Climate Adaptation of Cities in Southern Africa

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The world is already experiencing the unprecedented impacts of climate change, which predominantly affects developing nations in the Global South. These nations are highly exposed to catastrophic climate events like droughts, floods, storms, and cyclones because of their high levels of vulnerability, poor capacity for adaptation, and pervasive poverty.[1] Large-scale climate change impacts have been felt in Southern Africa. People in this region are particularly vulnerable to the effects of climate change because of its geographical location with low levels of human development, weak institutions, high levels of inequality, high reliance on agriculture, inadequate technology, and improper resource management.[2]

Impact of the Cyclones on Communities in Mozambique, Malawi and Zimbabwe

In recent years, countries in the southern part of Africa have felt the brunt of the changing climate, especially with the havoc wreaked by cyclones. The climate in the Southern Africa region is quite erratic, with regular floods, droughts, cyclones, and other natural disasters. Particularly in Mozambique, Malawi, and Zimbabwe, the frequency and severity of floods have increased.[3] Cyclones are the largest natural disaster to hit southern Africa in at least 20 years and have had a significant impact on millions of people in Malawi, Mozambique, and Zimbabwe.[4]

Cyclone Idai made landfall as a Category 2 storm close to Beira city, Mozambique on 4 March 2019. Its torrential rains and violent winds caused flash flooding, hundreds of fatalities, and extensive crop and property damage. Nearly 2.2 million people in Mozambique, Zimbabwe, and Malawi were impacted by the cyclone's catastrophic flooding which damaged an unprecedented amount of property.[5]

It hit the central region of Mozambique, leaving an estimated 3,000 km2 of land submerged and damaging more than 240,000 houses. Following Cyclone Idai's landfall, more than 715,000 hectares of crops were destroyed and caused the loss of livelihoods, including fishing.[6] The cyclone made landfall during the critical harvest period, effectively wiping out the food of thousands of families, prolonging an already difficult lean season, and leaving many without the prospect of another full harvest until the following year. Cyclone Idai caused significant displacement and protection concerns. Many children, the elderly, and people with disabilities were unable to flee to safety and more than half of the affected people were children.

The cyclone severely impacted livelihoods in Zimbabwe's Eastern Highlands.[7] In the districts of Chimanimani, Chipinge, Nyanga, and Mutare, it resulted in riverine and flash flooding, fatalities, and overall destruction.[8] A total of 51,000 people were rendered homeless, 340 people died, and a large number of people went missing in Zimbabwe as a result of the cyclone

and the ensuing flooding and landslides.[9] There were severe effects on infrastructure, agriculture, and schools.

Fifteen districts in Malawi were affected by major flooding brought on by Cyclone Idai's heavy rainfall, which prompted the government of Malawi to declare a disaster.[10] The situation was made worse by the increased winds and flooding, which caused damage in both rural and urban areas, collapsed buildings, washed away bridges, blocked highways, and destroyed houses and property.[11]

Homes and infrastructure were damaged, as well as agricultural lands and livestock. Sanitation facilities also sustained considerable damage, increasing the danger of waterborne diseases.[12] Countless people were displaced and sought shelter in schools and temporary structures, increasing the risk of spreading diseases and posing problems for the privacy and protection of women and girls. The Department of Disaster Management Affairs reported that as of March 22, more than 850,000 people – including 59 fatalities, 677 injuries, and about 87,000 displaced individuals – had been affected in Malawi alone.[13]

Just as these countries were trying to pick up the slack and rebuild, cyclone Ana hit in January 2022. Over the entire northern region of Mozambique, there were fatalities, extensive damage, and overflowing rivers caused by heavy rain and high winds. Considerable public infrastructures was damaged, including residences and healthcare institutions. Basic services and healthcare for the impacted population were disrupted.[14] The cyclone flooded a total of 70,982 hectares of land, affected about 180,869 individuals, injured 207 people, and killed at least 38 people in Mozambique.[15]

Malawi also experienced significantly increased flooding in several districts throughout the country, particularly in the Southern Region, due to Cyclone Ana's extensive heavy rainfall and powerful wind. This resulted in significant damage, including blown-off house roofs, livestock losses, collapsed houses, damaged road systems, destroyed household items, severely damaged teaching and learning materials, crops washed away, crop logging from the strong winds, contamination of water sources, and damage to the power plant that resulted in interruptions to the power supply. Some areas were designated disaster zones, and the entire nation experienced a power outage. The majority of Malawi's public and private infrastructure was destroyed including homes, schools, hospitals, and churches. A total of 49,214 individuals were displaced as a result of this disaster, including women, children, and persons with disabilities.[16]

Ana resulted in damage and destruction in at least six provinces in Zimbabwe, with Manicaland province being the most affected. Schools, bridges, and highways were damaged in 12 different districts across the five provinces of Mashonaland West, East, and Central, Masvingo, and Manicaland, affecting more than 3,000 people. The cyclone damaged Zimbabwe's public infrastructure to varying degrees (classrooms, roads, electricity lines, and bridges). 271 households that had been displaced in 11 of the 12 districts experienced losses in housing, Water, Sanitation and Hygiene (WASH), livelihoods, and food security (crops),[17] as well as

additional indirect effects such as trauma, an increase in protection risks, and injuries. Several communities along Zimbabwe's northern and north-eastern border were battered by moderate to severe rains with daily maximums of 80mm and high gusts reaching speeds of up to 80km/h. Ana left a path of extremely devastation in most provinces.[18]

Plans on Climate Change Impact Management

Increased climate change-induced hazards will worsen national vulnerability. For developing nations like these, preparing cities for climatic threats is a top priority. The dire need for effective adaptation strategies was demonstrated by the cyclones.[19] The need to adapt infrastructure to climate change impacts is clear, both in terms of the role that infrastructure plays in protecting people and their assets from the direct and indirect impacts of climate change, as well as the significance of infrastructure for all economic activities.[20]

The National Institute for Disaster Management (INGC), under the direction of the government of Mozambique, has adopted an integrated coastal planning approach that is in line with strategic principles and best practice guidelines in terms of coastal management and responding to climate change. This approach aims to plan for and start prevention through the implementation of adaptation measures at the national level, based on science and in support of sustainable development.[21]

They have set out to:

- Plan any coastal development so that it is safely away from the high-water mark, and re-establish natural defences with the required environmental permits.
- Develop and implement Coastal Management Programmes that include Shoreline Management Plans to carry out comprehensive planning and implementation.
- Establish a coastal development setback line that will shield beachfront developments from storm damage and exacerbated coastal erosion while also safeguarding the natural environment from intrusion from buildings.
- Work in harmony with nature by preserving the integrity of buffer dune systems, which should be maintained and properly vegetated with the proper dune species in accordance with the original natural zones.
- Keep the sand reservoir (volume) in the dune system at the same level, or increase it.
- Protect, restore and maintain natural systems like mangroves and coral reefs.

The government of Malawi came up with the National Adaptation Plan (NAP) to reduce its susceptibility to the effects of climate change. This is to increase resilience and adaptive capacity while facilitating the cogent integration of climate change adaptation into pertinent new and existing policies, programmes, and national development activities.[22] The NAP will be advanced through several activities, including developing tools and capacity for coordination and execution of the NAP process, engaging stakeholders and developing their capacity, creating and strengthening Expert Working Groups, conducting assessments of climate change risk and vulnerability, and, most importantly, integrating NAP adaptation priorities into ministry spending plans.

The Malawian government recognized the necessity of developing well-researched plans for activities to serve as the foundation and basis for implementing comprehensive and coordinated actions that are aimed at halting climate change and its hazards, leading to the creation of the National Climate Change Investment Plan (NCCIP).[23] To ensure that Malawi's economy and society develop to their full potential within a well-protected and sustainable environment, safeguarded from major climate change effects, and with responsibility for present and future generations, the NCCIP will ensure that the key priority areas of the actions to address climate change and its effects are timely and sufficiently resourced.

According to projections, Zimbabwe's climate will likely get more extreme and become less predictable.[24] Future climatic circumstances would therefore render obsolete the local practices, systems, and infrastructure that are already in place and that have been somewhat adapted. To adapt to upcoming climate changes, new adaptation strategies are needed. Zimbabwe's Nationally Determined Contribution (NDC) outlines the plans for adapting to climate change. The NDC's adaptation plans include building resilience in managing disaster risks related to climate change by developing and maintaining an integrated approach in all sectors of the economy to reduce the impacts of climate extreme events, promoting climate indexed insurance solutions and market frameworks, and strengthening early warning systems on climate-related risks.[25] The NDC also outlines cross sectional adaptation efforts such as:

- Supporting capacity building through promoting research, development, informational outreach, and training on climate change-related topics.
- Integrating gender-responsive climate policy and emphasising particular initiatives to support vulnerable groups (women, youth, and children) in climate change adaptation efforts across all economic sectors.
- Supporting sustainable agroforestry practices and non-timber forest products to improve forest-based adaptation.
- Implementing management techniques for hydropower plants that increase their capacity to generate electricity in conditions where there is less water available owing to a lack of rainfall.
- Increasing reservoirs' water-holding capacity to prepare for increased abstraction and evaporation.
- Strengthening community capacities and support for diversifying livelihoods and moving away from agriculture into other sectors.

Recommendations on Adaptations by Regional/International Institutions

Public authorities, both at the national and international levels, are primarily responsible for adapting to climate change.[26] The development and deployment of research technology, collective action, public investment in critical areas like adequate infrastructure and early warning systems, information and advice for risk groups, and adjustments to public decision-making processes are all necessary for anticipatory measures to control risk and dangers.

The South African Institute of International Affairs (SAIIA) suggests that coastal cities in

Southern Africa embrace Ecosystem-based Adaptation (EbA) as it allows for climate adaptation and disaster risk reduction while also offering services that can enhance people's quality of life.[27] SAIIA recommends effective:

- EbA governance and management in local governments, which requires suitable regulatory and legislative frameworks, should be supported by long-term planning, sufficient resources, enabling tools, procedures, and systems.
- Coordination and collaboration, which requires institutional agreements and partnerships, both across institutions and within departments. This will make it possible to strategically utilise the limited resources that are available across different institutions.

According to the World Bank[28], adaptation to climate change in infrastructure planning and design will require a shift in perspective away from ingrained behaviour and practices, with the aim of better integrating the knowledge of the relevant professions, such as climate scientists and design engineers. The following areas should be taken into account:

- Provide technical guidelines for incorporating climate change into infrastructure planning and design in climate-sensitive sectors: The development of voluntary technical guidelines on how to incorporate the concepts of climate resilience into practical infrastructure planning and design could be accomplished by a multi-stakeholder technical working group.
- Create an open data knowledge repository for the development of climate-resilient infrastructure: There is a need to establish common data sources (on climate scenarios, hydrology, standard construction costs, etc.), which could be made public on open-data platforms hosted by African institutions (like UNECA's African Climate Policy Centre) in order to reduce the cost of the analysis required to incorporate climate considerations into infrastructure development.
- Organise training courses for experts in climate-resilient infrastructure: One or more training programmes could be organized for professionals involved in the planning, design, and operation of climate-sensitive infrastructure to ensure adequate strengthening of the technical skills needed to improve the climate resilience of infrastructure.
- Establish a facility for planning climate resilience projects in Africa: The facility, which would be sufficiently supported with grants or subsidized resources, could have various windows to meet the unique demands of various sectors or for various phases of the infrastructure development cycle. For instance, the facility could help the development of master plans for climate-resilient infrastructure or the incorporation of climate resilience into specific projects.
- A climate-resilient infrastructure development observatory should be established in Africa: An observatory on the development of climate-resilient infrastructure could be set up to make sure that the work being done at the technical level (methodology, data, and project preparation) and in training maintains visibility and connections with the policy level of decision-making.

Notes

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