

Improving adaptation to climate change in sub-Saharan cities

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ACADEMIC



CULTURAL



ENVIRONMENTAL



HEALTH



POLITICAL



SOCIAL

SUMMARY

Cities and towns in sub-Saharan Africa are highly vulnerable to the impacts of climate change. This is due to a combination of rapid urbanisation, socio-economic inequality, and the extent that people's livelihoods depend on natural resources.

In light of this, Dr Ricci launched a research collaboration between African and European Universities, as well as local authorities and communities, to look at urban development, resilient infrastructure, and adaptation to climate change in the region. The collaboration improved the ability of local authorities to integrate climate change into urban development and environmental plans and programmes.

As a result, many policies in the region have been amended to include measures designed collectively by researchers, public officials, and the local community. Many residents stand to benefit from these measures, which will reduce the impact of climate change on their lives.

RESEARCH DESCRIPTION

In sub-Saharan cities, the legacy of colonial regulations has brought about a range of complex social issues - like spatial and social segregation, and unequal access to natural resources and infrastructure. This heavily affects the capacity of cities to cope with extreme weather events and environmental changes. The situation is made worse by rapid urbanisation and climate change.

Negative impacts, in cities like Dar es Salaam, have been seen during the flooding events that occurred in 2011, 2014 and 2018. These events affected water resources, land, vegetation, biodiversity, ecosystems like mangrove forests, and people's livelihoods.

Since 2009, Dr Ricci, together with researchers and students from ARDHI University, has conducted and coordinated several field investigations and stakeholder consultations. Building on the results of *Adapting to Climate Change in Coastal Dar es Salaam* (a project co-funded by the EU and implemented between 2010 and 2015 by Sapienza University in Rome and ARDHI University in Tanzania), Dr Ricci developed and tested a new way of integrating climate change adaptation into plans and programmes.



Urban development in Dar es Salaam.

At the same time, Dr Ricci investigated the relationship between urban infrastructure and vulnerability to environmental change: in 2016 she began a research project to understand how the introduction of a water distribution system changes the way people access and manage water in unplanned settlements. The aim was to identify the factors that help increase access to water (and flexibility of access), as they are crucial to climate change adaptation.

Her pilot study involved local authorities, water authorities, development agencies, researchers, and residents in two neighbourhoods in Dar es Salaam. It found that flexibility in access to water depends on how the new infrastructure changes the relationships between local authorities, NGOs, community groups, local representatives, and utility companies.

RESEARCH IMPACT

Political

The collaboration helped improve awareness and understanding of adaptation to climate change by communities, official agencies, and research institutions, while increasing capacity to tackle the roots of vulnerability. It contributed to integrating scientific and community knowledge on climate change and vulnerability into urban planning policies, such as the *Temeke Medium Term Expenditure Framework*, the *Temeke Municipal Council's Strategic Plan*, the *Strategic Water Supply Plan for Dar es Salaam*, and the *Dar es Salaam Master Plan*.

Since 2014, these plans have been amended to include adaptation measures designed collectively by researchers, public officials, and the local community. The implementation of the measures will help mitigate or avoid the negative impacts of climate change in Dar es Salaam, where the population is currently about 6 million. Most of the implementation is occurring in Temeke municipality, where the majority of the city's population growth is expected in the future, and where more than 1 million people already live.

Economic

The adaptation measures that have been put in place contribute to avoiding or reducing the costs of impacts related to climate change. These include damage to buildings, infrastructure, and other property; loss in agriculture production; and harm to the coastal ecosystem environment (such as the delicate equilibrium between mangroves and ground and surface water flow in Temeke). In addition, integrating climate change measures into existing plans and programmes helps to save resources for developing new plans for climate change adaptation.

Environmental

The measures also help protect the natural environment. For example, providing alternative economic activities to charcoal-making, they mitigate deforestation and protect mangroves and the coastal ecosystems, improving the water cycle.

Because of the results of borehole monitoring and participatory activities conducted during the research collaboration, regular surveys are conducted in Temeke municipality to oversee and limit borehole drilling in sensitive coastal areas, preventing saltwater intrusion and soil depletion.

Health

Improving the water cycle helps increase the quality and quantity of fresh water, thereby reducing water-related disease; it also improves soil quality as well as the quality of agricultural products, with a positive impact on health and nutrition. In addition, preserving mangrove forests mitigates the negative effects of coastal and tidal flooding events on people's health and wellbeing.

Over the coming decades, the health impacts of climate change will likely be vast, causing millions of excess deaths. Policies that help communities adapt to the effects of climate change - like the policies amended through this project - will help reduce these negative health consequences.

The effects of mangroves deforestation in Pemba Mnasi, Temeke.



Cultural

Multiple stakeholders have been engaged in this work (exploring vulnerability situations and solutions to reduce or avoid them). For example, 24 members of the local community were involved in scenario workshops to develop a climate-related theatre performance to be shown in different locations in Dar es Salaam. 11 performances reached a group of more than 2000 people.

And about 40 officers from urban development and environment management units of local authorities were involved in training activities and in designing adaptation measures to address climate-related challenges, like saltwater intrusion.

From an interview conducted with the Agricultural Officer of Temeke municipality in September 2019, it emerged that they not only continue to develop and implement adaptation measures, but they regularly work with community groups to develop activities to preserve mangroves, protect riverbanks and ocean shoreline, minimise borehole drilling, and raise awareness of appropriate environmental management.

Academic

The research collaboration produced data and methodologies to design climate change adaptation measures which are likely to be accepted and supported by the local community, considering their livelihoods, everyday practices, and existing strategies to cope with environmental changes. These methods could be used to integrate adaptation measures into policies and plans in other parts of the world.

The results of the research collaboration were also used to develop other projects, such as the *Building Climate Resilience in Tanzania Water Sector* project, between 2014 and 2016. Among other things, this project helped empower community leaders to identify and prioritise action plans against flooding.

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An unplanned settlement in Keko Mwanga, Temeke, where access to water is crucial for climate change adaptation.

