas and lack of green space leads to higher urban temperatures (the urban heat island effect). Heat Stress impacts health, labour productivity and leisure activities in cities.

SOLUTION

- Nature-based solutions such as Mangrove Restoration in coastal communtiies
- Vertical Greening Systems in dense neighbourhoods
- Green infrastructure such as wetland rehabitation, green roof, living walls. These do not only lead to increased resilience of the urban area, but have numerous co-benefits, such as improved air quality, better health, improved biodiversity and enhanced overall quality of life for citizens.
- Strategies to tackle floods include flood risk transfer through insurance; implementation of structural flood control measures; enforcing law and regulation related to natural disaster, and the establishment of risk perception and warning systems (IPCC, 2014; Nikolaou et al., 2014).
- Green building development: greening the existing housing stock including within slums and informal settlements.



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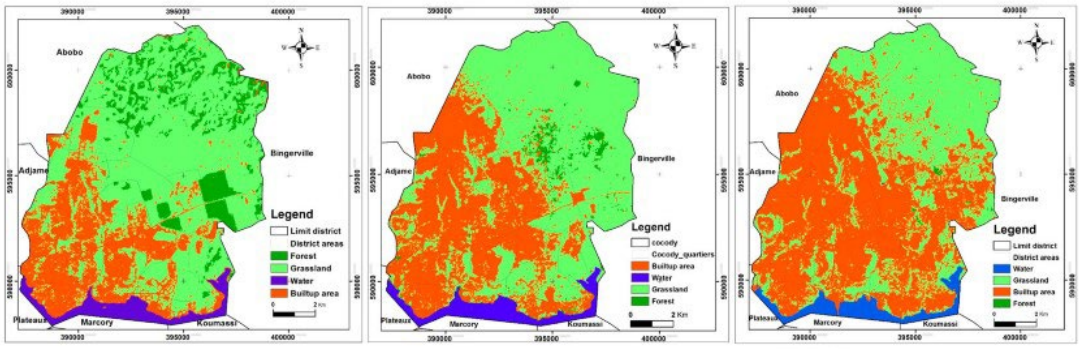

a. Year 1989 b. Year 2000 c. Year 2014

Land use/cover of the district of Cocody for the years 1989, 2000 and 2014.

- ICT-enabled data generation: Hydrodynamic modelling as well as community action-planning to map flood vulnerability level. Remote sensing and drone technology can support monitoring of urban landscapes. In Congo, with support of the World Bank data-based technologies through drones and GIS were deployed for 'highly detailed' neighborhood risks, geo-locating potential outbreaks and conveying critical information to at-risk populations.

4

HOW CAN THE CLIMAPAFRICA PROGRAM CONTRIBUTE TO ADRESS THE CHALLENGE?

ClimapAfrica creates a forum for exchange of ideas across disciplines/research areas, cultures, and nationalities, which will expand opportunities for scientists, increase global scientific capacity, and contribute to improving the state of the world. The Working Group on 'Climate Change and Land Use' contributes through:

- Collaboration within the working group to facilitate inter-disciplinary approach and understanding for research activities and to develop climate change research capacity in Africa and for Africa;
- Increasing the professional network and spread of connections for research activities;
- Promoting capacity building for members and interested stakeholders through Working Group activities;
- Providing a platform for co-production of knowledge by collaboration of African researchers and non-academic stakeholders.

The thematic working groups are composed of postdoctoral fellows and African alumni of German funding initiatives with expertise in the field of climate research. **LINK to climapAfrica working group: Climate change and Land use**

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LINK to profiles of all climapAfrica postdocs fellows of this working group

LINK to profiles of all climapAfrica alumni experts of this working group

PHOTOS AND GRAPHICS

1 Damage to waterfront houses through sea level rise and sea Incursion. Source: Olumuyiwa Adegun, 2019 | 2 Addressing Hazards, Risks, and Vulnerable Populations in Informal Settlements. Source: Satterthwaite et al (2020) | 3 Land use change in a commune of Abidjan. Source: (Kablan et al., 2018) | 4 People Blocked by flooding in Abidjan. Source: Kablan, 2020